INFORMATION ONLY

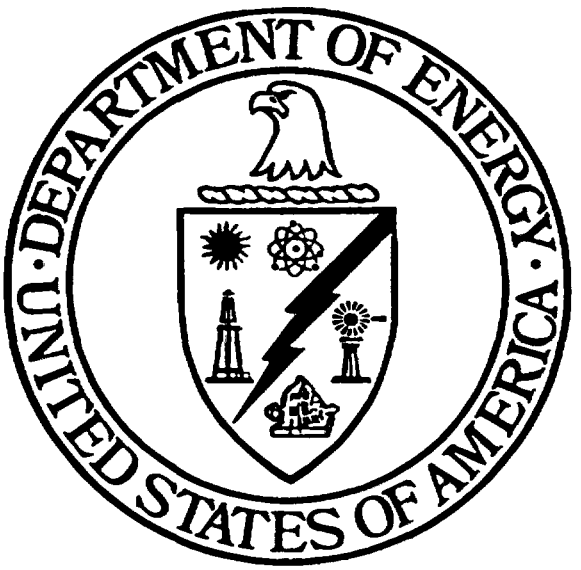
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United States Department of Energy

National Spent Nuclear Fuel Program

Volume II

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 C

Source Term Estimates for the Year 2010

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Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1970
Estimates as of: 2010
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]Template Burnup(MWd): 5011.2
Template BOL Heavy Metal Mass (MT): 0.0329181
Template Decay Time: 35 years

Estimated Canister usage: HIC = 3.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-12	3.59	7.19	0.00E+00	2.22E-11	4.44E-11	Avg. MeV	
Am-241	1.1066E-01	3.59	7.19	1.50E-01	5.48E-01	9.46E-01	0.0150	3.215E+11
Am-242m	1.9247E-03	3.59	7.19	0.00E+00	6.92E-03	1.38E-02	0.0250	4.681E+10
Am-243	1.0740E-04	3.59	7.19	9.57E+00	9.57E+00	9.57E+00	0.0375	7.733E+10
C-14	2.6042E-05	3.59	7.19	0.00E+00	9.36E-05	1.87E-04	0.0575	5.515E+10
Cl-36	3.4243E-10	3.59	7.19	0.00E+00	1.23E-09	2.46E-09	0.0850	2.325E+11
Cm-243	4.0629E-04	3.59	7.19	0.00E+00	1.46E-03	2.92E-03	0.1250	2.066E+10
Cm-244	1.6024E-03	3.59	7.19	0.00E+00	5.76E-03	1.15E-02	0.2250	2.100E+10
Co-60	3.4275E-03	3.59	7.19	0.00E+00	1.23E-02	2.46E-02	0.3750	9.100E+09
Cs-134	1.5566E-03	3.59	7.19	0.00E+00	5.59E-03	1.12E-02	0.5750	3.686E+11
Cs-135	4.7693E-05	3.59	7.19	0.00E+00	1.71E-04	3.43E-04	0.8500	3.852E+09
Cs-137	1.4007E+00	3.59	7.19	0.00E+00	5.03E+00	1.01E+01	1.2500	4.610E+09
Eu-154	1.6184E-02	3.59	7.19	0.00E+00	5.82E-02	1.16E-01	1.7500	1.043E+08
Eu-155	1.3774E-02	3.59	7.19	0.00E+00	4.95E-02	9.90E-02	2.2500	2.140E+04
Fe-55	3.8028E-04	3.59	7.19	0.00E+00	1.37E-03	2.73E-03	2.7500	1.194E+05
H-3	3.8454E-03	3.59	7.19	0.00E+00	1.38E-02	2.76E-02	3.5000	8.076E+02
I-129	1.2891E-06	3.59	7.19	0.00E+00	4.63E-06	9.26E-06	5.0000	2.874E+02
Kr-85	2.7848E-02	3.59	7.19	0.00E+00	1.00E-01	2.00E-01	7.0000	3.187E+01
Np-237	3.7516E-06	3.59	7.19	0.00E+00	1.35E-05	2.70E-05	11.0000	3.584E+00
Pa-231	1.2488E-11	3.59	7.19	0.00E+00	4.49E-11	8.97E-11		
Pb-210	2.4206E-12	3.59	7.19	0.00E+00	8.70E-12	1.74E-11		
Pm-147	1.5671E-02	3.59	7.19	0.00E+00	5.63E-02	1.13E-01		
Pu-238	1.4877E-02	3.59	7.19	0.00E+00	5.35E-02	1.07E-01		
Pu-239	-3.5520E-02	3.59	0.00	1.23E+00	1.11E+00	1.23E+00		
Pu-240	2.0690E-02	3.59	7.19	6.27E-01	7.02E-01	7.76E-01		
Pu-241	-1.4799E+00	3.59	0.00	2.82E+01	2.28E+01	2.82E+01		
Pu-242	1.1252E-05	3.59	7.19	1.67E-04	2.08E-04	2.48E-04		
Ra-226	7.8524E-12	3.59	7.19	0.00E+00	2.82E-11	5.64E-11		
Ra-228	2.4086E-16	3.59	7.19	0.00E+00	8.65E-16	1.73E-15		
Ru-106	1.5066E-05	3.59	7.19	0.00E+00	5.41E-05	1.08E-04		
Se-79	1.0127E-05	3.59	7.19	0.00E+00	3.64E-05	7.28E-05		
Sn-126	4.3902E-05	3.59	7.19	0.00E+00	1.58E-04	3.16E-04		
Sr-90	5.0088E-01	3.59	7.19	0.00E+00	1.80E+00	3.60E+00		
Tc-99	3.9412E-04	3.59	7.19	0.00E+00	1.42E-03	2.83E-03		
Th-229	2.7219E-12	3.59	7.19	0.00E+00	9.78E-12	1.96E-11		
Th-230	1.0441E-09	3.59	7.19	0.00E+00	3.75E-09	7.50E-09		
Th-232	3.1689E-16	3.59	7.19	0.00E+00	1.14E-15	2.28E-15		
Tl-208	4.6636E-07	3.59	7.19	0.00E+00	1.68E-06	3.35E-06		
U-232	1.2638E-06	3.59	7.19	0.00E+00	4.54E-06	9.08E-06		
U-233	5.7451E-10	3.59	7.19	0.00E+00	2.06E-09	4.13E-09		
U-234	4.3044E-06	3.59	7.19	0.00E+00	1.55E-05	3.09E-05		
U-235	-7.7765E-09	3.59	0.00	2.53E-07	2.26E-07	2.53E-07		
U-236	1.8050E-07	3.59	7.19	0.00E+00	6.49E-07	1.30E-06		
U-238	-1.7914E-07	3.59	0.00	1.85E-05	1.78E-05	1.85E-05		
Y-90	5.0088E-01	3.59	7.19	0.00E+00	1.80E+00	3.60E+00		
Other Radionuclides					5.09E+00	1.02E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.22E-01	4.81E-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: 2010
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: 25 years

Estimated Canister usage:
18"x15'
1.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6376E-10	91,386.55	182,773.11	0.00E+00	6.07E-05	1.21E-04	Avg. MeV	
Am-241	1.3144E-01	91,386.55	182,773.11	0.00E+00	1.20E+04	2.40E+04	0.0150	1.243E+16
Am-242m	3.0039E-04	91,386.55	182,773.11	0.00E+00	2.75E+01	5.49E+01	0.0250	2.517E+15
Am-243	6.2629E-04	91,386.55	182,773.11	0.00E+00	5.72E+01	1.14E+02	0.0375	2.436E+15
C-14	4.7965E-05	91,386.55	182,773.11	0.00E+00	4.38E+00	8.77E+00	0.0575	2.658E+15
Cl-36	8.0297E-07	91,386.55	182,773.11	0.00E+00	7.34E-02	1.47E-01	0.0850	1.408E+15
Cm-243	3.1993E-04	91,386.55	182,773.11	0.00E+00	2.92E+01	5.85E+01	0.1250	1.029E+15
Cm-244	7.1851E-02	91,386.55	182,773.11	0.00E+00	6.57E+03	1.31E+04	0.2250	1.209E+15
Co-60	9.5220E-03	91,386.55	182,773.11	0.00E+00	8.70E+02	1.74E+03	0.3750	5.187E+14
Cs-134	1.1662E-03	91,386.55	182,773.11	0.00E+00	1.07E+02	2.13E+02	0.5750	1.192E+16
Cs-135	1.4433E-05	91,386.55	182,773.11	0.00E+00	1.32E+00	2.64E+00	0.8500	2.353E+14
Cs-137	1.7603E+00	91,386.55	182,773.11	0.00E+00	1.61E+05	3.22E+05	1.2500	3.178E+14
Eu-154	4.5203E-02	91,386.55	182,773.11	0.00E+00	4.13E+03	8.26E+03	1.7500	6.963E+12
Eu-155	7.1479E-03	91,386.55	182,773.11	0.00E+00	6.53E+02	1.31E+03	2.2500	1.286E+09
Fe-55	6.1919E-04	91,386.55	182,773.11	0.00E+00	5.66E+01	1.13E+02	2.7500	1.446E+09
H-3	3.6386E-02	91,386.55	182,773.11	0.00E+00	3.33E+03	6.65E+03	3.5000	1.894E+08
I-129	9.8288E-07	91,386.55	182,773.11	0.00E+00	8.98E-02	1.80E-01	5.0000	8.095E+07
Kr-85	5.3844E-02	91,386.55	182,773.11	0.00E+00	4.92E+03	9.84E+03	7.0000	9.333E+06
Np-237	1.0546E-05	91,386.55	182,773.11	0.00E+00	9.64E-01	1.93E+00	11.0000	1.072E+06
Pa-231	1.1370E-09	91,386.55	182,773.11	0.00E+00	1.04E-04	2.08E-04		
Pb-210	3.3624E-11	91,386.55	182,773.11	0.00E+00	3.07E-06	6.15E-06		
Pm-147	5.1211E-03	91,386.55	182,773.11	0.00E+00	4.68E+02	9.36E+02		
Pu-238	8.0669E-02	91,386.55	182,773.11	0.00E+00	7.37E+03	1.47E+04		
Pu-239	1.1626E-02	91,386.55	182,773.11	0.00E+00	1.06E+03	2.12E+03		
Pu-240	1.5097E-02	91,386.55	182,773.11	0.00E+00	1.38E+03	2.76E+03		
Pu-241	1.4567E+00	91,386.55	182,773.11	0.00E+00	1.33E+05	2.66E+05		
Pu-242	6.4260E-05	91,386.55	182,773.11	0.00E+00	5.87E+00	1.17E+01		
Ra-226	1.1392E-10	91,386.55	182,773.11	0.00E+00	1.04E-05	2.08E-05		
Ra-228	5.1841E-12	91,386.55	182,773.11	0.00E+00	4.74E-07	9.48E-07		
Ru-106	5.9012E-07	91,386.55	182,773.11	0.00E+00	5.39E-02	1.08E-01		
Se-79	1.2379E-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	1.1630E+00	91,386.55	182,773.11	0.00E+00	1.06E+05	2.13E+05		
Tc-99	3.9357E-04	91,386.55	182,773.11	0.00E+00	3.60E+01	7.19E+01		
Th-229	8.5691E-11	91,386.55	182,773.11	0.00E+00	7.83E-06	1.57E-05		
Th-230	1.4493E-06	91,386.55	182,773.11	0.00E+00	1.32E-03	2.65E-03		
Th-232	5.2923E-12	91,386.55	182,773.11	0.00E+00	4.84E-07	9.67E-07		
Tl-208	1.9202E-07	91,386.55	182,773.11	0.00E+00	1.75E-02	3.51E-02		
U-232	5.2083E-07	91,386.55	182,773.11	0.00E+00	4.76E-02	9.52E-02	Thermal Power	
U-233	2.4386E-08	91,386.55	182,773.11	0.00E+00	2.23E-03	4.46E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	4.7012E-05	91,386.55	182,773.11	0.00E+00	4.30E+00	8.59E+00	2.51E+03	5.01E+03
U-235	-1.4492E-06	91,386.55	0.00	5.00E-02	0.00E+00	5.00E-02	Total	Total
U-236	7.5759E-06	91,386.55	182,773.11	0.00E+00	6.92E-01	1.38E+00		
U-238	-2.6129E-07	91,386.55	0.00	2.52E-01	2.28E-01	2.52E-01		
Y-90	1.1631E+00	91,386.55	182,773.11	0.00E+00	1.06E+05	2.13E+05		
Other Radionuclides					1.54E+05	3.09E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	3.38	2.78	1.06
Bounding:	6.76	5.53	

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

[2]Total burnup for all fuel associated with this worksheet must be 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: 2010
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: 25 years

Estimated Canister usage: 18"x15" 1.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (CI)	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)
Ac-227	6.6376E-10	10,273.05	10,378.50	0.00E+00	6.82E-06	6.89E-06
Am-241	1.3144E-01	10,273.05	10,378.50	0.00E+00	1.35E+03	1.36E+03
Am-242m	3.0039E-04	10,273.05	10,378.50	0.00E+00	3.09E+00	3.12E+00
Am-243	6.2629E-04	10,273.05	10,378.50	0.00E+00	6.43E+00	6.50E+00
C-14	4.7965E-05	10,273.05	10,378.50	0.00E+00	4.93E-01	4.98E-01
Cl-36	8.0297E-07	10,273.05	10,378.50	0.00E+00	8.25E-03	8.33E-03
Cm-243	3.1993E-04	10,273.05	10,378.50	0.00E+00	3.29E+00	3.32E+00
Cm-244	7.1851E-02	10,273.05	10,378.50	0.00E+00	7.38E+02	7.46E+02
Co-60	9.5220E-03	10,273.05	10,378.50	0.00E+00	9.78E+01	9.88E+01
Cs-134	1.1662E-03	10,273.05	10,378.50	0.00E+00	1.20E+01	1.21E+01
Cs-135	1.4433E-05	10,273.05	10,378.50	0.00E+00	1.48E-01	1.50E-01
Cs-137	1.7603E+00	10,273.05	10,378.50	0.00E+00	1.81E+04	1.83E+04
Eu-154	4.5203E-02	10,273.05	10,378.50	0.00E+00	4.64E+02	4.69E+02
Eu-155	7.1479E-03	10,273.05	10,378.50	0.00E+00	7.34E+01	7.42E+01
Fe-55	6.1919E-04	10,273.05	10,378.50	0.00E+00	6.36E+00	6.43E+00
H-3	3.6386E-02	10,273.05	10,378.50	0.00E+00	3.74E+02	3.78E+02
I-129	9.8288E-07	10,273.05	10,378.50	0.00E+00	1.01E-02	1.02E-02
Kr-85	5.3844E-02	10,273.05	10,378.50	0.00E+00	5.53E+02	5.59E+02
Np-237	1.0546E-05	10,273.05	10,378.50	0.00E+00	1.08E-01	1.09E-01
Pa-231	1.1370E-09	10,273.05	10,378.50	0.00E+00	1.17E-05	1.18E-05
Pb-210	3.3624E-11	10,273.05	10,378.50	0.00E+00	3.45E-07	3.49E-07
Pm-147	5.1211E-03	10,273.05	10,378.50	0.00E+00	5.26E+01	5.31E+01
Pu-238	8.0669E-02	10,273.05	10,378.50	0.00E+00	8.29E+02	8.37E+02
Pu-239	1.1626E-02	10,273.05	10,378.50	0.00E+00	1.19E+02	1.21E+02
Pu-240	1.5097E-02	10,273.05	10,378.50	0.00E+00	1.55E+02	1.57E+02
Pu-241	1.4567E+00	10,273.05	10,378.50	0.00E+00	1.50E+04	1.51E+04
Pu-242	6.4260E-05	10,273.05	10,378.50	0.00E+00	6.60E-01	6.67E-01
Ra-226	1.1392E-10	10,273.05	10,378.50	0.00E+00	1.17E-06	1.18E-06
Ra-228	5.1841E-12	10,273.05	10,378.50	0.00E+00	5.33E-08	5.38E-08
Ru-106	5.9012E-07	10,273.05	10,378.50	0.00E+00	6.06E-03	6.12E-03
Se-79	1.2379E-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	1.1630E+00	10,273.05	10,378.50	0.00E+00	1.19E+04	1.21E+04
Tc-99	3.9357E-04	10,273.05	10,378.50	0.00E+00	4.04E+00	4.08E+00
Th-229	8.5691E-11	10,273.05	10,378.50	0.00E+00	8.80E-07	8.89E-07
Th-230	1.4493E-08	10,273.05	10,378.50	0.00E+00	1.49E-04	1.50E-04
Th-232	5.2923E-12	10,273.05	10,378.50	0.00E+00	5.44E-08	5.49E-08
Tl-208	1.9202E-07	10,273.05	10,378.50	0.00E+00	1.97E-03	1.99E-03
U-232	5.2083E-07	10,273.05	10,378.50	0.00E+00	5.35E-03	5.41E-03
U-233	2.4386E-08	10,273.05	10,378.50	0.00E+00	2.51E-04	2.53E-04
U-234	4.7012E-05	10,273.05	10,378.50	0.00E+00	4.83E-01	4.88E-01
U-235	-1.4492E-06	10,273.05	0.00	1.28E-02	0.00E+00	1.28E-02
U-236	7.5759E-06	10,273.05	10,378.50	0.00E+00	7.78E-02	7.86E-02
U-238	-2.6129E-07	10,273.05	0.00	1.22E-01	1.20E-01	1.22E-01
Y-90	1.1631E+00	10,273.05	10,378.50	0.00E+00	1.19E+04	1.21E+04
Other Radionuclides					1.74E+04	1.75E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.058E+14
0.0250	1.429E+14
0.0375	1.383E+14
0.0575	1.509E+14
0.0850	7.997E+13
0.1250	5.842E+13
0.2250	6.865E+13
0.3750	2.946E+13
0.5750	6.769E+14
0.8500	1.336E+13
1.2500	1.805E+13
1.7500	3.954E+11
2.2500	7.303E+07
2.7500	8.208E+07
3.5000	1.076E+07
5.0000	4.597E+06
7.0000	5.300E+05
11.0000	6.088E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.82E+02	2.85E+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:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	1.8	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

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

Estimated EOL HM/Given EOL HM: 0.98

[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: 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: 2010
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: 15 years

Estimated Canister usage: 18"x15' = 52.20

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3735E-12	638,157.18	1,276,314.37	0.00E+00	8.77E-07	1.75E-06	Avg. MeV	
Am-241	7.9527E-02	638,157.18	1,276,314.37	1.75E+04	6.83E+04	1.19E+05	0.0150	6.417E+16
Am-242m	2.1053E-03	638,157.18	1,276,314.37	0.00E+00	1.34E+03	2.69E+03	0.0250	1.384E+16
Am-243	1.0760E-04	638,157.18	1,276,314.37	0.00E+00	6.87E+01	1.37E+02	0.0375	1.583E+16
C-14	2.6141E-05	638,157.18	1,276,314.37	0.00E+00	1.67E+01	3.34E+01	0.0575	1.347E+16
Cl-36	3.4243E-10	638,157.18	1,276,314.37	0.00E+00	2.19E-04	4.37E-04	0.0850	7.885E+15
Cm-243	6.6092E-04	638,157.18	1,276,314.37	0.00E+00	4.22E+02	8.44E+02	0.1250	5.889E+15
Cm-244	2.9933E-03	638,157.18	1,276,314.37	0.00E+00	1.91E+03	3.82E+03	0.2250	5.971E+15
Co-60	1.5934E-02	638,157.18	1,276,314.37	0.00E+00	1.02E+04	2.03E+04	0.3750	3.070E+15
Cs-134	4.6356E-02	638,157.18	1,276,314.37	0.00E+00	2.96E+04	5.92E+04	0.5750	1.026E+17
Cs-135	4.7693E-05	638,157.18	1,276,314.37	0.00E+00	3.04E+01	6.09E+01	0.8500	3.433E+15
Cs-137	2.1113E+00	638,157.18	1,276,314.37	0.00E+00	1.35E+06	2.69E+06	1.2500	2.989E+15
Eu-154	4.8092E-02	638,157.18	1,276,314.37	0.00E+00	3.07E+04	6.14E+04	1.7500	4.910E+13
Eu-155	6.8447E-02	638,157.18	1,276,314.37	0.00E+00	4.37E+04	8.74E+04	2.2500	1.653E+12
Fe-55	5.8479E-03	638,157.18	1,276,314.37	0.00E+00	3.73E+03	7.46E+03	2.7500	1.724E+11
H-3	8.9300E-03	638,157.18	1,276,314.37	0.00E+00	5.70E+03	1.14E+04	3.5000	1.946E+10
I-129	1.2891E-06	638,157.18	1,276,314.37	0.00E+00	8.23E-01	1.65E+00	5.0000	4.815E+07
Kr-85	7.0941E-02	638,157.18	1,276,314.37	0.00E+00	4.53E+04	9.05E+04	7.0000	5.509E+06
Np-237	2.6541E-06	638,157.18	1,276,314.37	0.00E+00	1.69E+00	3.39E+00	11.0000	6.309E+05
Pa-231	4.8970E-12	638,157.18	1,276,314.37	0.00E+00	3.13E-06	6.25E-06		
Pb-210	2.2170E-13	638,157.18	1,276,314.37	0.00E+00	1.41E-07	2.83E-07		
Pm-147	2.3617E-01	638,157.18	1,276,314.37	0.00E+00	1.51E+05	3.01E+05		
Pu-238	2.8636E-02	638,157.18	1,276,314.37	0.00E+00	1.83E+04	3.65E+04		
Pu-239	-3.5520E-02	638,157.18	0.00	1.44E+05	1.21E+05	1.44E+05		
Pu-240	2.0790E-02	638,157.18	1,276,314.37	7.31E+04	8.63E+04	9.96E+04		
Pu-241	-4.8316E-01	638,157.18	0.00	3.28E+06	2.97E+06	3.28E+06		
Pu-242	1.1052E-05	638,157.18	1,276,314.37	1.95E+01	2.65E+01	3.36E+01		
Ra-226	5.7471E-13	638,157.18	1,276,314.37	0.00E+00	3.67E-07	7.34E-07		
Ra-228	5.4957E-17	638,157.18	1,276,314.37	0.00E+00	3.51E-11	7.01E-11		
Ru-106	1.4582E-02	638,157.18	1,276,314.37	0.00E+00	9.31E+03	1.86E+04		
Se-79	1.0137E-05	638,157.18	1,276,314.37	0.00E+00	6.47E+00	1.29E+01		
Sn-126	4.3922E-05	638,157.18	1,276,314.37	0.00E+00	2.80E+01	5.61E+01		
Sr-90	7.6329E-01	638,157.18	1,276,314.37	0.00E+00	4.87E+05	9.74E+05		
Tc-99	3.9412E-04	638,157.18	1,276,314.37	0.00E+00	2.52E+02	5.03E+02		
Th-229	1.6457E-12	638,157.18	1,276,314.37	0.00E+00	1.05E-06	2.10E-06		
Th-230	1.8822E-10	638,157.18	1,276,314.37	0.00E+00	1.20E-04	2.40E-04		
Th-232	9.7601E-17	638,157.18	1,276,314.37	0.00E+00	6.23E-11	1.25E-10		
Tl-208	5.2722E-07	638,157.18	1,276,314.37	0.00E+00	3.36E-01	6.73E-01		
U-232	1.4925E-06	638,157.18	1,276,314.37	0.00E+00	9.52E-01	1.90E+00	Thermal Power	
U-233	2.1113E-10	638,157.18	1,276,314.37	0.00E+00	1.35E-04	2.69E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.9528E-06	638,157.18	1,276,314.37	0.00E+00	1.25E+00	2.49E+00	2.03E+04	3.47E+04
U-235	-9.7920E-09	638,157.18	0.00	2.95E-02	2.33E-02	2.95E-02	Total	Total
U-236	1.1570E-07	638,157.18	1,276,314.37	0.00E+00	7.38E-02	1.48E-01		
U-238	-1.7914E-07	638,157.18	0.00	2.15E+00	2.03E+00	2.15E+00		
Y-90	7.6329E-01	638,157.18	1,276,314.37	0.00E+00	4.87E+05	9.74E+05		
Other Radionuclides					1.38E+06	2.77E+06		

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: 2010
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: 15 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	1.3735E-12	31,146.44	69,045.35	0.00E+00	4.28E-08	9.48E-08
Am-241	7.9527E-02	31,146.44	69,045.35	9.16E+02	3.39E+03	6.41E+03
Am-242m	2.1053E-03	31,146.44	69,045.35	0.00E+00	6.56E+01	1.45E+02
Am-243	1.0760E-04	31,146.44	69,045.35	0.00E+00	3.35E+00	7.43E+00
C-14	2.6141E-05	31,146.44	69,045.35	0.00E+00	8.14E-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	6.6092E-04	31,146.44	69,045.35	0.00E+00	2.06E+01	4.56E+01
Cm-244	2.9933E-03	31,146.44	69,045.35	0.00E+00	9.32E+01	2.07E+02
Co-60	1.5934E-02	31,146.44	69,045.35	0.00E+00	4.96E+02	1.10E+03
Cs-134	4.6356E-02	31,146.44	69,045.35	0.00E+00	1.44E+03	3.20E+03
Cs-135	4.7693E-05	31,146.44	69,045.35	0.00E+00	1.49E+00	3.29E+00
Cs-137	2.1113E+00	31,146.44	69,045.35	0.00E+00	6.58E+04	1.46E+05
Eu-154	4.8092E-02	31,146.44	69,045.35	0.00E+00	1.50E+03	3.32E+03
Eu-155	6.8447E-02	31,146.44	69,045.35	0.00E+00	2.13E+03	4.73E+03
Fe-55	5.8479E-03	31,146.44	69,045.35	0.00E+00	1.82E+02	4.04E+02
H-3	8.9300E-03	31,146.44	69,045.35	0.00E+00	2.78E+02	6.17E+02
I-129	1.2891E-06	31,146.44	69,045.35	0.00E+00	4.02E-02	8.90E-02
Kr-85	7.0941E-02	31,146.44	69,045.35	0.00E+00	2.21E+03	4.90E+03
Np-237	2.6541E-06	31,146.44	69,045.35	0.00E+00	8.27E-02	1.83E-01
Pa-231	4.8970E-12	31,146.44	69,045.35	0.00E+00	1.53E-07	3.38E-07
Pb-210	2.2170E-13	31,146.44	69,045.35	0.00E+00	6.91E-09	1.53E-08
Pm-147	2.3617E-01	31,146.44	69,045.35	0.00E+00	7.36E+03	1.63E+04
Pu-238	2.8636E-02	31,146.44	69,045.35	0.00E+00	8.92E+02	1.98E+03
Pu-239	-3.5520E-02	31,146.44	0.00	7.52E+03	6.41E+03	7.52E+03
Pu-240	2.0790E-02	31,146.44	69,045.35	3.82E+03	4.47E+03	5.26E+03
Pu-241	-4.8316E-01	31,146.44	0.00	1.72E+05	1.57E+05	1.72E+05
Pu-242	1.1052E-05	31,146.44	69,045.35	1.02E+00	1.36E+00	1.78E+00
Ra-226	5.7471E-13	31,146.44	69,045.35	0.00E+00	1.79E-08	3.97E-08
Ra-228	5.4957E-17	31,146.44	69,045.35	0.00E+00	1.71E-12	3.79E-12
Ru-106	1.4582E-02	31,146.44	69,045.35	0.00E+00	4.54E+02	1.01E+03
Se-79	1.0137E-05	31,146.44	69,045.35	0.00E+00	3.16E-01	7.00E-01
Sn-126	4.3922E-05	31,146.44	69,045.35	0.00E+00	1.37E+00	3.03E+00
Sr-90	7.6329E-01	31,146.44	69,045.35	0.00E+00	2.38E+04	5.27E+04
Tc-99	3.9412E-04	31,146.44	69,045.35	0.00E+00	1.23E+01	2.72E+01
Th-229	1.6457E-12	31,146.44	69,045.35	0.00E+00	5.13E-08	1.14E-07
Th-230	1.8822E-10	31,146.44	69,045.35	0.00E+00	5.86E-06	1.30E-05
Th-232	9.7601E-17	31,146.44	69,045.35	0.00E+00	3.04E-12	6.74E-12
Tl-208	5.2722E-07	31,146.44	69,045.35	0.00E+00	1.64E-02	3.64E-02
U-232	1.4925E-06	31,146.44	69,045.35	0.00E+00	4.65E-02	1.03E-01
U-233	2.1113E-10	31,146.44	69,045.35	0.00E+00	6.58E-06	1.46E-05
U-234	1.9528E-06	31,146.44	69,045.35	0.00E+00	6.08E-02	1.35E-01
U-235	-9.7920E-09	31,146.44	0.00	1.54E-03	1.24E-03	1.54E-03
U-236	1.1570E-07	31,146.44	69,045.35	0.00E+00	3.60E-03	7.99E-03
U-238	-1.7914E-07	31,146.44	0.00	1.12E-01	1.07E-01	1.12E-01
Y-90	7.6329E-01	31,146.44	69,045.35	0.00E+00	2.38E+04	5.27E+04
Other Radionuclides					6.75E+04	1.50E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.470E+15
0.0250	7.487E+14
0.0375	8.562E+14
0.0575	7.280E+14
0.0850	4.266E+14
0.1250	3.186E+14
0.2250	3.230E+14
0.3750	1.661E+14
0.5750	5.549E+15
0.8500	1.857E+14
1.2500	1.617E+14
1.7500	2.656E+12
2.2500	8.941E+10
2.7500	9.326E+09
3.5000	1.053E+09
5.0000	2.574E+06
7.0000	2.945E+05
11.0000	3.373E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.02E+03	1.86E+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: 2010
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: 15 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	1.3735E-12	27,338.13	60,603.11	0.00E+00	3.75E-08	8.32E-08
Am-241	7.9527E-02	27,338.13	60,603.11	8.04E+02	2.98E+03	5.62E+03
Am-242m	2.1053E-03	27,338.13	60,603.11	0.00E+00	5.76E+01	1.28E+02
Am-243	1.0760E-04	27,338.13	60,603.11	0.00E+00	2.94E+00	6.52E+00
C-14	2.6141E-05	27,338.13	60,603.11	0.00E+00	7.15E-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	6.6092E-04	27,338.13	60,603.11	0.00E+00	1.81E+01	4.01E+01
Cm-244	2.9933E-03	27,338.13	60,603.11	0.00E+00	8.18E+01	1.81E+02
Co-60	1.5934E-02	27,338.13	60,603.11	0.00E+00	4.36E+02	9.66E+02
Cs-134	4.6356E-02	27,338.13	60,603.11	0.00E+00	1.27E+03	2.81E+03
Cs-135	4.7693E-05	27,338.13	60,603.11	0.00E+00	1.30E+00	2.89E+00
Cs-137	2.1113E+00	27,338.13	60,603.11	0.00E+00	5.77E+04	1.28E+05
Eu-154	4.8092E-02	27,338.13	60,603.11	0.00E+00	1.31E+03	2.91E+03
Eu-155	6.8447E-02	27,338.13	60,603.11	0.00E+00	1.87E+03	4.15E+03
Fe-55	5.8479E-03	27,338.13	60,603.11	0.00E+00	1.60E+02	3.54E+02
H-3	8.9300E-03	27,338.13	60,603.11	0.00E+00	2.44E+02	5.41E+02
I-129	1.2891E-06	27,338.13	60,603.11	0.00E+00	3.52E-02	7.81E-02
Kr-85	7.0941E-02	27,338.13	60,603.11	0.00E+00	1.94E+03	4.30E+03
Np-237	2.6541E-06	27,338.13	60,603.11	0.00E+00	7.26E-02	1.61E-01
Pa-231	4.8970E-12	27,338.13	60,603.11	0.00E+00	1.34E-07	2.97E-07
Pb-210	2.2170E-13	27,338.13	60,603.11	0.00E+00	6.06E-09	1.34E-08
Pm-147	2.3617E-01	27,338.13	60,603.11	0.00E+00	6.46E+03	1.43E+04
Pu-238	2.8636E-02	27,338.13	60,603.11	0.00E+00	7.83E+02	1.74E+03
Pu-239	-3.5520E-02	27,338.13	0.00	6.60E+03	5.63E+03	6.60E+03
Pu-240	2.0790E-02	27,338.13	60,603.11	3.36E+03	3.92E+03	4.62E+03
Pu-241	-4.8316E-01	27,338.13	0.00	1.51E+05	1.37E+05	1.51E+05
Pu-242	1.1052E-05	27,338.13	60,603.11	8.95E-01	1.20E+00	1.56E+00
Ra-226	5.7471E-13	27,338.13	60,603.11	0.00E+00	1.57E-06	3.48E-06
Ra-228	5.4957E-17	27,338.13	60,603.11	0.00E+00	1.50E-12	3.33E-12
Ru-106	1.4582E-02	27,338.13	60,603.11	0.00E+00	3.99E+02	8.84E+02
Se-79	1.0137E-05	27,338.13	60,603.11	0.00E+00	2.77E-01	6.14E-01
Sn-126	4.3922E-05	27,338.13	60,603.11	0.00E+00	1.20E+00	2.66E+00
Sr-90	7.6329E-01	27,338.13	60,603.11	0.00E+00	2.09E+04	4.63E+04
Tc-99	3.9412E-04	27,338.13	60,603.11	0.00E+00	1.08E+01	2.39E+01
Th-229	1.6457E-12	27,338.13	60,603.11	0.00E+00	4.50E-06	9.97E-06
Th-230	1.8822E-10	27,338.13	60,603.11	0.00E+00	5.15E-06	1.14E-05
Th-232	9.7601E-17	27,338.13	60,603.11	0.00E+00	2.67E-12	5.91E-12
Tl-208	5.2722E-07	27,338.13	60,603.11	0.00E+00	1.44E-02	3.20E-02
U-232	1.4925E-06	27,338.13	60,603.11	0.00E+00	4.08E-02	9.04E-02
U-233	2.1113E-10	27,338.13	60,603.11	0.00E+00	5.77E-06	1.28E-05
U-234	1.9528E-06	27,338.13	60,603.11	0.00E+00	5.34E-02	1.18E-01
U-235	-9.7920E-09	27,338.13	0.00	1.36E-03	1.09E-03	1.36E-03
U-236	1.1570E-07	27,338.13	60,603.11	0.00E+00	3.16E-03	7.01E-03
U-238	-1.7914E-07	27,338.13	0.00	9.87E-02	9.39E-02	9.87E-02
Y-90	7.6329E-01	27,338.13	60,603.11	0.00E+00	2.09E+04	4.63E+04
Other Radionuclides					5.93E+04	1.31E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.046E+15
0.0250	6.572E+14
0.0375	7.515E+14
0.0575	6.390E+14
0.0850	3.744E+14
0.1250	2.796E+14
0.2250	2.835E+14
0.3750	1.458E+14
0.5750	4.870E+15
0.8500	1.630E+14
1.2500	1.419E+14
1.7500	2.331E+12
2.2500	7.848E+10
2.7500	8.186E+09
3.5000	9.241E+08
5.0000	2.259E+06
7.0000	2.585E+05
11.0000	2.960E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.93E+02	1.63E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

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

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1992
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x15' 1.09

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	1.3735E-12	634.54	787.70	0.00E+00	8.72E-10	1.08E-09
Am-241	7.9527E-02	634.54	787.70	1.83E+01	6.88E+01	8.10E+01
Am-242m	2.1053E-03	634.54	787.70	0.00E+00	1.34E+00	1.66E+00
Am-243	1.0760E-04	634.54	787.70	0.00E+00	6.83E-02	8.48E-02
C-14	2.6141E-05	634.54	787.70	0.00E+00	1.66E-02	2.06E-02
Cl-36	3.4243E-10	634.54	787.70	0.00E+00	2.17E-07	2.70E-07
Cm-243	6.6092E-04	634.54	787.70	0.00E+00	4.19E-01	5.21E-01
Cm-244	2.9933E-03	634.54	787.70	0.00E+00	1.90E+00	2.36E+00
Co-60	1.5934E-02	634.54	787.70	0.00E+00	1.01E+01	1.26E+01
Cs-134	4.6356E-02	634.54	787.70	0.00E+00	2.94E+01	3.65E+01
Cs-135	4.7693E-05	634.54	787.70	0.00E+00	3.03E-02	3.76E-02
Cs-137	2.1113E+00	634.54	787.70	0.00E+00	1.34E+03	1.66E+03
Eu-154	4.8092E-02	634.54	787.70	0.00E+00	3.05E+01	3.79E+01
Eu-155	6.8447E-02	634.54	787.70	0.00E+00	4.34E+01	5.39E+01
Fe-55	5.8479E-03	634.54	787.70	0.00E+00	3.71E+00	4.61E+00
H-3	8.9300E-03	634.54	787.70	0.00E+00	5.67E+00	7.03E+00
I-129	1.2891E-06	634.54	787.70	0.00E+00	8.18E-04	1.02E-03
Kr-85	7.0941E-02	634.54	787.70	0.00E+00	4.50E+01	5.59E+01
Np-237	2.6541E-06	634.54	787.70	0.00E+00	1.68E-03	2.09E-03
Pa-231	4.8970E-12	634.54	787.70	0.00E+00	3.11E-09	3.86E-09
Pb-210	2.2170E-13	634.54	787.70	0.00E+00	1.41E-10	1.75E-10
Pm-147	2.3617E-01	634.54	787.70	0.00E+00	1.50E+02	1.86E+02
Pu-238	2.8636E-02	634.54	787.70	0.00E+00	1.82E+01	2.26E+01
Pu-239	-3.5520E-02	634.54	0.00	1.51E+02	1.28E+02	1.51E+02
Pu-240	2.0790E-02	634.54	787.70	7.65E+01	8.97E+01	9.29E+01
Pu-241	-4.8316E-01	634.54	0.00	3.44E+03	3.13E+03	3.44E+03
Pu-242	1.1052E-05	634.54	787.70	2.04E-02	2.74E-02	2.91E-02
Ra-226	5.7471E-13	634.54	787.70	0.00E+00	3.65E-10	4.53E-10
Ra-228	5.4957E-17	634.54	787.70	0.00E+00	3.49E-14	4.33E-14
Ru-106	1.4582E-02	634.54	787.70	0.00E+00	9.25E+00	1.15E+01
Se-79	1.0137E-05	634.54	787.70	0.00E+00	6.43E-03	7.99E-03
Sn-126	4.3922E-05	634.54	787.70	0.00E+00	2.79E-02	3.46E-02
Sr-90	7.6329E-01	634.54	787.70	0.00E+00	4.84E+02	6.01E+02
Tc-99	3.9412E-04	634.54	787.70	0.00E+00	2.50E-01	3.10E-01
Th-229	1.8457E-12	634.54	787.70	0.00E+00	1.04E-09	1.30E-09
Th-230	1.8822E-10	634.54	787.70	0.00E+00	1.19E-07	1.48E-07
Th-232	9.7601E-17	634.54	787.70	0.00E+00	6.19E-14	7.69E-14
Tl-208	5.2722E-07	634.54	787.70	0.00E+00	3.35E-04	4.15E-04
U-232	1.4925E-06	634.54	787.70	0.00E+00	9.47E-04	1.18E-03
U-233	2.1113E-10	634.54	787.70	0.00E+00	1.34E-07	1.66E-07
U-234	1.9528E-06	634.54	787.70	0.00E+00	1.24E-03	1.54E-03
U-235	-9.7920E-09	634.54	0.00	3.09E-05	2.47E-05	3.09E-05
U-236	1.1570E-07	634.54	787.70	0.00E+00	7.34E-05	9.11E-05
U-238	-1.7914E-07	634.54	0.00	2.25E-03	2.14E-03	2.25E-03
Y-90	7.6329E-01	634.54	787.70	0.00E+00	4.84E+02	6.01E+02
Other Radionuclides					1.38E+03	1.71E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.001E+13
0.0250	8.549E+12
0.0375	9.768E+12
0.0575	8.415E+12
0.0850	4.867E+12
0.1250	3.635E+12
0.2250	3.685E+12
0.3750	1.895E+12
0.5750	6.330E+13
0.8500	2.119E+12
1.2500	1.845E+12
1.7500	3.030E+10
2.2500	1.020E+09
2.7500	1.064E+08
3.5000	1.203E+07
5.0000	3.718E+04
7.0000	4.250E+03
11.0000	4.865E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.06E+01	2.45E+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=8.513kg
Bounding burnup taken from SFD and converted to MWd using BOL=8.513kg

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: 2010
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: 15 years

Estimated Canister usage: 18"x15" = 0.20

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	1.3735E-12	251.33	502.65	0.00E+00	3.45E-10	6.90E-10
Am-241	7.9527E-02	251.33	502.65	6.73E+01	8.73E+01	1.07E+02
Am-242m	2.1053E-03	251.33	502.65	0.00E+00	5.29E-01	1.06E+00
Am-243	1.0760E-04	251.33	502.65	0.00E+00	2.70E-02	5.41E-02
C-14	2.6141E-05	251.33	502.65	0.00E+00	6.57E-03	1.31E-02
Cl-36	3.4243E-10	251.33	502.65	0.00E+00	8.61E-08	1.72E-07
Cm-243	6.6092E-04	251.33	502.65	0.00E+00	1.66E-01	3.32E-01
Cm-244	2.9933E-03	251.33	502.65	0.00E+00	7.52E-01	1.50E+00
Co-60	1.5934E-02	251.33	502.65	0.00E+00	4.00E+00	8.01E+00
Cs-134	4.6356E-02	251.33	502.65	0.00E+00	1.17E+01	2.33E+01
Cs-135	4.7693E-05	251.33	502.65	0.00E+00	1.20E-02	2.40E-02
Cs-137	2.1113E+00	251.33	502.65	0.00E+00	5.31E+02	1.06E+03
Eu-154	4.8092E-02	251.33	502.65	0.00E+00	1.21E+01	2.42E+01
Eu-155	6.8447E-02	251.33	502.65	0.00E+00	1.72E+01	3.44E+01
Fe-55	5.8479E-03	251.33	502.65	0.00E+00	1.47E+00	2.94E+00
H-3	8.9300E-03	251.33	502.65	0.00E+00	2.24E+00	4.49E+00
I-129	1.2891E-06	251.33	502.65	0.00E+00	3.24E-04	6.48E-04
Kr-85	7.0941E-02	251.33	502.65	0.00E+00	1.78E+01	3.57E+01
Np-237	2.6541E-06	251.33	502.65	0.00E+00	6.67E-04	1.33E-03
Pa-231	4.8970E-12	251.33	502.65	0.00E+00	1.23E-09	2.46E-09
Pb-210	2.2170E-13	251.33	502.65	0.00E+00	5.57E-11	1.11E-10
Pm-147	2.3617E-01	251.33	502.65	0.00E+00	5.94E+01	1.19E+02
Pu-238	2.8636E-02	251.33	502.65	0.00E+00	7.20E+00	1.44E+01
Pu-239	-3.5520E-02	251.33	0.00	5.52E+02	5.44E+02	5.52E+02
Pu-240	2.0790E-02	251.33	502.65	2.81E+02	2.86E+02	2.91E+02
Pu-241	-4.8316E-01	251.33	0.00	1.26E+04	1.25E+04	1.26E+04
Pu-242	1.1052E-05	251.33	502.65	7.49E-02	7.77E-02	8.04E-02
Ra-226	5.7471E-13	251.33	502.65	0.00E+00	1.44E-10	2.89E-10
Ra-228	5.4957E-17	251.33	502.65	0.00E+00	1.38E-14	2.76E-14
Ru-106	1.4582E-02	251.33	502.65	0.00E+00	3.66E+00	7.33E+00
Se-79	1.0137E-05	251.33	502.65	0.00E+00	2.55E-03	5.10E-03
Sn-126	4.3922E-05	251.33	502.65	0.00E+00	1.10E-02	2.21E-02
Sr-90	7.6329E-01	251.33	502.65	0.00E+00	1.92E+02	3.84E+02
Tc-99	3.9412E-04	251.33	502.65	0.00E+00	9.91E-02	1.98E-01
Th-229	1.6457E-12	251.33	502.65	0.00E+00	4.14E-10	8.27E-10
Th-230	1.8822E-10	251.33	502.65	0.00E+00	4.73E-08	9.46E-08
Th-232	9.7601E-17	251.33	502.65	0.00E+00	2.45E-14	4.91E-14
Tl-208	5.2722E-07	251.33	502.65	0.00E+00	1.33E-04	2.65E-04
U-232	1.4925E-06	251.33	502.65	0.00E+00	3.75E-04	7.50E-04
U-233	2.1113E-10	251.33	502.65	0.00E+00	5.31E-08	1.06E-07
U-234	1.9528E-06	251.33	502.65	0.00E+00	4.91E-04	9.82E-04
U-235	-9.7920E-09	251.33	0.00	1.13E-04	1.11E-04	1.13E-04
U-236	1.1570E-07	251.33	502.65	0.00E+00	2.91E-05	5.82E-05
U-238	-1.7914E-07	251.33	0.00	8.26E-03	8.21E-03	8.26E-03
Y-90	7.6329E-01	251.33	502.65	0.00E+00	1.92E+02	3.84E+02
Other Radionuclides					5.45E+02	1.09E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.853E+13
0.0250	5.507E+12
0.0375	6.239E+12
0.0575	6.142E+12
0.0850	3.106E+12
0.1250	2.322E+12
0.2250	2.352E+12
0.3750	1.210E+12
0.5750	4.039E+13
0.8500	1.352E+12
1.2500	1.177E+12
1.7500	1.934E+10
2.2500	6.512E+08
2.7500	6.806E+07
3.5000	7.806E+06
5.0000	7.882E+04
7.0000	8.982E+03
11.0000	1.027E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.35E+01	3.91E+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: 2010
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: 15 years

Estimated Canister usage:
18"x15'
1.20

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.1509E-08	5,934.58	8,479.48	0.00E+00	1.28E-04	1.82E-04	Avg. MeV	
Am-241	4.6529E-07	5,934.58	8,479.48	0.00E+00	2.76E-03	3.95E-03	0.0150	9.091E+14
Am-242m	0.0000E+00	5,934.58	8,479.48	0.00E+00	0.00E+00	0.00E+00	0.0250	1.927E+14
Am-243	8.3923E-15	5,934.58	8,479.48	0.00E+00	4.98E-11	7.12E-11	0.0375	1.675E+14
C-14	2.1765E-05	5,934.58	8,479.48	0.00E+00	1.29E-01	1.85E-01	0.0575	1.759E+14
Cl-36	5.5188E-08	5,934.58	8,479.48	0.00E+00	3.28E-04	4.68E-04	0.0850	1.081E+14
Cm-243	2.5208E-14	5,934.58	8,479.48	0.00E+00	1.50E-10	2.14E-10	0.1250	6.990E+13
Cm-244	1.1259E-15	5,934.58	8,479.48	0.00E+00	6.68E-12	9.55E-12	0.2250	9.128E+13
Co-60	2.9094E-02	5,934.58	8,479.48	0.00E+00	1.73E+02	2.47E+02	0.3750	4.178E+13
Cs-134	5.1932E-04	5,934.58	8,479.48	0.00E+00	3.08E+00	4.40E+00	0.5750	6.926E+14
Cs-135	4.4996E-05	5,934.58	8,479.48	0.00E+00	2.67E-01	3.82E-01	0.8500	6.689E+12
Cs-137	2.1867E+00	5,934.58	8,479.48	0.00E+00	1.30E+04	1.85E+04	1.2500	2.054E+13
Eu-154	9.2837E-04	5,934.58	8,479.48	0.00E+00	5.51E+00	7.87E+00	1.7500	1.700E+11
Eu-155	2.3180E-02	5,934.58	8,479.48	0.00E+00	1.38E+02	1.97E+02	2.2500	4.864E+06
Fe-55	2.9332E-03	5,934.58	8,479.48	0.00E+00	1.74E+01	2.49E+01	2.7500	2.222E+07
H-3	1.0871E-02	5,934.58	8,479.48	0.00E+00	6.45E+01	9.22E+01	3.5000	2.565E+06
I-129	1.1426E-06	5,934.58	8,479.48	0.00E+00	6.78E-03	9.69E-03	5.0000	6.262E+02
Kr-85	1.4068E-01	5,934.58	8,479.48	0.00E+00	8.35E+02	1.19E+03	7.0000	5.570E+01
Np-237	3.3099E-06	5,934.58	8,479.48	0.00E+00	1.96E-02	2.81E-02	11.0000	5.315E+00
Pa-231	7.8640E-08	5,934.58	8,479.48	0.00E+00	4.67E-04	6.67E-04		
Pb-210	7.4277E-13	5,934.58	8,479.48	0.00E+00	4.41E-09	6.30E-09		
Pm-147	2.2856E-01	5,934.58	8,479.48	0.00E+00	1.36E+03	1.94E+03		
Pu-238	2.0095E-04	5,934.58	8,479.48	0.00E+00	1.19E+00	1.70E+00		
Pu-239	1.9481E-02	5,934.58	8,479.48	0.00E+00	1.16E+02	1.65E+02		
Pu-240	6.8056E-05	5,934.58	8,479.48	0.00E+00	4.04E-01	5.77E-01		
Pu-241	1.0939E-05	5,934.58	8,479.48	0.00E+00	6.49E-02	9.28E-02		
Pu-242	4.3751E-13	5,934.58	8,479.48	0.00E+00	2.60E-09	3.71E-09		
Ra-226	4.0428E-12	5,934.58	8,479.48	0.00E+00	2.40E-08	3.43E-08		
Ra-228	2.1032E-11	5,934.58	8,479.48	0.00E+00	1.25E-07	1.78E-07		
Ru-106	2.9077E-04	5,934.58	8,479.48	0.00E+00	1.73E+00	2.47E+00		
Se-79	1.6492E-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	1.9396E+00	5,934.58	8,479.48	0.00E+00	1.15E+04	1.64E+04		
Tc-99	4.4842E-04	5,934.58	8,479.48	0.00E+00	2.66E+00	3.80E+00		
Th-229	1.8544E-11	5,934.58	8,479.48	0.00E+00	1.10E-07	1.57E-07		
Th-230	9.0605E-10	5,934.58	8,479.48	0.00E+00	5.38E-06	7.68E-06		
Th-232	2.3674E-11	5,934.58	8,479.48	0.00E+00	1.40E-07	2.01E-07		
Tl-208	7.0323E-09	5,934.58	8,479.48	0.00E+00	4.17E-05	5.96E-05		
U-232	1.9106E-08	5,934.58	8,479.48	0.00E+00	1.13E-04	1.62E-04		
U-233	9.6774E-09	5,934.58	8,479.48	0.00E+00	5.74E-05	8.21E-05		
U-234	4.8796E-06	5,934.58	8,479.48	0.00E+00	2.90E-02	4.14E-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	1.9396E+00	5,934.58	8,479.48	0.00E+00	1.15E+04	1.64E+04		
Other Radionuclides					1.29E+04	1.84E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.48E+02	2.12E+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: 2010
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: 15 years

Estimated Canister usage: 18"x15" 0.02

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3735E-12	1,038.59	2,077.18	0.00E+00	1.43E-09	2.85E-09	Avg. MeV	
Am-241	7.9527E-02	1,038.59	2,077.18	2.97E+01	1.12E+02	1.95E+02	0.0150	1.045E+14
Am-242m	2.1053E-03	1,038.59	2,077.18	0.00E+00	2.19E+00	4.37E+00	0.0250	2.253E+13
Am-243	1.0760E-04	1,038.59	2,077.18	0.00E+00	1.12E-01	2.24E-01	0.0375	2.576E+13
C-14	2.6141E-05	1,038.59	2,077.18	0.00E+00	2.72E-02	5.43E-02	0.0575	2.193E+13
Cl-36	3.4243E-10	1,038.59	2,077.18	0.00E+00	3.56E-07	7.11E-07	0.0850	1.283E+13
Cm-243	6.6092E-04	1,038.59	2,077.18	0.00E+00	6.86E-01	1.37E+00	0.1250	9.584E+12
Cm-244	2.9933E-03	1,038.59	2,077.18	0.00E+00	3.11E+00	6.22E+00	0.2250	9.718E+12
Co-60	1.5934E-02	1,038.59	2,077.18	0.00E+00	1.65E+01	3.31E+01	0.3750	4.996E+12
Cs-134	4.6356E-02	1,038.59	2,077.18	0.00E+00	4.81E+01	9.63E+01	0.5750	1.669E+14
Cs-135	4.7693E-05	1,038.59	2,077.18	0.00E+00	4.95E-02	9.91E-02	0.8500	5.587E+12
Cs-137	2.1113E+00	1,038.59	2,077.18	0.00E+00	2.19E+03	4.39E+03	1.2500	4.864E+12
Eu-154	4.8092E-02	1,038.59	2,077.18	0.00E+00	4.99E+01	9.99E+01	1.7500	7.991E+10
Eu-155	6.8447E-02	1,038.59	2,077.18	0.00E+00	7.11E+01	1.42E+02	2.2500	2.690E+09
Fe-55	5.8479E-03	1,038.59	2,077.18	0.00E+00	6.07E+00	1.21E+01	2.7500	2.806E+08
H-3	8.9300E-03	1,038.59	2,077.18	0.00E+00	9.27E+00	1.85E+01	3.5000	3.168E+07
I-129	1.2891E-06	1,038.59	2,077.18	0.00E+00	1.34E-03	2.68E-03	5.0000	7.952E+04
Kr-85	7.0941E-02	1,038.59	2,077.18	0.00E+00	7.37E+01	1.47E+02	7.0000	9.097E+03
Np-237	2.6541E-06	1,038.59	2,077.18	0.00E+00	2.76E-03	5.51E-03	11.0000	1.042E+03
Pa-231	4.8970E-12	1,038.59	2,077.18	0.00E+00	5.09E-09	1.02E-08		
Pb-210	2.2170E-13	1,038.59	2,077.18	0.00E+00	2.30E-10	4.61E-10		
Pm-147	2.3617E-01	1,038.59	2,077.18	0.00E+00	2.45E+02	4.91E+02		
Pu-238	2.8636E-02	1,038.59	2,077.18	0.00E+00	2.97E+01	5.95E+01		
Pu-239	-3.5520E-02	1,038.59	0.00	2.44E+02	2.07E+02	2.44E+02		
Pu-240	2.0790E-02	1,038.59	2,077.18	1.24E+02	1.45E+02	1.67E+02		
Pu-241	-4.8316E-01	1,038.59	0.00	5.56E+03	5.05E+03	5.56E+03		
Pu-242	1.1052E-05	1,038.59	2,077.18	3.30E-02	4.45E-02	5.60E-02		
Ra-226	5.7471E-13	1,038.59	2,077.18	0.00E+00	5.97E-10	1.19E-09		
Ra-228	5.4957E-17	1,038.59	2,077.18	0.00E+00	5.71E-14	1.14E-13		
Ru-106	1.4582E-02	1,038.59	2,077.18	0.00E+00	1.51E+01	3.03E+01		
Se-79	1.0137E-05	1,038.59	2,077.18	0.00E+00	1.05E-02	2.11E-02		
Sn-126	4.3922E-05	1,038.59	2,077.18	0.00E+00	4.56E-02	9.12E-02		
Sr-90	7.6329E-01	1,038.59	2,077.18	0.00E+00	7.93E+02	1.59E+03		
Tc-99	3.9412E-04	1,038.59	2,077.18	0.00E+00	4.09E-01	8.19E-01		
Th-229	1.6457E-12	1,038.59	2,077.18	0.00E+00	1.71E-09	3.42E-09		
Th-230	1.8822E-10	1,038.59	2,077.18	0.00E+00	1.95E-07	3.91E-07		
Th-232	9.7601E-17	1,038.59	2,077.18	0.00E+00	1.01E-13	2.03E-13		
Tl-208	5.2722E-07	1,038.59	2,077.18	0.00E+00	5.48E-04	1.10E-03		
U-232	1.4925E-06	1,038.59	2,077.18	0.00E+00	1.55E-03	3.10E-03		
U-233	2.1113E-10	1,038.59	2,077.18	0.00E+00	2.19E-07	4.39E-07		
U-234	1.9528E-06	1,038.59	2,077.18	0.00E+00	2.03E-03	4.06E-03		
U-235	-9.7920E-09	1,038.59	0.00	5.00E-05	3.98E-05	5.00E-05		
U-236	1.1570E-07	1,038.59	2,077.18	0.00E+00	1.20E-04	2.40E-04		
U-238	-1.7914E-07	1,038.59	0.00	3.64E-03	3.45E-03	3.64E-03		
Y-90	7.6329E-01	1,038.59	2,077.18	0.00E+00	7.93E+02	1.59E+03		
Other Radionuclides					2.25E+03	4.50E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.36E+01	5.59E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

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

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1992
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 16"x15' = 1.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.3735E-12	185.22	370.43	0.00E+00	2.54E-10	5.09E-10
Am-241	7.9527E-02	185.22	370.43	5.29E+00	2.00E+01	3.48E+01
Am-242m	2.1053E-03	185.22	370.43	0.00E+00	3.90E-01	7.80E-01
Am-243	1.0760E-04	185.22	370.43	0.00E+00	1.99E-02	3.99E-02
C-14	2.6141E-05	185.22	370.43	0.00E+00	4.84E-03	9.68E-03
Cl-36	3.4243E-10	185.22	370.43	0.00E+00	6.34E-08	1.27E-07
Cm-243	6.6092E-04	185.22	370.43	0.00E+00	1.22E-01	2.45E-01
Cm-244	2.9933E-03	185.22	370.43	0.00E+00	5.54E-01	1.11E+00
Co-60	1.5934E-02	185.22	370.43	0.00E+00	2.95E+00	5.90E+00
Cs-134	4.6356E-02	185.22	370.43	0.00E+00	8.59E+00	1.72E+01
Cs-135	4.7693E-05	185.22	370.43	0.00E+00	8.83E-03	1.77E-02
Cs-137	2.1113E+00	185.22	370.43	0.00E+00	3.91E+02	7.82E+02
Eu-154	4.8092E-02	185.22	370.43	0.00E+00	8.91E+00	1.78E+01
Eu-155	6.8447E-02	185.22	370.43	0.00E+00	1.27E+01	2.54E+01
Fe-55	5.8479E-03	185.22	370.43	0.00E+00	1.08E+00	2.17E+00
H-3	8.9300E-03	185.22	370.43	0.00E+00	1.65E+00	3.31E+00
I-129	1.2891E-06	185.22	370.43	0.00E+00	2.39E-04	4.78E-04
Kr-85	7.0941E-02	185.22	370.43	0.00E+00	1.31E+01	2.63E+01
Np-237	2.6541E-06	185.22	370.43	0.00E+00	4.92E-04	9.83E-04
Pa-231	4.8970E-12	185.22	370.43	0.00E+00	9.07E-10	1.81E-09
Pb-210	2.2170E-13	185.22	370.43	0.00E+00	4.11E-11	8.21E-11
Pm-147	2.3617E-01	185.22	370.43	0.00E+00	4.37E+01	8.75E+01
Pu-238	2.8636E-02	185.22	370.43	0.00E+00	5.30E+00	1.06E+01
Pu-239	-3.5520E-02	185.22	0.00	4.34E+01	3.68E+01	4.34E+01
Pu-240	2.0790E-02	185.22	370.43	2.21E+01	2.59E+01	2.98E+01
Pu-241	-4.8316E-01	185.22	0.00	9.91E+02	9.01E+02	9.91E+02
Pu-242	1.1052E-05	185.22	370.43	5.89E-03	7.93E-03	9.98E-03
Ra-226	5.7471E-13	185.22	370.43	0.00E+00	1.06E-10	2.13E-10
Ra-228	5.4957E-17	185.22	370.43	0.00E+00	1.02E-14	2.04E-14
Ru-106	1.4582E-02	185.22	370.43	0.00E+00	2.70E+00	5.40E+00
Se-79	1.0137E-05	185.22	370.43	0.00E+00	1.88E-03	3.76E-03
Sn-126	4.3922E-05	185.22	370.43	0.00E+00	8.14E-03	1.63E-02
Sr-90	7.6329E-01	185.22	370.43	0.00E+00	1.41E+02	2.83E+02
Tc-99	3.9412E-04	185.22	370.43	0.00E+00	7.30E-02	1.46E-01
Th-229	1.6457E-12	185.22	370.43	0.00E+00	3.05E-10	6.10E-10
Th-230	1.8822E-10	185.22	370.43	0.00E+00	3.49E-08	6.97E-08
Th-232	9.7601E-17	185.22	370.43	0.00E+00	1.81E-14	3.62E-14
Tl-208	5.2722E-07	185.22	370.43	0.00E+00	9.77E-05	1.95E-04
U-232	1.4925E-06	185.22	370.43	0.00E+00	2.76E-04	5.53E-04
U-233	2.1113E-10	185.22	370.43	0.00E+00	3.91E-08	7.82E-08
U-234	1.9528E-06	185.22	370.43	0.00E+00	3.62E-04	7.23E-04
U-235	-9.7920E-09	185.22	0.00	8.92E-06	7.10E-06	8.92E-06
U-236	1.1570E-07	185.22	370.43	0.00E+00	2.14E-05	4.29E-05
U-238	-1.7914E-07	185.22	0.00	6.49E-04	6.16E-04	6.49E-04
Y-90	7.6329E-01	185.22	370.43	0.00E+00	1.41E+02	2.83E+02
Other Radionuclides					4.01E+02	8.03E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.864E+13
0.0250	4.017E+12
0.0375	4.593E+12
0.0575	3.911E+12
0.0850	2.289E+12
0.1250	1.709E+12
0.2250	1.733E+12
0.3750	8.910E+11
0.5750	2.977E+13
0.8500	9.963E+11
1.2500	8.675E+11
1.7500	1.425E+10
2.2500	4.797E+08
2.7500	5.004E+07
3.5000	5.650E+06
5.0000	1.418E+04
7.0000	1.622E+03
11.0000	1.858E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.99E+00	1.02E+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:		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	[1]**Fuel decay start date:**	1992
SNF ID #:	329	**Estimates as of:**	2010
Fuel Units & Descr:	14 - HEX ARRAY 169 ROD	**Template:**	FFTF (FAST, SST, 10 to 30%, Pu & U)
Heavy Metal Mass:	BOL= ; EOL=605.982kg	[2]**Template Burnup(MWd):**	5011.2
ROD Storage Site:	HANFORD	**Template BOL Heavy Metal Mass (MT):**	0.0329181
		Template Decay Time:	15 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	1.3735E-12	96,319.97	140,074.70	0.00E+00	1.32E-07	1.92E-07
Am-241	7.9527E-02	96,319.97	140,074.70	1.35E+03	9.01E+03	1.25E+04
Am-242m	2.1053E-03	96,319.97	140,074.70	0.00E+00	2.03E+02	2.95E+02
Am-243	1.0760E-04	96,319.97	140,074.70	0.00E+00	1.04E+01	1.51E+01
C-14	2.6141E-05	96,319.97	140,074.70	0.00E+00	2.52E+00	3.66E+00
Cl-36	3.4243E-10	96,319.97	140,074.70	0.00E+00	3.30E-05	4.80E-05
Cm-243	6.6092E-04	96,319.97	140,074.70	0.00E+00	6.37E+01	9.26E+01
Cm-244	2.9933E-03	96,319.97	140,074.70	0.00E+00	2.88E+02	4.19E+02
Co-60	1.5934E-02	96,319.97	140,074.70	0.00E+00	1.53E+03	2.23E+03
Cs-134	4.6356E-02	96,319.97	140,074.70	0.00E+00	4.47E+03	6.49E+03
Cs-135	4.7693E-05	96,319.97	140,074.70	0.00E+00	4.59E+00	6.68E+00
Cs-137	2.1113E+00	96,319.97	140,074.70	0.00E+00	2.03E+05	2.96E+05
Eu-154	4.8092E-02	96,319.97	140,074.70	0.00E+00	4.63E+03	6.74E+03
Eu-155	6.8447E-02	96,319.97	140,074.70	0.00E+00	6.59E+03	9.59E+03
Fe-55	5.8479E-03	96,319.97	140,074.70	0.00E+00	5.63E+02	8.19E+02
H-3	8.9300E-03	96,319.97	140,074.70	0.00E+00	8.60E+02	1.25E+03
I-129	1.2891E-06	96,319.97	140,074.70	0.00E+00	1.24E-01	1.81E-01
Kr-85	7.0941E-02	96,319.97	140,074.70	0.00E+00	6.83E+03	9.94E+03
Np-237	2.6541E-06	96,319.97	140,074.70	0.00E+00	2.56E-01	3.72E-01
Pa-231	4.8970E-12	96,319.97	140,074.70	0.00E+00	4.72E-07	6.86E-07
Pb-210	2.2170E-13	96,319.97	140,074.70	0.00E+00	2.14E-08	3.11E-08
Pm-147	2.3617E-01	96,319.97	140,074.70	0.00E+00	2.27E+04	3.31E+04
Pu-238	2.8636E-02	96,319.97	140,074.70	0.00E+00	2.76E+03	4.01E+03
Pu-239	-3.5520E-02	96,319.97	0.00	1.11E+04	7.70E+03	1.11E+04
Pu-240	2.0790E-02	96,319.97	140,074.70	5.65E+03	7.65E+03	6.56E+03
Pu-241	-4.8316E-01	96,319.97	0.00	2.54E+05	2.07E+05	2.54E+05
Pu-242	1.1052E-05	96,319.97	140,074.70	1.51E+00	2.57E+00	3.06E+00
Ra-226	5.7471E-13	96,319.97	140,074.70	0.00E+00	5.54E-08	8.05E-08
Ra-228	5.4957E-17	96,319.97	140,074.70	0.00E+00	5.29E-12	7.70E-12
Ru-106	1.4582E-02	96,319.97	140,074.70	0.00E+00	1.40E+03	2.04E+03
Se-79	1.0137E-05	96,319.97	140,074.70	0.00E+00	9.76E-01	1.42E+00
Sn-126	4.3922E-05	96,319.97	140,074.70	0.00E+00	4.23E+00	6.15E+00
Sr-90	7.6329E-01	96,319.97	140,074.70	0.00E+00	7.35E+04	1.07E+05
Tc-99	3.9412E-04	96,319.97	140,074.70	0.00E+00	3.80E+01	5.52E+01
Th-229	1.6457E-12	96,319.97	140,074.70	0.00E+00	1.59E-07	2.31E-07
Th-230	1.8822E-10	96,319.97	140,074.70	0.00E+00	1.81E-05	2.64E-05
Th-232	9.7601E-17	96,319.97	140,074.70	0.00E+00	9.40E-12	1.37E-11
Tl-208	5.2722E-07	96,319.97	140,074.70	0.00E+00	5.08E-02	7.39E-02
U-232	1.4925E-06	96,319.97	140,074.70	0.00E+00	1.44E-01	2.09E-01
U-233	2.1113E-10	96,319.97	140,074.70	0.00E+00	2.03E-05	2.96E-05
U-234	1.9528E-06	96,319.97	140,074.70	0.00E+00	1.88E-01	2.74E-01
U-235	-9.7920E-09	96,319.97	0.00	2.28E-03	1.34E-03	2.28E-03
U-236	1.1570E-07	96,319.97	140,074.70	0.00E+00	1.11E-02	1.62E-02
U-238	-1.7914E-07	96,319.97	0.00	1.66E-01	1.49E-01	1.66E-01
Y-90	7.6329E-01	96,319.97	140,074.70	0.00E+00	7.35E+04	1.07E+05
Other Radionuclides					2.09E+05	3.04E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.013E+15
0.0250	1.518E+15
0.0375	1.737E+15
0.0575	1.470E+15
0.0850	8.654E+14
0.1250	6.463E+14
0.2250	6.553E+14
0.3750	3.369E+14
0.5750	1.126E+16
0.8500	3.768E+14
1.2500	3.280E+14
1.7500	5.389E+12
2.2500	1.814E+11
2.7500	1.892E+10
3.5000	2.135E+09
5.0000	4.722E+08
7.0000	5.406E+05
11.0000	6.192E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.52E+03	3.57E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

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

Basis for burnup used in estimate:

Nominal burnup taken from SFD and converted to MWd using BOL=702.481kg
Bounding burnup taken from SFD and converted to MWd using BOL=702.481kg

Checks

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

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FFTF-TFA-CRBR-3 & CRBR-5
SNF ID #: 322
Fuel Units & Descr: 2 - HEX ARRAY 217 ROD
Heavy Metal Mass: BOL= ; EOL=69.402kg
ROD Storage Site: HANFORD

[1]Fuel decay start date: 1992
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x15' = 0.40

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.3735E-12	5,116.34	5,738.65	0.00E+00	7.03E-09	7.88E-09
Am-241	7.9527E-02	5,116.34	5,738.65	1.44E+02	5.51E+02	6.00E+02
Am-242m	2.1053E-03	5,116.34	5,738.65	0.00E+00	1.08E+01	1.21E+01
Am-243	1.0760E-04	5,116.34	5,738.65	0.00E+00	5.51E-01	6.17E-01
C-14	2.6141E-05	5,116.34	5,738.65	0.00E+00	1.34E-01	1.50E-01
Cl-36	3.4243E-10	5,116.34	5,738.65	0.00E+00	1.75E-06	1.97E-06
Cm-243	6.6092E-04	5,116.34	5,738.65	0.00E+00	3.38E+00	3.79E+00
Cm-244	2.9933E-03	5,116.34	5,738.65	0.00E+00	1.53E+01	1.72E+01
Co-60	1.5934E-02	5,116.34	5,738.65	0.00E+00	8.15E+01	9.14E+01
Cs-134	4.6356E-02	5,116.34	5,738.65	0.00E+00	2.37E+02	2.66E+02
Cs-135	4.7693E-05	5,116.34	5,738.65	0.00E+00	2.44E-01	2.74E-01
Cs-137	2.1113E+00	5,116.34	5,738.65	0.00E+00	1.08E+04	1.21E+04
Eu-154	4.8092E-02	5,116.34	5,738.65	0.00E+00	2.46E+02	2.76E+02
Eu-155	6.8447E-02	5,116.34	5,738.65	0.00E+00	3.50E+02	3.93E+02
Fe-55	5.8479E-03	5,116.34	5,738.65	0.00E+00	2.99E+01	3.36E+01
H-3	8.9300E-03	5,116.34	5,738.65	0.00E+00	4.57E+01	5.12E+01
I-129	1.2891E-06	5,116.34	5,738.65	0.00E+00	6.60E-03	7.40E-03
Kr-85	7.0941E-02	5,116.34	5,738.65	0.00E+00	3.63E+02	4.07E+02
Np-237	2.6541E-06	5,116.34	5,738.65	0.00E+00	1.36E-02	1.52E-02
Pa-231	4.8970E-12	5,116.34	5,738.65	0.00E+00	2.51E-08	2.81E-08
Pb-210	2.2170E-13	5,116.34	5,738.65	0.00E+00	1.13E-09	1.27E-09
Pm-147	2.3617E-01	5,116.34	5,738.65	0.00E+00	1.21E+03	1.36E+03
Pu-238	2.8636E-02	5,116.34	5,738.65	0.00E+00	1.47E+02	1.64E+02
Pu-239	-3.5520E-02	5,116.34	0.00	1.18E+03	9.98E+02	1.18E+03
Pu-240	2.0790E-02	5,116.34	5,738.65	6.00E+02	7.06E+02	7.19E+02
Pu-241	-4.8316E-01	5,116.34	0.00	2.69E+04	2.44E+04	2.69E+04
Pu-242	1.1062E-05	5,116.34	5,738.65	1.60E-01	2.16E-01	2.23E-01
Ra-226	5.7471E-13	5,116.34	5,738.65	0.00E+00	2.94E-09	3.30E-09
Ra-228	5.4957E-17	5,116.34	5,738.65	0.00E+00	2.81E-13	3.15E-13
Ru-106	1.4582E-02	5,116.34	5,738.65	0.00E+00	7.46E+01	8.37E+01
Se-79	1.0137E-05	5,116.34	5,738.65	0.00E+00	5.19E-02	5.82E-02
Sn-126	4.3922E-05	5,116.34	5,738.65	0.00E+00	2.25E-01	2.52E-01
Sr-90	7.6329E-01	5,116.34	5,738.65	0.00E+00	3.91E+03	4.38E+03
Tc-99	3.9412E-04	5,116.34	5,738.65	0.00E+00	2.02E+00	2.26E+00
Th-229	1.6457E-12	5,116.34	5,738.65	0.00E+00	8.42E-09	9.44E-09
Th-230	1.8822E-10	5,116.34	5,738.65	0.00E+00	9.63E-07	1.08E-06
Th-232	9.7601E-17	5,116.34	5,738.65	0.00E+00	4.99E-13	5.60E-13
Tl-208	5.2722E-07	5,116.34	5,738.65	0.00E+00	2.70E-03	3.03E-03
U-232	1.4925E-06	5,116.34	5,738.65	0.00E+00	7.64E-03	8.56E-03
U-233	2.1113E-10	5,116.34	5,738.65	0.00E+00	1.08E-06	1.21E-06
U-234	1.9528E-06	5,116.34	5,738.65	0.00E+00	9.99E-03	1.12E-02
U-235	-9.7920E-09	5,116.34	0.00	2.42E-04	1.92E-04	2.42E-04
U-236	1.1570E-07	5,116.34	5,738.65	0.00E+00	5.92E-04	6.64E-04
U-238	-1.7914E-07	5,116.34	0.00	1.76E-02	1.67E-02	1.76E-02
Y-90	7.6329E-01	5,116.34	5,738.65	0.00E+00	3.91E+03	4.38E+03
Other Radionuclides					1.11E+04	1.24E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.921E+14
0.0250	6.229E+13
0.0375	7.117E+13
0.0575	6.144E+13
0.0850	3.545E+13
0.1250	2.648E+13
0.2250	2.685E+13
0.3750	1.380E+13
0.5750	4.612E+14
0.8500	1.544E+13
1.2500	1.344E+13
1.7500	2.206E+11
2.2500	7.431E+09
2.7500	7.753E+08
3.5000	8.767E+07
5.0000	2.809E+05
7.0000	3.210E+04
11.0000	3.674E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.84E+02	1.83E+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: 2010
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: 15 years

Estimated Canister usage: 18"x15' 0.20

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3735E-12	3.46	6.92	0.00E+00	4.75E-12	9.51E-12	Avg. MeV	
Am-241	7.9527E-02	3.46	6.92	6.67E+01	6.70E+01	6.73E+01	0.0150	3.943E+12
Am-242m	2.1053E-03	3.46	6.92	0.00E+00	7.29E-03	1.46E-02	0.0250	1.374E+11
Am-243	1.0760E-04	3.46	6.92	0.00E+00	3.72E-04	7.45E-04	0.0375	9.220E+10
C-14	2.6141E-05	3.46	6.92	0.00E+00	9.05E-05	1.81E-04	0.0575	9.982E+11
Cl-36	3.4243E-10	3.46	6.92	0.00E+00	1.19E-09	2.37E-09	0.0850	4.379E+10
Cm-243	6.6092E-04	3.46	6.92	0.00E+00	2.29E-03	4.57E-03	0.1250	3.482E+10
Cm-244	2.9933E-03	3.46	6.92	0.00E+00	1.04E-02	2.07E-02	0.2250	3.270E+10
Co-60	1.5934E-02	3.46	6.92	0.00E+00	5.51E-02	1.10E-01	0.3750	1.797E+10
Cs-134	4.6356E-02	3.46	6.92	0.00E+00	1.60E-01	3.21E-01	0.5750	5.563E+11
Cs-135	4.7693E-05	3.46	6.92	0.00E+00	1.65E-04	3.30E-04	0.8500	1.863E+10
Cs-137	2.1113E+00	3.46	6.92	0.00E+00	7.31E+00	1.46E+01	1.2500	1.621E+10
Eu-154	4.8092E-02	3.46	6.92	0.00E+00	1.66E-01	3.33E-01	1.7500	2.668E+08
Eu-155	6.8447E-02	3.46	6.92	0.00E+00	2.37E-01	4.74E-01	2.2500	9.267E+08
Fe-55	5.8479E-03	3.46	6.92	0.00E+00	2.02E-02	4.05E-02	2.7500	1.110E+06
H-3	8.9300E-03	3.46	6.92	0.00E+00	3.09E-02	6.18E-02	3.5000	2.610E+05
I-129	1.2891E-06	3.46	6.92	0.00E+00	4.46E-06	8.92E-06	5.0000	6.629E+04
Kr-85	7.0941E-02	3.46	6.92	0.00E+00	2.46E-01	4.91E-01	7.0000	7.545E+03
Np-237	2.6541E-06	3.46	6.92	0.00E+00	9.19E-06	1.84E-05	11.0000	8.623E+02
Pa-231	4.8970E-12	3.46	6.92	0.00E+00	1.69E-11	3.39E-11		
Pb-210	2.2170E-13	3.46	6.92	0.00E+00	7.67E-13	1.53E-12		
Pm-147	2.3617E-01	3.46	6.92	0.00E+00	8.17E-01	1.63E+00		
Pu-238	2.8636E-02	3.46	6.92	0.00E+00	9.91E-02	1.98E-01		
Pu-239	-3.5520E-02	3.46	0.00	5.48E+02	5.48E+02	5.48E+02		
Pu-240	2.0790E-02	3.46	6.92	2.78E+02	2.78E+02	2.79E+02		
Pu-241	-4.8316E-01	3.46	0.00	1.25E+04	1.25E+04	1.25E+04		
Pu-242	1.1052E-05	3.46	6.92	7.42E-02	7.43E-02	7.43E-02		
Ra-226	5.7471E-13	3.46	6.92	0.00E+00	1.99E-12	3.98E-12		
Ra-228	5.4957E-17	3.46	6.92	0.00E+00	1.90E-16	3.80E-16		
Ru-106	1.4582E-02	3.46	6.92	0.00E+00	5.05E-02	1.01E-01		
Se-79	1.0137E-05	3.46	6.92	0.00E+00	3.51E-05	7.02E-05		
Sn-126	4.3922E-05	3.46	6.92	0.00E+00	1.52E-04	3.04E-04		
Sr-90	7.6329E-01	3.46	6.92	0.00E+00	2.64E+00	5.28E+00		
Tc-99	3.9412E-04	3.46	6.92	0.00E+00	1.36E-03	2.73E-03		
Th-229	1.6457E-12	3.46	6.92	0.00E+00	5.70E-12	1.14E-11		
Th-230	1.8822E-10	3.46	6.92	0.00E+00	6.51E-10	1.30E-09		
Th-232	9.7601E-17	3.46	6.92	0.00E+00	3.38E-16	6.76E-16		
Tl-208	5.2722E-07	3.46	6.92	0.00E+00	1.82E-06	3.65E-06		
U-232	1.4925E-06	3.46	6.92	0.00E+00	5.17E-06	1.03E-05		
U-233	2.1113E-10	3.46	6.92	0.00E+00	7.31E-10	1.46E-09		
U-234	1.9528E-06	3.46	6.92	0.00E+00	6.76E-06	1.35E-05		
U-235	-9.7920E-09	3.46	0.00	1.12E-04	1.12E-04	1.12E-04		
U-236	1.1570E-07	3.46	6.92	0.00E+00	4.00E-07	8.01E-07		
U-238	-1.7914E-07	3.46	0.00	8.19E-03	8.19E-03	8.19E-03		
Y-90	7.6329E-01	3.46	6.92	0.00E+00	2.64E+00	5.28E+00		
Other Radionuclides					7.50E+00	1.50E+01		

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: 2010
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: 15 years

Estimated Canister usage: 18"x15' 0.20

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	1.3735E-12	2,694.34	5,388.68	0.00E+00	3.70E-09	7.40E-09
Am-241	7.9527E-02	2,694.34	5,388.68	8.73E+01	3.02E+02	5.16E+02
Am-242m	2.1053E-03	2,694.34	5,388.68	0.00E+00	5.67E+00	1.13E+01
Am-243	1.0760E-04	2,694.34	5,388.68	0.00E+00	2.90E-01	5.80E-01
C-14	2.6141E-05	2,694.34	5,388.68	0.00E+00	7.04E-02	1.41E-01
Cl-36	3.4243E-10	2,694.34	5,388.68	0.00E+00	9.23E-07	1.85E-06
Cm-243	6.6092E-04	2,694.34	5,388.68	0.00E+00	1.78E+00	3.56E+00
Cm-244	2.9933E-03	2,694.34	5,388.68	0.00E+00	8.06E+00	1.61E+01
Co-60	1.5934E-02	2,694.34	5,388.68	0.00E+00	4.29E+01	8.59E+01
Cs-134	4.6356E-02	2,694.34	5,388.68	0.00E+00	1.25E+02	2.50E+02
Cs-135	4.7693E-05	2,694.34	5,388.68	0.00E+00	1.29E-01	2.57E-01
Cs-137	2.1113E+00	2,694.34	5,388.68	0.00E+00	5.69E+03	1.14E+04
Eu-154	4.8092E-02	2,694.34	5,388.68	0.00E+00	1.30E+02	2.59E+02
Eu-155	6.8447E-02	2,694.34	5,388.68	0.00E+00	1.84E+02	3.69E+02
Fe-55	5.8479E-03	2,694.34	5,388.68	0.00E+00	1.58E+01	3.15E+01
H-3	8.9300E-03	2,694.34	5,388.68	0.00E+00	2.41E+01	4.81E+01
I-129	1.2891E-06	2,694.34	5,388.68	0.00E+00	3.47E-03	6.95E-03
Kr-85	7.0941E-02	2,694.34	5,388.68	0.00E+00	1.91E+02	3.82E+02
Np-237	2.6541E-06	2,694.34	5,388.68	0.00E+00	7.15E-03	1.43E-02
Pa-231	4.8970E-12	2,694.34	5,388.68	0.00E+00	1.32E-08	2.64E-08
Pb-210	2.2170E-13	2,694.34	5,388.68	0.00E+00	5.97E-10	1.19E-09
Pm-147	2.3617E-01	2,694.34	5,388.68	0.00E+00	6.36E+02	1.27E+03
Pu-238	2.8636E-02	2,694.34	5,388.68	0.00E+00	7.72E+01	1.54E+02
Pu-239	-3.5520E-02	2,694.34	0.00	7.17E+02	6.21E+02	7.17E+02
Pu-240	2.0790E-02	2,694.34	5,388.68	3.64E+02	4.20E+02	4.76E+02
Pu-241	-4.8316E-01	2,694.34	0.00	1.64E+04	1.50E+04	1.64E+04
Pu-242	1.1052E-05	2,694.34	5,388.68	9.71E-02	1.27E-01	1.57E-01
Ra-226	5.7471E-13	2,694.34	5,388.68	0.00E+00	1.55E-09	3.10E-09
Ra-228	5.4957E-17	2,694.34	5,388.68	0.00E+00	1.48E-13	2.96E-13
Ru-106	1.4582E-02	2,694.34	5,388.68	0.00E+00	3.93E+01	7.86E+01
Se-79	1.0137E-05	2,694.34	5,388.68	0.00E+00	2.73E-02	5.46E-02
Sn-126	4.3922E-05	2,694.34	5,388.68	0.00E+00	1.18E-01	2.37E-01
Sr-90	7.6329E-01	2,694.34	5,388.68	0.00E+00	2.06E+03	4.11E+03
Tc-99	3.9412E-04	2,694.34	5,388.68	0.00E+00	1.06E+00	2.12E+00
Th-229	1.6457E-12	2,694.34	5,388.68	0.00E+00	4.43E-09	8.87E-09
Th-230	1.8822E-10	2,694.34	5,388.68	0.00E+00	5.07E-07	1.01E-06
Th-232	9.7601E-17	2,694.34	5,388.68	0.00E+00	2.63E-13	5.26E-13
Tl-208	5.2722E-07	2,694.34	5,388.68	0.00E+00	1.42E-03	2.84E-03
U-232	1.4925E-06	2,694.34	5,388.68	0.00E+00	4.02E-03	8.04E-03
U-233	2.1113E-10	2,694.34	5,388.68	0.00E+00	5.69E-07	1.14E-06
U-234	1.9528E-06	2,694.34	5,388.68	0.00E+00	5.26E-03	1.05E-02
U-235	-9.7920E-09	2,694.34	0.00	1.47E-04	1.21E-04	1.47E-04
U-236	1.1570E-07	2,694.34	5,388.68	0.00E+00	3.12E-04	6.23E-04
U-238	-1.7914E-07	2,694.34	0.00	1.07E-02	1.02E-02	1.07E-02
Y-90	7.6329E-01	2,694.34	5,388.68	0.00E+00	2.06E+03	4.11E+03
Other Radionuclides					5.84E+03	1.17E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.717E+14
0.0250	5.845E+13
0.0375	6.682E+13
0.0575	5.704E+13
0.0850	3.329E+13
0.1250	2.486E+13
0.2250	2.521E+13
0.3750	1.296E+13
0.5750	4.330E+14
0.8500	1.449E+13
1.2500	1.262E+13
1.7500	2.073E+11
2.2500	6.978E+09
2.7500	7.279E+08
3.5000	8.221E+07
5.0000	2.165E+05
7.0000	2.477E+04
11.0000	2.836E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.14E+01	1.82E+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: 2010
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: 15 years

Estimated Canister usage:
18"x15'
0.40

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.3735E-12	10,382.82	20,765.65	0.00E+00	1.43E-08	2.85E-08
Am-241	7.9527E-02	10,382.82	20,765.65	1.90E+02	1.02E+03	1.84E+03
Am-242m	2.1053E-03	10,382.82	20,765.65	0.00E+00	2.19E+01	4.37E+01
Am-243	1.0760E-04	10,382.82	20,765.65	0.00E+00	1.12E+00	2.23E+00
C-14	2.6141E-05	10,382.82	20,765.65	0.00E+00	2.71E-01	5.43E-01
Cl-36	3.4243E-10	10,382.82	20,765.65	0.00E+00	3.56E-06	7.11E-06
Cm-243	6.6092E-04	10,382.82	20,765.65	0.00E+00	6.86E+00	1.37E+01
Cm-244	2.9933E-03	10,382.82	20,765.65	0.00E+00	3.11E+01	6.22E+01
Co-60	1.5934E-02	10,382.82	20,765.65	0.00E+00	1.65E+02	3.31E+02
Cs-134	4.6356E-02	10,382.82	20,765.65	0.00E+00	4.81E+02	9.63E+02
Cs-135	4.7693E-05	10,382.82	20,765.65	0.00E+00	4.95E-01	9.90E-01
Cs-137	2.1113E+00	10,382.82	20,765.65	0.00E+00	2.19E+04	4.38E+04
Eu-154	4.8092E-02	10,382.82	20,765.65	0.00E+00	4.99E+02	9.99E+02
Eu-155	6.8447E-02	10,382.82	20,765.65	0.00E+00	7.11E+02	1.42E+03
Fe-55	5.8479E-03	10,382.82	20,765.65	0.00E+00	6.07E+01	1.21E+02
H-3	8.9300E-03	10,382.82	20,765.65	0.00E+00	9.27E+01	1.85E+02
I-129	1.2891E-06	10,382.82	20,765.65	0.00E+00	1.34E-02	2.68E-02
Kr-85	7.0941E-02	10,382.82	20,765.65	0.00E+00	7.37E+02	1.47E+03
Np-237	2.6541E-06	10,382.82	20,765.65	0.00E+00	2.76E-02	5.51E-02
Pa-231	4.8970E-12	10,382.82	20,765.65	0.00E+00	5.08E-08	1.02E-07
Pb-210	2.2170E-13	10,382.82	20,765.65	0.00E+00	2.30E-09	4.60E-09
Pm-147	2.3617E-01	10,382.82	20,765.65	0.00E+00	2.45E+03	4.90E+03
Pu-238	2.8636E-02	10,382.82	20,765.65	0.00E+00	2.97E+02	5.95E+02
Pu-239	-3.5520E-02	10,382.82	0.00	1.56E+03	1.19E+03	1.56E+03
Pu-240	2.0790E-02	10,382.82	20,765.65	7.92E+02	1.01E+03	1.22E+03
Pu-241	-4.8316E-01	10,382.82	0.00	3.56E+04	3.06E+04	3.56E+04
Pu-242	1.1052E-05	10,382.82	20,765.65	2.11E-01	3.26E-01	4.41E-01
Ra-226	5.7471E-13	10,382.82	20,765.65	0.00E+00	5.97E-09	1.19E-08
Ra-228	5.4957E-17	10,382.82	20,765.65	0.00E+00	5.71E-13	1.14E-12
Ru-106	1.4582E-02	10,382.82	20,765.65	0.00E+00	1.51E+02	3.03E+02
Se-79	1.0137E-05	10,382.82	20,765.65	0.00E+00	1.05E-01	2.11E-01
Sn-126	4.3922E-05	10,382.82	20,765.65	0.00E+00	4.56E-01	9.12E-01
Sr-90	7.6329E-01	10,382.82	20,765.65	0.00E+00	7.93E+03	1.59E+04
Tc-99	3.9412E-04	10,382.82	20,765.65	0.00E+00	4.09E+00	8.18E+00
Th-229	1.6457E-12	10,382.82	20,765.65	0.00E+00	1.71E-08	3.42E-08
Th-230	1.8822E-10	10,382.82	20,765.65	0.00E+00	1.95E-06	3.91E-06
Th-232	9.7601E-17	10,382.82	20,765.65	0.00E+00	1.01E-12	2.03E-12
Tl-208	5.2722E-07	10,382.82	20,765.65	0.00E+00	5.47E-03	1.09E-02
U-232	1.4925E-06	10,382.82	20,765.65	0.00E+00	1.55E-02	3.10E-02
U-233	2.1113E-10	10,382.82	20,765.65	0.00E+00	2.19E-06	4.38E-06
U-234	1.9528E-06	10,382.82	20,765.65	0.00E+00	2.03E-02	4.06E-02
U-235	-9.7920E-09	10,382.82	0.00	3.20E-04	2.18E-04	3.20E-04
U-236	1.1570E-07	10,382.82	20,765.65	0.00E+00	1.20E-03	2.40E-03
U-238	-1.7914E-07	10,382.82	0.00	2.33E-02	2.14E-02	2.33E-02
Y-90	7.6329E-01	10,382.82	20,765.65	0.00E+00	7.93E+03	1.59E+04
Other Radionuclides					2.25E+04	4.50E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.039E+15
0.0250	2.251E+14
0.0375	2.575E+14
0.0575	2.178E+14
0.0850	1.283E+14
0.1250	9.581E+13
0.2250	9.715E+13
0.3750	4.995E+13
0.5750	1.669E+15
0.8500	5.585E+13
1.2500	4.863E+13
1.7500	7.989E+11
2.2500	2.689E+10
2.7500	2.805E+09
3.5000	3.165E+08
5.0000	6.893E+05
7.0000	7.892E+04
11.0000	9.040E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.91E+02	5.24E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

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

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1992
Estimates as of: 2010
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: 15 years

Estimated Canister usage:
16"x15"
0.60

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3735E-12	10,725.31	11,359.60	0.00E+00	1.47E-08	1.56E-08	Avg. MeV	
Am-241	7.9527E-02	10,725.31	11,359.60	2.74E+02	1.13E+03	1.18E+03	0.0150	5.775E+14
Am-242m	2.1053E-03	10,725.31	11,359.60	0.00E+00	2.26E+01	2.39E+01	0.0250	1.233E+14
Am-243	1.0760E-04	10,725.31	11,359.60	0.00E+00	1.15E+00	1.22E+00	0.0375	1.409E+14
C-14	2.6141E-05	10,725.31	11,359.60	0.00E+00	2.80E-01	2.97E-01	0.0575	1.215E+14
Cl-36	3.4243E-10	10,725.31	11,359.60	0.00E+00	3.67E-06	3.89E-06	0.0850	7.018E+13
Cm-243	6.6092E-04	10,725.31	11,359.60	0.00E+00	7.09E+00	7.51E+00	0.1250	5.242E+13
Cm-244	2.9933E-03	10,725.31	11,359.60	0.00E+00	3.21E+01	3.40E+01	0.2250	5.315E+13
Co-60	1.5934E-02	10,725.31	11,359.60	0.00E+00	1.71E+02	1.81E+02	0.3750	2.733E+13
Cs-134	4.6356E-02	10,725.31	11,359.60	0.00E+00	4.97E+02	5.27E+02	0.5750	9.129E+14
Cs-135	4.7693E-05	10,725.31	11,359.60	0.00E+00	5.12E-01	5.42E-01	0.8500	3.055E+13
Cs-137	2.1113E+00	10,725.31	11,359.60	0.00E+00	2.26E+04	2.40E+04	1.2500	2.660E+13
Eu-154	4.8092E-02	10,725.31	11,359.60	0.00E+00	5.16E+02	5.46E+02	1.7500	4.370E+11
Eu-155	6.8447E-02	10,725.31	11,359.60	0.00E+00	7.34E+02	7.78E+02	2.2500	1.471E+10
Fe-55	5.8479E-03	10,725.31	11,359.60	0.00E+00	6.27E+01	6.64E+01	2.7500	1.535E+09
H-3	8.9300E-03	10,725.31	11,359.60	0.00E+00	9.58E+01	1.01E+02	3.5000	1.735E+08
I-129	1.2891E-06	10,725.31	11,359.60	0.00E+00	1.38E-02	1.46E-02	5.0000	5.454E+05
Kr-85	7.0941E-02	10,725.31	11,359.60	0.00E+00	7.61E+02	8.06E+02	7.0000	6.233E+04
Np-237	2.6541E-06	10,725.31	11,359.60	0.00E+00	2.85E-02	3.01E-02	11.0000	7.135E+03
Pa-231	4.8970E-12	10,725.31	11,359.60	0.00E+00	5.25E-08	5.56E-08		
Pb-210	2.2170E-13	10,725.31	11,359.60	0.00E+00	2.38E-09	2.52E-09		
Pm-147	2.3617E-01	10,725.31	11,359.60	0.00E+00	2.53E+03	2.68E+03		
Pu-238	2.8636E-02	10,725.31	11,359.60	0.00E+00	3.07E+02	3.25E+02		
Pu-239	-3.5520E-02	10,725.31	0.00	2.25E+03	1.87E+03	2.25E+03		
Pu-240	2.0790E-02	10,725.31	11,359.60	1.14E+03	1.37E+03	1.38E+03		
Pu-241	-4.8316E-01	10,725.31	0.00	5.13E+04	4.61E+04	5.13E+04		
Pu-242	1.1052E-05	10,725.31	11,359.60	3.05E-01	4.23E-01	4.30E-01		
Ra-226	5.7471E-13	10,725.31	11,359.60	0.00E+00	6.16E-09	6.53E-09		
Ra-228	5.4957E-17	10,725.31	11,359.60	0.00E+00	5.89E-13	6.24E-13		
Ru-106	1.4582E-02	10,725.31	11,359.60	0.00E+00	1.56E+02	1.66E+02		
Se-79	1.0137E-05	10,725.31	11,359.60	0.00E+00	1.09E-01	1.15E-01		
Sn-126	4.3922E-05	10,725.31	11,359.60	0.00E+00	4.71E-01	4.99E-01		
Sr-90	7.8329E-01	10,725.31	11,359.60	0.00E+00	8.19E+03	8.67E+03		
Tc-99	3.9412E-04	10,725.31	11,359.60	0.00E+00	4.23E+00	4.48E+00		
Th-229	1.6457E-12	10,725.31	11,359.60	0.00E+00	1.77E-08	1.87E-08		
Th-230	1.8822E-10	10,725.31	11,359.60	0.00E+00	2.02E-06	2.14E-06		
Th-232	9.7601E-17	10,725.31	11,359.60	0.00E+00	1.05E-12	1.11E-12		
Tl-208	5.2722E-07	10,725.31	11,359.60	0.00E+00	5.65E-03	5.99E-03		
U-232	1.4925E-06	10,725.31	11,359.60	0.00E+00	1.60E-02	1.70E-02		
U-233	2.1113E-10	10,725.31	11,359.60	0.00E+00	2.26E-06	2.40E-06		
U-234	1.9528E-06	10,725.31	11,359.60	0.00E+00	2.09E-02	2.22E-02		
U-235	-9.7920E-09	10,725.31	0.00	4.61E-04	3.56E-04	4.61E-04		
U-236	1.1570E-07	10,725.31	11,359.60	0.00E+00	1.24E-03	1.31E-03		
U-238	-1.7914E-07	10,725.31	0.00	3.36E-02	3.17E-02	3.36E-02		
Y-90	7.8329E-01	10,725.31	11,359.60	0.00E+00	8.19E+03	8.67E+03		
Other Radionuclides					2.32E+04	2.46E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.33E+02	3.58E+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-384
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: 2010
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: 15 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	1.3735E-12	3,631.59	3,953.60	0.00E+00	4.99E-09	5.43E-09
Am-241	7.9527E-02	3,631.59	3,953.60	1.72E+02	4.61E+02	4.87E+02
Am-242m	2.1053E-03	3,631.59	3,953.60	0.00E+00	7.65E+00	8.32E+00
Am-243	1.0760E-04	3,631.59	3,953.60	0.00E+00	3.91E-01	4.25E-01
C-14	2.6141E-05	3,631.59	3,953.60	0.00E+00	9.49E-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	6.6092E-04	3,631.59	3,953.60	0.00E+00	2.40E+00	2.61E+00
Cm-244	2.9933E-03	3,631.59	3,953.60	0.00E+00	1.09E+01	1.18E+01
Co-60	1.5934E-02	3,631.59	3,953.60	0.00E+00	5.79E+01	6.30E+01
Cs-134	4.6356E-02	3,631.59	3,953.60	0.00E+00	1.68E+02	1.83E+02
Cs-135	4.7693E-05	3,631.59	3,953.60	0.00E+00	1.73E-01	1.89E-01
Cs-137	2.1113E+00	3,631.59	3,953.60	0.00E+00	7.67E+03	8.35E+03
Eu-154	4.8092E-02	3,631.59	3,953.60	0.00E+00	1.75E+02	1.90E+02
Eu-155	6.8447E-02	3,631.59	3,953.60	0.00E+00	2.49E+02	2.71E+02
Fe-55	5.8479E-03	3,631.59	3,953.60	0.00E+00	2.12E+01	2.31E+01
H-3	8.9300E-03	3,631.59	3,953.60	0.00E+00	3.24E+01	3.53E+01
I-129	1.2891E-06	3,631.59	3,953.60	0.00E+00	4.68E-03	5.10E-03
Kr-85	7.0941E-02	3,631.59	3,953.60	0.00E+00	2.58E+02	2.80E+02
Np-237	2.6541E-06	3,631.59	3,953.60	0.00E+00	9.64E-03	1.05E-02
Pa-231	4.8970E-12	3,631.59	3,953.60	0.00E+00	1.78E-08	1.94E-08
Pb-210	2.2170E-13	3,631.59	3,953.60	0.00E+00	8.05E-10	8.77E-10
Pm-147	2.3617E-01	3,631.59	3,953.60	0.00E+00	8.58E+02	9.34E+02
Pu-238	2.8636E-02	3,631.59	3,953.60	0.00E+00	1.04E+02	1.13E+02
Pu-239	-3.5520E-02	3,631.59	0.00	1.42E+03	1.29E+03	1.42E+03
Pu-240	2.0790E-02	3,631.59	3,953.60	7.20E+02	7.95E+02	8.02E+02
Pu-241	-4.8316E-01	3,631.59	0.00	3.23E+04	3.05E+04	3.23E+04
Pu-242	1.1052E-05	3,631.59	3,953.60	1.92E-01	2.32E-01	2.36E-01
Ra-226	5.7471E-13	3,631.59	3,953.60	0.00E+00	2.09E-09	2.27E-09
Ra-228	5.4957E-17	3,631.59	3,953.60	0.00E+00	2.00E-13	2.17E-13
Ru-106	1.4582E-02	3,631.59	3,953.60	0.00E+00	5.30E+01	5.77E+01
Se-79	1.0137E-05	3,631.59	3,953.60	0.00E+00	3.68E-02	4.01E-02
Sn-126	4.3922E-05	3,631.59	3,953.60	0.00E+00	1.60E-01	1.74E-01
Sr-90	7.6329E-01	3,631.59	3,953.60	0.00E+00	2.77E+03	3.02E+03
Tc-99	3.9412E-04	3,631.59	3,953.60	0.00E+00	1.43E+00	1.56E+00
Th-229	1.6457E-12	3,631.59	3,953.60	0.00E+00	5.98E-09	6.51E-09
Th-230	1.8822E-10	3,631.59	3,953.60	0.00E+00	6.84E-07	7.44E-07
Th-232	9.7601E-17	3,631.59	3,953.60	0.00E+00	3.54E-13	3.86E-13
Tl-208	5.2722E-07	3,631.59	3,953.60	0.00E+00	1.91E-03	2.08E-03
U-232	1.4925E-06	3,631.59	3,953.60	0.00E+00	5.42E-03	5.90E-03
U-233	2.1113E-10	3,631.59	3,953.60	0.00E+00	7.67E-07	8.35E-07
U-234	1.9528E-06	3,631.59	3,953.60	0.00E+00	7.09E-03	7.72E-03
U-235	-9.7920E-09	3,631.59	0.00	2.91E-04	2.55E-04	2.91E-04
U-236	1.1570E-07	3,631.59	3,953.60	0.00E+00	4.20E-04	4.57E-04
U-238	-1.7914E-07	3,631.59	0.00	2.12E-02	2.05E-02	2.12E-02
Y-90	7.6329E-01	3,631.59	3,953.60	0.00E+00	2.77E+03	3.02E+03
Other Radionuclides					7.87E+03	8.57E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.052E+14
0.0250	4.298E+13
0.0375	4.904E+13
0.0575	4.335E+13
0.0850	2.443E+13
0.1250	1.825E+13
0.2250	1.850E+13
0.3750	9.512E+12
0.5750	3.177E+14
0.8500	1.063E+13
1.2500	9.259E+12
1.7500	1.521E+11
2.2500	5.120E+09
2.7500	5.344E+08
3.5000	6.057E+07
5.0000	2.663E+05
7.0000	3.040E+04
11.0000	3.478E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.46E+02	1.57E+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: 2010
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: 15 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	1.3735E-12	835.27	1,229.60	0.00E+00	1.15E-09	1.69E-09
Am-241	7.9527E-02	835.27	1,229.60	6.91E+01	1.36E+02	1.67E+02
Am-242m	2.1053E-03	835.27	1,229.60	0.00E+00	1.76E+00	2.59E+00
Am-243	1.0760E-04	835.27	1,229.60	0.00E+00	8.99E-02	1.32E-01
C-14	2.6141E-05	835.27	1,229.60	0.00E+00	2.18E-02	3.21E-02
Cl-36	3.4243E-10	835.27	1,229.60	0.00E+00	2.86E-07	4.21E-07
Cm-243	6.6092E-04	835.27	1,229.60	0.00E+00	5.52E-01	8.13E-01
Cm-244	2.9933E-03	835.27	1,229.60	0.00E+00	2.50E+00	3.68E+00
Co-60	1.5934E-02	835.27	1,229.60	0.00E+00	1.33E+01	1.96E+01
Cs-134	4.6356E-02	835.27	1,229.60	0.00E+00	3.87E+01	5.70E+01
Cs-135	4.7693E-05	835.27	1,229.60	0.00E+00	3.98E-02	5.86E-02
Cs-137	2.1113E+00	835.27	1,229.60	0.00E+00	1.76E+03	2.60E+03
Eu-154	4.8092E-02	835.27	1,229.60	0.00E+00	4.02E+01	5.91E+01
Eu-155	6.8447E-02	835.27	1,229.60	0.00E+00	5.72E+01	8.42E+01
Fe-55	5.8479E-03	835.27	1,229.60	0.00E+00	4.88E+00	7.19E+00
H-3	8.9300E-03	835.27	1,229.60	0.00E+00	7.46E+00	1.10E+01
I-129	1.2891E-06	835.27	1,229.60	0.00E+00	1.08E-03	1.59E-03
Kr-85	7.0941E-02	835.27	1,229.60	0.00E+00	5.93E+01	8.72E+01
Np-237	2.6541E-06	835.27	1,229.60	0.00E+00	2.22E-03	3.26E-03
Pa-231	4.8970E-12	835.27	1,229.60	0.00E+00	4.09E-09	6.02E-09
Pb-210	2.2170E-13	835.27	1,229.60	0.00E+00	1.85E-10	2.73E-10
Pm-147	2.3617E-01	835.27	1,229.60	0.00E+00	1.97E+02	2.90E+02
Pu-238	2.8636E-02	835.27	1,229.60	0.00E+00	2.39E+01	3.52E+01
Pu-239	-3.5520E-02	835.27	0.00	5.67E+02	5.38E+02	5.67E+02
Pu-240	2.0790E-02	835.27	1,229.60	2.88E+02	3.06E+02	3.14E+02
Pu-241	-4.8316E-01	835.27	0.00	1.29E+04	1.25E+04	1.29E+04
Pu-242	1.1052E-05	835.27	1,229.60	7.69E-02	8.61E-02	9.05E-02
Ra-226	5.7471E-13	835.27	1,229.60	0.00E+00	4.80E-10	7.07E-10
Ra-228	5.4957E-17	835.27	1,229.60	0.00E+00	4.59E-14	6.76E-14
Ru-106	1.4582E-02	835.27	1,229.60	0.00E+00	1.22E+01	1.79E+01
Se-79	1.0137E-05	835.27	1,229.60	0.00E+00	8.47E-03	1.25E-02
Sn-126	4.3922E-05	835.27	1,229.60	0.00E+00	3.67E-02	5.40E-02
Sr-90	7.6329E-01	835.27	1,229.60	0.00E+00	6.38E+02	9.39E+02
Tc-99	3.9412E-04	835.27	1,229.60	0.00E+00	3.29E-01	4.85E-01
Th-229	1.6457E-12	835.27	1,229.60	0.00E+00	1.37E-09	2.02E-09
Th-230	1.8822E-10	835.27	1,229.60	0.00E+00	1.57E-07	2.31E-07
Th-232	9.7601E-17	835.27	1,229.60	0.00E+00	8.15E-14	1.20E-13
Tl-208	5.2722E-07	835.27	1,229.60	0.00E+00	4.40E-04	6.48E-04
U-232	1.4925E-06	835.27	1,229.60	0.00E+00	1.25E-03	1.84E-03
U-233	2.1113E-10	835.27	1,229.60	0.00E+00	1.76E-07	2.60E-07
U-234	1.9528E-06	835.27	1,229.60	0.00E+00	1.63E-03	2.40E-03
U-235	-9.7920E-09	835.27	0.00	1.16E-04	1.08E-04	1.16E-04
U-236	1.1570E-07	835.27	1,229.60	0.00E+00	9.66E-05	1.42E-04
U-238	-1.7914E-07	835.27	0.00	8.48E-03	8.33E-03	8.48E-03
Y-90	7.6329E-01	835.27	1,229.60	0.00E+00	6.38E+02	9.39E+02
Other Radionuclides					1.81E+03	2.67E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.464E+13
0.0250	1.338E+13
0.0375	1.525E+13
0.0575	1.370E+13
0.0850	7.597E+12
0.1250	5.676E+12
0.2250	5.753E+12
0.3750	2.959E+12
0.5750	9.881E+13
0.8500	3.307E+12
1.2500	2.879E+12
1.7500	4.730E+10
2.2500	1.592E+09
2.7500	1.662E+08
3.5000	1.887E+07
5.0000	9.816E+04
7.0000	1.120E+04
11.0000	1.281E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.61E+01	6.84E+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: 2010
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: 15 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	2.1509E-08	1,204.37	1,348.90	0.00E+00	2.59E-05	2.90E-05
Am-241	4.6529E-07	1,204.37	1,348.90	0.00E+00	5.60E-04	6.28E-04
Am-242m	0.0000E+00	1,204.37	1,348.90	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3923E-15	1,204.37	1,348.90	0.00E+00	1.01E-11	1.13E-11
C-14	2.1765E-05	1,204.37	1,348.90	0.00E+00	2.62E-02	2.94E-02
Cl-36	5.5188E-08	1,204.37	1,348.90	0.00E+00	6.65E-05	7.44E-05
Cm-243	2.5208E-14	1,204.37	1,348.90	0.00E+00	3.04E-11	3.40E-11
Cm-244	1.1259E-15	1,204.37	1,348.90	0.00E+00	1.36E-12	1.52E-12
Co-60	2.9094E-02	1,204.37	1,348.90	0.00E+00	3.50E+01	3.92E+01
Cs-134	5.1932E-04	1,204.37	1,348.90	0.00E+00	6.25E-01	7.01E-01
Cs-135	4.4996E-05	1,204.37	1,348.90	0.00E+00	5.42E-02	6.07E-02
Cs-137	2.1867E+00	1,204.37	1,348.90	0.00E+00	2.63E+03	2.95E+03
Eu-154	9.2837E-04	1,204.37	1,348.90	0.00E+00	1.12E+00	1.25E+00
Eu-155	2.3180E-02	1,204.37	1,348.90	0.00E+00	2.79E+01	3.13E+01
Fe-55	2.9332E-03	1,204.37	1,348.90	0.00E+00	3.53E+00	3.96E+00
H-3	1.0871E-02	1,204.37	1,348.90	0.00E+00	1.31E+01	1.47E+01
I-129	1.1426E-06	1,204.37	1,348.90	0.00E+00	1.38E-03	1.54E-03
Kr-85	1.4068E-01	1,204.37	1,348.90	0.00E+00	1.69E+02	1.90E+02
Np-237	3.3099E-06	1,204.37	1,348.90	0.00E+00	3.99E-03	4.46E-03
Pa-231	7.8640E-08	1,204.37	1,348.90	0.00E+00	9.47E-05	1.06E-04
Pb-210	7.4277E-13	1,204.37	1,348.90	0.00E+00	8.95E-10	1.00E-09
Pm-147	2.2856E-01	1,204.37	1,348.90	0.00E+00	2.75E+02	3.08E+02
Pu-238	2.0095E-04	1,204.37	1,348.90	0.00E+00	2.42E-01	2.71E-01
Pu-239	1.9481E-02	1,204.37	1,348.90	0.00E+00	2.35E+01	2.63E+01
Pu-240	6.8056E-05	1,204.37	1,348.90	0.00E+00	8.20E-02	9.18E-02
Pu-241	1.0939E-05	1,204.37	1,348.90	0.00E+00	1.32E-02	1.48E-02
Pu-242	4.3751E-13	1,204.37	1,348.90	0.00E+00	5.27E-10	5.90E-10
Ra-226	4.0428E-12	1,204.37	1,348.90	0.00E+00	4.87E-09	5.45E-09
Ra-228	2.1032E-11	1,204.37	1,348.90	0.00E+00	2.53E-08	2.84E-08
Ru-106	2.9077E-04	1,204.37	1,348.90	0.00E+00	3.50E-01	3.92E-01
Se-79	1.6492E-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	1.9396E+00	1,204.37	1,348.90	0.00E+00	2.34E+03	2.62E+03
Tc-99	4.4842E-04	1,204.37	1,348.90	0.00E+00	5.40E-01	6.05E-01
Th-229	1.8544E-11	1,204.37	1,348.90	0.00E+00	2.23E-08	2.50E-08
Th-230	9.0605E-10	1,204.37	1,348.90	0.00E+00	1.09E-06	1.22E-06
Th-232	2.3674E-11	1,204.37	1,348.90	0.00E+00	2.85E-08	3.19E-08
Tl-208	7.0323E-09	1,204.37	1,348.90	0.00E+00	8.47E-06	9.49E-06
U-232	1.9106E-06	1,204.37	1,348.90	0.00E+00	2.30E-05	2.58E-05
U-233	9.6774E-09	1,204.37	1,348.90	0.00E+00	1.17E-05	1.31E-05
U-234	4.8796E-06	1,204.37	1,348.90	0.00E+00	5.88E-03	6.58E-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	1.9396E+00	1,204.37	1,348.90	0.00E+00	2.34E+03	2.62E+03
Other Radionuclides					2.62E+03	2.93E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.446E+14
0.0250	3.066E+13
0.0375	2.665E+13
0.0575	2.799E+13
0.0850	1.720E+13
0.1250	1.112E+13
0.2250	1.452E+13
0.3750	6.647E+12
0.5750	1.102E+14
0.8500	1.064E+12
1.2500	3.267E+12
1.7500	2.705E+10
2.2500	7.737E+07
2.7500	3.535E+08
3.5000	4.081E+05
5.0000	1.311E+02
7.0000	1.249E+01
11.0000	1.262E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.01E+01	3.37E+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: 2010
Template: FFTF (FAST, SST, 10 to 30%, Pu & U)
[2]Template Burnup(MWd): 5011.2
Template BOL Heavy Metal Mass (MT): 0.0329181
Template Decay Time: 35 years

Estimated Canister usage: HIC = 2.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1822E-12	45,119.38	45,119.38	0.00E+00	2.79E-07	2.79E-07	Avg. MeV	
Am-241	1.1066E-01	45,119.38	45,119.38	1.74E+02	5.17E+03	5.17E+03	0.0150	1.459E+15
Am-242m	1.9247E-03	45,119.38	45,119.38	0.00E+00	8.68E+01	8.68E+01	0.0250	2.932E+14
Am-243	1.0740E-04	45,119.38	45,119.38	0.00E+00	4.85E+00	4.85E+00	0.0375	3.409E+14
C-14	2.6042E-05	45,119.38	45,119.38	0.00E+00	1.17E+00	1.17E+00	0.0575	3.353E+14
Cl-36	3.4243E-10	45,119.38	45,119.38	0.00E+00	1.55E-05	1.55E-05	0.0850	1.633E+14
Cm-243	4.0629E-04	45,119.38	45,119.38	0.00E+00	1.83E+01	1.83E+01	0.1250	1.149E+14
Cm-244	1.6024E-03	45,119.38	45,119.38	0.00E+00	7.23E+01	7.23E+01	0.2250	1.318E+14
Co-60	3.4275E-03	45,119.38	45,119.38	0.00E+00	1.55E+02	1.55E+02	0.3750	5.712E+13
Cs-134	1.5566E-03	45,119.38	45,119.38	0.00E+00	7.02E+01	7.02E+01	0.5750	2.314E+15
Cs-135	4.7693E-05	45,119.38	45,119.38	0.00E+00	2.15E+00	2.15E+00	0.8500	2.418E+13
Cs-137	1.4007E+00	45,119.38	45,119.38	0.00E+00	6.32E+04	6.32E+04	1.2500	2.894E+13
Eu-154	1.6184E-02	45,119.38	45,119.38	0.00E+00	7.30E+02	7.30E+02	1.7500	6.547E+11
Eu-155	1.3774E-02	45,119.38	45,119.38	0.00E+00	6.21E+02	6.21E+02	2.2500	1.296E+08
Fe-55	3.8028E-04	45,119.38	45,119.38	0.00E+00	1.72E+01	1.72E+01	2.7500	7.467E+08
H-3	3.8454E-03	45,119.38	45,119.38	0.00E+00	1.74E+02	1.74E+02	3.5000	2.769E+06
I-129	1.2891E-06	45,119.38	45,119.38	0.00E+00	5.82E-02	5.82E-02	5.0000	8.765E+05
Kr-85	2.7848E-02	45,119.38	45,119.38	0.00E+00	1.26E+03	1.26E+03	7.0000	1.001E+05
Np-237	3.7516E-06	45,119.38	45,119.38	0.00E+00	1.69E-01	1.69E-01	11.0000	1.145E+04
Pa-231	1.2488E-11	45,119.38	45,119.38	0.00E+00	5.63E-07	5.63E-07		
Pb-210	2.4206E-12	45,119.38	45,119.38	0.00E+00	1.09E-07	1.09E-07		
Pm-147	1.5671E-02	45,119.38	45,119.38	0.00E+00	7.07E+02	7.07E+02		
Pu-238	1.4877E-02	45,119.38	45,119.38	0.00E+00	6.71E+02	6.71E+02		
Pu-239	-3.5520E-02	45,119.38	0.00	1.43E+03	0.00E+00	1.43E+03		
Pu-240	2.0690E-02	45,119.38	45,119.38	7.27E+02	1.66E+03	1.66E+03		
Pu-241	-1.4799E+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	7.8524E-12	45,119.38	45,119.38	0.00E+00	3.54E-07	3.54E-07		
Ra-228	2.4086E-16	45,119.38	45,119.38	0.00E+00	1.09E-11	1.09E-11		
Ru-106	1.5066E-05	45,119.38	45,119.38	0.00E+00	6.80E-01	6.80E-01		
Se-79	1.0127E-05	45,119.38	45,119.38	0.00E+00	4.57E-01	4.57E-01		
Sn-126	4.3902E-05	45,119.38	45,119.38	0.00E+00	1.98E+00	1.98E+00		
Sr-90	5.0088E-01	45,119.38	45,119.38	0.00E+00	2.26E+04	2.26E+04		
Tc-99	3.9412E-04	45,119.38	45,119.38	0.00E+00	1.78E+01	1.78E+01		
Th-229	2.7219E-12	45,119.38	45,119.38	0.00E+00	1.23E-07	1.23E-07		
Th-230	1.0441E-09	45,119.38	45,119.38	0.00E+00	4.71E-05	4.71E-05		
Th-232	3.1689E-16	45,119.38	45,119.38	0.00E+00	1.43E-11	1.43E-11		
Tl-208	4.6636E-07	45,119.38	45,119.38	0.00E+00	2.10E-02	2.10E-02		
U-232	1.2638E-06	45,119.38	45,119.38	0.00E+00	5.70E-02	5.70E-02	Thermal Power	
U-233	5.7451E-10	45,119.38	45,119.38	0.00E+00	2.59E-05	2.59E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	4.3044E-06	45,119.38	45,119.38	0.00E+00	1.94E-01	1.94E-01	7.19E+02	7.84E+02
U-235	-7.7765E-09	45,119.38	0.00	2.94E-04	0.00E+00	2.94E-04	Total	Total
U-236	1.8050E-07	45,119.38	45,119.38	0.00E+00	8.14E-03	8.14E-03		
U-238	-1.7914E-07	45,119.38	0.00	2.14E-02	1.33E-02	2.14E-02		
Y-90	5.0088E-01	45,119.38	45,119.38	0.00E+00	2.26E+04	2.26E+04		
Other Radionuclides					6.39E+04	6.39E+04		

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: 2010
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: 25 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	6.6376E-10	60,759.03	60,759.03	0.00E+00	4.03E-05	4.03E-05
Am-241	1.3144E-01	60,759.03	60,759.03	0.00E+00	7.99E+03	7.99E+03
Am-242m	3.0039E-04	60,759.03	60,759.03	0.00E+00	1.83E+01	1.83E+01
Am-243	6.2629E-04	60,759.03	60,759.03	0.00E+00	3.81E+01	3.81E+01
C-14	4.7965E-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	3.1993E-04	60,759.03	60,759.03	0.00E+00	1.94E+01	1.94E+01
Cm-244	7.1851E-02	60,759.03	60,759.03	0.00E+00	4.37E+03	4.37E+03
Co-60	9.5220E-03	60,759.03	60,759.03	0.00E+00	5.79E+02	5.79E+02
Cs-134	1.1662E-03	60,759.03	60,759.03	0.00E+00	7.09E+01	7.09E+01
Cs-135	1.4433E-05	60,759.03	60,759.03	0.00E+00	8.77E-01	8.77E-01
Cs-137	1.7603E+00	60,759.03	60,759.03	0.00E+00	1.07E+05	1.07E+05
Eu-154	4.5203E-02	60,759.03	60,759.03	0.00E+00	2.75E+03	2.75E+03
Eu-155	7.1479E-03	60,759.03	60,759.03	0.00E+00	4.34E+02	4.34E+02
Fe-55	6.1919E-04	60,759.03	60,759.03	0.00E+00	3.76E+01	3.76E+01
H-3	3.6386E-02	60,759.03	60,759.03	0.00E+00	2.21E+03	2.21E+03
I-129	9.8288E-07	60,759.03	60,759.03	0.00E+00	5.97E-02	5.97E-02
Kr-85	5.3844E-02	60,759.03	60,759.03	0.00E+00	3.27E+03	3.27E+03
Np-237	1.0546E-05	60,759.03	60,759.03	0.00E+00	6.41E-01	6.41E-01
Pa-231	1.1370E-09	60,759.03	60,759.03	0.00E+00	6.91E-05	6.91E-05
Pb-210	3.3624E-11	60,759.03	60,759.03	0.00E+00	2.04E-06	2.04E-06
Pm-147	5.1211E-03	60,759.03	60,759.03	0.00E+00	3.11E+02	3.11E+02
Pu-238	8.0669E-02	60,759.03	60,759.03	0.00E+00	4.90E+03	4.90E+03
Pu-239	1.1626E-02	60,759.03	60,759.03	0.00E+00	7.06E+02	7.06E+02
Pu-240	1.5097E-02	60,759.03	60,759.03	0.00E+00	9.17E+02	9.17E+02
Pu-241	1.4567E+00	60,759.03	60,759.03	0.00E+00	8.85E+04	8.85E+04
Pu-242	6.4260E-05	60,759.03	60,759.03	0.00E+00	3.90E+00	3.90E+00
Ra-226	1.1392E-10	60,759.03	60,759.03	0.00E+00	6.92E-06	6.92E-06
Ra-228	5.1841E-12	60,759.03	60,759.03	0.00E+00	3.15E-07	3.15E-07
Ru-106	5.9012E-07	60,759.03	60,759.03	0.00E+00	3.59E-02	3.59E-02
Se-79	1.2379E-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	1.1630E+00	60,759.03	60,759.03	0.00E+00	7.07E+04	7.07E+04
Tc-99	3.9357E-04	60,759.03	60,759.03	0.00E+00	2.39E+01	2.39E+01
Th-229	8.5691E-11	60,759.03	60,759.03	0.00E+00	5.21E-06	5.21E-06
Th-230	1.4493E-08	60,759.03	60,759.03	0.00E+00	8.81E-04	8.81E-04
Th-232	5.2923E-12	60,759.03	60,759.03	0.00E+00	3.22E-07	3.22E-07
Tl-208	1.9202E-07	60,759.03	60,759.03	0.00E+00	1.17E-02	1.17E-02
U-232	5.2083E-07	60,759.03	60,759.03	0.00E+00	3.16E-02	3.16E-02
U-233	2.4386E-08	60,759.03	60,759.03	0.00E+00	1.48E-03	1.48E-03
U-234	4.7012E-05	60,759.03	60,759.03	0.00E+00	2.86E+00	2.86E+00
U-235	-1.4492E-06	60,759.03	0.00	8.84E-03	0.00E+00	8.84E-03
U-236	7.5759E-06	60,759.03	60,759.03	0.00E+00	4.60E-01	4.60E-01
U-238	-2.6129E-07	60,759.03	0.00	4.16E-02	2.57E-02	4.16E-02
Y-90	1.1631E+00	60,759.03	60,759.03	0.00E+00	7.07E+04	7.07E+04
Other Radionuclides					1.03E+05	1.03E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.132E+15
0.0250	8.368E+14
0.0375	8.099E+14
0.0575	8.835E+14
0.0850	4.682E+14
0.1250	3.420E+14
0.2250	4.019E+14
0.3750	1.724E+14
0.5750	3.963E+15
0.8500	7.821E+13
1.2500	1.056E+14
1.7500	2.315E+12
2.2500	4.275E+08
2.7500	4.805E+08
3.5000	6.297E+07
5.0000	2.691E+07
7.0000	3.102E+06
11.0000	3.564E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.67E+03	1.67E+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: 1.59

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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: 2010
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated Canister usage: HIC: 1.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	2,143.51	2,449.72	0.00E+00	1.88E-06	2.15E-06
Am-241	1.4352E-01	2,143.51	2,449.72	0.00E+00	3.08E+02	3.52E+02
Am-242m	2.8698E-04	2,143.51	2,449.72	0.00E+00	6.15E-01	7.03E-01
Am-243	6.2565E-04	2,143.51	2,449.72	0.00E+00	1.34E+00	1.53E+00
C-14	4.7901E-05	2,143.51	2,449.72	0.00E+00	1.03E-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	2.5081E-04	2,143.51	2,449.72	0.00E+00	5.38E-01	6.14E-01
Cm-244	4.9015E-02	2,143.51	2,449.72	0.00E+00	1.05E+02	1.20E+02
Co-60	2.5581E-03	2,143.51	2,449.72	0.00E+00	5.48E+00	6.27E+00
Cs-134	4.0536E-05	2,143.51	2,449.72	0.00E+00	8.69E-02	9.93E-02
Cs-135	1.4433E-05	2,143.51	2,449.72	0.00E+00	3.09E-02	3.54E-02
Cs-137	1.3979E+00	2,143.51	2,449.72	0.00E+00	3.00E+03	3.42E+03
Eu-154	2.0203E-02	2,143.51	2,449.72	0.00E+00	4.33E+01	4.95E+01
Eu-155	1.7684E-03	2,143.51	2,449.72	0.00E+00	3.79E+00	4.33E+00
Fe-55	4.3136E-05	2,143.51	2,449.72	0.00E+00	9.25E-02	1.06E-01
H-3	2.0769E-02	2,143.51	2,449.72	0.00E+00	4.45E+01	5.09E+01
I-129	9.8288E-07	2,143.51	2,449.72	0.00E+00	2.11E-03	2.41E-03
Kr-85	2.8214E-02	2,143.51	2,449.72	0.00E+00	6.05E+01	6.91E+01
Np-237	1.1218E-05	2,143.51	2,449.72	0.00E+00	2.40E-02	2.75E-02
Pa-231	1.3036E-09	2,143.51	2,449.72	0.00E+00	2.79E-06	3.19E-06
Pb-210	8.5078E-11	2,143.51	2,449.72	0.00E+00	1.82E-07	2.08E-07
Pm-147	3.6531E-04	2,143.51	2,449.72	0.00E+00	7.83E-01	8.95E-01
Pu-238	7.4564E-02	2,143.51	2,449.72	0.00E+00	1.60E+02	1.83E+02
Pu-239	1.1623E-02	2,143.51	2,449.72	0.00E+00	2.49E+01	2.85E+01
Pu-240	1.5132E-02	2,143.51	2,449.72	0.00E+00	3.24E+01	3.71E+01
Pu-241	9.0036E-01	2,143.51	2,449.72	0.00E+00	1.93E+03	2.21E+03
Pu-242	6.4260E-05	2,143.51	2,449.72	0.00E+00	1.38E-01	1.57E-01
Ra-226	2.2804E-10	2,143.51	2,449.72	0.00E+00	4.89E-07	5.59E-07
Ra-228	5.2713E-12	2,143.51	2,449.72	0.00E+00	1.13E-08	1.29E-08
Ru-106	6.1160E-10	2,143.51	2,449.72	0.00E+00	1.31E-06	1.50E-06
Se-79	1.2377E-05	2,143.51	2,449.72	0.00E+00	2.65E-02	3.03E-02
Sn-126	2.5210E-05	2,143.51	2,449.72	0.00E+00	5.40E-02	6.18E-02
Sr-90	9.1667E-01	2,143.51	2,449.72	0.00E+00	1.96E+03	2.25E+03
Tc-99	3.9357E-04	2,143.51	2,449.72	0.00E+00	8.44E-01	9.64E-01
Th-229	1.2057E-10	2,143.51	2,449.72	0.00E+00	2.58E-07	2.95E-07
Th-230	2.1043E-08	2,143.51	2,449.72	0.00E+00	4.51E-05	5.16E-05
Th-232	5.2972E-12	2,143.51	2,449.72	0.00E+00	1.14E-08	1.30E-08
Tl-208	1.7474E-07	2,143.51	2,449.72	0.00E+00	3.75E-04	4.28E-04
U-232	4.7368E-07	2,143.51	2,449.72	0.00E+00	1.02E-03	1.16E-03
U-233	2.5097E-08	2,143.51	2,449.72	0.00E+00	5.38E-05	6.15E-05
U-234	5.0000E-05	2,143.51	2,449.72	0.00E+00	1.07E-01	1.22E-01
U-235	-1.4489E-06	2,143.51	0.00	4.58E-03	1.47E-03	4.58E-03
U-236	7.5824E-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	9.1699E-01	2,143.51	2,449.72	0.00E+00	1.97E+03	2.25E+03
Other Radionuclides					2.88E+03	3.29E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.318E+14
0.0250	2.658E+13
0.0375	2.535E+13
0.0575	2.929E+13
0.0850	1.475E+13
0.1250	1.023E+13
0.2250	1.265E+13
0.3750	5.438E+12
0.5750	1.265E+14
0.8500	1.750E+12
1.2500	1.719E+12
1.7500	5.147E+10
2.2500	8.288E+06
2.7500	1.698E+07
3.5000	1.749E+06
5.0000	7.476E+05
7.0000	8.617E+04
11.0000	9.896E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.83E+01	5.63E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	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: 2010
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:
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	4.2184E-10	5,060,015.91	5,718,007.18	0.00E+00	2.13E-03	2.41E-03
Am-241	9.6379E-02	5,060,015.91	5,718,007.18	0.00E+00	4.88E+05	5.51E+05
Am-242m	5.8463E-05	5,060,015.91	5,718,007.18	0.00E+00	2.96E+02	3.34E+02
Am-243	4.6279E-05	5,060,015.91	5,718,007.18	0.00E+00	2.34E+02	2.65E+02
C-14	9.2026E-05	5,060,015.91	5,718,007.18	0.00E+00	4.66E+02	5.26E+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	4.5445E-04	5,060,015.91	5,718,007.18	0.00E+00	2.30E+03	2.60E+03
Co-60	6.3707E-05	5,060,015.91	5,718,007.18	0.00E+00	3.22E+02	3.64E+02
Cs-134	1.4042E-05	5,060,015.91	5,718,007.18	0.00E+00	7.11E+01	8.03E+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	1.1945E+00	5,060,015.91	5,718,007.18	0.00E+00	6.04E+06	6.83E+06
Eu-154	6.6451E-03	5,060,015.91	5,718,007.18	0.00E+00	3.36E+04	3.80E+04
Eu-155	2.9052E-04	5,060,015.91	5,718,007.18	0.00E+00	1.47E+03	1.66E+03
Fe-55	2.8807E-06	5,060,015.91	5,718,007.18	0.00E+00	1.46E+01	1.65E+01
H-3	2.1063E-03	5,060,015.91	5,718,007.18	0.00E+00	1.07E+04	1.20E+04
I-129	8.6006E-07	5,060,015.91	5,718,007.18	0.00E+00	4.35E+00	4.92E+00
Kr-85	2.6739E-02	5,060,015.91	5,718,007.18	0.00E+00	1.35E+05	1.53E+05
Np-237	8.5589E-06	5,060,015.91	5,718,007.18	0.00E+00	4.33E+01	4.89E+01
Pa-231	1.2500E-09	5,060,015.91	5,718,007.18	0.00E+00	6.33E-03	7.15E-03
Pb-210	2.3017E-11	5,060,015.91	5,718,007.18	0.00E+00	1.16E-04	1.32E-04
Pm-147	5.9856E-04	5,060,015.91	5,718,007.18	0.00E+00	3.03E+03	3.42E+03
Pu-238	2.0029E-02	5,060,015.91	5,718,007.18	0.00E+00	1.01E+05	1.15E+05
Pu-239	2.8836E-02	5,060,015.91	5,718,007.18	0.00E+00	1.46E+05	1.65E+05
Pu-240	2.2802E-02	5,060,015.91	5,718,007.18	0.00E+00	1.15E+05	1.30E+05
Pu-241	6.1020E-01	5,060,015.91	5,718,007.18	0.00E+00	3.09E+06	3.49E+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	9.7701E-11	5,060,015.91	5,718,007.18	0.00E+00	4.94E-04	5.59E-04
Ra-228	1.1068E-14	5,060,015.91	5,718,007.18	0.00E+00	5.60E-08	6.33E-08
Ru-106	5.9224E-10	5,060,015.91	5,718,007.18	0.00E+00	3.00E-03	3.39E-03
Se-79	1.0899E-05	5,060,015.91	5,718,007.18	0.00E+00	5.52E+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	8.4899E-01	5,060,015.91	5,718,007.18	0.00E+00	4.30E+06	4.85E+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	1.2928E-12	5,060,015.91	5,718,007.18	0.00E+00	6.54E-06	7.39E-06
Th-230	1.6293E-06	5,060,015.91	5,718,007.18	0.00E+00	8.24E-02	9.32E-02
Th-232	1.6451E-14	5,060,015.91	5,718,007.18	0.00E+00	8.32E-08	9.41E-08
Tl-208	3.4382E-15	5,060,015.91	5,718,007.18	0.00E+00	1.74E-08	1.97E-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	9.9425E-10	5,060,015.91	5,718,007.18	0.00E+00	5.03E-03	5.69E-03
U-234	6.5575E-05	5,060,015.91	5,718,007.18	0.00E+00	3.32E+02	3.75E+02
U-235	-1.2944E-06	5,060,015.91	0.00	5.22E+01	4.57E+01	5.22E+01
U-236	1.1951E-05	5,060,015.91	5,718,007.18	0.00E+00	6.05E+01	6.83E+01
U-238	-3.0619E-07	5,060,015.91	0.00	6.98E+02	6.97E+02	6.98E+02
Y-90	8.4928E-01	5,060,015.91	5,718,007.18	0.00E+00	4.30E+06	4.86E+06
Other Radionuclides					5.80E+06	6.55E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.778E+17
0.0250	5.678E+16
0.0375	5.253E+16
0.0575	5.995E+16
0.0850	3.153E+16
0.1250	2.094E+16
0.2250	2.705E+16
0.3750	1.171E+16
0.5750	2.525E+17
0.8500	2.565E+15
1.2500	1.399E+15
1.7500	7.096E+13
2.2500	5.737E+09
2.7500	1.379E+08
3.5000	1.220E+06
5.0000	5.152E+07
7.0000	5.841E+06
11.0000	6.655E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.83E+04	9.75E+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	Estimated EOL HM/Given EOL HM
Nominal:	0.40	0.50	1.00
Bounding:	0.45	0.88	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1981
Estimates as of: 2010
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: 25 years

Estimated Canister usage: 18"x15" 1.50

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6376E-10	38,160.90	38,160.90	0.00E+00	2.53E-05	2.53E-05	Avg. MeV	
Am-241	1.3144E-01	38,160.90	38,160.90	0.00E+00	5.02E+03	5.02E+03	0.0150	2.595E+15
Am-242m	3.0039E-04	38,160.90	38,160.90	0.00E+00	1.15E+01	1.15E+01	0.0250	5.256E+14
Am-243	6.2629E-04	38,160.90	38,160.90	0.00E+00	2.39E+01	2.39E+01	0.0375	5.087E+14
C-14	4.7965E-05	38,160.90	38,160.90	0.00E+00	1.83E+00	1.83E+00	0.0575	5.549E+14
Cl-36	8.0297E-07	38,160.90	38,160.90	0.00E+00	3.06E-02	3.06E-02	0.0850	2.940E+14
Cm-243	3.1993E-04	38,160.90	38,160.90	0.00E+00	1.22E+01	1.22E+01	0.1250	2.148E+14
Cm-244	7.1851E-02	38,160.90	38,160.90	0.00E+00	2.74E+03	2.74E+03	0.2250	2.524E+14
Co-60	9.5220E-03	38,160.90	38,160.90	0.00E+00	3.63E+02	3.63E+02	0.3750	1.083E+14
Cs-134	1.1662E-03	38,160.90	38,160.90	0.00E+00	4.45E+01	4.45E+01	0.5750	2.489E+15
Cs-135	1.4433E-05	38,160.90	38,160.90	0.00E+00	5.51E-01	5.51E-01	0.8500	4.912E+13
Cs-137	1.7603E+00	38,160.90	38,160.90	0.00E+00	6.72E+04	6.72E+04	1.2500	6.636E+13
Eu-154	4.5203E-02	38,160.90	38,160.90	0.00E+00	1.73E+03	1.73E+03	1.7500	1.454E+12
Eu-155	7.1479E-03	38,160.90	38,160.90	0.00E+00	2.73E+02	2.73E+02	2.2500	2.685E+08
Fe-55	6.1919E-04	38,160.90	38,160.90	0.00E+00	2.36E+01	2.36E+01	2.7500	3.018E+08
H-3	3.6386E-02	38,160.90	38,160.90	0.00E+00	1.39E+03	1.39E+03	3.5000	3.955E+07
I-129	9.8288E-07	38,160.90	38,160.90	0.00E+00	3.75E-02	3.75E-02	5.0000	1.690E+07
Kr-85	5.3844E-02	38,160.90	38,160.90	0.00E+00	2.05E+03	2.05E+03	7.0000	1.949E+06
Np-237	1.0546E-05	38,160.90	38,160.90	0.00E+00	4.02E-01	4.02E-01	11.0000	2.238E+05
Pa-231	1.1370E-09	38,160.90	38,160.90	0.00E+00	4.34E-05	4.34E-05		
Pb-210	3.3624E-11	38,160.90	38,160.90	0.00E+00	1.28E-06	1.28E-06		
Pm-147	5.1211E-03	38,160.90	38,160.90	0.00E+00	1.95E+02	1.95E+02		
Pu-238	8.0669E-02	38,160.90	38,160.90	0.00E+00	3.08E+03	3.08E+03		
Pu-239	1.1626E-02	38,160.90	38,160.90	0.00E+00	4.44E+02	4.44E+02		
Pu-240	1.5097E-02	38,160.90	38,160.90	0.00E+00	5.76E+02	5.76E+02		
Pu-241	1.4567E+00	38,160.90	38,160.90	0.00E+00	5.56E+04	5.56E+04		
Pu-242	6.4260E-05	38,160.90	38,160.90	0.00E+00	2.45E+00	2.45E+00		
Ra-226	1.1392E-10	38,160.90	38,160.90	0.00E+00	4.35E-06	4.35E-06		
Ra-228	5.1841E-12	38,160.90	38,160.90	0.00E+00	1.98E-07	1.98E-07		
Ru-106	5.9012E-07	38,160.90	38,160.90	0.00E+00	2.25E-02	2.25E-02		
Se-79	1.2379E-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	1.1630E+00	38,160.90	38,160.90	0.00E+00	4.44E+04	4.44E+04		
Tc-99	3.9357E-04	38,160.90	38,160.90	0.00E+00	1.50E+01	1.50E+01		
Th-229	8.5691E-11	38,160.90	38,160.90	0.00E+00	3.27E-06	3.27E-06		
Th-230	1.4493E-08	38,160.90	38,160.90	0.00E+00	5.53E-04	5.53E-04		
Th-232	5.2923E-12	38,160.90	38,160.90	0.00E+00	2.02E-07	2.02E-07		
Tl-208	1.9202E-07	38,160.90	38,160.90	0.00E+00	7.33E-03	7.33E-03		
U-232	5.2083E-07	38,160.90	38,160.90	0.00E+00	1.99E-02	1.99E-02		
U-233	2.4386E-08	38,160.90	38,160.90	0.00E+00	9.31E-04	9.31E-04		
U-234	4.7012E-05	38,160.90	38,160.90	0.00E+00	1.79E+00	1.79E+00		
U-235	-1.4492E-06	38,160.90	0.00	6.30E-02	7.74E-03	6.30E-02		
U-236	7.5759E-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	1.1631E+00	38,160.90	38,160.90	0.00E+00	4.44E+04	4.44E+04		
Other Radionuclides					6.45E+04	6.45E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.65E+03	1.65E+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 %:	2.5	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
Nominal:	0.93	0.14
Bounding:	0.93	0.27

Estimated EOL HM/Given EOL HM: 0.97

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1969
Estimates as of: 2010
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: 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	8.7758E-10	433,632.15	867,264.30	0.00E+00	3.81E-04	7.61E-04
Am-241	1.4352E-01	433,632.15	867,264.30	0.00E+00	6.22E+04	1.24E+05
Am-242m	2.8698E-04	433,632.15	867,264.30	0.00E+00	1.24E+02	2.49E+02
Am-243	6.2565E-04	433,632.15	867,264.30	0.00E+00	2.71E+02	5.43E+02
C-14	4.7901E-05	433,632.15	867,264.30	0.00E+00	2.08E+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	2.5081E-04	433,632.15	867,264.30	0.00E+00	1.09E+02	2.18E+02
Cm-244	4.9015E-02	433,632.15	867,264.30	0.00E+00	2.13E+04	4.25E+04
Co-60	2.5581E-03	433,632.15	867,264.30	0.00E+00	1.11E+03	2.22E+03
Cs-134	4.0536E-06	433,632.15	867,264.30	0.00E+00	1.76E+01	3.52E+01
Cs-135	1.4433E-05	433,632.15	867,264.30	0.00E+00	6.26E+00	1.25E+01
Cs-137	1.3979E+00	433,632.15	867,264.30	0.00E+00	6.06E+05	1.21E+06
Eu-154	2.0203E-02	433,632.15	867,264.30	0.00E+00	8.76E+03	1.75E+04
Eu-155	1.7684E-03	433,632.15	867,264.30	0.00E+00	7.67E+02	1.53E+03
Fe-55	4.3136E-05	433,632.15	867,264.30	0.00E+00	1.87E+01	3.74E+01
H-3	2.0769E-02	433,632.15	867,264.30	0.00E+00	9.01E+03	1.80E+04
I-129	9.8288E-07	433,632.15	867,264.30	0.00E+00	4.26E-01	8.52E-01
Kr-85	2.8214E-02	433,632.15	867,264.30	0.00E+00	1.22E+04	2.45E+04
Np-237	1.1218E-05	433,632.15	867,264.30	0.00E+00	4.86E+00	9.73E+00
Pa-231	1.3036E-09	433,632.15	867,264.30	0.00E+00	5.65E-04	1.13E-03
Pb-210	8.5078E-11	433,632.15	867,264.30	0.00E+00	3.69E-05	7.38E-05
Pm-147	3.6531E-04	433,632.15	867,264.30	0.00E+00	1.58E+02	3.17E+02
Pu-238	7.4564E-02	433,632.15	867,264.30	0.00E+00	3.23E+04	6.47E+04
Pu-239	1.1623E-02	433,632.15	867,264.30	0.00E+00	5.04E+03	1.01E+04
Pu-240	1.5132E-02	433,632.15	867,264.30	0.00E+00	6.56E+03	1.31E+04
Pu-241	9.0036E-01	433,632.15	867,264.30	0.00E+00	3.90E+05	7.81E+05
Pu-242	6.4260E-06	433,632.15	867,264.30	0.00E+00	2.79E+01	5.57E+01
Ra-226	2.2804E-10	433,632.15	867,264.30	0.00E+00	9.89E-05	1.98E-04
Ra-228	5.2713E-12	433,632.15	867,264.30	0.00E+00	2.29E-06	4.57E-06
Ru-106	6.1160E-10	433,632.15	867,264.30	0.00E+00	2.65E-04	5.30E-04
Se-79	1.2377E-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	9.1667E-01	433,632.15	867,264.30	0.00E+00	3.97E+05	7.95E+05
Tc-99	3.9357E-04	433,632.15	867,264.30	0.00E+00	1.71E+02	3.41E+02
Th-229	1.2057E-10	433,632.15	867,264.30	0.00E+00	5.23E-05	1.05E-04
Th-230	2.1043E-08	433,632.15	867,264.30	0.00E+00	9.13E-03	1.83E-02
Th-232	5.2972E-12	433,632.15	867,264.30	0.00E+00	2.30E-06	4.59E-06
Tl-208	1.7474E-07	433,632.15	867,264.30	0.00E+00	7.58E-02	1.52E-01
U-232	4.7368E-07	433,632.15	867,264.30	0.00E+00	2.05E-01	4.11E-01
U-233	2.5097E-08	433,632.15	867,264.30	0.00E+00	1.09E-02	2.18E-02
U-234	5.0000E-05	433,632.15	867,264.30	0.00E+00	2.17E+01	4.34E+01
U-235	-1.4489E-06	433,632.15	0.00	2.49E-01	0.00E+00	2.49E-01
U-236	7.5824E-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	9.1699E-01	433,632.15	867,264.30	0.00E+00	3.98E+05	7.95E+05
Other Radionuclides					5.82E+05	1.16E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.666E+16
0.0250	9.410E+15
0.0375	8.975E+15
0.0575	1.037E+16
0.0850	5.221E+15
0.1250	3.623E+15
0.2250	4.477E+15
0.3750	1.925E+15
0.5750	4.478E+16
0.8500	6.195E+14
1.2500	6.085E+14
1.7500	1.822E+13
2.2500	2.934E+09
2.7500	6.012E+09
3.5000	6.190E+08
5.0000	2.647E+06
7.0000	3.050E+07
11.0000	3.503E+06

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.97E+03	1.99E+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
Nominal:	263,023.20	433,632.15
Bounding:	399,405.60	867,264.30

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1971
Estimates as of: 2010
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: MCO: 0.86

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.2184E-10	6,078.13	12,156.27	0.00E+00	2.56E-06	5.13E-06
Am-241	9.6379E-02	6,078.13	12,156.27	0.00E+00	5.86E+02	1.17E+03
Am-242m	5.8463E-05	6,078.13	12,156.27	0.00E+00	3.55E-01	7.11E-01
Am-243	4.6279E-05	6,078.13	12,156.27	0.00E+00	2.81E-01	5.63E-01
C-14	9.2026E-05	6,078.13	12,156.27	0.00E+00	5.59E-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	4.5445E-04	6,078.13	12,156.27	0.00E+00	2.76E+00	5.52E+00
Co-60	6.3707E-05	6,078.13	12,156.27	0.00E+00	3.87E-01	7.74E-01
Cs-134	1.4042E-05	6,078.13	12,156.27	0.00E+00	8.53E-02	1.71E-01
Cs-135	1.0066E-05	6,078.13	12,156.27	0.00E+00	6.12E-02	1.22E-01
Cs-137	1.1945E+00	6,078.13	12,156.27	0.00E+00	7.26E+03	1.45E+04
Eu-154	6.6451E-03	6,078.13	12,156.27	0.00E+00	4.04E+01	8.08E+01
Eu-155	2.9052E-04	6,078.13	12,156.27	0.00E+00	1.77E+00	3.53E+00
Fe-55	2.8807E-06	6,078.13	12,156.27	0.00E+00	1.75E-02	3.50E-02
H-3	2.1063E-03	6,078.13	12,156.27	0.00E+00	1.28E+01	2.56E+01
I-129	8.6006E-07	6,078.13	12,156.27	0.00E+00	5.23E-03	1.05E-02
Kr-85	2.6739E-02	6,078.13	12,156.27	0.00E+00	1.63E+02	3.25E+02
Np-237	8.5589E-06	6,078.13	12,156.27	0.00E+00	5.20E-02	1.04E-01
Pa-231	1.2500E-09	6,078.13	12,156.27	0.00E+00	7.60E-06	1.52E-05
Pb-210	2.3017E-11	6,078.13	12,156.27	0.00E+00	1.40E-07	2.80E-07
Pm-147	5.9656E-04	6,078.13	12,156.27	0.00E+00	3.64E+00	7.28E+00
Pu-238	2.0029E-02	6,078.13	12,156.27	0.00E+00	1.22E+02	2.43E+02
Pu-239	2.8836E-02	6,078.13	12,156.27	0.00E+00	1.75E+02	3.51E+02
Pu-240	2.2802E-02	6,078.13	12,156.27	0.00E+00	1.39E+02	2.77E+02
Pu-241	6.1020E-01	6,078.13	12,156.27	0.00E+00	3.71E+03	7.42E+03
Pu-242	1.4526E-05	6,078.13	12,156.27	0.00E+00	8.83E-02	1.77E-01
Ra-226	9.7701E-11	6,078.13	12,156.27	0.00E+00	5.94E-07	1.19E-06
Ra-228	1.1068E-14	6,078.13	12,156.27	0.00E+00	6.73E-11	1.35E-10
Ru-106	5.9224E-10	6,078.13	12,156.27	0.00E+00	3.60E-06	7.20E-06
Se-79	1.0699E-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	8.4899E-01	6,078.13	12,156.27	0.00E+00	5.16E+03	1.03E+04
Tc-99	3.6494E-04	6,078.13	12,156.27	0.00E+00	2.22E+00	4.44E+00
Th-229	1.2928E-12	6,078.13	12,156.27	0.00E+00	7.86E-09	1.57E-08
Th-230	1.6293E-08	6,078.13	12,156.27	0.00E+00	9.90E-05	1.98E-04
Th-232	1.6451E-14	6,078.13	12,156.27	0.00E+00	1.00E-10	2.00E-10
Tl-208	3.4382E-15	6,078.13	12,156.27	0.00E+00	2.09E-11	4.18E-11
U-232	0.0000E+00	6,078.13	12,156.27	0.00E+00	0.00E+00	0.00E+00
U-233	9.9425E-10	6,078.13	12,156.27	0.00E+00	6.04E-06	1.21E-05
U-234	6.5575E-05	6,078.13	12,156.27	0.00E+00	3.99E-01	7.97E-01
U-235	-1.2944E-06	6,078.13	0.00	5.37E-03	0.00E+00	5.37E-03
U-236	1.1951E-05	6,078.13	12,156.27	0.00E+00	7.26E-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	8.4928E-01	6,078.13	12,156.27	0.00E+00	5.16E+03	1.03E+04
Other Radionuclides					6.97E+03	1.39E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.907E+14
0.0250	1.207E+14
0.0375	1.117E+14
0.0575	1.275E+14
0.0850	6.703E+13
0.1250	4.451E+13
0.2250	5.750E+13
0.3750	2.488E+13
0.5750	5.368E+14
0.8500	5.454E+12
1.2500	2.975E+12
1.7500	1.509E+11
2.2500	1.219E+07
2.7500	2.902E+05
3.5000	2.566E+05
5.0000	1.084E+05
7.0000	1.228E+04
11.0000	1.399E+03

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:	GRAPHITE	GRAPHITE
Fuel Cladding:	ALUM	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	0.066	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: 2010
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: MCO: 0.14

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.2184E-10	454.58	909.16	0.00E+00	1.92E-07	3.84E-07
Am-241	9.6379E-02	454.58	909.16	0.00E+00	4.38E+01	8.76E+01
Am-242m	5.8463E-05	454.58	909.16	0.00E+00	2.66E-02	5.32E-02
Am-243	4.6279E-05	454.58	909.16	0.00E+00	2.10E-02	4.21E-02
C-14	9.2026E-05	454.58	909.16	0.00E+00	4.18E-02	8.37E-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	4.5445E-04	454.58	909.16	0.00E+00	2.07E-01	4.13E-01
Co-60	6.3707E-05	454.58	909.16	0.00E+00	2.90E-02	5.79E-02
Cs-134	1.4042E-05	454.58	909.16	0.00E+00	6.38E-03	1.28E-02
Cs-135	1.0066E-05	454.58	909.16	0.00E+00	4.58E-03	9.15E-03
Cs-137	1.1945E+00	454.58	909.16	0.00E+00	5.43E+02	1.09E+03
Eu-154	6.6451E-03	454.58	909.16	0.00E+00	3.02E+00	6.04E+00
Eu-155	2.9052E-04	454.58	909.16	0.00E+00	1.32E-01	2.64E-01
Fe-55	2.8807E-08	454.58	909.16	0.00E+00	1.31E-03	2.62E-03
H-3	2.1063E-03	454.58	909.16	0.00E+00	9.57E-01	1.91E+00
I-129	8.6006E-07	454.58	909.16	0.00E+00	3.91E-04	7.82E-04
Kr-85	2.6739E-02	454.58	909.16	0.00E+00	1.22E+01	2.43E+01
Np-237	8.5589E-06	454.58	909.16	0.00E+00	3.89E-03	7.78E-03
Pa-231	1.2500E-09	454.58	909.16	0.00E+00	5.68E-07	1.14E-06
Pb-210	2.3017E-11	454.58	909.16	0.00E+00	1.05E-08	2.09E-08
Pm-147	5.9856E-04	454.58	909.16	0.00E+00	2.72E-01	5.44E-01
Pu-238	2.0029E-02	454.58	909.16	0.00E+00	9.10E+00	1.82E+01
Pu-239	2.8836E-02	454.58	909.16	0.00E+00	1.31E+01	2.62E+01
Pu-240	2.2802E-02	454.58	909.16	0.00E+00	1.04E+01	2.07E+01
Pu-241	6.1020E-01	454.58	909.16	0.00E+00	2.77E+02	5.55E+02
Pu-242	1.4526E-05	454.58	909.16	0.00E+00	6.60E-03	1.32E-02
Ra-226	9.7701E-11	454.58	909.16	0.00E+00	4.44E-08	8.88E-08
Ra-228	1.1068E-14	454.58	909.16	0.00E+00	5.03E-12	1.01E-11
Ru-106	5.9224E-10	454.58	909.16	0.00E+00	2.69E-07	5.38E-07
Se-79	1.0899E-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	8.4899E-01	454.58	909.16	0.00E+00	3.86E+02	7.72E+02
Tc-99	3.6494E-04	454.58	909.16	0.00E+00	1.66E-01	3.32E-01
Th-229	1.2928E-12	454.58	909.16	0.00E+00	5.88E-10	1.18E-09
Th-230	1.6293E-08	454.58	909.16	0.00E+00	7.41E-06	1.48E-05
Th-232	1.6451E-14	454.58	909.16	0.00E+00	7.48E-12	1.50E-11
Tl-208	3.4382E-15	454.58	909.16	0.00E+00	1.56E-12	3.13E-12
U-232	0.0000E+00	454.58	909.16	0.00E+00	0.00E+00	0.00E+00
U-233	9.9425E-10	454.58	909.16	0.00E+00	4.52E-07	9.04E-07
U-234	6.5575E-05	454.58	909.16	0.00E+00	2.98E-02	5.96E-02
U-235	-1.2944E-06	454.58	0.00	1.10E-02	1.04E-02	1.10E-02
U-236	1.1951E-05	454.58	909.16	0.00E+00	5.43E-03	1.09E-02
U-238	-3.0619E-07	454.58	0.00	1.35E-01	1.35E-01	1.35E-01
Y-90	8.4928E-01	454.58	909.16	0.00E+00	3.86E+02	7.72E+02
Other Radionuclides					5.21E+02	1.04E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.418E+13
0.0250	9.029E+12
0.0375	8.352E+12
0.0575	9.532E+12
0.0850	5.013E+12
0.1250	3.329E+12
0.2250	4.301E+12
0.3750	1.861E+12
0.5750	4.015E+13
0.8500	4.079E+11
1.2500	2.225E+11
1.7500	1.128E+10
2.2500	9.124E+05
2.7500	2.208E+04
3.5000	1.953E+04
5.0000	8.247E+03
7.0000	9.352E+02
11.0000	1.066E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.76E+00	1.55E+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
SNF ID #: 777
Fuel Units & Descr: 2 - SCRAP
Heavy Metal Mass: BOL=2.711kg; EOL=2.628kg
ROD Storage Site: HANFORD

[1]Fuel decay start date: 1992
Estimates as of: 2010
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: 15 years

Estimated Canister usage: HIC = 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	2.1509E-08	73.37	146.73	0.00E+00	1.58E-06	3.16E-06
Am-241	4.6529E-07	73.37	146.73	0.00E+00	3.41E-05	6.83E-05
Am-242m	0.0000E+00	73.37	146.73	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3923E-15	73.37	146.73	0.00E+00	6.16E-13	1.23E-12
C-14	2.1765E-05	73.37	146.73	0.00E+00	1.60E-03	3.19E-03
Cl-36	5.5188E-08	73.37	146.73	0.00E+00	4.05E-06	8.10E-06
Cm-243	2.5208E-14	73.37	146.73	0.00E+00	1.85E-12	3.70E-12
Cm-244	1.1259E-15	73.37	146.73	0.00E+00	8.26E-14	1.65E-13
Co-60	2.9094E-02	73.37	146.73	0.00E+00	2.13E+00	4.27E+00
Cs-134	5.1932E-04	73.37	146.73	0.00E+00	3.81E-02	7.62E-02
Cs-135	4.4996E-05	73.37	146.73	0.00E+00	3.30E-03	6.60E-03
Cs-137	2.1867E+00	73.37	146.73	0.00E+00	1.60E+02	3.21E+02
Eu-154	9.2837E-04	73.37	146.73	0.00E+00	6.81E-02	1.36E-01
Eu-155	2.3180E-02	73.37	146.73	0.00E+00	1.70E+00	3.40E+00
Fe-55	2.9332E-03	73.37	146.73	0.00E+00	2.15E-01	4.30E-01
H-3	1.0871E-02	73.37	146.73	0.00E+00	7.98E-01	1.60E+00
I-129	1.1426E-06	73.37	146.73	0.00E+00	8.38E-05	1.68E-04
Kr-85	1.4068E-01	73.37	146.73	0.00E+00	1.03E+01	2.06E+01
Np-237	3.3099E-06	73.37	146.73	0.00E+00	2.43E-04	4.86E-04
Pa-231	7.8640E-08	73.37	146.73	0.00E+00	5.77E-06	1.15E-05
Pb-210	7.4277E-13	73.37	146.73	0.00E+00	5.45E-11	1.09E-10
Pm-147	2.2856E-01	73.37	146.73	0.00E+00	1.68E+01	3.35E+01
Pu-238	2.0095E-04	73.37	146.73	0.00E+00	1.47E-02	2.95E-02
Pu-239	1.9481E-02	73.37	146.73	0.00E+00	1.43E+00	2.86E+00
Pu-240	6.8056E-05	73.37	146.73	0.00E+00	4.99E-03	9.99E-03
Pu-241	1.0939E-05	73.37	146.73	0.00E+00	8.03E-04	1.61E-03
Pu-242	4.3751E-13	73.37	146.73	0.00E+00	3.21E-11	6.42E-11
Ra-226	4.0428E-12	73.37	146.73	0.00E+00	2.97E-10	5.93E-10
Ra-228	2.1032E-11	73.37	146.73	0.00E+00	1.54E-09	3.09E-09
Ru-106	2.9077E-04	73.37	146.73	0.00E+00	2.13E-02	4.27E-02
Se-79	1.6492E-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	1.9396E+00	73.37	146.73	0.00E+00	1.42E+02	2.85E+02
Tc-99	4.4842E-04	73.37	146.73	0.00E+00	3.29E-02	6.58E-02
Th-229	1.8544E-11	73.37	146.73	0.00E+00	1.36E-09	2.72E-09
Th-230	9.0605E-10	73.37	146.73	0.00E+00	6.65E-08	1.33E-07
Th-232	2.3674E-11	73.37	146.73	0.00E+00	1.74E-09	3.47E-09
Tl-208	7.0323E-09	73.37	146.73	0.00E+00	5.16E-07	1.03E-06
U-232	1.9106E-08	73.37	146.73	0.00E+00	1.40E-06	2.80E-06
U-233	9.6774E-09	73.37	146.73	0.00E+00	7.10E-07	1.42E-06
U-234	4.8796E-06	73.37	146.73	0.00E+00	3.58E-04	7.16E-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	1.9396E+00	73.37	146.73	0.00E+00	1.42E+02	2.85E+02
Other Radionuclides					1.59E+02	3.19E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.573E+13
0.0250	3.335E+12
0.0375	2.899E+12
0.0575	3.044E+12
0.0850	1.871E+12
0.1250	1.209E+12
0.2250	1.579E+12
0.3750	7.230E+11
0.5750	1.199E+13
0.8500	1.157E+11
1.2500	3.554E+11
1.7500	2.942E+09
2.2500	8.416E+06
2.7500	3.845E+05
3.5000	4.439E+04
5.0000	9.910E+00
7.0000	8.573E-01
11.0000	7.972E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.84E+00	3.67E+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: 2010
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'
0.03

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	3.74	7.48	0.00E+00	9.89E-09	1.98E-08
Am-241	3.1429E-03	3.74	7.48	0.00E+00	1.18E-02	2.35E-02
Am-242m	1.3195E-06	3.74	7.48	0.00E+00	4.94E-06	9.88E-06
Am-243	1.4753E-07	3.74	7.48	0.00E+00	5.52E-07	1.10E-06
C-14	1.2847E-04	3.74	7.48	0.00E+00	4.81E-04	9.62E-04
Cl-36	2.8120E-06	3.74	7.48	0.00E+00	1.05E-05	2.10E-05
Cm-243	1.2465E-07	3.74	7.48	0.00E+00	4.66E-07	9.33E-07
Cm-244	9.5564E-07	3.74	7.48	0.00E+00	3.58E-06	7.15E-06
Co-60	1.7880E-01	3.74	7.48	0.00E+00	6.69E-01	1.34E+00
Cs-134	5.8692E-04	3.74	7.48	0.00E+00	2.20E-03	4.39E-03
Cs-135	3.2195E-05	3.74	7.48	0.00E+00	1.20E-04	2.41E-04
Cs-137	1.9489E+00	3.74	7.48	0.00E+00	7.29E+00	1.46E+01
Eu-154	4.5895E-03	3.74	7.48	0.00E+00	1.72E-02	3.44E-02
Eu-155	3.6045E-03	3.74	7.48	0.00E+00	1.35E-02	2.70E-02
Fe-55	1.4185E-02	3.74	7.48	0.00E+00	5.31E-02	1.06E-01
H-3	4.7895E-03	3.74	7.48	0.00E+00	1.79E-02	3.58E-02
I-129	7.3684E-07	3.74	7.48	0.00E+00	2.76E-06	5.52E-06
Kr-85	9.5820E-02	3.74	7.48	0.00E+00	3.59E-01	7.17E-01
Np-237	1.2552E-06	3.74	7.48	0.00E+00	4.70E-06	9.39E-06
Pa-231	7.0406E-09	3.74	7.48	0.00E+00	2.63E-08	5.27E-08
Pb-210	5.8000E-14	3.74	7.48	0.00E+00	2.17E-13	4.34E-13
Pm-147	4.0075E-02	3.74	7.48	0.00E+00	1.50E-01	3.00E-01
Pu-238	9.2256E-04	3.74	7.48	0.00E+00	3.45E-03	6.91E-03
Pu-239	5.5278E-03	3.74	7.48	0.00E+00	2.07E-02	4.14E-02
Pu-240	2.1248E-03	3.74	7.48	0.00E+00	7.95E-03	1.59E-02
Pu-241	4.9549E-02	3.74	7.48	0.00E+00	1.85E-01	3.71E-01
Pu-242	2.3128E-07	3.74	7.48	0.00E+00	8.66E-07	1.73E-06
Ra-226	2.4526E-13	3.74	7.48	0.00E+00	9.18E-13	1.84E-12
Ra-228	2.4015E-10	3.74	7.48	0.00E+00	8.99E-10	1.80E-09
Ru-106	3.0602E-06	3.74	7.48	0.00E+00	1.15E-05	2.29E-05
Se-79	1.3015E-05	3.74	7.48	0.00E+00	4.87E-05	9.74E-05
Sn-126	1.2165E-05	3.74	7.48	0.00E+00	4.55E-05	9.11E-05
Sr-90	1.8226E+00	3.74	7.48	0.00E+00	6.82E+00	1.36E+01
Tc-99	4.4241E-04	3.74	7.48	0.00E+00	1.66E-03	3.31E-03
Th-229	3.0962E-10	3.74	7.48	0.00E+00	1.16E-09	2.32E-09
Th-230	4.2346E-11	3.74	7.48	0.00E+00	1.58E-10	3.17E-10
Th-232	2.5278E-10	3.74	7.48	0.00E+00	9.46E-10	1.89E-09
Tl-208	1.5820E-06	3.74	7.48	0.00E+00	5.92E-06	1.18E-07
U-232	4.2647E-06	3.74	7.48	0.00E+00	1.60E-07	3.19E-07
U-233	1.2211E-07	3.74	7.48	0.00E+00	4.57E-07	9.14E-07
U-234	1.9955E-07	3.74	7.48	0.00E+00	7.47E-07	1.49E-06
U-235	-2.6194E-06	3.74	0.00	1.64E-04	1.54E-04	1.64E-04
U-236	1.2693E-05	3.74	7.48	0.00E+00	4.75E-05	9.50E-05
U-238	-3.6331E-06	3.74	0.00	1.04E-04	1.03E-04	1.04E-04
Y-90	1.8241E+00	3.74	7.48	0.00E+00	6.83E+00	1.37E+01
Other Radionuclides					7.21E+00	1.44E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.501E+11
0.0250	1.561E+11
0.0375	1.353E+11
0.0575	1.455E+11
0.0850	8.785E+10
0.1250	5.742E+10
0.2250	7.543E+10
0.3750	3.306E+10
0.5750	5.437E+11
0.8500	6.129E+09
1.2500	1.018E+11
1.7500	1.575E+08
2.2500	5.424E+05
2.7500	5.976E+03
3.5000	3.360E+01
5.0000	4.128E+00
7.0000	4.667E-01
11.0000	5.312E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.35E-02	1.87E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.792	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	3.74	1.15
Bounding:		7.48

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

Checks

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

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1987
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' = 0.59

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.4556E-09	421.00	842.00	0.00E+00	1.03E-06	2.07E-06	Avg. MeV	
Am-241	3.8752E-03	421.00	842.00	0.00E+00	1.63E+00	3.26E+00	0.0150	8.641E+13
Am-242m	1.8617E-06	421.00	842.00	0.00E+00	7.84E-04	1.57E-03	0.0250	1.784E+13
Am-243	2.3293E-07	421.00	842.00	0.00E+00	9.81E-05	1.96E-04	0.0375	1.868E+13
C-14	4.3233E-05	421.00	842.00	0.00E+00	1.82E-02	3.64E-02	0.0575	1.726E+13
Cl-36	4.3023E-08	421.00	842.00	0.00E+00	1.81E-05	3.62E-05	0.0850	1.051E+13
Cm-243	1.9053E-07	421.00	842.00	0.00E+00	8.02E-05	1.60E-04	0.1250	1.180E+13
Cm-244	1.7744E-06	421.00	842.00	0.00E+00	7.47E-04	1.49E-03	0.2250	9.524E+12
Co-60	4.3188E-03	421.00	842.00	0.00E+00	1.82E+00	3.64E+00	0.3750	3.914E+12
Cs-134	6.7188E-04	421.00	842.00	0.00E+00	2.83E-01	5.66E-01	0.5750	6.235E+13
Cs-135	3.1549E-05	421.00	842.00	0.00E+00	1.33E-02	2.66E-02	0.8500	6.634E+12
Cs-137	1.9489E+00	421.00	842.00	0.00E+00	8.20E+02	1.64E+03	1.2500	7.146E+12
Eu-154	4.0301E-01	421.00	842.00	0.00E+00	1.70E+02	3.39E+02	1.7500	2.141E+11
Eu-155	5.4000E-02	421.00	842.00	0.00E+00	2.27E+01	4.55E+01	2.2500	3.393E+06
Fe-55	1.5955E-04	421.00	842.00	0.00E+00	6.72E-02	1.34E-01	2.7500	5.647E+05
H-3	4.6571E-03	421.00	842.00	0.00E+00	1.96E+00	3.92E+00	3.5000	3.881E+03
I-129	7.3805E-07	421.00	842.00	0.00E+00	3.11E-04	6.21E-04	5.0000	4.809E+02
Kr-85	9.5684E-02	421.00	842.00	0.00E+00	4.03E+01	8.06E+01	7.0000	5.430E+01
Np-237	1.4618E-06	421.00	842.00	0.00E+00	6.15E-04	1.23E-03	11.0000	6.176E+00
Pa-231	6.4782E-09	421.00	842.00	0.00E+00	2.73E-06	5.45E-06		
Pb-210	6.3158E-14	421.00	842.00	0.00E+00	2.66E-11	5.32E-11		
Pm-147	3.9564E-02	421.00	842.00	0.00E+00	1.67E+01	3.33E+01		
Pu-238	1.2008E-03	421.00	842.00	0.00E+00	5.06E-01	1.01E+00		
Pu-239	5.6917E-03	421.00	842.00	0.00E+00	2.40E+00	4.79E+00		
Pu-240	2.2617E-03	421.00	842.00	0.00E+00	9.52E-01	1.90E+00		
Pu-241	6.1113E-02	421.00	842.00	0.00E+00	2.57E+01	5.15E+01		
Pu-242	3.0602E-07	421.00	842.00	0.00E+00	1.29E-04	2.58E-04		
Ra-226	2.6707E-13	421.00	842.00	0.00E+00	1.12E-10	2.25E-10		
Ra-228	2.2556E-10	421.00	842.00	0.00E+00	9.50E-08	1.90E-07		
Ru-106	3.1293E-06	421.00	842.00	0.00E+00	1.32E-03	2.63E-03		
Se-79	1.2935E-05	421.00	842.00	0.00E+00	5.45E-03	1.09E-02		
Sn-126	1.2238E-05	421.00	842.00	0.00E+00	5.15E-03	1.03E-02		
Sr-90	1.8195E+00	421.00	842.00	0.00E+00	7.66E+02	1.53E+03		
Tc-99	4.4120E-04	421.00	842.00	0.00E+00	1.86E-01	3.71E-01		
Th-229	3.3308E-10	421.00	842.00	0.00E+00	1.40E-07	2.80E-07		
Th-230	4.6526E-11	421.00	842.00	0.00E+00	1.96E-08	3.92E-08		
Th-232	2.3744E-10	421.00	842.00	0.00E+00	1.00E-07	2.00E-07		
Tl-208	1.8195E-08	421.00	842.00	0.00E+00	7.66E-06	1.53E-05		
U-232	4.9098E-08	421.00	842.00	0.00E+00	2.07E-05	4.13E-05	Thermal Power	
U-233	1.3140E-07	421.00	842.00	0.00E+00	5.53E-05	1.11E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	2.2571E-07	421.00	842.00	0.00E+00	9.50E-05	1.90E-04		
U-235	-2.6159E-06	421.00	0.00	5.28E-03	4.18E-03	5.28E-03		
U-236	1.2719E-05	421.00	842.00	0.00E+00	5.35E-03	1.07E-02	1.09E+01	2.19E+01
U-238	-3.8857E-08	421.00	0.00	3.33E-03	3.31E-03	3.33E-03	Total	Total
Y-90	1.8211E+00	421.00	842.00	0.00E+00	7.67E+02	1.53E+03		
Other Radionuclides					8.82E+02	1.76E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.92	0.31	0.98
Bounding:	1.85		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1989
Estimates as of: 2010
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' 0.81

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.6436E-09	343.66	687.32	0.00E+00	9.08E-07	1.82E-06
Am-241	3.1429E-03	343.66	687.32	0.00E+00	1.08E+00	2.16E+00
Am-242m	1.3195E-06	343.66	687.32	0.00E+00	4.53E-04	9.07E-04
Am-243	1.4753E-07	343.66	687.32	0.00E+00	5.07E-05	1.01E-04
C-14	1.2847E-04	343.66	687.32	0.00E+00	4.41E-02	8.83E-02
Cl-36	2.8120E-06	343.66	687.32	0.00E+00	9.66E-04	1.93E-03
Cm-243	1.2465E-07	343.66	687.32	0.00E+00	4.28E-05	8.57E-05
Cm-244	9.5564E-07	343.66	687.32	0.00E+00	3.28E-04	6.57E-04
Co-60	1.7880E-01	343.66	687.32	0.00E+00	6.14E+01	1.23E+02
Cs-134	5.8692E-04	343.66	687.32	0.00E+00	2.02E-01	4.03E-01
Cs-135	3.2195E-05	343.66	687.32	0.00E+00	1.11E-02	2.21E-02
Cs-137	1.9489E+00	343.66	687.32	0.00E+00	6.70E+02	1.34E+03
Eu-154	4.5895E-03	343.66	687.32	0.00E+00	1.58E+00	3.15E+00
Eu-155	3.6045E-03	343.66	687.32	0.00E+00	1.24E+00	2.48E+00
Fe-55	1.4185E-02	343.66	687.32	0.00E+00	4.87E+00	9.75E+00
H-3	4.7895E-03	343.66	687.32	0.00E+00	1.65E+00	3.29E+00
I-129	7.3684E-07	343.66	687.32	0.00E+00	2.53E-04	5.06E-04
Kr-85	9.5820E-02	343.66	687.32	0.00E+00	3.29E+01	6.59E+01
Np-237	1.2552E-06	343.66	687.32	0.00E+00	4.31E-04	8.63E-04
Pa-231	7.0406E-09	343.66	687.32	0.00E+00	2.42E-06	4.84E-06
Pb-210	5.8000E-14	343.66	687.32	0.00E+00	1.99E-11	3.99E-11
Pm-147	4.0075E-02	343.66	687.32	0.00E+00	1.38E+01	2.75E+01
Pu-238	9.2256E-04	343.66	687.32	0.00E+00	3.17E-01	6.34E-01
Pu-239	5.5278E-03	343.66	687.32	0.00E+00	1.90E+00	3.80E+00
Pu-240	2.1248E-03	343.66	687.32	0.00E+00	7.30E-01	1.46E+00
Pu-241	4.9549E-02	343.66	687.32	0.00E+00	1.70E+01	3.41E+01
Pu-242	2.3128E-07	343.66	687.32	0.00E+00	7.95E-05	1.59E-04
Ra-226	2.4526E-13	343.66	687.32	0.00E+00	8.43E-11	1.69E-10
Ra-228	2.4015E-10	343.66	687.32	0.00E+00	8.25E-08	1.65E-07
Ru-106	3.0602E-06	343.66	687.32	0.00E+00	1.05E-03	2.10E-03
Se-79	1.3015E-05	343.66	687.32	0.00E+00	4.47E-03	8.95E-03
Sn-126	1.2165E-05	343.66	687.32	0.00E+00	4.18E-03	8.36E-03
Sr-90	1.8226E+00	343.66	687.32	0.00E+00	6.26E+02	1.25E+03
Tc-99	4.4241E-04	343.66	687.32	0.00E+00	1.52E-01	3.04E-01
Th-229	3.0962E-10	343.66	687.32	0.00E+00	1.06E-07	2.13E-07
Th-230	4.2346E-11	343.66	687.32	0.00E+00	1.46E-08	2.91E-08
Th-232	2.5278E-10	343.66	687.32	0.00E+00	8.69E-08	1.74E-07
Tl-208	1.5820E-06	343.66	687.32	0.00E+00	5.44E-06	1.09E-05
U-232	4.2647E-08	343.66	687.32	0.00E+00	1.47E-05	2.93E-05
U-233	1.2211E-07	343.66	687.32	0.00E+00	4.20E-05	8.39E-05
U-234	1.9955E-07	343.66	687.32	0.00E+00	6.86E-05	1.37E-04
U-235	-2.6194E-06	343.66	0.00	7.59E-03	6.68E-03	7.59E-03
U-236	1.2693E-05	343.66	687.32	0.00E+00	4.36E-03	8.72E-03
U-238	-3.6331E-06	343.66	0.00	4.72E-03	4.71E-03	4.72E-03
Y-90	1.8241E+00	343.66	687.32	0.00E+00	6.27E+02	1.25E+03
Other Radionuclides					6.62E+02	1.32E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.888E+13
0.0250	1.434E+13
0.0375	1.242E+13
0.0575	1.336E+13
0.0850	8.067E+12
0.1250	5.272E+12
0.2250	6.927E+12
0.3750	3.036E+12
0.5750	4.993E+13
0.8500	5.628E+11
1.2500	9.326E+12
1.7500	1.446E+10
2.2500	4.980E+07
2.7500	5.487E+05
3.5000	3.059E+03
5.0000	3.680E+02
7.0000	4.158E+01
11.0000	4.732E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.50E+09	1.72E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000115	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	256.56	343.66
Bounding:		687.32

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1989
Estimates as of: 2010
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' 0.30

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	30.88	61.75	0.00E+00	8.16E-08	1.63E-07
Am-241	3.1429E-03	30.88	61.75	0.00E+00	9.70E-02	1.94E-01
Am-242m	1.3195E-06	30.88	61.75	0.00E+00	4.07E-05	8.15E-05
Am-243	1.4753E-07	30.88	61.75	0.00E+00	4.56E-06	9.11E-06
C-14	1.2847E-04	30.88	61.75	0.00E+00	3.97E-03	7.93E-03
Cl-36	2.8120E-06	30.88	61.75	0.00E+00	8.68E-05	1.74E-04
Cm-243	1.2465E-07	30.88	61.75	0.00E+00	3.85E-06	7.70E-06
Cm-244	9.5564E-07	30.88	61.75	0.00E+00	2.95E-05	5.90E-05
Co-60	1.7880E-01	30.88	61.75	0.00E+00	5.52E+00	1.10E+01
Cs-134	5.8692E-04	30.88	61.75	0.00E+00	1.81E-02	3.62E-02
Cs-135	3.2195E-05	30.88	61.75	0.00E+00	9.94E-04	1.99E-03
Cs-137	1.9489E+00	30.88	61.75	0.00E+00	6.02E+01	1.20E+02
Eu-154	4.5895E-03	30.88	61.75	0.00E+00	1.42E-01	2.83E-01
Eu-155	3.6045E-03	30.88	61.75	0.00E+00	1.11E-01	2.23E-01
Fe-55	1.4185E-02	30.88	61.75	0.00E+00	4.38E-01	8.76E-01
H-3	4.7895E-03	30.88	61.75	0.00E+00	1.48E-01	2.96E-01
I-129	7.3684E-07	30.88	61.75	0.00E+00	2.28E-05	4.55E-05
Kr-85	9.5820E-02	30.88	61.75	0.00E+00	2.96E+00	5.92E+00
Np-237	1.2552E-06	30.88	61.75	0.00E+00	3.88E-05	7.75E-05
Pa-231	7.0406E-09	30.88	61.75	0.00E+00	2.17E-07	4.35E-07
Pb-210	5.8000E-14	30.88	61.75	0.00E+00	1.79E-12	3.58E-12
Pm-147	4.0075E-02	30.88	61.75	0.00E+00	1.24E+00	2.47E+00
Pu-238	9.2256E-04	30.88	61.75	0.00E+00	2.85E-02	5.70E-02
Pu-239	5.5278E-03	30.88	61.75	0.00E+00	1.71E-01	3.41E-01
Pu-240	2.1248E-03	30.88	61.75	0.00E+00	6.56E-02	1.31E-01
Pu-241	4.9549E-02	30.88	61.75	0.00E+00	1.53E+00	3.06E+00
Pu-242	2.3128E-07	30.88	61.75	0.00E+00	7.14E-06	1.43E-05
Ra-226	2.4526E-13	30.88	61.75	0.00E+00	7.57E-12	1.51E-11
Ra-228	2.4015E-10	30.88	61.75	0.00E+00	7.41E-09	1.48E-08
Ru-106	3.0602E-06	30.88	61.75	0.00E+00	9.45E-05	1.89E-04
Se-79	1.3015E-05	30.88	61.75	0.00E+00	4.02E-04	8.04E-04
Sn-126	1.2165E-05	30.88	61.75	0.00E+00	3.76E-04	7.51E-04
Sr-90	1.8226E+00	30.88	61.75	0.00E+00	5.63E+01	1.13E+02
Tc-99	4.4241E-04	30.88	61.75	0.00E+00	1.37E-02	2.73E-02
Th-229	3.0962E-10	30.88	61.75	0.00E+00	9.56E-09	1.91E-08
Th-230	4.2346E-11	30.88	61.75	0.00E+00	1.31E-09	2.61E-09
Th-232	2.5278E-10	30.88	61.75	0.00E+00	7.80E-09	1.56E-08
Tl-208	1.5820E-06	30.88	61.75	0.00E+00	4.88E-07	9.77E-07
U-232	4.2647E-06	30.88	61.75	0.00E+00	1.32E-06	2.63E-06
U-233	1.2211E-07	30.88	61.75	0.00E+00	3.77E-06	7.54E-06
U-234	1.9955E-07	30.88	61.75	0.00E+00	6.16E-06	1.23E-05
U-235	-2.6194E-06	30.88	0.00	2.72E-03	2.64E-03	2.72E-03
U-236	1.2693E-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	1.8241E+00	30.88	61.75	0.00E+00	5.63E+01	1.13E+02
Other Radionuclides					5.95E+01	1.19E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.188E+12
0.0250	1.288E+12
0.0375	1.116E+12
0.0575	1.201E+12
0.0850	7.248E+11
0.1250	4.737E+11
0.2250	6.223E+11
0.3750	2.728E+11
0.5750	4.486E+12
0.8500	5.056E+10
1.2500	8.379E+11
1.7500	1.299E+09
2.2500	4.474E+06
2.7500	4.931E+04
3.5000	2.818E+02
5.0000	3.602E+01
7.0000	4.077E+00
11.0000	4.643E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.73E-01	1.84E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	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	Estimated EOL HM/Given EOL HM
Nominal:	0.14	0.61	1.00
Bounding:	0.29		

[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: 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: 2010
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012682
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 2.26

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.9667E-09	2,282.86	4,565.72	0.00E+00	4.49E-06	8.98E-06	Avg. MeV	
Am-241	4.9468E-05	2,282.86	4,565.72	0.00E+00	1.13E-01	2.26E-01	0.0150	8.978E+14
Am-242m	9.7537E-09	2,282.86	4,565.72	0.00E+00	2.23E-05	4.45E-05	0.0250	1.915E+14
Am-243	9.8802E-10	2,282.86	4,565.72	0.00E+00	2.26E-06	4.51E-06	0.0375	1.709E+14
C-14	2.3095E-04	2,282.86	4,565.72	0.00E+00	5.27E-01	1.05E+00	0.0575	1.718E+14
Cl-36	1.2261E-06	2,282.86	4,565.72	0.00E+00	2.80E-03	5.60E-03	0.0850	1.089E+14
Cm-243	5.1581E-10	2,282.86	4,565.72	0.00E+00	1.18E-06	2.36E-06	0.1250	8.686E+13
Cm-244	7.3012E-09	2,282.86	4,565.72	0.00E+00	1.67E-05	3.33E-05	0.2250	9.015E+13
Co-60	3.6556E+00	2,282.86	4,565.72	0.00E+00	8.35E+03	1.67E+04	0.3750	4.376E+13
Cs-134	7.2063E-02	2,282.86	4,565.72	0.00E+00	1.65E+02	3.29E+02	0.5750	5.305E+14
Cs-135	3.0316E-05	2,282.86	4,565.72	0.00E+00	6.92E-02	1.38E-01	0.8500	2.569E+13
Cs-137	2.9002E+00	2,282.86	4,565.72	0.00E+00	6.62E+03	1.32E+04	1.2500	1.240E+15
Eu-154	7.5025E-03	2,282.86	4,565.72	0.00E+00	1.71E+01	3.43E+01	1.7500	4.378E+11
Eu-155	4.6123E-02	2,282.86	4,565.72	0.00E+00	1.05E+02	2.11E+02	2.2500	1.253E+12
Fe-55	3.6439E+00	2,282.86	4,565.72	0.00E+00	8.32E+03	1.66E+04	2.7500	7.109E+09
H-3	1.3524E-02	2,282.86	4,565.72	0.00E+00	3.09E+01	6.17E+01	3.5000	7.847E+08
I-129	7.3195E-07	2,282.86	4,565.72	0.00E+00	1.67E-03	3.34E-03	5.0000	1.891E+02
Kr-85	2.8686E-01	2,282.86	4,565.72	0.00E+00	6.55E+02	1.31E+03	7.0000	2.123E+01
Np-237	1.1478E-06	2,282.86	4,565.72	0.00E+00	2.62E-03	5.24E-03	11.0000	2.406E+00
Pa-231	1.0990E-08	2,282.86	4,565.72	0.00E+00	2.51E-05	5.02E-05		
Pb-210	8.0782E-15	2,282.86	4,565.72	0.00E+00	1.84E-11	3.69E-11		
Pm-147	3.2097E+00	2,282.86	4,565.72	0.00E+00	7.33E+03	1.47E+04		
Pu-238	3.7404E-04	2,282.86	4,565.72	0.00E+00	8.54E-01	1.71E+00		
Pu-239	6.6839E-04	2,282.86	4,565.72	0.00E+00	1.53E+00	3.05E+00		
Pu-240	8.7121E-05	2,282.86	4,565.72	0.00E+00	1.99E-01	3.98E-01		
Pu-241	3.0283E-03	2,282.86	4,565.72	0.00E+00	6.91E+00	1.38E+01		
Pu-242	1.9717E-09	2,282.86	4,565.72	0.00E+00	4.50E-06	9.00E-06		
Ra-226	7.3527E-14	2,282.86	4,565.72	0.00E+00	1.68E-10	3.36E-10		
Ra-228	6.0965E-12	2,282.86	4,565.72	0.00E+00	1.39E-08	2.78E-08		
Ru-106	1.6531E-01	2,282.86	4,565.72	0.00E+00	3.77E+02	7.55E+02		
Se-79	1.3228E-05	2,282.86	4,565.72	0.00E+00	3.02E-02	6.04E-02		
Sn-126	1.1494E-05	2,282.86	4,565.72	0.00E+00	2.62E-02	5.25E-02		
Sr-90	2.7854E+00	2,282.86	4,565.72	0.00E+00	6.36E+03	1.27E+04		
Tc-99	4.6656E-04	2,282.86	4,565.72	0.00E+00	1.07E+00	2.13E+00		
Th-229	2.9368E-12	2,282.86	4,565.72	0.00E+00	6.70E-09	1.34E-08		
Th-230	3.2662E-11	2,282.86	4,565.72	0.00E+00	7.46E-08	1.49E-07		
Th-232	8.3045E-12	2,282.86	4,565.72	0.00E+00	1.90E-08	3.79E-08		
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		

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: 2010
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 50 years

Estimated Canister usage:
18"x10'
0.69

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.4276E-08	15.30	30.61	0.00E+00	5.25E-07	1.05E-06	Avg. MeV	
Am-241	1.1458E-04	15.30	30.61	0.00E+00	1.75E-03	3.51E-03	0.0150	1.596E+12
Am-242m	7.9468E-09	15.30	30.61	0.00E+00	1.22E-07	2.43E-07	0.0250	3.317E+11
Am-243	9.8386E-10	15.30	30.61	0.00E+00	1.51E-08	3.01E-08	0.0375	2.875E+11
C-14	2.2978E-04	15.30	30.61	0.00E+00	3.52E-03	7.03E-03	0.0575	3.093E+11
Cl-36	1.2261E-06	15.30	30.61	0.00E+00	1.88E-05	3.75E-05	0.0850	1.868E+11
Cm-243	1.7271E-10	15.30	30.61	0.00E+00	2.64E-09	5.29E-09	0.1250	1.212E+11
Cm-244	1.3058E-09	15.30	30.61	0.00E+00	2.00E-08	4.00E-08	0.2250	1.610E+11
Co-60	9.8636E-03	15.30	30.61	0.00E+00	1.51E-01	3.02E-01	0.3750	7.023E+10
Cs-134	1.9617E-08	15.30	30.61	0.00E+00	3.00E-07	6.00E-07	0.5750	1.169E+12
Cs-135	3.0316E-05	15.30	30.61	0.00E+00	4.64E-04	9.28E-04	0.8500	1.154E+10
Cs-137	1.0263E+00	15.30	30.61	0.00E+00	1.57E+01	3.14E+01	1.2500	2.629E+10
Eu-154	2.0017E-04	15.30	30.61	0.00E+00	3.06E-03	6.13E-03	1.7500	2.972E+08
Eu-155	8.5957E-05	15.30	30.61	0.00E+00	1.32E-03	2.63E-03	2.2500	1.507E+05
Fe-55	2.2646E-05	15.30	30.61	0.00E+00	3.47E-04	6.93E-04	2.7500	2.052E+04
H-3	1.0835E-03	15.30	30.61	0.00E+00	1.66E-02	3.32E-02	3.5000	1.994E+00
I-129	7.3195E-07	15.30	30.61	0.00E+00	1.12E-05	2.24E-05	5.0000	8.245E-01
Kr-85	1.5661E-02	15.30	30.61	0.00E+00	2.40E-01	4.79E-01	7.0000	9.127E-02
Np-237	1.1494E-06	15.30	30.61	0.00E+00	1.76E-05	3.52E-05	11.0000	1.026E-02
Pa-231	5.8070E-08	15.30	30.61	0.00E+00	8.89E-07	1.78E-06		
Pb-210	1.2985E-12	15.30	30.61	0.00E+00	1.99E-11	3.97E-11		
Pm-147	2.2196E-05	15.30	30.61	0.00E+00	3.40E-04	6.79E-04		
Pu-238	2.6223E-04	15.30	30.61	0.00E+00	4.01E-03	8.03E-03		
Pu-239	6.6739E-04	15.30	30.61	0.00E+00	1.02E-02	2.04E-02		
Pu-240	8.6705E-05	15.30	30.61	0.00E+00	1.33E-03	2.65E-03		
Pu-241	3.4759E-04	15.30	30.61	0.00E+00	5.32E-03	1.06E-02		
Pu-242	1.9717E-09	15.30	30.61	0.00E+00	3.02E-08	6.03E-08		
Ra-226	3.0000E-12	15.30	30.61	0.00E+00	4.59E-11	9.18E-11		
Ra-228	8.3328E-12	15.30	30.61	0.00E+00	1.28E-10	2.55E-10		
Ru-106	6.1464E-15	15.30	30.61	0.00E+00	9.41E-14	1.88E-13		
Se-79	1.3221E-05	15.30	30.61	0.00E+00	2.02E-04	4.05E-04		
Sn-126	1.1491E-05	15.30	30.61	0.00E+00	1.76E-04	3.52E-04		
Sr-90	9.5541E-01	15.30	30.61	0.00E+00	1.46E+01	2.92E+01		
Tc-99	4.6656E-04	15.30	30.61	0.00E+00	7.14E-03	1.43E-02		
Th-229	1.9085E-11	15.30	30.61	0.00E+00	2.92E-10	5.84E-10		
Th-230	2.1913E-10	15.30	30.61	0.00E+00	3.35E-09	6.71E-09		
Th-232	8.3478E-12	15.30	30.61	0.00E+00	1.28E-10	2.55E-10		
Tl-208	1.8752E-08	15.30	30.61	0.00E+00	2.87E-07	5.74E-07		
U-232	5.0782E-08	15.30	30.61	0.00E+00	7.77E-07	1.55E-06		
U-233	3.2596E-09	15.30	30.61	0.00E+00	4.99E-08	9.98E-08		
U-234	3.9817E-07	15.30	30.61	0.00E+00	6.09E-06	1.22E-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	9.5557E-01	15.30	30.61	0.00E+00	1.46E+01	2.92E+01		
Other Radionuclides					1.87E+01	3.73E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.79E-01	3.57E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	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: 2010
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'
0.06

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	3.4276E-08	28.72	57.43	0.00E+00	9.84E-07	1.97E-06
Am-241	1.1458E-04	28.72	57.43	0.00E+00	3.29E-03	6.58E-03
Am-242m	7.9468E-09	28.72	57.43	0.00E+00	2.28E-07	4.56E-07
Am-243	9.8386E-10	28.72	57.43	0.00E+00	2.83E-08	5.65E-08
C-14	2.2978E-04	28.72	57.43	0.00E+00	6.60E-03	1.32E-02
Cl-36	1.2261E-06	28.72	57.43	0.00E+00	3.52E-05	7.04E-05
Cm-243	1.7271E-10	28.72	57.43	0.00E+00	4.96E-09	9.92E-09
Cm-244	1.3058E-09	28.72	57.43	0.00E+00	3.75E-08	7.50E-08
Co-60	9.8636E-03	28.72	57.43	0.00E+00	2.83E-01	5.67E-01
Cs-134	1.9617E-08	28.72	57.43	0.00E+00	5.63E-07	1.13E-06
Cs-135	3.0316E-05	28.72	57.43	0.00E+00	8.71E-04	1.74E-03
Cs-137	1.0263E+00	28.72	57.43	0.00E+00	2.95E+01	5.89E+01
Eu-154	2.0017E-04	28.72	57.43	0.00E+00	5.75E-03	1.15E-02
Eu-155	8.5957E-05	28.72	57.43	0.00E+00	2.47E-03	4.94E-03
Fe-55	2.2646E-05	28.72	57.43	0.00E+00	6.50E-04	1.30E-03
H-3	1.0835E-03	28.72	57.43	0.00E+00	3.11E-02	6.22E-02
I-129	7.3195E-07	28.72	57.43	0.00E+00	2.10E-05	4.20E-05
Kr-85	1.5661E-02	28.72	57.43	0.00E+00	4.50E-01	8.99E-01
Np-237	1.1494E-06	28.72	57.43	0.00E+00	3.30E-05	6.60E-05
Pa-231	5.8070E-08	28.72	57.43	0.00E+00	1.67E-06	3.34E-06
Pb-210	1.2985E-12	28.72	57.43	0.00E+00	3.73E-11	7.46E-11
Pm-147	2.2196E-05	28.72	57.43	0.00E+00	6.37E-04	1.27E-03
Pu-238	2.6223E-04	28.72	57.43	0.00E+00	7.53E-03	1.51E-02
Pu-239	6.6739E-04	28.72	57.43	0.00E+00	1.92E-02	3.83E-02
Pu-240	8.6705E-05	28.72	57.43	0.00E+00	2.49E-03	4.98E-03
Pu-241	3.4759E-04	28.72	57.43	0.00E+00	9.98E-03	2.00E-02
Pu-242	1.9717E-09	28.72	57.43	0.00E+00	5.66E-08	1.13E-07
Ra-226	3.0000E-12	28.72	57.43	0.00E+00	8.62E-11	1.72E-10
Ra-228	8.3328E-12	28.72	57.43	0.00E+00	2.39E-10	4.79E-10
Ru-106	6.1464E-15	28.72	57.43	0.00E+00	1.77E-13	3.53E-13
Se-79	1.3221E-05	28.72	57.43	0.00E+00	3.80E-04	7.59E-04
Sn-126	1.1491E-05	28.72	57.43	0.00E+00	3.30E-04	6.60E-04
Sr-90	9.5541E-01	28.72	57.43	0.00E+00	2.74E+01	5.49E+01
Tc-99	4.6656E-04	28.72	57.43	0.00E+00	1.34E-02	2.68E-02
Th-229	1.9085E-11	28.72	57.43	0.00E+00	5.48E-10	1.10E-09
Th-230	2.1913E-10	28.72	57.43	0.00E+00	6.29E-09	1.26E-08
Th-232	8.3478E-12	28.72	57.43	0.00E+00	2.40E-10	4.79E-10
Tl-208	1.8752E-08	28.72	57.43	0.00E+00	5.39E-07	1.08E-06
U-232	5.0782E-08	28.72	57.43	0.00E+00	1.46E-06	2.92E-06
U-233	3.2596E-09	28.72	57.43	0.00E+00	9.36E-08	1.87E-07
U-234	3.9817E-07	28.72	57.43	0.00E+00	1.14E-05	2.29E-05
U-235	-2.7761E-08	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	9.5557E-01	28.72	57.43	0.00E+00	2.74E+01	5.49E+01
Other Radionuclides					3.50E+01	7.00E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.995E+12
0.0250	6.224E+11
0.0375	5.396E+11
0.0575	5.804E+11
0.0850	3.508E+11
0.1250	2.274E+11
0.2250	3.021E+11
0.3750	1.318E+11
0.5750	2.194E+12
0.8500	2.166E+10
1.2500	4.934E+10
1.7500	5.578E+08
2.2500	2.827E+05
2.7500	3.851E+04
3.5000	3.391E+00
5.0000	1.400E+00
7.0000	1.547E-01
11.0000	1.736E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.35E-01	6.70E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	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
Nominal:		28.72
Bounding:		57.43

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	2.50	
Bounding:	5.00	

Estimated EOL HM/Given EOL HM: 1.00

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

[2]Total burnup for all fuel associated with this worksheet must be 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: 2010
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: 20 years

Estimated Canister usage: 18"x10' 0.17

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	5.0630E-10	670.42	1,340.84	0.00E+00	3.39E-07	6.79E-07
Am-241	1.1489E-01	670.42	1,340.84	0.00E+00	7.70E+01	1.54E+02
Am-242m	3.0733E-04	670.42	1,340.84	0.00E+00	2.06E-01	4.12E-01
Am-243	6.2661E-04	670.42	1,340.84	0.00E+00	4.20E-01	8.40E-01
C-14	4.7997E-05	670.42	1,340.84	0.00E+00	3.22E-02	6.44E-02
Cl-36	8.0313E-07	670.42	1,340.84	0.00E+00	5.38E-04	1.08E-03
Cm-243	3.6127E-04	670.42	1,340.84	0.00E+00	2.42E-01	4.84E-01
Cm-244	8.6999E-02	670.42	1,340.84	0.00E+00	5.83E+01	1.17E+02
Co-60	1.8379E-02	670.42	1,340.84	0.00E+00	1.23E+01	2.46E+01
Cs-134	6.2548E-03	670.42	1,340.84	0.00E+00	4.19E+00	8.39E+00
Cs-135	1.4433E-05	670.42	1,340.84	0.00E+00	9.68E-03	1.94E-02
Cs-137	1.9767E+00	670.42	1,340.84	0.00E+00	1.33E+03	2.65E+03
Eu-154	6.7603E-02	670.42	1,340.84	0.00E+00	4.53E+01	9.06E+01
Eu-155	1.4373E-02	670.42	1,340.84	0.00E+00	9.64E+00	1.93E+01
Fe-55	2.3466E-03	670.42	1,340.84	0.00E+00	1.57E+00	3.15E+00
H-3	4.8143E-02	670.42	1,340.84	0.00E+00	3.23E+01	6.46E+01
I-129	9.8288E-07	670.42	1,340.84	0.00E+00	6.59E-04	1.32E-03
Kr-85	7.4386E-02	670.42	1,340.84	0.00E+00	4.99E+01	9.97E+01
Np-237	1.0145E-05	670.42	1,340.84	0.00E+00	6.80E-03	1.36E-02
Pa-231	1.0258E-09	670.42	1,340.84	0.00E+00	6.88E-07	1.38E-06
Pb-210	1.4163E-11	670.42	1,340.84	0.00E+00	9.50E-09	1.90E-08
Pm-147	1.9170E-02	670.42	1,340.84	0.00E+00	1.29E+01	2.57E+01
Pu-238	8.3915E-02	670.42	1,340.84	0.00E+00	5.63E+01	1.13E+02
Pu-239	1.1628E-02	670.42	1,340.84	0.00E+00	7.80E+00	1.56E+01
Pu-240	1.5050E-02	670.42	1,340.84	0.00E+00	1.01E+01	2.02E+01
Pu-241	1.8524E+00	670.42	1,340.84	0.00E+00	1.24E+03	2.48E+03
Pu-242	6.4260E-05	670.42	1,340.84	0.00E+00	4.31E-02	8.62E-02
Ra-226	6.0562E-11	670.42	1,340.84	0.00E+00	4.06E-08	8.12E-08
Ra-228	4.9919E-12	670.42	1,340.84	0.00E+00	3.35E-09	6.69E-09
Ru-106	1.8330E-05	670.42	1,340.84	0.00E+00	1.23E-02	2.46E-02
Se-79	1.2379E-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	1.3098E+00	670.42	1,340.84	0.00E+00	8.78E+02	1.76E+03
Tc-99	3.9357E-04	670.42	1,340.84	0.00E+00	2.64E-01	5.28E-01
Th-229	6.2968E-11	670.42	1,340.84	0.00E+00	4.22E-08	8.44E-08
Th-230	1.0362E-06	670.42	1,340.84	0.00E+00	6.95E-06	1.39E-05
Th-232	5.2891E-12	670.42	1,340.84	0.00E+00	3.55E-09	7.09E-09
Tl-208	1.9977E-07	670.42	1,340.84	0.00E+00	1.34E-04	2.68E-04
U-232	5.4490E-07	670.42	1,340.84	0.00E+00	3.65E-04	7.31E-04
U-233	2.3934E-06	670.42	1,340.84	0.00E+00	1.60E-05	3.21E-05
U-234	4.4816E-05	670.42	1,340.84	0.00E+00	3.00E-02	6.01E-02
U-235	-1.4492E-06	670.42	0.00	7.90E-04	0.00E+00	7.90E-04
U-236	7.5711E-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	1.3101E+00	670.42	1,340.84	0.00E+00	8.78E+02	1.76E+03
Other Radionuclides					1.27E+03	2.54E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.026E+14
0.0250	2.089E+13
0.0375	2.041E+13
0.0575	2.144E+13
0.0850	1.175E+13
0.1250	8.898E+12
0.2250	1.007E+13
0.3750	4.342E+12
0.5750	9.858E+13
0.8500	2.555E+12
1.2500	3.836E+12
1.7500	7.062E+10
2.2500	1.637E+07
2.7500	1.149E+07
3.5000	1.701E+06
5.0000	7.164E+05
7.0000	8.259E+04
11.0000	9.488E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.01E+01	4.02E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	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
Nominal:	592.20	670.42
Bounding:		1,340.84

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	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: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 1.00

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	0.02	0.05	0.00E+00	1.51E-11	3.02E-11
Am-241	2.0060E-03	0.02	0.05	0.00E+00	4.57E-05	9.14E-05
Am-242m	4.2429E-07	0.02	0.05	0.00E+00	9.66E-09	1.93E-08
Am-243	1.4899E-06	0.02	0.05	0.00E+00	3.39E-08	6.79E-08
C-14	5.7135E-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	1.6443E-07	0.02	0.05	0.00E+00	3.74E-09	7.49E-09
Cm-244	2.9330E-05	0.02	0.05	0.00E+00	6.68E-07	1.34E-06
Co-60	5.3186E-06	0.02	0.05	0.00E+00	1.21E-07	2.42E-07
Cs-134	3.1563E-03	0.02	0.05	0.00E+00	7.19E-05	1.44E-04
Cs-135	3.4477E-06	0.02	0.05	0.00E+00	7.85E-08	1.57E-07
Cs-137	2.0313E+00	0.02	0.05	0.00E+00	4.63E-02	9.25E-02
Eu-154	2.4513E-02	0.02	0.05	0.00E+00	5.58E-04	1.12E-03
Eu-155	4.8175E-03	0.02	0.05	0.00E+00	1.10E-04	2.19E-04
Fe-55	1.2397E-04	0.02	0.05	0.00E+00	2.82E-06	5.65E-06
H-3	4.5697E-03	0.02	0.05	0.00E+00	1.04E-04	2.08E-04
I-129	7.5300E-07	0.02	0.05	0.00E+00	1.71E-08	3.43E-08
Kr-85	1.0850E-01	0.02	0.05	0.00E+00	2.47E-03	4.94E-03
Np-237	9.5561E-06	0.02	0.05	0.00E+00	2.18E-07	4.35E-07
Pa-231	2.0359E-09	0.02	0.05	0.00E+00	4.64E-11	9.27E-11
Pb-210	4.9728E-11	0.02	0.05	0.00E+00	1.13E-12	2.26E-12
Pm-147	4.8502E-02	0.02	0.05	0.00E+00	1.10E-03	2.21E-03
Pu-238	1.8254E-02	0.02	0.05	0.00E+00	4.16E-04	8.31E-04
Pu-239	4.2810E-04	0.02	0.05	0.00E+00	9.75E-06	1.95E-05
Pu-240	2.4368E-04	0.02	0.05	0.00E+00	5.55E-06	1.11E-05
Pu-241	3.3415E-02	0.02	0.05	0.00E+00	7.61E-04	1.52E-03
Pu-242	3.6329E-07	0.02	0.05	0.00E+00	8.27E-09	1.65E-08
Ra-226	2.2854E-10	0.02	0.05	0.00E+00	5.20E-12	1.04E-11
Ra-228	1.2426E-14	0.02	0.05	0.00E+00	2.83E-16	5.66E-16
Ru-106	6.3589E-06	0.02	0.05	0.00E+00	1.45E-07	2.90E-07
Se-79	1.2933E-05	0.02	0.05	0.00E+00	2.94E-07	5.89E-07
Sn-126	1.1574E-05	0.02	0.05	0.00E+00	2.64E-07	5.27E-07
Sr-90	1.9248E+00	0.02	0.05	0.00E+00	4.38E-02	8.77E-02
Tc-99	4.2239E-04	0.02	0.05	0.00E+00	9.62E-06	1.92E-05
Th-229	5.0953E-12	0.02	0.05	0.00E+00	1.16E-13	2.32E-13
Th-230	4.1885E-08	0.02	0.05	0.00E+00	9.54E-10	1.91E-09
Th-232	1.9270E-14	0.02	0.05	0.00E+00	4.39E-16	8.78E-16
Tl-208	4.6024E-08	0.02	0.05	0.00E+00	1.05E-09	2.10E-09
U-232	1.2582E-07	0.02	0.05	0.00E+00	2.86E-09	5.73E-09
U-233	2.5825E-09	0.02	0.05	0.00E+00	5.88E-11	1.18E-10
U-234	1.8450E-04	0.02	0.05	0.00E+00	4.20E-06	8.40E-06
U-235	-2.7235E-06	0.02	0.00	3.93E-04	3.93E-04	3.93E-04
U-238	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	1.9254E+00	0.02	0.05	0.00E+00	4.38E-02	8.77E-02
Other Radionuclides					4.40E-02	8.81E-02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.816E+09
0.0250	9.996E+08
0.0375	8.719E+08
0.0575	9.338E+08
0.0850	5.655E+08
0.1250	3.841E+08
0.2250	4.948E+08
0.3750	2.120E+08
0.5750	3.457E+09
0.8500	5.845E+07
1.2500	3.338E+07
1.7500	1.532E+08
2.2500	1.345E+02
2.7500	7.602E+01
3.5000	3.910E-01
5.0000	3.743E-02
7.0000	4.178E-03
11.0000	4.716E-04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.53E-04	1.10E-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 %:	91.89393939	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: 2010
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: 15 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	4.5861E-10	1.30	13.74	0.00E+00	5.95E-10	6.30E-09
Am-241	1.7832E-03	1.30	13.74	0.00E+00	2.32E-03	2.45E-02
Am-242m	4.3410E-07	1.30	13.74	0.00E+00	5.64E-07	5.96E-06
Am-243	1.4907E-06	1.30	13.74	0.00E+00	1.94E-06	2.05E-05
C-14	5.7162E-09	1.30	13.74	0.00E+00	7.42E-09	7.85E-08
Cl-36	1.3124E-32	1.30	13.74	0.00E+00	1.70E-32	1.80E-31
Cm-243	1.8568E-07	1.30	13.74	0.00E+00	2.41E-07	2.55E-06
Cm-244	3.5512E-05	1.30	13.74	0.00E+00	4.61E-05	4.88E-04
Co-60	1.0261E-05	1.30	13.74	0.00E+00	1.33E-05	1.41E-04
Cs-134	1.6931E-02	1.30	13.74	0.00E+00	2.20E-02	2.33E-01
Cs-135	3.4477E-06	1.30	13.74	0.00E+00	4.48E-06	4.74E-05
Cs-137	2.2800E+00	1.30	13.74	0.00E+00	2.96E+00	3.13E+01
Eu-154	3.6656E-02	1.30	13.74	0.00E+00	4.76E-02	5.04E-01
Eu-155	9.6841E-03	1.30	13.74	0.00E+00	1.26E-02	1.33E-01
Fe-55	4.6977E-04	1.30	13.74	0.00E+00	6.10E-04	6.45E-03
H-3	6.0485E-03	1.30	13.74	0.00E+00	7.85E-03	8.31E-02
I-129	7.5300E-07	1.30	13.74	0.00E+00	9.78E-07	1.03E-05
Kr-85	1.4989E-01	1.30	13.74	0.00E+00	1.95E-01	2.06E+00
Np-237	9.5534E-06	1.30	13.74	0.00E+00	1.24E-05	1.31E-04
Pa-231	1.6550E-09	1.30	13.74	0.00E+00	2.15E-09	2.27E-08
Pb-210	2.6631E-11	1.30	13.74	0.00E+00	3.46E-11	3.66E-10
Pm-147	1.8156E-01	1.30	13.74	0.00E+00	2.36E-01	2.49E+00
Pu-238	1.8990E-02	1.30	13.74	0.00E+00	2.47E-02	2.61E-01
Pu-239	4.2838E-04	1.30	13.74	0.00E+00	5.56E-04	5.89E-03
Pu-240	2.4379E-04	1.30	13.74	0.00E+00	3.17E-04	3.35E-03
Pu-241	4.2511E-02	1.30	13.74	0.00E+00	5.52E-02	5.84E-01
Pu-242	3.6329E-07	1.30	13.74	0.00E+00	4.72E-07	4.99E-06
Ra-226	1.4725E-10	1.30	13.74	0.00E+00	1.91E-10	2.02E-09
Ra-228	8.9760E-15	1.30	13.74	0.00E+00	1.17E-14	1.23E-13
Ru-106	1.9752E-04	1.30	13.74	0.00E+00	2.56E-04	2.71E-03
Se-79	1.2933E-05	1.30	13.74	0.00E+00	1.68E-05	1.78E-04
Sn-126	1.1574E-05	1.30	13.74	0.00E+00	1.50E-05	1.59E-04
Sr-90	2.1680E+00	1.30	13.74	0.00E+00	2.81E+00	2.98E+01
Tc-99	4.2239E-04	1.30	13.74	0.00E+00	5.48E-04	5.80E-03
Th-229	3.9270E-12	1.30	13.74	0.00E+00	5.10E-12	5.40E-11
Th-230	3.3578E-08	1.30	13.74	0.00E+00	4.36E-08	4.61E-07
Th-232	1.5452E-14	1.30	13.74	0.00E+00	2.01E-14	2.12E-13
Tl-208	4.6705E-08	1.30	13.74	0.00E+00	6.06E-08	6.42E-07
U-232	1.3045E-07	1.30	13.74	0.00E+00	1.69E-07	1.79E-06
U-233	2.3739E-09	1.30	13.74	0.00E+00	3.08E-09	3.26E-08
U-234	1.8423E-04	1.30	13.74	0.00E+00	2.39E-04	2.53E-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	2.1686E+00	1.30	13.74	0.00E+00	2.82E+00	2.98E+01
Other Radionuclides					2.82E+00	2.99E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.639E+12
0.0250	3.418E+11
0.0375	2.985E+11
0.0575	3.183E+11
0.0850	1.928E+11
0.1250	1.323E+11
0.2250	1.665E+11
0.3750	7.276E+10
0.5750	1.181E+12
0.8500	2.805E+10
1.2500	1.417E+10
1.7500	5.938E+08
2.2500	7.428E+05
2.7500	4.465E+04
3.5000	2.840E+03
5.0000	7.537E+00
7.0000	8.368E-01
11.0000	9.412E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.57E-02	3.72E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	1.30	
Bounding:	13.74	

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1991
Estimates as of: 2010
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: 15 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	4.5861E-10	0.03	0.29	0.00E+00	1.24E-11	1.32E-10
Am-241	1.7832E-03	0.03	0.29	0.00E+00	4.84E-05	5.12E-04
Am-242m	4.3410E-07	0.03	0.29	0.00E+00	1.18E-08	1.25E-07
Am-243	1.4907E-06	0.03	0.29	0.00E+00	4.05E-08	4.28E-07
C-14	5.7162E-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	1.8568E-07	0.03	0.29	0.00E+00	5.04E-09	5.33E-08
Cm-244	3.5512E-05	0.03	0.29	0.00E+00	9.64E-07	1.02E-05
Co-60	1.0261E-05	0.03	0.29	0.00E+00	2.78E-07	2.95E-06
Cs-134	1.6931E-02	0.03	0.29	0.00E+00	4.60E-04	4.86E-03
Cs-135	3.4477E-06	0.03	0.29	0.00E+00	9.36E-08	9.90E-07
Cs-137	2.2800E+00	0.03	0.29	0.00E+00	6.19E-02	6.55E-01
Eu-154	3.6656E-02	0.03	0.29	0.00E+00	9.95E-04	1.05E-02
Eu-155	9.6841E-03	0.03	0.29	0.00E+00	2.63E-04	2.78E-03
Fe-55	4.6977E-04	0.03	0.29	0.00E+00	1.27E-05	1.35E-04
H-3	6.0485E-03	0.03	0.29	0.00E+00	1.64E-04	1.74E-03
I-129	7.5300E-07	0.03	0.29	0.00E+00	2.04E-08	2.16E-07
Kr-85	1.4989E-01	0.03	0.29	0.00E+00	4.07E-03	4.31E-02
Np-237	9.5534E-06	0.03	0.29	0.00E+00	2.59E-07	2.74E-06
Pa-231	1.6550E-09	0.03	0.29	0.00E+00	4.49E-11	4.75E-10
Pb-210	2.6631E-11	0.03	0.29	0.00E+00	7.23E-13	7.65E-12
Pm-147	1.8156E-01	0.03	0.29	0.00E+00	4.93E-03	5.21E-02
Pu-238	1.8990E-02	0.03	0.29	0.00E+00	5.15E-04	5.45E-03
Pu-239	4.2838E-04	0.03	0.29	0.00E+00	1.16E-05	1.23E-04
Pu-240	2.4379E-04	0.03	0.29	0.00E+00	6.62E-06	7.00E-05
Pu-241	4.2511E-02	0.03	0.29	0.00E+00	1.15E-03	1.22E-02
Pu-242	3.6329E-07	0.03	0.29	0.00E+00	9.86E-09	1.04E-07
Ra-226	1.4725E-10	0.03	0.29	0.00E+00	4.00E-12	4.23E-11
Ra-228	8.9760E-15	0.03	0.29	0.00E+00	2.44E-16	2.58E-15
Ru-106	1.9752E-04	0.03	0.29	0.00E+00	5.36E-06	5.67E-05
Se-79	1.2933E-05	0.03	0.29	0.00E+00	3.51E-07	3.71E-06
Sn-126	1.1574E-05	0.03	0.29	0.00E+00	3.14E-07	3.32E-06
Sr-90	2.1680E+00	0.03	0.29	0.00E+00	5.88E-02	6.23E-01
Tc-99	4.2239E-04	0.03	0.29	0.00E+00	1.15E-05	1.21E-04
Th-229	3.9270E-12	0.03	0.29	0.00E+00	1.07E-13	1.13E-12
Th-230	3.3578E-08	0.03	0.29	0.00E+00	9.11E-10	9.64E-09
Th-232	1.5452E-14	0.03	0.29	0.00E+00	4.19E-16	4.44E-15
Tl-208	4.6705E-08	0.03	0.29	0.00E+00	1.27E-09	1.34E-08
U-232	1.3045E-07	0.03	0.29	0.00E+00	3.54E-09	3.75E-08
U-233	2.3739E-09	0.03	0.29	0.00E+00	6.44E-11	6.82E-10
U-234	1.8423E-04	0.03	0.29	0.00E+00	5.00E-06	5.29E-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	2.1686E+00	0.03	0.29	0.00E+00	5.89E-02	6.23E-01
Other Radionuclides					5.90E-02	6.25E-01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.427E+10
0.0250	7.145E+09
0.0375	6.239E+09
0.0575	6.653E+09
0.0850	4.031E+09
0.1250	2.766E+09
0.2250	3.481E+09
0.3750	1.521E+09
0.5750	2.489E+10
0.8500	5.864E+08
1.2500	2.962E+08
1.7500	1.241E+07
2.2500	1.553E+04
2.7500	9.333E+02
3.5000	5.936E+01
5.0000	1.559E-01
7.0000	1.731E-02
11.0000	1.946E-03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.47E-04	7.79E-03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	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:
[1]Nominal burnup taken directly from SFD (converted to MWd).
[1]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: 2010
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: 15 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	4.5861E-10	0.13	1.42	0.00E+00	6.14E-11	6.50E-10
Am-241	1.7832E-03	0.13	1.42	0.00E+00	2.39E-04	2.53E-03
Am-242m	4.3410E-07	0.13	1.42	0.00E+00	5.81E-08	6.15E-07
Am-243	1.4907E-06	0.13	1.42	0.00E+00	2.00E-07	2.11E-06
C-14	5.7162E-09	0.13	1.42	0.00E+00	7.65E-10	8.10E-09
Cl-36	1.3124E-32	0.13	1.42	0.00E+00	1.76E-33	1.86E-32
Cm-243	1.8568E-07	0.13	1.42	0.00E+00	2.49E-08	2.63E-07
Cm-244	3.5512E-05	0.13	1.42	0.00E+00	4.75E-06	5.03E-05
Co-60	1.0261E-05	0.13	1.42	0.00E+00	1.37E-06	1.45E-05
Cs-134	1.6931E-02	0.13	1.42	0.00E+00	2.27E-03	2.40E-02
Cs-135	3.4477E-06	0.13	1.42	0.00E+00	4.62E-07	4.88E-06
Cs-137	2.2800E+00	0.13	1.42	0.00E+00	3.05E-01	3.23E+00
Eu-154	3.6656E-02	0.13	1.42	0.00E+00	4.91E-03	5.19E-02
Eu-155	9.6841E-03	0.13	1.42	0.00E+00	1.30E-03	1.37E-02
Fe-55	4.6977E-04	0.13	1.42	0.00E+00	6.29E-05	6.65E-04
H-3	6.0485E-03	0.13	1.42	0.00E+00	8.10E-04	8.57E-03
I-129	7.5300E-07	0.13	1.42	0.00E+00	1.01E-07	1.07E-06
Kr-85	1.4989E-01	0.13	1.42	0.00E+00	2.01E-02	2.12E-01
Np-237	9.5534E-06	0.13	1.42	0.00E+00	1.28E-06	1.35E-05
Pa-231	1.6550E-09	0.13	1.42	0.00E+00	2.22E-10	2.34E-09
Pb-210	2.6631E-11	0.13	1.42	0.00E+00	3.56E-12	3.77E-11
Pm-147	1.8156E-01	0.13	1.42	0.00E+00	2.43E-02	2.57E-01
Pu-238	1.8990E-02	0.13	1.42	0.00E+00	2.54E-03	2.69E-02
Pu-239	4.2838E-04	0.13	1.42	0.00E+00	5.73E-05	6.07E-04
Pu-240	2.4379E-04	0.13	1.42	0.00E+00	3.26E-05	3.45E-04
Pu-241	4.2511E-02	0.13	1.42	0.00E+00	5.69E-03	6.02E-02
Pu-242	3.6329E-07	0.13	1.42	0.00E+00	4.86E-08	5.15E-07
Ra-226	1.4725E-10	0.13	1.42	0.00E+00	1.97E-11	2.09E-10
Ra-228	8.9760E-15	0.13	1.42	0.00E+00	1.20E-15	1.27E-14
Ru-106	1.9752E-04	0.13	1.42	0.00E+00	2.64E-05	2.80E-04
Se-79	1.2933E-05	0.13	1.42	0.00E+00	1.73E-06	1.83E-05
Sn-126	1.1574E-05	0.13	1.42	0.00E+00	1.55E-06	1.64E-05
Sr-90	2.1680E+00	0.13	1.42	0.00E+00	2.90E-01	3.07E+00
Tc-99	4.2239E-04	0.13	1.42	0.00E+00	5.65E-05	5.98E-04
Th-229	3.9270E-12	0.13	1.42	0.00E+00	5.26E-13	5.56E-12
Th-230	3.3578E-08	0.13	1.42	0.00E+00	4.49E-09	4.76E-08
Th-232	1.5452E-14	0.13	1.42	0.00E+00	2.07E-15	2.19E-14
Tl-208	4.6705E-08	0.13	1.42	0.00E+00	6.25E-09	6.62E-08
U-232	1.3045E-07	0.13	1.42	0.00E+00	1.75E-08	1.85E-07
U-233	2.3739E-09	0.13	1.42	0.00E+00	3.18E-10	3.36E-09
U-234	1.8423E-04	0.13	1.42	0.00E+00	2.47E-05	2.61E-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	2.1686E+00	0.13	1.42	0.00E+00	2.90E-01	3.07E+00
Other Radionuclides					2.91E-01	3.08E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.690E+11
0.0250	3.524E+10
0.0375	3.077E+10
0.0575	3.281E+10
0.0850	1.988E+10
0.1250	1.364E+10
0.2250	1.717E+10
0.3750	7.502E+09
0.5750	1.218E+11
0.8500	2.892E+09
1.2500	1.461E+09
1.7500	6.122E+07
2.2500	7.659E+04
2.7500	4.603E+03
3.5000	2.928E+02
5.0000	7.699E-01
7.0000	8.545E-02
11.0000	9.608E-03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.68E-03	3.84E-02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.12714777	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.13	
Bounding:	1.42	

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1991
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 0.17

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.5861E-10	0.01	0.12	0.00E+00	5.06E-12	5.36E-11
Am-241	1.7832E-03	0.01	0.12	0.00E+00	1.97E-05	2.08E-04
Am-242m	4.3410E-07	0.01	0.12	0.00E+00	4.79E-09	5.07E-08
Am-243	1.4907E-06	0.01	0.12	0.00E+00	1.65E-08	1.74E-07
C-14	5.7162E-09	0.01	0.12	0.00E+00	6.31E-11	6.68E-10
Cl-36	1.3124E-32	0.01	0.12	0.00E+00	1.45E-34	1.53E-33
Cm-243	1.8568E-07	0.01	0.12	0.00E+00	2.05E-09	2.17E-08
Cm-244	3.5512E-05	0.01	0.12	0.00E+00	3.92E-07	4.15E-06
Co-60	1.0261E-05	0.01	0.12	0.00E+00	1.13E-07	1.20E-06
Cs-134	1.6931E-02	0.01	0.12	0.00E+00	1.87E-04	1.98E-03
Cs-135	3.4477E-06	0.01	0.12	0.00E+00	3.81E-08	4.03E-07
Cs-137	2.2800E+00	0.01	0.12	0.00E+00	2.52E-02	2.66E-01
Eu-154	3.6656E-02	0.01	0.12	0.00E+00	4.05E-04	4.28E-03
Eu-155	9.6841E-03	0.01	0.12	0.00E+00	1.07E-04	1.13E-03
Fe-55	4.6977E-04	0.01	0.12	0.00E+00	5.19E-06	5.49E-05
H-3	6.0485E-03	0.01	0.12	0.00E+00	6.68E-05	7.07E-04
I-129	7.5300E-07	0.01	0.12	0.00E+00	8.31E-09	8.80E-08
Kr-85	1.4989E-01	0.01	0.12	0.00E+00	1.65E-03	1.75E-02
Np-237	9.5534E-06	0.01	0.12	0.00E+00	1.05E-07	1.12E-06
Pa-231	1.6550E-09	0.01	0.12	0.00E+00	1.83E-11	1.93E-10
Pb-210	2.6631E-11	0.01	0.12	0.00E+00	2.94E-13	3.11E-12
Pm-147	1.8156E-01	0.01	0.12	0.00E+00	2.00E-03	2.12E-02
Pu-238	1.8990E-02	0.01	0.12	0.00E+00	2.10E-04	2.22E-03
Pu-239	4.2838E-04	0.01	0.12	0.00E+00	4.73E-06	5.00E-05
Pu-240	2.4379E-04	0.01	0.12	0.00E+00	2.69E-06	2.85E-05
Pu-241	4.2511E-02	0.01	0.12	0.00E+00	4.69E-04	4.97E-03
Pu-242	3.6329E-07	0.01	0.12	0.00E+00	4.01E-09	4.24E-08
Ra-226	1.4725E-10	0.01	0.12	0.00E+00	1.63E-12	1.72E-11
Ra-228	8.9760E-15	0.01	0.12	0.00E+00	9.91E-17	1.05E-15
Ru-106	1.9752E-04	0.01	0.12	0.00E+00	2.18E-06	2.31E-05
Se-79	1.2933E-05	0.01	0.12	0.00E+00	1.43E-07	1.51E-06
Sn-126	1.1574E-05	0.01	0.12	0.00E+00	1.28E-07	1.35E-06
Sr-90	2.1680E+00	0.01	0.12	0.00E+00	2.39E-02	2.53E-01
Tc-99	4.2239E-04	0.01	0.12	0.00E+00	4.66E-06	4.93E-05
Th-229	3.9270E-12	0.01	0.12	0.00E+00	4.34E-14	4.59E-13
Th-230	3.3578E-08	0.01	0.12	0.00E+00	3.71E-10	3.92E-09
Th-232	1.5452E-14	0.01	0.12	0.00E+00	1.71E-16	1.81E-15
Tl-208	4.6705E-08	0.01	0.12	0.00E+00	5.16E-10	5.46E-09
U-232	1.3045E-07	0.01	0.12	0.00E+00	1.44E-09	1.52E-08
U-233	2.3739E-09	0.01	0.12	0.00E+00	2.62E-11	2.77E-10
U-234	1.8423E-04	0.01	0.12	0.00E+00	2.03E-06	2.15E-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	2.1686E+00	0.01	0.12	0.00E+00	2.39E-02	2.53E-01
Other Radionuclides					2.40E-02	2.54E-01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.394E+10
0.0250	2.907E+09
0.0375	2.538E+09
0.0575	2.706E+09
0.0850	1.640E+09
0.1250	1.125E+09
0.2250	1.416E+09
0.3750	6.187E+08
0.5750	1.004E+10
0.8500	2.385E+08
1.2500	1.205E+08
1.7500	5.049E+06
2.2500	6.317E+03
2.7500	3.796E+02
3.5000	2.415E+01
5.0000	6.454E-02
7.0000	7.167E-03
11.0000	8.062E-04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.04E-04	3.17E-03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.01	
Bounding:	0.12	

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1985
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated Canister usage: 18"x10'
78.80

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (CI)	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	480,779.86	961,559.72	0.00E+00	5.51E-04	1.10E-03	Avg. MeV	
Am-241	2.3056E-03	480,779.86	961,559.72	0.00E+00	1.11E+03	2.22E+03	0.0150	8.998E+16
Am-242m	4.1476E-07	480,779.86	961,559.72	0.00E+00	1.99E-01	3.99E-01	0.0250	1.869E+16
Am-243	1.4894E-06	480,779.86	961,559.72	0.00E+00	7.16E-01	1.43E+00	0.0375	1.628E+16
C-14	5.7108E-09	480,779.86	961,559.72	0.00E+00	2.75E-03	5.49E-03	0.0575	1.748E+16
Cl-36	1.3124E-32	480,779.86	961,559.72	0.00E+00	6.31E-27	1.26E-26	0.0850	1.055E+16
Cm-243	1.4562E-07	480,779.86	961,559.72	0.00E+00	7.00E-02	1.40E-01	0.1250	7.065E+15
Cm-244	2.4221E-05	480,779.86	961,559.72	0.00E+00	1.16E+01	2.33E+01	0.2250	9.106E+15
Co-60	2.7560E-06	480,779.86	961,559.72	0.00E+00	1.33E+00	2.65E+00	0.3750	3.959E+15
Cs-134	5.8851E-04	480,779.86	961,559.72	0.00E+00	2.83E+02	5.66E+02	0.5750	6.490E+16
Cs-135	3.4477E-06	480,779.86	961,559.72	0.00E+00	1.66E+00	3.32E+00	0.8500	9.352E+14
Cs-137	1.8099E+00	480,779.86	961,559.72	0.00E+00	8.70E+05	1.74E+06	1.2500	5.201E+14
Eu-154	1.6386E-02	480,779.86	961,559.72	0.00E+00	7.88E+03	1.58E+04	1.7500	2.569E+13
Eu-155	2.3957E-03	480,779.86	961,559.72	0.00E+00	1.15E+03	2.30E+03	2.2500	1.831E+09
Fe-55	3.2707E-05	480,779.86	961,559.72	0.00E+00	1.57E+01	3.14E+01	2.7500	1.500E+09
H-3	3.4504E-03	480,779.86	961,559.72	0.00E+00	1.66E+03	3.32E+03	3.5000	1.132E+06
I-129	7.5300E-07	480,779.86	961,559.72	0.00E+00	3.62E-01	7.24E-01	5.0000	3.806E+05
Kr-85	7.8540E-02	480,779.86	961,559.72	0.00E+00	3.78E+04	7.55E+04	7.0000	4.188E+04
Np-237	9.5615E-06	480,779.86	961,559.72	0.00E+00	4.60E+00	9.19E+00	11.0000	4.685E+03
Pa-231	2.7968E-09	480,779.86	961,559.72	0.00E+00	1.34E-03	2.69E-03		
Pb-210	1.2612E-10	480,779.86	961,559.72	0.00E+00	6.06E-05	1.21E-04		
Pm-147	1.2952E-02	480,779.86	961,559.72	0.00E+00	6.23E+03	1.25E+04		
Pu-238	1.7549E-02	480,779.86	961,559.72	0.00E+00	8.44E+03	1.69E+04		
Pu-239	4.2810E-04	480,779.86	961,559.72	0.00E+00	2.06E+02	4.12E+02		
Pu-240	2.4357E-04	480,779.86	961,559.72	0.00E+00	1.17E+02	2.34E+02		
Pu-241	2.6277E-02	480,779.86	961,559.72	0.00E+00	1.26E+04	2.53E+04		
Pu-242	3.6329E-07	480,779.86	961,559.72	0.00E+00	1.75E-01	3.49E-01		
Ra-226	4.4444E-10	480,779.86	961,559.72	0.00E+00	2.14E-04	4.27E-04		
Ra-228	1.9714E-14	480,779.86	961,559.72	0.00E+00	9.48E-09	1.90E-08		
Ru-106	2.0477E-07	480,779.86	961,559.72	0.00E+00	9.84E-02	1.97E-01		
Se-79	1.2933E-05	480,779.86	961,559.72	0.00E+00	6.22E+00	1.24E+01		
Sn-126	1.1574E-05	480,779.86	961,559.72	0.00E+00	5.56E+00	1.11E+01		
Sr-90	1.7092E+00	480,779.86	961,559.72	0.00E+00	8.22E+05	1.64E+06		
Tc-99	4.2239E-04	480,779.86	961,559.72	0.00E+00	2.03E+02	4.06E+02		
Th-229	7.7260E-12	480,779.86	961,559.72	0.00E+00	3.71E-06	7.43E-06		
Th-230	5.8497E-08	480,779.86	961,559.72	0.00E+00	2.81E-02	5.62E-02		
Th-232	2.6906E-14	480,779.86	961,559.72	0.00E+00	1.29E-08	2.59E-08		
Tl-208	4.4336E-08	480,779.86	961,559.72	0.00E+00	2.13E-02	4.26E-02		
U-232	1.2037E-07	480,779.86	961,559.72	0.00E+00	5.79E-02	1.16E-01		
U-233	3.0011E-09	480,779.86	961,559.72	0.00E+00	1.44E-03	2.89E-03		
U-234	1.8497E-04	480,779.86	961,559.72	0.00E+00	8.89E+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	1.7094E+00	480,779.86	961,559.72	0.00E+00	8.22E+05	1.64E+06		
Other Radionuclides					8.28E+05	1.66E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.62E+04	2.03E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	480,779.86	478,197.82
Bounding:		961,559.72

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 2035
Estimates as of: 2010
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 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	1.4545E-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-06	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)
5.15E+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: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated Canister usage: 18"x10' 6.40

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	45,921.00	91,842.00	0.00E+00	5.26E-05	1.05E-04
Am-241	2.3056E-03	45,921.00	91,842.00	0.00E+00	1.06E+02	2.12E+02
Am-242m	4.1476E-07	45,921.00	91,842.00	0.00E+00	1.90E-02	3.81E-02
Am-243	1.4894E-06	45,921.00	91,842.00	0.00E+00	6.84E-02	1.37E-01
C-14	5.7108E-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	1.4562E-07	45,921.00	91,842.00	0.00E+00	6.69E-03	1.34E-02
Cm-244	2.4221E-05	45,921.00	91,842.00	0.00E+00	1.11E+00	2.22E+00
Co-60	2.7560E-06	45,921.00	91,842.00	0.00E+00	1.27E-01	2.53E-01
Cs-134	5.8851E-04	45,921.00	91,842.00	0.00E+00	2.70E+01	5.40E+01
Cs-135	3.4477E-06	45,921.00	91,842.00	0.00E+00	1.58E-01	3.17E-01
Cs-137	1.8099E+00	45,921.00	91,842.00	0.00E+00	8.31E+04	1.66E+05
Eu-154	1.6386E-02	45,921.00	91,842.00	0.00E+00	7.52E+02	1.50E+03
Eu-155	2.3957E-03	45,921.00	91,842.00	0.00E+00	1.10E+02	2.20E+02
Fe-55	3.2707E-05	45,921.00	91,842.00	0.00E+00	1.50E+00	3.00E+00
H-3	3.4504E-03	45,921.00	91,842.00	0.00E+00	1.58E+02	3.17E+02
I-129	7.5300E-07	45,921.00	91,842.00	0.00E+00	3.46E-02	6.92E-02
Kr-85	7.8540E-02	45,921.00	91,842.00	0.00E+00	3.61E+03	7.21E+03
Np-237	9.5615E-06	45,921.00	91,842.00	0.00E+00	4.39E-01	8.78E-01
Pa-231	2.7968E-09	45,921.00	91,842.00	0.00E+00	1.28E-04	2.57E-04
Pb-210	1.2612E-10	45,921.00	91,842.00	0.00E+00	5.79E-06	1.16E-05
Pm-147	1.2952E-02	45,921.00	91,842.00	0.00E+00	5.95E+02	1.19E+03
Pu-238	1.7549E-02	45,921.00	91,842.00	0.00E+00	8.06E+02	1.61E+03
Pu-239	4.2810E-04	45,921.00	91,842.00	0.00E+00	1.97E+01	3.93E+01
Pu-240	2.4357E-04	45,921.00	91,842.00	0.00E+00	1.12E+01	2.24E+01
Pu-241	2.6277E-02	45,921.00	91,842.00	0.00E+00	1.21E+03	2.41E+03
Pu-242	3.6329E-07	45,921.00	91,842.00	0.00E+00	1.67E-02	3.34E-02
Ra-226	4.4444E-10	45,921.00	91,842.00	0.00E+00	2.04E-05	4.08E-05
Ra-228	1.9714E-14	45,921.00	91,842.00	0.00E+00	9.05E-10	1.81E-09
Ru-106	2.0477E-07	45,921.00	91,842.00	0.00E+00	9.40E-03	1.88E-02
Se-79	1.2933E-05	45,921.00	91,842.00	0.00E+00	5.94E-01	1.19E+00
Sn-126	1.1574E-05	45,921.00	91,842.00	0.00E+00	5.31E-01	1.06E+00
Sr-90	1.7092E+00	45,921.00	91,842.00	0.00E+00	7.85E+04	1.57E+05
Tc-99	4.2239E-04	45,921.00	91,842.00	0.00E+00	1.94E+01	3.88E+01
Th-229	7.7260E-12	45,921.00	91,842.00	0.00E+00	3.55E-07	7.10E-07
Th-230	5.8497E-06	45,921.00	91,842.00	0.00E+00	2.69E-03	5.37E-03
Th-232	2.6906E-14	45,921.00	91,842.00	0.00E+00	1.24E-09	2.47E-09
Tl-208	4.4336E-06	45,921.00	91,842.00	0.00E+00	2.04E-03	4.07E-03
U-232	1.2037E-07	45,921.00	91,842.00	0.00E+00	5.53E-03	1.11E-02
U-233	3.0011E-09	45,921.00	91,842.00	0.00E+00	1.38E-04	2.76E-04
U-234	1.8497E-04	45,921.00	91,842.00	0.00E+00	8.49E+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	1.7094E+00	45,921.00	91,842.00	0.00E+00	7.85E+04	1.57E+05
Other Radionuclides					7.91E+04	1.58E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.594E+15
0.0250	1.785E+15
0.0375	1.555E+15
0.0575	1.670E+15
0.0850	1.007E+15
0.1250	6.748E+14
0.2250	8.698E+14
0.3750	3.781E+14
0.5750	6.199E+15
0.8500	8.933E+13
1.2500	4.968E+13
1.7500	2.454E+12
2.2500	1.749E+08
2.7500	1.432E+08
3.5000	1.081E+05
5.0000	3.635E+04
7.0000	4.000E+03
11.0000	4.474E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.71E+02	1.94E+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=458.96kg; EOL=411.809kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1975
Estimates as of: 2010
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated Canister usage: Bare Fuel Transfer

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	44,857.39	89,714.78	0.00E+00	3.94E-05	7.87E-05	Avg. MeV	
Am-241	1.4352E-01	44,857.39	89,714.78	0.00E+00	6.44E+03	1.29E+04	0.0150	4.827E+15
Am-242m	2.8698E-04	44,857.39	89,714.78	0.00E+00	1.29E+01	2.57E+01	0.0250	9.734E+14
Am-243	6.2565E-04	44,857.39	89,714.78	0.00E+00	2.81E+01	5.61E+01	0.0375	9.284E+14
C-14	4.7901E-05	44,857.39	89,714.78	0.00E+00	2.15E+00	4.30E+00	0.0575	1.073E+15
Cl-36	8.0297E-07	44,857.39	89,714.78	0.00E+00	3.60E-02	7.20E-02	0.0850	5.401E+14
Cm-243	2.5081E-04	44,857.39	89,714.78	0.00E+00	1.13E+01	2.25E+01	0.1250	3.748E+14
Cm-244	4.9015E-02	44,857.39	89,714.78	0.00E+00	2.20E+03	4.40E+03	0.2250	4.632E+14
Co-60	2.5581E-03	44,857.39	89,714.78	0.00E+00	1.15E+02	2.30E+02	0.3750	1.992E+14
Cs-134	4.0536E-05	44,857.39	89,714.78	0.00E+00	1.82E+00	3.64E+00	0.5750	4.632E+15
Cs-135	1.4433E-05	44,857.39	89,714.78	0.00E+00	6.47E-01	1.29E+00	0.8500	6.408E+13
Cs-137	1.3979E+00	44,857.39	89,714.78	0.00E+00	6.27E+04	1.25E+05	1.2500	6.295E+13
Eu-154	2.0203E-02	44,857.39	89,714.78	0.00E+00	9.06E+02	1.81E+03	1.7500	1.885E+12
Eu-155	1.7684E-03	44,857.39	89,714.78	0.00E+00	7.93E+01	1.59E+02	2.2500	3.035E+08
Fe-55	4.3136E-05	44,857.39	89,714.78	0.00E+00	1.93E+00	3.87E+00	2.7500	6.219E+08
H-3	2.0769E-02	44,857.39	89,714.78	0.00E+00	9.32E+02	1.86E+03	3.5000	6.403E+07
I-129	9.8288E-07	44,857.39	89,714.78	0.00E+00	4.41E-02	8.82E-02	5.0000	2.738E+07
Kr-85	2.8214E-02	44,857.39	89,714.78	0.00E+00	1.27E+03	2.53E+03	7.0000	3.155E+06
Np-237	1.1218E-05	44,857.39	89,714.78	0.00E+00	5.03E-01	1.01E+00	11.0000	3.624E+05
Pa-231	1.3036E-09	44,857.39	89,714.78	0.00E+00	5.85E-05	1.17E-04		
Pb-210	8.5078E-11	44,857.39	89,714.78	0.00E+00	3.82E-06	7.63E-06		
Pm-147	3.6531E-04	44,857.39	89,714.78	0.00E+00	1.64E+01	3.28E+01		
Pu-238	7.4564E-02	44,857.39	89,714.78	0.00E+00	3.34E+03	6.69E+03		
Pu-239	1.1623E-02	44,857.39	89,714.78	0.00E+00	5.21E+02	1.04E+03		
Pu-240	1.5132E-02	44,857.39	89,714.78	0.00E+00	6.79E+02	1.36E+03		
Pu-241	9.0036E-01	44,857.39	89,714.78	0.00E+00	4.04E+04	8.08E+04		
Pu-242	6.4260E-05	44,857.39	89,714.78	0.00E+00	2.88E+00	5.77E+00		
Ra-226	2.2804E-10	44,857.39	89,714.78	0.00E+00	1.02E-05	2.05E-05		
Ra-228	5.2713E-12	44,857.39	89,714.78	0.00E+00	2.36E-07	4.73E-07		
Ru-106	6.1160E-10	44,857.39	89,714.78	0.00E+00	2.74E-05	5.49E-05		
Se-79	1.2377E-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	9.1667E-01	44,857.39	89,714.78	0.00E+00	4.11E+04	8.22E+04		
Tc-99	3.9357E-04	44,857.39	89,714.78	0.00E+00	1.77E+01	3.53E+01		
Th-229	1.2057E-10	44,857.39	89,714.78	0.00E+00	5.41E-06	1.08E-05		
Th-230	2.1043E-08	44,857.39	89,714.78	0.00E+00	9.44E-04	1.89E-03		
Th-232	5.2972E-12	44,857.39	89,714.78	0.00E+00	2.38E-07	4.75E-07		
Tl-208	1.7474E-07	44,857.39	89,714.78	0.00E+00	7.84E-03	1.57E-02		
U-232	4.7368E-07	44,857.39	89,714.78	0.00E+00	2.12E-02	4.25E-02	Thermal Power	
U-233	2.5097E-08	44,857.39	89,714.78	0.00E+00	1.13E-03	2.25E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	5.0000E-05	44,857.39	89,714.78	0.00E+00	2.24E+00	4.49E+00	1.03E+03	2.06E+03
U-235	-1.4489E-06	44,857.39	0.00	2.54E-02	0.00E+00	2.54E-02	Total	Total
U-236	7.5824E-06	44,857.39	89,714.78	0.00E+00	3.40E-01	6.80E-01		
U-238	-2.6129E-07	44,857.39	0.00	1.50E-01	1.39E-01	1.50E-01		
Y-90	9.1699E-01	44,857.39	89,714.78	0.00E+00	4.11E+04	8.23E+04		
Other Radionuclides					6.02E+04	1.20E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.05

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1982
Estimates as of: 2010
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' = 2.63

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.1459E-09	22.40	9.41	0.00E+00	9.29E-08	3.90E-08
Am-241	3.5850E-03	22.40	9.41	0.00E+00	8.03E-02	3.37E-02
Am-242m	1.2899E-06	22.40	9.41	0.00E+00	2.89E-05	1.21E-05
Am-243	1.4747E-07	22.40	9.41	0.00E+00	3.30E-06	1.39E-06
C-14	1.2839E-04	22.40	9.41	0.00E+00	2.88E-03	1.21E-03
Cl-36	2.6120E-06	22.40	9.41	0.00E+00	6.30E-05	2.65E-05
Cm-243	1.1038E-07	22.40	9.41	0.00E+00	2.47E-06	1.04E-06
Cm-244	7.8917E-07	22.40	9.41	0.00E+00	1.77E-05	7.42E-06
Co-60	9.2647E-02	22.40	9.41	0.00E+00	2.08E+00	8.72E-01
Cs-134	1.0940E-04	22.40	9.41	0.00E+00	2.45E-03	1.03E-03
Cs-135	3.2195E-05	22.40	9.41	0.00E+00	7.21E-04	3.03E-04
Cs-137	1.7368E+00	22.40	9.41	0.00E+00	3.89E+01	1.63E+01
Eu-154	3.0677E-03	22.40	9.41	0.00E+00	6.87E-02	2.89E-02
Eu-155	1.7925E-03	22.40	9.41	0.00E+00	4.02E-02	1.69E-02
Fe-55	3.7444E-03	22.40	9.41	0.00E+00	8.39E-02	3.52E-02
H-3	3.6180E-03	22.40	9.41	0.00E+00	8.10E-02	3.40E-02
I-129	7.3684E-07	22.40	9.41	0.00E+00	1.65E-05	6.93E-06
Kr-85	6.9368E-02	22.40	9.41	0.00E+00	1.55E+00	6.53E-01
Np-237	1.2662E-06	22.40	9.41	0.00E+00	2.84E-05	1.19E-05
Pa-231	9.1654E-09	22.40	9.41	0.00E+00	2.05E-07	8.62E-08
Pb-210	1.3728E-13	22.40	9.41	0.00E+00	3.08E-12	1.29E-12
Pm-147	1.0702E-02	22.40	9.41	0.00E+00	2.40E-01	1.01E-01
Pu-238	8.8692E-04	22.40	9.41	0.00E+00	1.99E-02	8.34E-03
Pu-239	5.5263E-03	22.40	9.41	0.00E+00	1.24E-01	5.20E-02
Pu-240	2.1233E-03	22.40	9.41	0.00E+00	4.76E-02	2.00E-02
Pu-241	3.8962E-02	22.40	9.41	0.00E+00	8.73E-01	3.67E-01
Pu-242	2.3128E-07	22.40	9.41	0.00E+00	5.18E-06	2.18E-06
Ra-226	4.6752E-13	22.40	9.41	0.00E+00	1.05E-11	4.40E-12
Ra-228	2.4827E-10	22.40	9.41	0.00E+00	5.56E-09	2.34E-09
Ru-106	9.8526E-08	22.40	9.41	0.00E+00	2.21E-06	9.27E-07
Se-79	1.3015E-05	22.40	9.41	0.00E+00	2.92E-04	1.22E-04
Sn-126	1.2165E-05	22.40	9.41	0.00E+00	2.73E-04	1.14E-04
Sr-90	1.6195E+00	22.40	9.41	0.00E+00	3.63E+01	1.52E+01
Tc-99	4.4241E-04	22.40	9.41	0.00E+00	9.91E-03	4.16E-03
Th-229	4.2451E-10	22.40	9.41	0.00E+00	9.51E-09	3.99E-09
Th-230	6.1398E-11	22.40	9.41	0.00E+00	1.38E-09	5.78E-10
Th-232	2.5278E-10	22.40	9.41	0.00E+00	5.66E-09	2.38E-09
Tl-208	1.5098E-08	22.40	9.41	0.00E+00	3.38E-07	1.42E-07
U-232	4.0662E-08	22.40	9.41	0.00E+00	9.11E-07	3.83E-07
U-233	1.2217E-07	22.40	9.41	0.00E+00	2.74E-06	1.15E-06
U-234	2.2391E-07	22.40	9.41	0.00E+00	5.02E-06	2.11E-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	1.6195E+00	22.40	9.41	0.00E+00	3.63E+01	1.52E+01
Other Radionuclides					3.85E+01	1.62E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.352E+11
0.0250	1.736E+11
0.0375	1.506E+11
0.0575	1.622E+11
0.0850	9.779E+10
0.1250	6.383E+10
0.2250	8.426E+10
0.3750	3.672E+10
0.5750	6.087E+11
0.8500	6.536E+09
1.2500	6.711E+10
1.7500	1.701E+08
2.2500	3.587E+05
2.7500	6.076E+03
3.5000	2.206E+01
5.0000	8.961E+00
7.0000	1.020E+00
11.0000	1.165E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.76E-01	2.80E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	44.026	10 to 20.1

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	22.40	4.01
Bounding:	9.41	8.02

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.07	0.18
Bounding:	0.03	0.85

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BMI (CPI-24)
SNF ID #: 774
Fuel Units & Descr: 2 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=0.559kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1961
Estimates as of: 2010
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012682
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 0.15

II. Estimates

	m	x_a	x_b	b	y_a	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3344E-08	528.25	528.25	0.00E+00	1.23E-05	1.23E-05	Avg. MeV	
Am-241	1.1135E-04	528.25	528.25	0.00E+00	5.88E-02	5.88E-02	0.0150	3.943E+13
Am-242m	8.5075E-09	528.25	528.25	0.00E+00	4.49E-06	4.49E-06	0.0250	8.193E+12
Am-243	9.8519E-10	528.25	528.25	0.00E+00	5.20E-07	5.20E-07	0.0375	7.087E+12
C-14	2.3012E-04	528.25	528.25	0.00E+00	1.22E-01	1.22E-01	0.0575	7.639E+12
Cl-36	1.2261E-06	528.25	528.25	0.00E+00	6.48E-04	6.48E-04	0.0850	4.615E+12
Cm-243	2.4875E-10	528.25	528.25	0.00E+00	1.31E-07	1.31E-07	0.1250	2.997E+12
Cm-244	2.3178E-09	528.25	528.25	0.00E+00	1.22E-06	1.22E-06	0.2250	3.973E+12
Co-60	7.0849E-02	528.25	528.25	0.00E+00	3.74E+01	3.74E+01	0.3750	1.733E+12
Cs-134	3.0266E-06	528.25	528.25	0.00E+00	1.60E-03	1.60E-03	0.5750	2.854E+13
Cs-135	3.0316E-05	528.25	528.25	0.00E+00	1.60E-02	1.60E-02	0.8500	2.889E+11
Cs-137	1.4511E+00	528.25	528.25	0.00E+00	7.67E+02	7.67E+02	1.2500	2.872E+12
Eu-154	6.6955E-04	528.25	528.25	0.00E+00	3.54E-01	3.54E-01	1.7500	7.453E+09
Eu-155	6.9850E-04	528.25	528.25	0.00E+00	3.69E-01	3.69E-01	2.2500	1.547E+07
Fe-55	1.2318E-03	528.25	528.25	0.00E+00	6.51E-01	6.51E-01	2.7500	4.473E+05
H-3	2.5141E-03	528.25	528.25	0.00E+00	1.33E+00	1.33E+00	3.5000	3.154E+01
I-129	7.3195E-07	528.25	528.25	0.00E+00	3.87E-04	3.87E-04	5.0000	1.297E+01
Kr-85	4.1281E-02	528.25	528.25	0.00E+00	2.18E+01	2.18E+01	7.0000	1.432E+00
Np-237	1.1489E-06	528.25	528.25	0.00E+00	6.07E-04	6.07E-04	11.0000	1.607E-01
Pa-231	4.5241E-08	528.25	528.25	0.00E+00	2.39E-05	2.39E-05		
Pb-210	6.4476E-13	528.25	528.25	0.00E+00	3.41E-10	3.41E-10		
Pm-147	1.1651E-03	528.25	528.25	0.00E+00	6.15E-01	6.15E-01		
Pu-238	2.9517E-04	528.25	528.25	0.00E+00	1.56E-01	1.56E-01		
Pu-239	6.6772E-04	528.25	528.25	0.00E+00	3.53E-01	3.53E-01		
Pu-240	8.6839E-05	528.25	528.25	0.00E+00	4.59E-02	4.59E-02		
Pu-241	7.1514E-04	528.25	528.25	0.00E+00	3.78E-01	3.78E-01		
Pu-242	1.9717E-09	528.25	528.25	0.00E+00	1.04E-06	1.04E-06		
Ra-226	1.7654E-12	528.25	528.25	0.00E+00	9.33E-10	9.33E-10		
Ra-228	8.2928E-12	528.25	528.25	0.00E+00	4.38E-09	4.38E-09		
Ru-106	1.8419E-10	528.25	528.25	0.00E+00	9.73E-08	9.73E-08		
Se-79	1.3223E-05	528.25	528.25	0.00E+00	6.98E-03	6.98E-03		
Sn-126	1.1493E-05	528.25	528.25	0.00E+00	6.07E-03	6.07E-03		
Sr-90	1.3649E+00	528.25	528.25	0.00E+00	7.21E+02	7.21E+02		
Tc-99	4.6656E-04	528.25	528.25	0.00E+00	2.46E-01	2.46E-01		
Th-229	1.4547E-11	528.25	528.25	0.00E+00	7.68E-09	7.68E-09		
Th-230	1.6617E-10	528.25	528.25	0.00E+00	8.78E-08	8.78E-08		
Th-232	8.3361E-12	528.25	528.25	0.00E+00	4.40E-09	4.40E-09		
Tl-208	2.1664E-08	528.25	528.25	0.00E+00	1.14E-05	1.14E-05		
U-232	5.8669E-08	528.25	528.25	0.00E+00	3.10E-05	3.10E-05	Thermal Power	
U-233	3.1847E-09	528.25	528.25	0.00E+00	1.68E-06	1.68E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	3.8769E-07	528.25	528.25	0.00E+00	2.05E-04	2.05E-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	9.22E+00	9.22E+00
U-238	-2.8547E-09	528.25	0.00	2.44E-05	2.29E-05	2.44E-05	Total	Total
Y-90	1.3652E+00	528.25	528.25	0.00E+00	7.21E+02	7.21E+02		
Other Radionuclides					8.72E+02	8.72E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[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=1.296kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1961
Estimates as of: 2010
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"x10' 0.08

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3344E-08	1,215.10	1,215.10	0.00E+00	2.84E-05	2.84E-05	Avg. MeV	
Am-241	1.1135E-04	1,215.10	1,215.10	0.00E+00	1.35E-01	1.35E-01	0.0150	9.069E+13
Am-242m	8.5075E-09	1,215.10	1,215.10	0.00E+00	1.03E-05	1.03E-05	0.0250	1.885E+13
Am-243	9.8519E-10	1,215.10	1,215.10	0.00E+00	1.20E-06	1.20E-06	0.0375	1.630E+13
C-14	2.3012E-04	1,215.10	1,215.10	0.00E+00	2.80E-01	2.80E-01	0.0575	1.757E+13
Cl-36	1.2261E-06	1,215.10	1,215.10	0.00E+00	1.49E-03	1.49E-03	0.0850	1.062E+13
Cm-243	2.4875E-10	1,215.10	1,215.10	0.00E+00	3.02E-07	3.02E-07	0.1250	6.893E+12
Cm-244	2.3178E-09	1,215.10	1,215.10	0.00E+00	2.82E-06	2.82E-06	0.2250	9.138E+12
Co-60	7.0849E-02	1,215.10	1,215.10	0.00E+00	8.61E+01	8.61E+01	0.3750	3.986E+12
Cs-134	3.0266E-06	1,215.10	1,215.10	0.00E+00	3.68E-03	3.68E-03	0.5750	6.566E+13
Cs-135	3.0316E-05	1,215.10	1,215.10	0.00E+00	3.68E-02	3.68E-02	0.8500	6.646E+11
Cs-137	1.4511E+00	1,215.10	1,215.10	0.00E+00	1.76E+03	1.76E+03	1.2500	6.606E+12
Eu-154	6.6955E-04	1,215.10	1,215.10	0.00E+00	8.14E-01	8.14E-01	1.7500	1.714E+10
Eu-155	6.9850E-04	1,215.10	1,215.10	0.00E+00	8.49E-01	8.49E-01	2.2500	3.559E+07
Fe-55	1.2318E-03	1,215.10	1,215.10	0.00E+00	1.50E+00	1.50E+00	2.7500	1.029E+06
H-3	2.5141E-03	1,215.10	1,215.10	0.00E+00	3.05E+00	3.05E+00	3.5000	7.255E+01
I-129	7.3195E-07	1,215.10	1,215.10	0.00E+00	8.89E-04	8.89E-04	5.0000	2.984E+01
Kr-85	4.1281E-02	1,215.10	1,215.10	0.00E+00	5.02E+01	5.02E+01	7.0000	3.295E+00
Np-237	1.1489E-06	1,215.10	1,215.10	0.00E+00	1.40E-03	1.40E-03	11.0000	3.697E-01
Pa-231	4.5241E-08	1,215.10	1,215.10	0.00E+00	5.50E-05	5.50E-05		
Pb-210	6.4476E-13	1,215.10	1,215.10	0.00E+00	7.83E-10	7.83E-10		
Pm-147	1.1651E-03	1,215.10	1,215.10	0.00E+00	1.42E+00	1.42E+00		
Pu-238	2.9517E-04	1,215.10	1,215.10	0.00E+00	3.59E-01	3.59E-01		
Pu-239	6.6772E-04	1,215.10	1,215.10	0.00E+00	8.11E-01	8.11E-01		
Pu-240	8.6839E-05	1,215.10	1,215.10	0.00E+00	1.06E-01	1.06E-01		
Pu-241	7.1514E-04	1,215.10	1,215.10	0.00E+00	8.69E-01	8.69E-01		
Pu-242	1.9717E-09	1,215.10	1,215.10	0.00E+00	2.40E-06	2.40E-06		
Ra-226	1.7654E-12	1,215.10	1,215.10	0.00E+00	2.15E-09	2.15E-09		
Ra-228	8.2928E-12	1,215.10	1,215.10	0.00E+00	1.01E-08	1.01E-08		
Ru-106	1.8419E-10	1,215.10	1,215.10	0.00E+00	2.24E-07	2.24E-07		
Se-79	1.3223E-05	1,215.10	1,215.10	0.00E+00	1.61E-02	1.61E-02		
Sn-126	1.1493E-05	1,215.10	1,215.10	0.00E+00	1.40E-02	1.40E-02		
Sr-90	1.3649E+00	1,215.10	1,215.10	0.00E+00	1.66E+03	1.66E+03		
Tc-99	4.6656E-04	1,215.10	1,215.10	0.00E+00	5.67E-01	5.67E-01		
Th-229	1.4547E-11	1,215.10	1,215.10	0.00E+00	1.77E-08	1.77E-08		
Th-230	1.6617E-10	1,215.10	1,215.10	0.00E+00	2.02E-07	2.02E-07		
Th-232	8.3361E-12	1,215.10	1,215.10	0.00E+00	1.01E-08	1.01E-08		
Tl-208	2.1664E-08	1,215.10	1,215.10	0.00E+00	2.63E-05	2.63E-05		
U-232	5.8669E-08	1,215.10	1,215.10	0.00E+00	7.13E-05	7.13E-05		
U-233	3.1847E-09	1,215.10	1,215.10	0.00E+00	3.87E-06	3.87E-06		
U-234	3.8769E-07	1,215.10	1,215.10	0.00E+00	4.71E-04	4.71E-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	1.3652E+00	1,215.10	1,215.10	0.00E+00	1.66E+03	1.66E+03		
Other Radionuclides					2.01E+03	2.01E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.12E+01	2.12E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	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: 2010
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"x10'
2.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3344E-08	1,115.44	2,230.88	0.00E+00	2.60E-05	5.21E-05	Avg. MeV	
Am-241	1.1135E-04	1,115.44	2,230.88	0.00E+00	1.24E-01	2.48E-01	0.0150	1.665E+14
Am-242m	8.5075E-09	1,115.44	2,230.88	0.00E+00	9.49E-06	1.90E-05	0.0250	3.460E+13
Am-243	9.8519E-10	1,115.44	2,230.88	0.00E+00	1.10E-06	2.20E-06	0.0375	2.993E+13
C-14	2.3012E-04	1,115.44	2,230.88	0.00E+00	2.57E-01	5.13E-01	0.0575	3.226E+13
Cl-36	1.2261E-06	1,115.44	2,230.88	0.00E+00	1.37E-03	2.74E-03	0.0850	1.949E+13
Cm-243	2.4875E-10	1,115.44	2,230.88	0.00E+00	2.77E-07	5.55E-07	0.1250	1.266E+13
Cm-244	2.3178E-09	1,115.44	2,230.88	0.00E+00	2.59E-06	5.17E-06	0.2250	1.678E+13
Co-60	7.0849E-02	1,115.44	2,230.88	0.00E+00	7.90E+01	1.58E+02	0.3750	7.318E+12
Cs-134	3.0266E-06	1,115.44	2,230.88	0.00E+00	3.38E-03	6.75E-03	0.5750	1.205E+14
Cs-135	3.0316E-05	1,115.44	2,230.88	0.00E+00	3.38E-02	6.76E-02	0.8500	1.220E+12
Cs-137	1.4511E+00	1,115.44	2,230.88	0.00E+00	1.62E+03	3.24E+03	1.2500	1.213E+13
Eu-154	6.6955E-04	1,115.44	2,230.88	0.00E+00	7.47E-01	1.49E+00	1.7500	3.147E+10
Eu-155	6.9850E-04	1,115.44	2,230.88	0.00E+00	7.79E-01	1.56E+00	2.2500	6.535E+07
Fe-55	1.2318E-03	1,115.44	2,230.88	0.00E+00	1.37E+00	2.75E+00	2.7500	1.883E+06
H-3	2.5141E-03	1,115.44	2,230.88	0.00E+00	2.80E+00	5.61E+00	3.5000	1.366E+02
I-129	7.3195E-07	1,115.44	2,230.88	0.00E+00	8.16E-04	1.63E-03	5.0000	5.621E+01
Kr-85	4.1281E-02	1,115.44	2,230.88	0.00E+00	4.60E+01	9.21E+01	7.0000	6.209E+00
Np-237	1.1489E-06	1,115.44	2,230.88	0.00E+00	1.28E-03	2.56E-03	11.0000	6.970E-01
Pa-231	4.5241E-08	1,115.44	2,230.88	0.00E+00	5.05E-05	1.01E-04		
Pb-210	6.4476E-13	1,115.44	2,230.88	0.00E+00	7.19E-10	1.44E-09		
Pm-147	1.1651E-03	1,115.44	2,230.88	0.00E+00	1.30E+00	2.60E+00		
Pu-238	2.9517E-04	1,115.44	2,230.88	0.00E+00	3.29E-01	6.58E-01		
Pu-239	6.6772E-04	1,115.44	2,230.88	0.00E+00	7.45E-01	1.49E+00		
Pu-240	8.6839E-05	1,115.44	2,230.88	0.00E+00	9.69E-02	1.94E-01		
Pu-241	7.1514E-04	1,115.44	2,230.88	0.00E+00	7.98E-01	1.60E+00		
Pu-242	1.9717E-09	1,115.44	2,230.88	0.00E+00	2.20E-06	4.40E-06		
Ra-226	1.7654E-12	1,115.44	2,230.88	0.00E+00	1.97E-09	3.94E-09		
Ra-228	8.2928E-12	1,115.44	2,230.88	0.00E+00	9.25E-09	1.85E-08		
Ru-106	1.8419E-10	1,115.44	2,230.88	0.00E+00	2.05E-07	4.11E-07		
Se-79	1.3223E-05	1,115.44	2,230.88	0.00E+00	1.47E-02	2.95E-02		
Sn-126	1.1493E-05	1,115.44	2,230.88	0.00E+00	1.28E-02	2.56E-02		
Sr-90	1.3649E+00	1,115.44	2,230.88	0.00E+00	1.52E+03	3.04E+03		
Tc-99	4.6656E-04	1,115.44	2,230.88	0.00E+00	5.20E-01	1.04E+00		
Th-229	1.4547E-11	1,115.44	2,230.88	0.00E+00	1.62E-08	3.25E-08		
Th-230	1.6617E-10	1,115.44	2,230.88	0.00E+00	1.85E-07	3.71E-07		
Th-232	8.3361E-12	1,115.44	2,230.88	0.00E+00	9.30E-09	1.86E-08		
Tl-208	2.1664E-08	1,115.44	2,230.88	0.00E+00	2.42E-05	4.83E-05		
U-232	5.8669E-08	1,115.44	2,230.88	0.00E+00	6.54E-05	1.31E-04	Thermal Power	
U-233	3.1847E-09	1,115.44	2,230.88	0.00E+00	3.55E-06	7.10E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	3.8769E-07	1,115.44	2,230.88	0.00E+00	4.32E-04	8.65E-04	1.95E+01	3.90E+01
U-235	-2.7761E-06	1,115.44	0.00	4.42E-02	4.11E-02	4.42E-02	Total	Total
U-238	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	1.3652E+00	1,115.44	2,230.88	0.00E+00	1.52E+03	3.05E+03		
Other Radionuclides					1.84E+03	3.68E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	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=6.6kg; EOL=5.11kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1981
Estimates as of: 2010
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: 25 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	6.6376E-10	465.59	931.17	0.00E+00	3.09E-07	6.18E-07
Am-241	1.3144E-01	465.59	931.17	0.00E+00	6.12E+01	1.22E+02
Am-242m	3.0039E-04	465.59	931.17	0.00E+00	1.40E-01	2.80E-01
Am-243	6.2629E-04	465.59	931.17	0.00E+00	2.92E-01	5.83E-01
C-14	4.7965E-05	465.59	931.17	0.00E+00	2.23E-02	4.47E-02
Cl-36	8.0297E-07	465.59	931.17	0.00E+00	3.74E-04	7.48E-04
Cm-243	3.1993E-04	465.59	931.17	0.00E+00	1.49E-01	2.98E-01
Cm-244	7.1851E-02	465.59	931.17	0.00E+00	3.35E+01	6.69E+01
Co-60	9.5220E-03	465.59	931.17	0.00E+00	4.43E+00	8.87E+00
Cs-134	1.1662E-03	465.59	931.17	0.00E+00	5.43E-01	1.09E+00
Cs-135	1.4433E-05	465.59	931.17	0.00E+00	6.72E-03	1.34E-02
Cs-137	1.7603E+00	465.59	931.17	0.00E+00	8.20E+02	1.64E+03
Eu-154	4.5203E-02	465.59	931.17	0.00E+00	2.10E+01	4.21E+01
Eu-155	7.1479E-03	465.59	931.17	0.00E+00	3.33E+00	6.66E+00
Fe-55	6.1919E-04	465.59	931.17	0.00E+00	2.88E-01	5.77E-01
H-3	3.6386E-02	465.59	931.17	0.00E+00	1.69E+01	3.39E+01
I-129	9.8288E-07	465.59	931.17	0.00E+00	4.58E-04	9.15E-04
Kr-85	5.3844E-02	465.59	931.17	0.00E+00	2.51E+01	5.01E+01
Np-237	1.0546E-05	465.59	931.17	0.00E+00	4.91E-03	9.82E-03
Pa-231	1.1370E-09	465.59	931.17	0.00E+00	5.29E-07	1.06E-06
Pb-210	3.3624E-11	465.59	931.17	0.00E+00	1.57E-08	3.13E-08
Pm-147	5.1211E-03	465.59	931.17	0.00E+00	2.38E+00	4.77E+00
Pu-238	8.0669E-02	465.59	931.17	0.00E+00	3.76E+01	7.51E+01
Pu-239	1.1626E-02	465.59	931.17	0.00E+00	5.41E+00	1.08E+01
Pu-240	1.5097E-02	465.59	931.17	0.00E+00	7.03E+00	1.41E+01
Pu-241	1.4567E+00	465.59	931.17	0.00E+00	6.78E+02	1.36E+03
Pu-242	6.4260E-05	465.59	931.17	0.00E+00	2.99E-02	5.98E-02
Ra-226	1.1392E-10	465.59	931.17	0.00E+00	5.30E-08	1.06E-07
Ra-228	5.1841E-12	465.59	931.17	0.00E+00	2.41E-09	4.83E-09
Ru-106	5.9012E-07	465.59	931.17	0.00E+00	2.75E-04	5.50E-04
Se-79	1.2379E-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	1.1630E+00	465.59	931.17	0.00E+00	5.41E+02	1.08E+03
Tc-99	3.9357E-04	465.59	931.17	0.00E+00	1.83E-01	3.66E-01
Th-229	8.5691E-11	465.59	931.17	0.00E+00	3.99E-08	7.98E-08
Th-230	1.4493E-08	465.59	931.17	0.00E+00	6.75E-06	1.35E-05
Th-232	5.2923E-12	465.59	931.17	0.00E+00	2.46E-09	4.93E-09
Tl-208	1.9202E-07	465.59	931.17	0.00E+00	8.94E-05	1.79E-04
U-232	5.2083E-07	465.59	931.17	0.00E+00	2.42E-04	4.85E-04
U-233	2.4386E-08	465.59	931.17	0.00E+00	1.14E-05	2.27E-05
U-234	4.7012E-05	465.59	931.17	0.00E+00	2.19E-02	4.38E-02
U-235	-1.4492E-06	465.59	0.00	3.46E-03	2.78E-03	3.46E-03
U-236	7.5759E-06	465.59	931.17	0.00E+00	3.53E-03	7.05E-03
U-238	-2.6129E-07	465.59	0.00	1.34E-03	1.22E-03	1.34E-03
Y-90	1.1631E+00	465.59	931.17	0.00E+00	5.42E+02	1.08E+03
Other Radionuclides					7.87E+02	1.57E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.332E+13
0.0250	1.282E+13
0.0375	1.241E+13
0.0575	1.354E+13
0.0850	7.175E+12
0.1250	5.241E+12
0.2250	6.159E+12
0.3750	2.643E+12
0.5750	6.073E+13
0.8500	1.199E+12
1.2500	1.619E+12
1.7500	3.548E+10
2.2500	6.552E+06
2.7500	7.365E+06
3.5000	9.650E+05
5.0000	4.124E+05
7.0000	4.755E+04
11.0000	5.462E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.28E+01	2.85E+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 %:	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: 2010
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: 15 years

Estimated Canister usage: 18"x10' 0.12

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.2135E-10	448.85	897.70	0.00E+00	1.89E-07	3.78E-07	Avg. MeV	
Am-241	1.0257E-01	448.85	897.70	0.00E+00	4.60E+01	9.21E+01	0.0150	7.763E+13
Am-242m	3.1444E-04	448.85	897.70	0.00E+00	1.41E-01	2.82E-01	0.0250	1.599E+13
Am-243	6.2694E-04	448.85	897.70	0.00E+00	2.81E-01	5.63E-01	0.0375	1.575E+13
C-14	4.8030E-05	448.85	897.70	0.00E+00	2.16E-02	4.31E-02	0.0575	1.596E+13
Cl-36	8.0313E-07	448.85	897.70	0.00E+00	3.60E-04	7.21E-04	0.0850	9.022E+12
Cm-243	4.0795E-04	448.85	897.70	0.00E+00	1.83E-01	3.66E-01	0.1250	7.131E+12
Cm-244	1.0533E-01	448.85	897.70	0.00E+00	4.73E+01	9.46E+01	0.2250	7.690E+12
Co-60	3.5449E-02	448.85	897.70	0.00E+00	1.59E+01	3.18E+01	0.3750	3.388E+12
Cs-134	3.3543E-02	448.85	897.70	0.00E+00	1.51E+01	3.01E+01	0.5750	7.544E+13
Cs-135	1.4433E-05	448.85	897.70	0.00E+00	6.48E-03	1.30E-02	0.8500	3.098E+12
Cs-137	2.2190E+00	448.85	897.70	0.00E+00	9.96E+02	1.99E+03	1.2500	4.362E+12
Eu-154	1.0111E-01	448.85	897.70	0.00E+00	4.54E+01	9.08E+01	1.7500	6.645E+10
Eu-155	2.8892E-02	448.85	897.70	0.00E+00	1.30E+01	2.59E+01	2.2500	5.701E+07
Fe-55	8.8889E-03	448.85	897.70	0.00E+00	3.99E+00	7.98E+00	2.7500	1.205E+07
H-3	6.3727E-02	448.85	897.70	0.00E+00	2.86E+01	5.72E+01	3.5000	1.885E+06
I-129	9.8288E-07	448.85	897.70	0.00E+00	4.41E-04	8.82E-04	5.0000	5.789E+05
Kr-85	1.0276E-01	448.85	897.70	0.00E+00	4.61E+01	9.22E+01	7.0000	6.674E+04
Np-237	9.9693E-06	448.85	897.70	0.00E+00	4.47E-03	8.95E-03	11.0000	7.667E+03
Pa-231	9.7028E-10	448.85	897.70	0.00E+00	4.36E-07	8.71E-07		
Pb-210	8.0862E-12	448.85	897.70	0.00E+00	3.63E-09	7.26E-09		
Pm-147	7.1786E-02	448.85	897.70	0.00E+00	3.22E+01	6.44E+01		
Pu-238	8.7274E-02	448.85	897.70	0.00E+00	3.92E+01	7.83E+01		
Pu-239	1.1630E-02	448.85	897.70	0.00E+00	5.22E+00	1.04E+01		
Pu-240	1.5016E-02	448.85	897.70	0.00E+00	6.74E+00	1.35E+01		
Pu-241	2.3563E+00	448.85	897.70	0.00E+00	1.06E+03	2.12E+03		
Pu-242	6.4260E-05	448.85	897.70	0.00E+00	2.88E-02	5.77E-02		
Ra-226	4.0407E-11	448.85	897.70	0.00E+00	1.81E-08	3.63E-08		
Ra-228	4.7917E-12	448.85	897.70	0.00E+00	2.15E-09	4.30E-09		
Ru-106	5.6928E-04	448.85	897.70	0.00E+00	2.56E-01	5.11E-01		
Se-79	1.2380E-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	1.4751E+00	448.85	897.70	0.00E+00	6.62E+02	1.32E+03		
Tc-99	3.9357E-04	448.85	897.70	0.00E+00	1.77E-01	3.53E-01		
Th-229	5.1744E-11	448.85	897.70	0.00E+00	2.32E-08	4.65E-08		
Th-230	8.3721E-09	448.85	897.70	0.00E+00	3.76E-06	7.52E-06		
Th-232	5.2859E-12	448.85	897.70	0.00E+00	2.37E-09	4.75E-09		
Tl-208	2.0397E-07	448.85	897.70	0.00E+00	9.16E-05	1.83E-04		
U-232	5.6638E-07	448.85	897.70	0.00E+00	2.54E-04	5.08E-04		
U-233	2.3708E-08	448.85	897.70	0.00E+00	1.06E-05	2.13E-05		
U-234	4.3653E-05	448.85	897.70	0.00E+00	1.96E-02	3.92E-02		
U-235	-1.4494E-06	448.85	0.00	1.35E-03	6.98E-04	1.35E-03		
U-236	7.5694E-06	448.85	897.70	0.00E+00	3.40E-03	6.80E-03		
U-238	-2.6129E-07	448.85	0.00	2.32E-03	2.21E-03	2.32E-03		
Y-90	1.4755E+00	448.85	897.70	0.00E+00	6.62E+02	1.32E+03		
Other Radionuclides					9.60E+02	1.92E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.51E+01	3.01E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	293.90	448.85
Bounding:	316.51	897.70

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.70	1.53
Bounding:	3.40	2.84

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1972
Estimates as of: 2010
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated Canister usage: Bare Fuel Transfer

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	11,990.37	23,980.74	0.00E+00	1.05E-05	2.10E-05	Avg. MeV	
Am-241	1.4352E-01	11,990.37	23,980.74	0.00E+00	1.72E+03	3.44E+03	0.0150	1.290E+15
Am-242m	2.8698E-04	11,990.37	23,980.74	0.00E+00	3.44E+00	6.88E+00	0.0250	2.602E+14
Am-243	6.2565E-04	11,990.37	23,980.74	0.00E+00	7.50E+00	1.50E+01	0.0375	2.482E+14
C-14	4.7901E-05	11,990.37	23,980.74	0.00E+00	5.74E-01	1.15E+00	0.0575	2.867E+14
Cl-36	8.0297E-07	11,990.37	23,980.74	0.00E+00	9.63E-03	1.93E-02	0.0850	1.444E+14
Cm-243	2.5081E-04	11,990.37	23,980.74	0.00E+00	3.01E+00	6.01E+00	0.1250	1.002E+14
Cm-244	4.9015E-02	11,990.37	23,980.74	0.00E+00	5.88E+02	1.18E+03	0.2250	1.238E+14
Co-60	2.5581E-03	11,990.37	23,980.74	0.00E+00	3.07E+01	6.13E+01	0.3750	5.324E+13
Cs-134	4.0536E-05	11,990.37	23,980.74	0.00E+00	4.86E-01	9.72E-01	0.5750	1.238E+15
Cs-135	1.4433E-05	11,990.37	23,980.74	0.00E+00	1.73E-01	3.46E-01	0.8500	1.713E+13
Cs-137	1.3979E+00	11,990.37	23,980.74	0.00E+00	1.68E+04	3.35E+04	1.2500	1.683E+13
Eu-154	2.0203E-02	11,990.37	23,980.74	0.00E+00	2.42E+02	4.84E+02	1.7500	5.039E+11
Eu-155	1.7684E-03	11,990.37	23,980.74	0.00E+00	2.12E+01	4.24E+01	2.2500	8.113E+07
Fe-55	4.3136E-05	11,990.37	23,980.74	0.00E+00	5.17E-01	1.03E+00	2.7500	1.662E+08
H-3	2.0769E-02	11,990.37	23,980.74	0.00E+00	2.49E+02	4.98E+02	3.5000	1.712E+07
I-129	9.8288E-07	11,990.37	23,980.74	0.00E+00	1.18E-02	2.36E-02	5.0000	7.318E+06
Kr-85	2.8214E-02	11,990.37	23,980.74	0.00E+00	3.38E+02	6.77E+02	7.0000	8.434E+05
Np-237	1.1218E-05	11,990.37	23,980.74	0.00E+00	1.35E-01	2.69E-01	11.0000	9.687E+04
Pa-231	1.3036E-09	11,990.37	23,980.74	0.00E+00	1.56E-05	3.13E-05		
Pb-210	8.5078E-11	11,990.37	23,980.74	0.00E+00	1.02E-06	2.04E-06		
Pm-147	3.6531E-04	11,990.37	23,980.74	0.00E+00	4.38E+00	8.76E+00		
Pu-238	7.4564E-02	11,990.37	23,980.74	0.00E+00	8.94E+02	1.79E+03		
Pu-239	1.1623E-02	11,990.37	23,980.74	0.00E+00	1.39E+02	2.79E+02		
Pu-240	1.5132E-02	11,990.37	23,980.74	0.00E+00	1.81E+02	3.63E+02		
Pu-241	9.0036E-01	11,990.37	23,980.74	0.00E+00	1.08E+04	2.16E+04		
Pu-242	6.4260E-05	11,990.37	23,980.74	0.00E+00	7.71E-01	1.54E+00		
Ra-226	2.2804E-10	11,990.37	23,980.74	0.00E+00	2.73E-06	5.47E-06		
Ra-228	5.2713E-12	11,990.37	23,980.74	0.00E+00	6.32E-08	1.26E-07		
Ru-106	6.1160E-10	11,990.37	23,980.74	0.00E+00	7.33E-06	1.47E-05		
Se-79	1.2377E-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	9.1667E-01	11,990.37	23,980.74	0.00E+00	1.10E+04	2.20E+04		
Tc-99	3.9357E-04	11,990.37	23,980.74	0.00E+00	4.72E+00	9.44E+00		
Th-229	1.2057E-10	11,990.37	23,980.74	0.00E+00	1.45E-06	2.89E-06		
Th-230	2.1043E-08	11,990.37	23,980.74	0.00E+00	2.52E-04	5.05E-04		
Th-232	5.2972E-12	11,990.37	23,980.74	0.00E+00	6.35E-08	1.27E-07		
Tl-208	1.7474E-07	11,990.37	23,980.74	0.00E+00	2.10E-03	4.19E-03		
U-232	4.7368E-07	11,990.37	23,980.74	0.00E+00	5.68E-03	1.14E-02		
U-233	2.5097E-08	11,990.37	23,980.74	0.00E+00	3.01E-04	6.02E-04		
U-234	5.0000E-05	11,990.37	23,980.74	0.00E+00	6.00E-01	1.20E+00		
U-235	-1.4489E-06	11,990.37	0.00	1.69E-02	0.00E+00	1.69E-02		
U-236	7.5824E-06	11,990.37	23,980.74	0.00E+00	9.09E-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	9.1699E-01	11,990.37	23,980.74	0.00E+00	1.10E+04	2.20E+04		
Other Radionuclides					1.61E+04	3.22E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.76E+02	5.52E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	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
Nominal:	5,310.89	11,990.37
Bounding:	5,318.51	23,980.74

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.30	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: 2010
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated Canister usage: Bare Fuel Transfer

II. Estimates	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	11,298.83	11,722.29	0.00E+00	9.92E-06	1.03E-05	Avg. MeV	
Am-241	1.4352E-01	11,298.83	11,722.29	0.00E+00	1.62E+03	1.68E+03	0.0150	6.307E+14
Am-242m	2.8698E-04	11,298.83	11,722.29	0.00E+00	3.24E+00	3.36E+00	0.0250	1.272E+14
Am-243	6.2565E-04	11,298.83	11,722.29	0.00E+00	7.07E+00	7.33E+00	0.0375	1.213E+14
C-14	4.7901E-05	11,298.83	11,722.29	0.00E+00	5.41E-01	5.62E-01	0.0575	1.402E+14
Cl-36	8.0297E-07	11,298.83	11,722.29	0.00E+00	9.07E-03	9.41E-03	0.0850	7.057E+13
Cm-243	2.5081E-04	11,298.83	11,722.29	0.00E+00	2.83E+00	2.94E+00	0.1250	4.897E+13
Cm-244	4.9015E-02	11,298.83	11,722.29	0.00E+00	5.54E+02	5.75E+02	0.2250	6.052E+13
Co-60	2.5581E-03	11,298.83	11,722.29	0.00E+00	2.89E+01	3.00E+01	0.3750	2.602E+13
Cs-134	4.0536E-05	11,298.83	11,722.29	0.00E+00	4.58E-01	4.75E-01	0.5750	6.053E+14
Cs-135	1.4433E-05	11,298.83	11,722.29	0.00E+00	1.63E-01	1.69E-01	0.8500	8.373E+12
Cs-137	1.3979E+00	11,298.83	11,722.29	0.00E+00	1.58E+04	1.64E+04	1.2500	8.225E+12
Eu-154	2.0203E-02	11,298.83	11,722.29	0.00E+00	2.28E+02	2.37E+02	1.7500	2.463E+11
Eu-155	1.7684E-03	11,298.83	11,722.29	0.00E+00	2.00E+01	2.07E+01	2.2500	3.966E+07
Fe-55	4.3136E-05	11,298.83	11,722.29	0.00E+00	4.87E-01	5.06E-01	2.7500	8.126E+07
H-3	2.0769E-02	11,298.83	11,722.29	0.00E+00	2.35E+02	2.43E+02	3.5000	8.367E+06
I-129	9.8288E-07	11,298.83	11,722.29	0.00E+00	1.11E-02	1.15E-02	5.0000	3.577E+08
Kr-85	2.8214E-02	11,298.83	11,722.29	0.00E+00	3.19E+02	3.31E+02	7.0000	4.123E+05
Np-237	1.1218E-05	11,298.83	11,722.29	0.00E+00	1.27E-01	1.31E-01	11.0000	4.736E+04
Pa-231	1.3036E-09	11,298.83	11,722.29	0.00E+00	1.47E-05	1.53E-05		
Pb-210	8.5078E-11	11,298.83	11,722.29	0.00E+00	9.61E-07	9.97E-07		
Pm-147	3.6531E-04	11,298.83	11,722.29	0.00E+00	4.13E+00	4.28E+00		
Pu-238	7.4564E-02	11,298.83	11,722.29	0.00E+00	8.42E+02	8.74E+02		
Pu-239	1.1623E-02	11,298.83	11,722.29	0.00E+00	1.31E+02	1.36E+02		
Pu-240	1.5132E-02	11,298.83	11,722.29	0.00E+00	1.71E+02	1.77E+02		
Pu-241	9.0036E-01	11,298.83	11,722.29	0.00E+00	1.02E+04	1.06E+04		
Pu-242	6.4260E-05	11,298.83	11,722.29	0.00E+00	7.26E-01	7.53E-01		
Ra-226	2.2804E-10	11,298.83	11,722.29	0.00E+00	2.58E-06	2.67E-06		
Ra-228	5.2713E-12	11,298.83	11,722.29	0.00E+00	5.96E-08	6.18E-08		
Ru-106	6.1160E-10	11,298.83	11,722.29	0.00E+00	6.91E-06	7.17E-06		
Se-79	1.2377E-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	9.1667E-01	11,298.83	11,722.29	0.00E+00	1.04E+04	1.07E+04		
Tc-99	3.9357E-04	11,298.83	11,722.29	0.00E+00	4.45E+00	4.61E+00		
Th-229	1.2057E-10	11,298.83	11,722.29	0.00E+00	1.36E-06	1.41E-06		
Th-230	2.1043E-08	11,298.83	11,722.29	0.00E+00	2.38E-04	2.47E-04		
Th-232	5.2972E-12	11,298.83	11,722.29	0.00E+00	5.99E-08	6.21E-08		
Tl-208	1.7474E-07	11,298.83	11,722.29	0.00E+00	1.97E-03	2.05E-03		
U-232	4.7368E-07	11,298.83	11,722.29	0.00E+00	5.35E-03	5.55E-03		
U-233	2.5097E-08	11,298.83	11,722.29	0.00E+00	2.84E-04	2.94E-04		
U-234	5.0000E-05	11,298.83	11,722.29	0.00E+00	5.65E-01	5.86E-01		
U-235	-1.4489E-06	11,298.83	0.00	3.67E-02	2.04E-02	3.67E-02		
U-236	7.5824E-06	11,298.83	11,722.29	0.00E+00	8.57E-02	8.89E-02		
U-238	-2.6129E-07	11,298.83	0.00	1.52E-01	1.49E-01	1.52E-01		
Y-90	9.1699E-01	11,298.83	11,722.29	0.00E+00	1.04E+04	1.07E+04		
Other Radionuclides					1.52E+04	1.57E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.60E+02	2.70E+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	Estimated EOL HM/Given EOL HM
Nominal:	0.69	0.77	0.99
Bounding:	0.71	1.48	

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

[2]Total burnup for all fuel associated with this worksheet must be 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: 2010
Template: PWR (Light Water, Zirc, 0 to 5%; U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated Canister usage: Bare Fuel Transfer

II. Estimates

	m	x_a	x_b	b	y_a	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	37,986.38	75,972.75	0.00E+00	3.33E-05	6.67E-05
Am-241	1.4352E-01	37,986.38	75,972.75	0.00E+00	5.45E+03	1.09E+04
Am-242m	2.8698E-04	37,986.38	75,972.75	0.00E+00	1.09E+01	2.18E+01
Am-243	6.2565E-04	37,986.38	75,972.75	0.00E+00	2.38E+01	4.75E+01
C-14	4.7901E-05	37,986.38	75,972.75	0.00E+00	1.82E+00	3.64E+00
Cl-36	8.0297E-07	37,986.38	75,972.75	0.00E+00	3.05E-02	6.10E-02
Cm-243	2.5081E-04	37,986.38	75,972.75	0.00E+00	9.53E+00	1.91E+01
Cm-244	4.9015E-02	37,986.38	75,972.75	0.00E+00	1.86E+03	3.72E+03
Co-60	2.5581E-03	37,986.38	75,972.75	0.00E+00	9.72E+01	1.94E+02
Cs-134	4.0536E-05	37,986.38	75,972.75	0.00E+00	1.54E+00	3.08E+00
Cs-135	1.4433E-05	37,986.38	75,972.75	0.00E+00	5.48E-01	1.10E+00
Cs-137	1.3979E+00	37,986.38	75,972.75	0.00E+00	5.31E+04	1.06E+05
Eu-154	2.0203E-02	37,986.38	75,972.75	0.00E+00	7.67E+02	1.53E+03
Eu-155	1.7684E-03	37,986.38	75,972.75	0.00E+00	6.72E+01	1.34E+02
Fe-55	4.3136E-05	37,986.38	75,972.75	0.00E+00	1.64E+00	3.28E+00
H-3	2.0769E-02	37,986.38	75,972.75	0.00E+00	7.89E+02	1.58E+03
I-129	9.8288E-07	37,986.38	75,972.75	0.00E+00	3.73E-02	7.47E-02
Kr-85	2.8214E-02	37,986.38	75,972.75	0.00E+00	1.07E+03	2.14E+03
Np-237	1.1218E-05	37,986.38	75,972.75	0.00E+00	4.26E-01	8.52E-01
Pa-231	1.3036E-09	37,986.38	75,972.75	0.00E+00	4.95E-05	9.90E-05
Pb-210	8.5078E-11	37,986.38	75,972.75	0.00E+00	3.23E-06	6.46E-06
Pm-147	3.6531E-04	37,986.38	75,972.75	0.00E+00	1.39E+01	2.78E+01
Pu-238	7.4564E-02	37,986.38	75,972.75	0.00E+00	2.83E+03	5.66E+03
Pu-239	1.1623E-02	37,986.38	75,972.75	0.00E+00	4.42E+02	8.83E+02
Pu-240	1.5132E-02	37,986.38	75,972.75	0.00E+00	5.75E+02	1.15E+03
Pu-241	9.0036E-01	37,986.38	75,972.75	0.00E+00	3.42E+04	6.84E+04
Pu-242	6.4260E-05	37,986.38	75,972.75	0.00E+00	2.44E+00	4.88E+00
Ra-226	2.2804E-10	37,986.38	75,972.75	0.00E+00	8.66E-06	1.73E-05
Ra-228	5.2713E-12	37,986.38	75,972.75	0.00E+00	2.00E-07	4.00E-07
Ru-106	6.1160E-10	37,986.38	75,972.75	0.00E+00	2.32E-05	4.65E-05
Se-79	1.2377E-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	9.1667E-01	37,986.38	75,972.75	0.00E+00	3.48E+04	6.96E+04
Tc-99	3.9357E-04	37,986.38	75,972.75	0.00E+00	1.50E+01	2.99E+01
Th-229	1.2057E-10	37,986.38	75,972.75	0.00E+00	4.58E-06	9.16E-06
Th-230	2.1043E-08	37,986.38	75,972.75	0.00E+00	7.99E-04	1.60E-03
Th-232	5.2972E-12	37,986.38	75,972.75	0.00E+00	2.01E-07	4.02E-07
Tl-208	1.7474E-07	37,986.38	75,972.75	0.00E+00	6.64E-03	1.33E-02
U-232	4.7368E-07	37,986.38	75,972.75	0.00E+00	1.80E-02	3.60E-02
U-233	2.5097E-08	37,986.38	75,972.75	0.00E+00	9.53E-04	1.91E-03
U-234	5.0000E-05	37,986.38	75,972.75	0.00E+00	1.90E+00	3.80E+00
U-235	-1.4489E-06	37,986.38	0.00	3.40E-02	0.00E+00	3.40E-02
U-236	7.5824E-06	37,986.38	75,972.75	0.00E+00	2.88E-01	5.76E-01
U-238	-2.6129E-07	37,986.38	0.00	1.79E-01	1.69E-01	1.79E-01
Y-90	9.1699E-01	37,986.38	75,972.75	0.00E+00	3.48E+04	6.97E+04
Other Radionuclides					5.10E+04	1.02E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.088E+15
0.0250	8.243E+14
0.0375	7.862E+14
0.0575	9.084E+14
0.0850	4.574E+14
0.1250	3.174E+14
0.2250	3.922E+14
0.3750	1.687E+14
0.5750	3.923E+15
0.8500	5.427E+13
1.2500	5.331E+13
1.7500	1.596E+12
2.2500	2.570E+08
2.7500	5.266E+08
3.5000	5.422E+07
5.0000	2.318E+07
7.0000	2.672E+06
11.0000	3.069E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.74E+02	1.76E+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
Nominal:	900.83	37,986.38
Bounding:	926.60	75,972.75

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.98	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: 2010
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated Canister usage: Bare Fuel Transfer

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	15,685.20	31,370.41	0.00E+00	1.38E-05	2.75E-05
Am-241	1.4352E-01	15,685.20	31,370.41	0.00E+00	2.25E+03	4.50E+03
Am-242m	2.8698E-04	15,685.20	31,370.41	0.00E+00	4.50E+00	9.00E+00
Am-243	6.2565E-04	15,685.20	31,370.41	0.00E+00	9.81E+00	1.96E+01
C-14	4.7901E-05	15,685.20	31,370.41	0.00E+00	7.51E-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	2.5081E-04	15,685.20	31,370.41	0.00E+00	3.93E+00	7.87E+00
Cm-244	4.9015E-02	15,685.20	31,370.41	0.00E+00	7.69E+02	1.54E+03
Co-60	2.5581E-03	15,685.20	31,370.41	0.00E+00	4.01E+01	8.02E+01
Cs-134	4.0536E-05	15,685.20	31,370.41	0.00E+00	6.36E-01	1.27E+00
Cs-135	1.4433E-05	15,685.20	31,370.41	0.00E+00	2.26E-01	4.53E-01
Cs-137	1.3979E+00	15,685.20	31,370.41	0.00E+00	2.19E+04	4.39E+04
Eu-154	2.0203E-02	15,685.20	31,370.41	0.00E+00	3.17E+02	6.34E+02
Eu-155	1.7684E-03	15,685.20	31,370.41	0.00E+00	2.77E+01	5.55E+01
Fe-55	4.3136E-05	15,685.20	31,370.41	0.00E+00	6.77E-01	1.35E+00
H-3	2.0769E-02	15,685.20	31,370.41	0.00E+00	3.26E+02	6.52E+02
I-129	9.8288E-07	15,685.20	31,370.41	0.00E+00	1.54E-02	3.08E-02
Kr-85	2.8214E-02	15,685.20	31,370.41	0.00E+00	4.43E+02	8.85E+02
Np-237	1.1218E-05	15,685.20	31,370.41	0.00E+00	1.76E-01	3.52E-01
Pa-231	1.3036E-09	15,685.20	31,370.41	0.00E+00	2.04E-05	4.09E-05
Pb-210	8.5078E-11	15,685.20	31,370.41	0.00E+00	1.33E-06	2.67E-06
Pm-147	3.6531E-04	15,685.20	31,370.41	0.00E+00	5.73E+00	1.15E+01
Pu-238	7.4564E-02	15,685.20	31,370.41	0.00E+00	1.17E+03	2.34E+03
Pu-239	1.1623E-02	15,685.20	31,370.41	0.00E+00	1.82E+02	3.65E+02
Pu-240	1.5132E-02	15,685.20	31,370.41	0.00E+00	2.37E+02	4.75E+02
Pu-241	9.0036E-01	15,685.20	31,370.41	0.00E+00	1.41E+04	2.82E+04
Pu-242	6.4260E-05	15,685.20	31,370.41	0.00E+00	1.01E+00	2.02E+00
Ra-226	2.2804E-10	15,685.20	31,370.41	0.00E+00	3.58E-06	7.15E-06
Ra-228	5.2713E-12	15,685.20	31,370.41	0.00E+00	8.27E-08	1.65E-07
Ru-106	6.1160E-10	15,685.20	31,370.41	0.00E+00	9.59E-06	1.92E-05
Se-79	1.2377E-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	9.1667E-01	15,685.20	31,370.41	0.00E+00	1.44E+04	2.88E+04
Tc-99	3.9357E-04	15,685.20	31,370.41	0.00E+00	6.17E+00	1.23E+01
Th-229	1.2057E-10	15,685.20	31,370.41	0.00E+00	1.89E-06	3.78E-06
Th-230	2.1043E-08	15,685.20	31,370.41	0.00E+00	3.30E-04	6.60E-04
Th-232	5.2972E-12	15,685.20	31,370.41	0.00E+00	8.31E-08	1.66E-07
Tl-208	1.7474E-07	15,685.20	31,370.41	0.00E+00	2.74E-03	5.48E-03
U-232	4.7368E-07	15,685.20	31,370.41	0.00E+00	7.43E-03	1.49E-02
U-233	2.5097E-08	15,685.20	31,370.41	0.00E+00	3.94E-04	7.87E-04
U-234	5.0000E-05	15,685.20	31,370.41	0.00E+00	7.84E-01	1.57E+00
U-235	-1.4489E-06	15,685.20	0.00	1.42E-02	0.00E+00	1.42E-02
U-236	7.5824E-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	9.1699E-01	15,685.20	31,370.41	0.00E+00	1.44E+04	2.88E+04
Other Radionuclides					2.11E+04	4.21E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.688E+15
0.0250	3.404E+14
0.0375	3.246E+14
0.0575	3.751E+14
0.0850	1.889E+14
0.1250	1.311E+14
0.2250	1.620E+14
0.3750	6.964E+13
0.5750	1.620E+15
0.8500	2.241E+13
1.2500	2.201E+13
1.7500	6.591E+11
2.2500	1.061E+08
2.7500	2.174E+08
3.5000	2.239E+07
5.0000	9.573E+08
7.0000	1.103E+06
11.0000	1.267E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.81E+02	7.22E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.92	14.77
Bounding:	3.84	19.11

Estimated EOL HM/Given EOL HM: 1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1972
Estimates as of: 2010
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated Canister usage: Bare Fuel Transfer

II. Estimates	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	29,160.32	33,700.28	0.00E+00	2.56E-05	2.96E-05	Avg. MeV	
Am-241	1.4352E-01	29,160.32	33,700.28	0.00E+00	4.19E+03	4.84E+03	0.0150	1.813E+15
Am-242m	2.8698E-04	29,160.32	33,700.28	0.00E+00	8.37E+00	9.67E+00	0.0250	3.657E+14
Am-243	6.2565E-04	29,160.32	33,700.28	0.00E+00	1.82E+01	2.11E+01	0.0375	3.487E+14
C-14	4.7901E-05	29,160.32	33,700.28	0.00E+00	1.40E+00	1.61E+00	0.0575	4.029E+14
Cl-36	8.0297E-07	29,160.32	33,700.28	0.00E+00	2.34E-02	2.71E-02	0.0850	2.029E+14
Cm-243	2.5081E-04	29,160.32	33,700.28	0.00E+00	7.31E+00	8.45E+00	0.1250	1.408E+14
Cm-244	4.9015E-02	29,160.32	33,700.28	0.00E+00	1.43E+03	1.65E+03	0.2250	1.740E+14
Co-60	2.5581E-03	29,160.32	33,700.28	0.00E+00	7.46E+01	8.62E+01	0.3750	7.481E+13
Cs-134	4.0536E-05	29,160.32	33,700.28	0.00E+00	1.18E+00	1.37E+00	0.5750	1.740E+15
Cs-135	1.4433E-05	29,160.32	33,700.28	0.00E+00	4.21E-01	4.86E-01	0.8500	2.407E+13
Cs-137	1.3979E+00	29,160.32	33,700.28	0.00E+00	4.08E+04	4.71E+04	1.2500	2.365E+13
Eu-154	2.0203E-02	29,160.32	33,700.28	0.00E+00	5.89E+02	6.81E+02	1.7500	7.081E+11
Eu-155	1.7684E-03	29,160.32	33,700.28	0.00E+00	5.16E+01	5.96E+01	2.2500	1.140E+08
Fe-55	4.3136E-05	29,160.32	33,700.28	0.00E+00	1.26E+00	1.45E+00	2.7500	2.336E+08
H-3	2.0769E-02	29,160.32	33,700.28	0.00E+00	6.06E+02	7.00E+02	3.5000	2.406E+07
I-129	9.8288E-07	29,160.32	33,700.28	0.00E+00	2.87E-02	3.31E-02	5.0000	1.029E+07
Kr-85	2.8214E-02	29,160.32	33,700.28	0.00E+00	8.23E+02	9.51E+02	7.0000	1.185E+06
Np-237	1.1218E-05	29,160.32	33,700.28	0.00E+00	3.27E-01	3.78E-01	11.0000	1.362E+05
Pa-231	1.3036E-09	29,160.32	33,700.28	0.00E+00	3.80E-05	4.39E-05		
Pb-210	8.5078E-11	29,160.32	33,700.28	0.00E+00	2.48E-06	2.87E-06		
Pm-147	3.6531E-04	29,160.32	33,700.28	0.00E+00	1.07E+01	1.23E+01		
Pu-238	7.4564E-02	29,160.32	33,700.28	0.00E+00	2.17E+03	2.51E+03		
Pu-239	1.1623E-02	29,160.32	33,700.28	0.00E+00	3.39E+02	3.92E+02		
Pu-240	1.5132E-02	29,160.32	33,700.28	0.00E+00	4.41E+02	5.10E+02		
Pu-241	9.0036E-01	29,160.32	33,700.28	0.00E+00	2.63E+04	3.03E+04		
Pu-242	6.4260E-05	29,160.32	33,700.28	0.00E+00	1.87E+00	2.17E+00		
Ra-226	2.2804E-10	29,160.32	33,700.28	0.00E+00	6.65E-06	7.68E-06		
Ra-228	5.2713E-12	29,160.32	33,700.28	0.00E+00	1.54E-07	1.78E-07		
Ru-106	6.1160E-10	29,160.32	33,700.28	0.00E+00	1.78E-05	2.06E-05		
Se-79	1.2377E-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	9.1667E-01	29,160.32	33,700.28	0.00E+00	2.67E+04	3.09E+04		
Tc-99	3.9357E-04	29,160.32	33,700.28	0.00E+00	1.15E+01	1.33E+01		
Th-229	1.2057E-10	29,160.32	33,700.28	0.00E+00	3.52E-06	4.06E-06		
Th-230	2.1043E-08	29,160.32	33,700.28	0.00E+00	6.14E-04	7.09E-04		
Th-232	5.2972E-12	29,160.32	33,700.28	0.00E+00	1.54E-07	1.79E-07		
Tl-208	1.7474E-07	29,160.32	33,700.28	0.00E+00	5.10E-03	5.89E-03		
U-232	4.7368E-07	29,160.32	33,700.28	0.00E+00	1.38E-02	1.60E-02		
U-233	2.5097E-08	29,160.32	33,700.28	0.00E+00	7.32E-04	8.46E-04		
U-234	5.0000E-05	29,160.32	33,700.28	0.00E+00	1.46E+00	1.69E+00		
U-235	-1.4489E-06	29,160.32	0.00	1.58E-01	1.16E-01	1.58E-01		
U-236	7.5824E-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	9.1699E-01	29,160.32	33,700.28	0.00E+00	2.67E+04	3.09E+04		
Other Radionuclides					3.91E+04	4.52E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.71E+02	7.75E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	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: 2010
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated Canister usage: Bare Fuel Transfer

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (CI)	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	140,435.08	280,870.16	0.00E+00	1.23E-04	2.46E-04	Avg. MeV	
Am-241	1.4352E-01	140,435.08	280,870.16	0.00E+00	2.02E+04	4.03E+04	0.0150	1.511E+16
Am-242m	2.8698E-04	140,435.08	280,870.16	0.00E+00	4.03E+01	8.06E+01	0.0250	3.047E+15
Am-243	6.2565E-04	140,435.08	280,870.16	0.00E+00	8.79E+01	1.76E+02	0.0375	2.907E+15
C-14	4.7901E-05	140,435.08	280,870.16	0.00E+00	6.73E+00	1.35E+01	0.0575	3.358E+15
Cl-36	8.0297E-07	140,435.08	280,870.16	0.00E+00	1.13E-01	2.26E-01	0.0850	1.691E+15
Cm-243	2.5081E-04	140,435.08	280,870.16	0.00E+00	3.52E+01	7.04E+01	0.1250	1.173E+15
Cm-244	4.9015E-02	140,435.08	280,870.16	0.00E+00	6.88E+03	1.38E+04	0.2250	1.450E+15
Co-60	2.5581E-03	140,435.08	280,870.16	0.00E+00	3.59E+02	7.19E+02	0.3750	6.235E+14
Cs-134	4.0536E-05	140,435.08	280,870.16	0.00E+00	5.69E+00	1.14E+01	0.5750	1.450E+16
Cs-135	1.4433E-05	140,435.08	280,870.16	0.00E+00	2.03E+00	4.05E+00	0.8500	2.006E+14
Cs-137	1.3979E+00	140,435.08	280,870.16	0.00E+00	1.96E+05	3.93E+05	1.2500	1.971E+14
Eu-154	2.0203E-02	140,435.08	280,870.16	0.00E+00	2.84E+03	5.67E+03	1.7500	5.902E+12
Eu-155	1.7684E-03	140,435.08	280,870.16	0.00E+00	2.48E+02	4.97E+02	2.2500	9.503E+08
Fe-55	4.3136E-05	140,435.08	280,870.16	0.00E+00	6.06E+00	1.21E+01	2.7500	1.947E+09
H-3	2.0769E-02	140,435.08	280,870.16	0.00E+00	2.92E+03	5.83E+03	3.5000	2.005E+08
I-129	9.8288E-07	140,435.08	280,870.16	0.00E+00	1.38E-01	2.76E-01	5.0000	8.571E+07
Kr-85	2.8214E-02	140,435.08	280,870.16	0.00E+00	3.96E+03	7.92E+03	7.0000	9.879E+06
Np-237	1.1218E-05	140,435.08	280,870.16	0.00E+00	1.58E+00	3.15E+00	11.0000	1.135E+06
Pa-231	1.3036E-09	140,435.08	280,870.16	0.00E+00	1.83E-04	3.66E-04		
Pb-210	8.5078E-11	140,435.08	280,870.16	0.00E+00	1.19E-05	2.39E-05		
Pm-147	3.6531E-04	140,435.08	280,870.16	0.00E+00	5.13E+01	1.03E+02		
Pu-238	7.4564E-02	140,435.08	280,870.16	0.00E+00	1.05E+04	2.09E+04		
Pu-239	1.1623E-02	140,435.08	280,870.16	0.00E+00	1.63E+03	3.26E+03		
Pu-240	1.5132E-02	140,435.08	280,870.16	0.00E+00	2.13E+03	4.25E+03		
Pu-241	9.0036E-01	140,435.08	280,870.16	0.00E+00	1.26E+05	2.53E+05		
Pu-242	6.4260E-05	140,435.08	280,870.16	0.00E+00	9.02E+00	1.80E+01		
Ra-226	2.2804E-10	140,435.08	280,870.16	0.00E+00	3.20E-05	6.40E-05		
Ra-228	5.2713E-12	140,435.08	280,870.16	0.00E+00	7.40E-07	1.48E-06		
Ru-106	6.1160E-10	140,435.08	280,870.16	0.00E+00	8.59E-05	1.72E-04		
Se-79	1.2377E-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	9.1667E-01	140,435.08	280,870.16	0.00E+00	1.29E+05	2.57E+05		
Tc-99	3.9357E-04	140,435.08	280,870.16	0.00E+00	5.53E+01	1.11E+02		
Th-229	1.2057E-10	140,435.08	280,870.16	0.00E+00	1.69E-05	3.39E-05		
Th-230	2.1043E-08	140,435.08	280,870.16	0.00E+00	2.96E-03	5.91E-03		
Th-232	5.2972E-12	140,435.08	280,870.16	0.00E+00	7.44E-07	1.49E-06		
Tl-208	1.7474E-07	140,435.08	280,870.16	0.00E+00	2.45E-02	4.91E-02		
U-232	4.7368E-07	140,435.08	280,870.16	0.00E+00	6.65E-02	1.33E-01	Thermal Power	
U-233	2.5097E-08	140,435.08	280,870.16	0.00E+00	3.52E-03	7.05E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	5.0000E-05	140,435.08	280,870.16	0.00E+00	7.02E+00	1.40E+01		
U-235	-1.4489E-06	140,435.08	0.00	3.47E-01	1.43E-01	3.47E-01		
U-236	7.5824E-06	140,435.08	280,870.16	0.00E+00	1.06E+00	2.13E+00	3.23E+03	6.46E+03
U-238	-2.6129E-07	140,435.08	0.00	1.48E+00	1.44E+00	1.48E+00	Total	Total
Y-90	9.1699E-01	140,435.08	280,870.16	0.00E+00	1.29E+05	2.58E+05		
Other Radionuclides					1.89E+05	3.77E+05		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	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	Estimated EOL HM/Given EOL HM
Nominal:	0.88	2.31	1.00
Bounding:	1.76	3.35	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BRP-EG/F
SNF ID #: 1081
Fuel Units & Descr: 4 - 9 X 9 ROD ARRAY
Heavy Metal Mass: BOL=553.686kg; EOL=541.107kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1973
Estimates as of: 2010
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated Canister usage: Bare Fuel Transfer

II. Estimates	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	11,962.22	23,924.45	0.00E+00	1.05E-05	2.10E-05	Avg. MeV	
Am-241	1.4352E-01	11,962.22	23,924.45	0.00E+00	1.72E+03	3.43E+03	0.0150	1.287E+15
Am-242m	2.8698E-04	11,962.22	23,924.45	0.00E+00	3.43E+00	6.87E+00	0.0250	2.596E+14
Am-243	6.2565E-04	11,962.22	23,924.45	0.00E+00	7.48E+00	1.50E+01	0.0375	2.476E+14
C-14	4.7901E-05	11,962.22	23,924.45	0.00E+00	5.73E-01	1.15E+00	0.0575	2.861E+14
Cl-36	8.0297E-07	11,962.22	23,924.45	0.00E+00	9.61E-03	1.92E-02	0.0850	1.440E+14
Cm-243	2.5081E-04	11,962.22	23,924.45	0.00E+00	3.00E+00	6.00E+00	0.1250	9.995E+13
Cm-244	4.9015E-02	11,962.22	23,924.45	0.00E+00	5.86E+02	1.17E+03	0.2250	1.235E+14
Co-60	2.5581E-03	11,962.22	23,924.45	0.00E+00	3.06E+01	6.12E+01	0.3750	5.311E+13
Cs-134	4.0536E-05	11,962.22	23,924.45	0.00E+00	4.85E-01	9.70E-01	0.5750	1.235E+15
Cs-135	1.4433E-05	11,962.22	23,924.45	0.00E+00	1.73E-01	3.45E-01	0.8500	1.709E+13
Cs-137	1.3979E+00	11,962.22	23,924.45	0.00E+00	1.67E+04	3.34E+04	1.2500	1.679E+13
Eu-154	2.0203E-02	11,962.22	23,924.45	0.00E+00	2.42E+02	4.83E+02	1.7500	5.027E+11
Eu-155	1.7684E-03	11,962.22	23,924.45	0.00E+00	2.12E+01	4.23E+01	2.2500	8.094E+07
Fe-55	4.3136E-05	11,962.22	23,924.45	0.00E+00	5.16E-01	1.03E+00	2.7500	1.658E+08
H-3	2.0769E-02	11,962.22	23,924.45	0.00E+00	2.48E+02	4.97E+02	3.5000	1.708E+07
I-129	9.8288E-07	11,962.22	23,924.45	0.00E+00	1.18E-02	2.35E-02	5.0000	7.301E+06
Kr-85	2.8214E-02	11,962.22	23,924.45	0.00E+00	3.38E+02	6.75E+02	7.0000	8.415E+05
Np-237	1.1218E-05	11,962.22	23,924.45	0.00E+00	1.34E-01	2.68E-01	11.0000	9.665E+04
Pa-231	1.3036E-09	11,962.22	23,924.45	0.00E+00	1.56E-05	3.12E-05		
Pb-210	8.5078E-11	11,962.22	23,924.45	0.00E+00	1.02E-06	2.04E-06		
Pm-147	3.6531E-04	11,962.22	23,924.45	0.00E+00	4.37E+00	8.74E+00		
Pu-238	7.4564E-02	11,962.22	23,924.45	0.00E+00	8.92E+02	1.78E+03		
Pu-239	1.1623E-02	11,962.22	23,924.45	0.00E+00	1.39E+02	2.78E+02		
Pu-240	1.5132E-02	11,962.22	23,924.45	0.00E+00	1.81E+02	3.62E+02		
Pu-241	9.0036E-01	11,962.22	23,924.45	0.00E+00	1.08E+04	2.15E+04		
Pu-242	6.4260E-05	11,962.22	23,924.45	0.00E+00	7.69E-01	1.54E+00		
Ra-226	2.2804E-10	11,962.22	23,924.45	0.00E+00	2.73E-06	5.46E-06		
Ra-228	5.2713E-12	11,962.22	23,924.45	0.00E+00	6.31E-08	1.26E-07		
Ru-106	6.1160E-10	11,962.22	23,924.45	0.00E+00	7.32E-06	1.46E-05		
Se-79	1.2377E-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	9.1667E-01	11,962.22	23,924.45	0.00E+00	1.10E+04	2.19E+04		
Tc-99	3.9357E-04	11,962.22	23,924.45	0.00E+00	4.71E+00	9.42E+00		
Th-229	1.2057E-10	11,962.22	23,924.45	0.00E+00	1.44E-06	2.88E-06		
Th-230	2.1043E-08	11,962.22	23,924.45	0.00E+00	2.52E-04	5.03E-04		
Th-232	5.2972E-12	11,962.22	23,924.45	0.00E+00	6.34E-08	1.27E-07		
Tl-208	1.7474E-07	11,962.22	23,924.45	0.00E+00	2.09E-03	4.18E-03		
U-232	4.7368E-07	11,962.22	23,924.45	0.00E+00	5.67E-03	1.13E-02		
U-233	2.5097E-08	11,962.22	23,924.45	0.00E+00	3.00E-04	6.00E-04		
U-234	5.0000E-05	11,962.22	23,924.45	0.00E+00	5.98E-01	1.20E+00		
U-235	-1.4489E-06	11,962.22	0.00	4.16E-02	2.43E-02	4.16E-02		
U-236	7.5824E-06	11,962.22	23,924.45	0.00E+00	9.07E-02	1.81E-01		
U-238	-2.6129E-07	11,962.22	0.00	1.80E-01	1.76E-01	1.80E-01		
Y-90	9.1699E-01	11,962.22	23,924.45	0.00E+00	1.10E+04	2.19E+04		
Other Radionuclides					1.61E+04	3.21E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.75E+02	5.50E+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
Nominal:	8,552.79	11,962.22
Bounding:	8,583.24	23,924.45

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BRP-EP
SNF ID #: 29
Fuel Units & Descr: 3 - 9 X 9 ROD ARRAY
Heavy Metal Mass: BOL=369.99kg; EOL=351.853kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1974
Estimates as of: 2010
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: Bare Fuel Transfer

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	17,236.64	34,473.28	0.00E+00	3.98E-02	7.95E-02	Avg. MeV	
Am-241	8.4448E+00	17,236.64	34,473.28	0.00E+00	1.46E+05	2.91E+05	0.0150	4.255E+16
Am-242m	1.6848E-02	17,236.64	34,473.28	0.00E+00	2.90E+02	5.81E+02	0.0250	8.407E+15
Am-243	1.6320E-02	17,236.64	34,473.28	0.00E+00	2.81E+02	5.63E+02	0.0375	7.344E+15
C-14	1.2090E-01	17,236.64	34,473.28	0.00E+00	2.08E+03	4.17E+03	0.0575	1.156E+16
Cl-36	2.2849E-03	17,236.64	34,473.28	0.00E+00	3.94E+01	7.88E+01	0.0850	4.510E+15
Cm-243	8.6624E-04	17,236.64	34,473.28	0.00E+00	1.49E+01	2.99E+01	0.1250	3.535E+15
Cm-244	1.6848E-01	17,236.64	34,473.28	0.00E+00	2.90E+03	5.81E+03	0.2250	3.907E+15
Co-60	2.8086E+01	17,236.64	34,473.28	0.00E+00	4.84E+05	9.68E+05	0.3750	1.671E+15
Cs-134	3.4148E-04	17,236.64	34,473.28	0.00E+00	5.89E+00	1.18E+01	0.5750	2.717E+16
Cs-135	4.3976E-04	17,236.64	34,473.28	0.00E+00	7.58E+00	1.52E+01	0.8500	1.038E+15
Cs-137	2.1049E+01	17,236.64	34,473.28	0.00E+00	3.63E+05	7.26E+05	1.2500	7.259E+16
Eu-154	1.2500E+00	17,236.64	34,473.28	0.00E+00	2.15E+04	4.31E+04	1.7500	3.211E+13
Eu-155	6.8986E-02	17,236.64	34,473.28	0.00E+00	1.19E+03	2.38E+03	2.2500	3.807E+11
Fe-55	2.9308E-01	17,236.64	34,473.28	0.00E+00	5.05E+03	1.01E+04	2.7500	1.073E+11
H-3	2.4311E-01	17,236.64	34,473.28	0.00E+00	4.19E+03	8.38E+03	3.5000	9.147E+07
I-129	1.0618E-05	17,236.64	34,473.28	0.00E+00	1.83E-01	3.66E-01	5.0000	3.883E+07
Kr-85	5.9882E-01	17,236.64	34,473.28	0.00E+00	1.03E+04	2.06E+04	7.0000	4.444E+06
Np-237	1.5668E-04	17,236.64	34,473.28	0.00E+00	2.70E+00	5.40E+00	11.0000	5.083E+05
Pa-231	2.8656E-06	17,236.64	34,473.28	0.00E+00	4.94E-02	9.88E-02		
Pb-210	2.3918E-08	17,236.64	34,473.28	0.00E+00	4.12E-04	8.25E-04		
Pm-147	1.6900E-02	17,236.64	34,473.28	0.00E+00	2.91E+02	5.83E+02		
Pu-238	-8.6120E-01	17,236.64	0.00	4.75E+04	3.27E+04	4.75E+04		
Pu-239	-4.8440E-02	17,236.64	0.00	5.75E+03	4.92E+03	5.75E+03		
Pu-240	-3.0095E-01	17,236.64	0.00	7.35E+03	2.16E+03	7.35E+03		
Pu-241	-1.0411E+02	17,236.64	0.00	1.89E+06	9.65E+04	1.89E+06		
Pu-242	-1.1381E-04	17,236.64	0.00	3.18E+01	2.98E+01	3.18E+01		
Ra-226	6.4400E-08	17,236.64	34,473.28	0.00E+00	1.11E-03	2.22E-03		
Ra-228	5.9952E-07	17,236.64	34,473.28	0.00E+00	1.03E-02	2.07E-02		
Ru-106	8.5526E-07	17,236.64	34,473.28	0.00E+00	1.47E-02	2.95E-02		
Se-79	1.9181E-04	17,236.64	34,473.28	0.00E+00	3.31E+00	6.61E+00		
Sn-126	1.6671E-04	17,236.64	34,473.28	0.00E+00	2.87E+00	5.75E+00		
Sr-90	1.9799E+01	17,236.64	34,473.28	0.00E+00	3.41E+05	6.83E+05		
Tc-99	6.7678E-03	17,236.64	34,473.28	0.00E+00	1.17E+02	2.33E+02		
Th-229	1.7488E-08	17,236.64	34,473.28	0.00E+00	3.01E-02	6.03E-02		
Th-230	5.8704E-08	17,236.64	34,473.28	0.00E+00	1.01E-01	2.02E-01		
Th-232	6.0208E-07	17,236.64	34,473.28	0.00E+00	1.04E-02	2.08E-02		
Tl-208	8.7573E-05	17,236.64	34,473.28	0.00E+00	1.51E+00	3.02E+00		
U-232	2.3706E-04	17,236.64	34,473.28	0.00E+00	4.09E+00	8.17E+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	1.9804E+01	17,236.64	34,473.28	0.00E+00	3.41E+05	6.83E+05		
Other Radionuclides					1.06E+06	2.13E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.83E+04	3.60E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	6,607.65	17,236.64
Bounding:	7,131.56	34,473.28

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.39	2.61
Bounding:	2.79	4.83

Estimated EOL HM/Given EOL HM: 31.12

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1974
Estimates as of: 2010
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated Canister usage: Bare Fuel Transfer

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	40,268.00	80,535.99	0.00E+00	3.53E-05	7.07E-05
Am-241	1.4352E-01	40,268.00	80,535.99	0.00E+00	5.78E+03	1.16E+04
Am-242m	2.8698E-04	40,268.00	80,535.99	0.00E+00	1.16E+01	2.31E+01
Am-243	6.2565E-04	40,268.00	80,535.99	0.00E+00	2.52E+01	5.04E+01
C-14	4.7901E-05	40,268.00	80,535.99	0.00E+00	1.93E+00	3.86E+00
Cl-36	8.0297E-07	40,268.00	80,535.99	0.00E+00	3.23E-02	6.47E-02
Cm-243	2.5081E-04	40,268.00	80,535.99	0.00E+00	1.01E+01	2.02E+01
Cm-244	4.9015E-02	40,268.00	80,535.99	0.00E+00	1.97E+03	3.95E+03
Co-60	2.5581E-03	40,268.00	80,535.99	0.00E+00	1.03E+02	2.06E+02
Cs-134	4.0536E-05	40,268.00	80,535.99	0.00E+00	1.63E+00	3.26E+00
Cs-135	1.4433E-05	40,268.00	80,535.99	0.00E+00	5.81E-01	1.16E+00
Cs-137	1.3979E+00	40,268.00	80,535.99	0.00E+00	5.63E+04	1.13E+05
Eu-154	2.0203E-02	40,268.00	80,535.99	0.00E+00	8.14E+02	1.63E+03
Eu-155	1.7684E-03	40,268.00	80,535.99	0.00E+00	7.12E+01	1.42E+02
Fe-55	4.3136E-05	40,268.00	80,535.99	0.00E+00	1.74E+00	3.47E+00
H-3	2.0769E-02	40,268.00	80,535.99	0.00E+00	8.36E+02	1.67E+03
I-129	9.8288E-07	40,268.00	80,535.99	0.00E+00	3.96E-02	7.92E-02
Kr-85	2.8214E-02	40,268.00	80,535.99	0.00E+00	1.14E+03	2.27E+03
Np-237	1.1218E-05	40,268.00	80,535.99	0.00E+00	4.52E-01	9.03E-01
Pa-231	1.3036E-09	40,268.00	80,535.99	0.00E+00	5.25E-05	1.05E-04
Pb-210	8.5078E-11	40,268.00	80,535.99	0.00E+00	3.43E-06	6.85E-06
Pm-147	3.6531E-04	40,268.00	80,535.99	0.00E+00	1.47E+01	2.94E+01
Pu-238	7.4564E-02	40,268.00	80,535.99	0.00E+00	3.00E+03	6.01E+03
Pu-239	1.1623E-02	40,268.00	80,535.99	0.00E+00	4.68E+02	9.36E+02
Pu-240	1.5132E-02	40,268.00	80,535.99	0.00E+00	6.09E+02	1.22E+03
Pu-241	9.0036E-01	40,268.00	80,535.99	0.00E+00	3.63E+04	7.25E+04
Pu-242	6.4260E-05	40,268.00	80,535.99	0.00E+00	2.59E+00	5.18E+00
Ra-226	2.2804E-10	40,268.00	80,535.99	0.00E+00	9.18E-06	1.84E-05
Ra-228	5.2713E-12	40,268.00	80,535.99	0.00E+00	2.12E-07	4.25E-07
Ru-106	6.1160E-10	40,268.00	80,535.99	0.00E+00	2.46E-05	4.93E-05
Se-79	1.2377E-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	9.1667E-01	40,268.00	80,535.99	0.00E+00	3.69E+04	7.38E+04
Tc-99	3.9357E-04	40,268.00	80,535.99	0.00E+00	1.58E+01	3.17E+01
Th-229	1.2057E-10	40,268.00	80,535.99	0.00E+00	4.86E-06	9.71E-06
Th-230	2.1043E-08	40,268.00	80,535.99	0.00E+00	8.47E-04	1.69E-03
Th-232	5.2972E-12	40,268.00	80,535.99	0.00E+00	2.13E-07	4.27E-07
Tl-208	1.7474E-07	40,268.00	80,535.99	0.00E+00	7.04E-03	1.41E-02
U-232	4.7368E-07	40,268.00	80,535.99	0.00E+00	1.91E-02	3.81E-02
U-233	2.5097E-08	40,268.00	80,535.99	0.00E+00	1.01E-03	2.02E-03
U-234	5.0000E-05	40,268.00	80,535.99	0.00E+00	2.01E+00	4.03E+00
U-235	-1.4489E-06	40,268.00	0.00	1.37E-01	7.83E-02	1.37E-01
U-236	7.5824E-06	40,268.00	80,535.99	0.00E+00	3.05E-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	9.1699E-01	40,268.00	80,535.99	0.00E+00	3.69E+04	7.39E+04
Other Radionuclides					5.41E+04	1.08E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.333E+15
0.0250	8.738E+14
0.0375	8.334E+14
0.0575	9.630E+14
0.0850	4.849E+14
0.1250	3.365E+14
0.2250	4.158E+14
0.3750	1.788E+14
0.5750	4.158E+15
0.8500	5.753E+13
1.2500	5.651E+13
1.7500	1.692E+12
2.2500	2.725E+08
2.7500	5.583E+08
3.5000	5.748E+07
5.0000	2.458E+07
7.0000	2.833E+06
11.0000	3.253E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.26E+02	1.85E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1974
Estimates as of: 2010
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated Canister usage: Bare Fuel Transfer

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	5,489.09	10,978.18	0.00E+00	4.82E-06	9.63E-06
Am-241	1.4352E-01	5,489.09	10,978.18	0.00E+00	7.88E+02	1.58E+03
Am-242m	2.8698E-04	5,489.09	10,978.18	0.00E+00	1.58E+00	3.15E+00
Am-243	6.2565E-04	5,489.09	10,978.18	0.00E+00	3.43E+00	6.87E+00
C-14	4.7901E-05	5,489.09	10,978.18	0.00E+00	2.63E-01	5.26E-01
Cl-36	8.0297E-07	5,489.09	10,978.18	0.00E+00	4.41E-03	8.82E-03
Cm-243	2.5081E-04	5,489.09	10,978.18	0.00E+00	1.38E+00	2.75E+00
Cm-244	4.9015E-02	5,489.09	10,978.18	0.00E+00	2.69E+02	5.38E+02
Co-60	2.5581E-03	5,489.09	10,978.18	0.00E+00	1.40E+01	2.81E+01
Cs-134	4.0536E-05	5,489.09	10,978.18	0.00E+00	2.23E-01	4.45E-01
Cs-135	1.4433E-05	5,489.09	10,978.18	0.00E+00	7.92E-02	1.58E-01
Cs-137	1.3979E+00	5,489.09	10,978.18	0.00E+00	7.67E+03	1.53E+04
Eu-154	2.0203E-02	5,489.09	10,978.18	0.00E+00	1.11E+02	2.22E+02
Eu-155	1.7684E-03	5,489.09	10,978.18	0.00E+00	9.71E+00	1.94E+01
Fe-55	4.3136E-05	5,489.09	10,978.18	0.00E+00	2.37E-01	4.74E-01
H-3	2.0769E-02	5,489.09	10,978.18	0.00E+00	1.14E+02	2.28E+02
I-129	9.8288E-07	5,489.09	10,978.18	0.00E+00	5.40E-03	1.08E-02
Kr-85	2.8214E-02	5,489.09	10,978.18	0.00E+00	1.55E+02	3.10E+02
Np-237	1.1218E-05	5,489.09	10,978.18	0.00E+00	6.16E-02	1.23E-01
Pa-231	1.3036E-09	5,489.09	10,978.18	0.00E+00	7.16E-06	1.43E-05
Pb-210	8.5078E-11	5,489.09	10,978.18	0.00E+00	4.67E-07	9.34E-07
Pm-147	3.6531E-04	5,489.09	10,978.18	0.00E+00	2.01E+00	4.01E+00
Pu-238	7.4564E-02	5,489.09	10,978.18	0.00E+00	4.09E+02	8.19E+02
Pu-239	1.1623E-02	5,489.09	10,978.18	0.00E+00	6.38E+01	1.28E+02
Pu-240	1.5132E-02	5,489.09	10,978.18	0.00E+00	8.31E+01	1.66E+02
Pu-241	9.0036E-01	5,489.09	10,978.18	0.00E+00	4.94E+03	9.88E+03
Pu-242	6.4260E-05	5,489.09	10,978.18	0.00E+00	3.53E-01	7.05E-01
Ra-226	2.2804E-10	5,489.09	10,978.18	0.00E+00	1.25E-06	2.50E-06
Ra-228	5.2713E-12	5,489.09	10,978.18	0.00E+00	2.89E-08	5.79E-08
Ru-106	6.1160E-10	5,489.09	10,978.18	0.00E+00	3.36E-06	6.71E-06
Se-79	1.2377E-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	9.1667E-01	5,489.09	10,978.18	0.00E+00	5.03E+03	1.01E+04
Tc-99	3.9357E-04	5,489.09	10,978.18	0.00E+00	2.16E+00	4.32E+00
Th-229	1.2057E-10	5,489.09	10,978.18	0.00E+00	6.62E-07	1.32E-06
Th-230	2.1043E-08	5,489.09	10,978.18	0.00E+00	1.16E-04	2.31E-04
Th-232	5.2972E-12	5,489.09	10,978.18	0.00E+00	2.91E-08	5.82E-08
Tl-208	1.7474E-07	5,489.09	10,978.18	0.00E+00	9.59E-04	1.92E-03
U-232	4.7368E-07	5,489.09	10,978.18	0.00E+00	2.60E-03	5.20E-03
U-233	2.5097E-08	5,489.09	10,978.18	0.00E+00	1.38E-04	2.76E-04
U-234	5.0000E-05	5,489.09	10,978.18	0.00E+00	2.74E-01	5.49E-01
U-235	-1.4489E-08	5,489.09	0.00	2.05E-02	1.26E-02	2.05E-02
U-236	7.5824E-08	5,489.09	10,978.18	0.00E+00	4.16E-02	8.32E-02
U-238	-2.6129E-07	5,489.09	0.00	8.74E-02	8.60E-02	8.74E-02
Y-90	9.1699E-01	5,489.09	10,978.18	0.00E+00	5.03E+03	1.01E+04
Other Radionuclides					7.37E+03	1.47E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.907E+14
0.0250	1.191E+14
0.0375	1.136E+14
0.0575	1.313E+14
0.0850	6.609E+13
0.1250	4.586E+13
0.2250	5.668E+13
0.3750	2.437E+13
0.5750	5.668E+14
0.8500	7.842E+12
1.2500	7.703E+12
1.7500	2.307E+11
2.2500	3.714E+07
2.7500	7.610E+07
3.5000	7.836E+06
5.0000	3.350E+06
7.0000	3.861E+05
11.0000	4.435E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.26E+02	2.53E+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
Nominal:	4,154.69	5,489.09
Bounding:	4,193.24	10,978.18

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.58	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: 2010
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: Bare Fuel Transfer

II. Estimates

Radionuclide	a_n Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.3344E-08	13,290.34	26,580.68	0.00E+00	3.10E-04	6.21E-04
Am-241	1.1135E-04	13,290.34	26,580.68	0.00E+00	1.48E+00	2.96E+00
Am-242m	8.5075E-09	13,290.34	26,580.68	0.00E+00	1.13E-04	2.26E-04
Am-243	9.8519E-10	13,290.34	26,580.68	0.00E+00	1.31E-05	2.62E-05
C-14	2.3012E-04	13,290.34	26,580.68	0.00E+00	3.06E+00	6.12E+00
Cl-36	1.2261E-06	13,290.34	26,580.68	0.00E+00	1.63E-02	3.26E-02
Cm-243	2.4875E-10	13,290.34	26,580.68	0.00E+00	3.31E-06	6.61E-06
Cm-244	2.3178E-09	13,290.34	26,580.68	0.00E+00	3.08E-05	6.16E-05
Co-60	7.0849E-02	13,290.34	26,580.68	0.00E+00	9.42E+02	1.88E+03
Cs-134	3.0266E-06	13,290.34	26,580.68	0.00E+00	4.02E-02	8.04E-02
Cs-135	3.0316E-05	13,290.34	26,580.68	0.00E+00	4.03E-01	8.06E-01
Cs-137	1.4511E+00	13,290.34	26,580.68	0.00E+00	1.93E+04	3.86E+04
Eu-154	6.6955E-04	13,290.34	26,580.68	0.00E+00	8.90E+00	1.78E+01
Eu-155	6.9850E-04	13,290.34	26,580.68	0.00E+00	9.28E+00	1.86E+01
Fe-55	1.2318E-03	13,290.34	26,580.68	0.00E+00	1.64E+01	3.27E+01
H-3	2.5141E-03	13,290.34	26,580.68	0.00E+00	3.34E+01	6.68E+01
I-129	7.3195E-07	13,290.34	26,580.68	0.00E+00	9.73E-03	1.95E-02
Kr-85	4.1281E-02	13,290.34	26,580.68	0.00E+00	5.49E+02	1.10E+03
Np-237	1.1489E-06	13,290.34	26,580.68	0.00E+00	1.53E-02	3.05E-02
Pa-231	4.5241E-08	13,290.34	26,580.68	0.00E+00	6.01E-04	1.20E-03
Pb-210	6.4476E-13	13,290.34	26,580.68	0.00E+00	8.57E-09	1.71E-08
Pm-147	1.1651E-03	13,290.34	26,580.68	0.00E+00	1.55E+01	3.10E+01
Pu-238	2.9517E-04	13,290.34	26,580.68	0.00E+00	3.92E+00	7.85E+00
Pu-239	6.6772E-04	13,290.34	26,580.68	0.00E+00	8.87E+00	1.77E+01
Pu-240	8.6839E-05	13,290.34	26,580.68	0.00E+00	1.15E+00	2.31E+00
Pu-241	7.1514E-04	13,290.34	26,580.68	0.00E+00	9.50E+00	1.90E+01
Pu-242	1.9717E-09	13,290.34	26,580.68	0.00E+00	2.62E-05	5.24E-05
Ra-226	1.7654E-12	13,290.34	26,580.68	0.00E+00	2.35E-08	4.69E-08
Ra-228	8.2928E-12	13,290.34	26,580.68	0.00E+00	1.10E-07	2.20E-07
Ru-106	1.8419E-10	13,290.34	26,580.68	0.00E+00	2.45E-06	4.90E-06
Se-79	1.3223E-05	13,290.34	26,580.68	0.00E+00	1.76E-01	3.51E-01
Sn-126	1.1493E-05	13,290.34	26,580.68	0.00E+00	1.53E-01	3.05E-01
Sr-90	1.3649E+00	13,290.34	26,580.68	0.00E+00	1.81E+04	3.63E+04
Tc-99	4.6656E-04	13,290.34	26,580.68	0.00E+00	6.20E+00	1.24E+01
Th-229	1.4547E-11	13,290.34	26,580.68	0.00E+00	1.93E-07	3.87E-07
Th-230	1.6617E-10	13,290.34	26,580.68	0.00E+00	2.21E-06	4.42E-06
Th-232	8.3361E-12	13,290.34	26,580.68	0.00E+00	1.11E-07	2.22E-07
Tl-208	2.1664E-08	13,290.34	26,580.68	0.00E+00	2.88E-04	5.76E-04
U-232	5.8669E-08	13,290.34	26,580.68	0.00E+00	7.80E-04	1.56E-03
U-233	3.1847E-09	13,290.34	26,580.68	0.00E+00	4.23E-05	8.47E-05
U-234	3.8769E-07	13,290.34	26,580.68	0.00E+00	5.15E-03	1.03E-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	1.3652E+00	13,290.34	26,580.68	0.00E+00	1.81E+04	3.63E+04
Other Radionuclides					2.19E+04	4.39E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.984E+15
0.0250	4.123E+14
0.0375	3.566E+14
0.0575	3.844E+14
0.0850	2.322E+14
0.1250	1.508E+14
0.2250	1.999E+14
0.3750	8.720E+13
0.5750	1.436E+15
0.8500	1.454E+13
1.2500	1.445E+14
1.7500	3.750E+11
2.2500	7.786E+08
2.7500	2.251E+07
3.5000	2.279E+03
5.0000	9.503E+02
7.0000	1.063E+02
11.0000	1.203E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.32E+02	4.64E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	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: 2010
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: 25 years

Estimated Canister usage: HIC 1.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.1940E-09	24.54	49.08	0.00E+00	7.84E-08	1.57E-07	Avg. MeV	
Am-241	2.0920E-02	24.54	49.08	0.00E+00	5.13E-01	1.03E+00	0.0150	4.362E+12
Am-242m	3.7060E-06	24.54	49.08	0.00E+00	9.09E-05	1.82E-04	0.0250	9.060E+11
Am-243	2.0600E-06	24.54	49.08	0.00E+00	5.06E-05	1.01E-04	0.0375	7.966E+11
C-14	1.1278E-03	24.54	49.08	0.00E+00	2.77E-02	5.54E-02	0.0575	8.552E+11
Cl-36	8.3760E-11	24.54	49.08	0.00E+00	2.06E-09	4.11E-09	0.0850	5.077E+11
Cm-243	6.4200E-07	24.54	49.08	0.00E+00	1.58E-05	3.15E-05	0.1250	3.395E+11
Cm-244	1.5322E-05	24.54	49.08	0.00E+00	3.76E-04	7.52E-04	0.2250	4.370E+11
Co-60	2.4000E-01	24.54	49.08	0.00E+00	5.89E+00	1.18E+01	0.3750	1.910E+11
Cs-134	2.2840E-04	24.54	49.08	0.00E+00	5.60E-03	1.12E-02	0.5750	3.296E+12
Cs-135	7.9140E-06	24.54	49.08	0.00E+00	1.94E-04	3.88E-04	0.8500	4.429E+10
Cs-137	1.8038E+00	24.54	49.08	0.00E+00	4.43E+01	8.85E+01	1.2500	8.963E+11
Eu-154	1.5200E-02	24.54	49.08	0.00E+00	3.73E-01	7.46E-01	1.7500	1.226E+09
Eu-155	2.5420E-03	24.54	49.08	0.00E+00	6.24E-02	1.25E-01	2.2500	4.708E+06
Fe-55	8.2660E-04	24.54	49.08	0.00E+00	2.03E-02	4.06E-02	2.7500	1.023E+05
H-3	4.1740E-02	24.54	49.08	0.00E+00	1.02E+00	2.05E+00	3.5000	2.724E+02
I-129	7.5020E-07	24.54	49.08	0.00E+00	1.84E-05	3.68E-05	5.0000	1.077E+02
Kr-85	7.2960E-02	24.54	49.08	0.00E+00	1.79E+00	3.58E+00	7.0000	1.212E+01
Np-237	5.4700E-06	24.54	49.08	0.00E+00	1.34E-04	2.68E-04	11.0000	1.376E+00
Pa-231	6.2740E-09	24.54	49.08	0.00E+00	1.54E-07	3.08E-07		
Pb-210	1.7004E-09	24.54	49.08	0.00E+00	4.17E-08	8.35E-08		
Pm-147	1.3972E-02	24.54	49.08	0.00E+00	3.43E-01	6.86E-01		
Pu-238	6.9520E-03	24.54	49.08	0.00E+00	1.71E-01	3.41E-01		
Pu-239	1.8748E-02	24.54	49.08	0.00E+00	4.60E-01	9.20E-01		
Pu-240	8.3640E-03	24.54	49.08	0.00E+00	2.05E-01	4.10E-01		
Pu-241	2.3640E-01	24.54	49.08	0.00E+00	5.80E+00	1.16E+01		
Pu-242	2.0400E-06	24.54	49.08	0.00E+00	5.01E-05	1.00E-04		
Ra-226	5.8960E-09	24.54	49.08	0.00E+00	1.45E-07	2.89E-07		
Ra-228	1.1638E-09	24.54	49.08	0.00E+00	2.86E-08	5.71E-08		
Ru-106	3.1580E-07	24.54	49.08	0.00E+00	7.75E-06	1.55E-05		
Se-79	1.2524E-05	24.54	49.08	0.00E+00	3.07E-04	6.15E-04		
Sn-126	1.2054E-05	24.54	49.08	0.00E+00	2.96E-04	5.92E-04		
Sr-90	1.6036E+00	24.54	49.08	0.00E+00	3.94E+01	7.87E+01		
Tc-99	4.4140E-04	24.54	49.08	0.00E+00	1.08E-02	2.17E-02		
Th-229	3.0560E-09	24.54	49.08	0.00E+00	7.50E-08	1.50E-07		
Th-230	7.5960E-07	24.54	49.08	0.00E+00	1.86E-05	3.73E-05		
Th-232	1.1926E-09	24.54	49.08	0.00E+00	2.93E-08	5.85E-08		
Tl-208	5.0820E-08	24.54	49.08	0.00E+00	1.25E-06	2.49E-06		
U-232	1.3656E-07	24.54	49.08	0.00E+00	3.35E-06	6.70E-06	Thermal Power	
U-233	9.1580E-07	24.54	49.08	0.00E+00	2.25E-05	4.49E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	2.3440E-03	24.54	49.08	0.00E+00	5.75E-02	1.15E-01	6.20E-01	1.24E+00
U-235	-2.3316E-06	24.54	0.00	2.47E-03	2.42E-03	2.47E-03	Total	Total
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	1.6040E+00	24.54	49.08	0.00E+00	3.94E+01	7.87E+01		
Other Radionuclides					4.22E+01	8.44E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		24.54
Bounding:		49.08

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1979
Estimates as of: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 25 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	1.9648E-06	29,508.45	29,508.45	0.00E+00	5.80E-02	5.80E-02
Am-241	7.8064E+00	29,508.45	29,508.45	0.00E+00	2.30E+05	2.30E+05
Am-242m	1.7632E-02	29,508.45	29,508.45	0.00E+00	5.20E+02	5.20E+02
Am-243	1.6336E-02	29,508.45	29,508.45	0.00E+00	4.82E+02	4.82E+02
C-14	1.2101E-01	29,508.45	29,508.45	0.00E+00	3.57E+03	3.57E+03
Cl-36	2.2849E-03	29,508.45	29,508.45	0.00E+00	6.74E+01	6.74E+01
Cm-243	1.1046E-03	29,508.45	29,508.45	0.00E+00	3.26E+01	3.26E+01
Cm-244	2.4704E-01	29,508.45	29,508.45	0.00E+00	7.29E+03	7.29E+03
Co-60	1.0466E+02	29,508.45	29,508.45	0.00E+00	3.09E+06	3.09E+06
Cs-134	9.8289E-03	29,508.45	29,508.45	0.00E+00	2.90E+02	2.90E+02
Cs-135	4.3976E-04	29,508.45	29,508.45	0.00E+00	1.30E+01	1.30E+01
Cs-137	2.6526E+01	29,508.45	29,508.45	0.00E+00	7.83E+05	7.83E+05
Eu-154	2.7975E+00	29,508.45	29,508.45	0.00E+00	8.26E+04	8.26E+04
Eu-155	2.7881E-01	29,508.45	29,508.45	0.00E+00	8.23E+03	8.23E+03
Fe-55	4.2151E+00	29,508.45	29,508.45	0.00E+00	1.24E+05	1.24E+05
H-3	4.2599E-01	29,508.45	29,508.45	0.00E+00	1.26E+04	1.26E+04
I-129	1.0618E-05	29,508.45	29,508.45	0.00E+00	3.13E-01	3.13E-01
Kr-85	1.1426E+00	29,508.45	29,508.45	0.00E+00	3.37E+04	3.37E+04
Np-237	1.5647E-04	29,508.45	29,508.45	0.00E+00	4.62E+00	4.62E+00
Pa-231	2.8624E-06	29,508.45	29,508.45	0.00E+00	8.45E-02	8.45E-02
Pb-210	9.2770E-09	29,508.45	29,508.45	0.00E+00	2.74E-04	2.74E-04
Pm-147	2.3690E-01	29,508.45	29,508.45	0.00E+00	6.99E+03	6.99E+03
Pu-238	-6.1800E-01	29,508.45	0.00	7.98E+03	0.00E+00	7.98E+03
Pu-239	-4.8280E-02	29,508.45	0.00	9.66E+02	0.00E+00	9.66E+02
Pu-240	-3.0095E-01	29,508.45	0.00	1.23E+03	0.00E+00	1.23E+03
Pu-241	-7.4000E+01	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	3.2167E-08	29,508.45	29,508.45	0.00E+00	9.49E-04	9.49E-04
Ra-228	5.9024E-07	29,508.45	29,508.45	0.00E+00	1.74E-02	1.74E-02
Ru-106	3.9140E-06	29,508.45	29,508.45	0.00E+00	1.15E-01	1.15E-01
Se-79	1.9184E-04	29,508.45	29,508.45	0.00E+00	5.66E+00	5.66E+00
Sn-126	1.6671E-04	29,508.45	29,508.45	0.00E+00	4.92E+00	4.92E+00
Sr-90	2.5126E+01	29,508.45	29,508.45	0.00E+00	7.41E+05	7.41E+05
Tc-99	6.7678E-03	29,508.45	29,508.45	0.00E+00	2.00E+02	2.00E+02
Th-229	1.2398E-06	29,508.45	29,508.45	0.00E+00	3.66E-02	3.66E-02
Th-230	4.1442E-06	29,508.45	29,508.45	0.00E+00	1.22E-01	1.22E-01
Th-232	-4.2431E-09	29,508.45	0.00	1.26E-03	1.13E-03	1.26E-03
Tl-208	9.6478E-05	29,508.45	29,508.45	0.00E+00	2.85E+00	2.85E+00
U-232	2.6103E-04	29,508.45	29,508.45	0.00E+00	7.70E+00	7.70E+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	2.5126E+01	29,508.45	29,508.45	0.00E+00	7.41E+05	7.41E+05
Other Radionuclides					2.07E+06	2.07E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.941E+16
0.0250	9.792E+15
0.0375	8.736E+15
0.0575	1.192E+16
0.0850	5.156E+15
0.1250	4.484E+15
0.2250	4.380E+15
0.3750	1.846E+15
0.5750	2.945E+16
0.8500	1.774E+15
1.2500	2.303E+17
1.7500	5.579E+13
2.2500	1.212E+12
2.7500	1.038E+11
3.5000	1.061E+08
5.0000	4.516E+07
7.0000	5.185E+06
11.0000	5.941E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.89E+04	6.82E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	FAST	(Worst Case)
Fuel Cladding:	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: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 25 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	1.9648E-06	29,508.45	29,508.45	0.00E+00	5.80E-02	5.80E-02
Am-241	7.8064E+00	29,508.45	29,508.45	0.00E+00	2.30E+05	2.30E+05
Am-242m	1.7632E-02	29,508.45	29,508.45	0.00E+00	5.20E+02	5.20E+02
Am-243	1.6336E-02	29,508.45	29,508.45	0.00E+00	4.82E+02	4.82E+02
C-14	1.2101E-01	29,508.45	29,508.45	0.00E+00	3.57E+03	3.57E+03
Cl-36	2.2849E-03	29,508.45	29,508.45	0.00E+00	6.74E+01	6.74E+01
Cm-243	1.1046E-03	29,508.45	29,508.45	0.00E+00	3.26E+01	3.26E+01
Cm-244	2.4704E-01	29,508.45	29,508.45	0.00E+00	7.29E+03	7.29E+03
Co-60	1.0466E+02	29,508.45	29,508.45	0.00E+00	3.09E+06	3.09E+06
Cs-134	9.8289E-03	29,508.45	29,508.45	0.00E+00	2.90E+02	2.90E+02
Cs-135	4.3976E-04	29,508.45	29,508.45	0.00E+00	1.30E+01	1.30E+01
Cs-137	2.6526E+01	29,508.45	29,508.45	0.00E+00	7.83E+05	7.83E+05
Eu-154	2.7975E+00	29,508.45	29,508.45	0.00E+00	8.26E+04	8.26E+04
Eu-155	2.7881E-01	29,508.45	29,508.45	0.00E+00	8.23E+03	8.23E+03
Fe-55	4.2151E+00	29,508.45	29,508.45	0.00E+00	1.24E+05	1.24E+05
H-3	4.2599E-01	29,508.45	29,508.45	0.00E+00	1.26E+04	1.26E+04
I-129	1.0618E-05	29,508.45	29,508.45	0.00E+00	3.13E-01	3.13E-01
Kr-85	1.1426E+00	29,508.45	29,508.45	0.00E+00	3.37E+04	3.37E+04
Np-237	1.5647E-04	29,508.45	29,508.45	0.00E+00	4.62E+00	4.62E+00
Pa-231	2.8624E-06	29,508.45	29,508.45	0.00E+00	8.45E-02	8.45E-02
Pb-210	9.2770E-09	29,508.45	29,508.45	0.00E+00	2.74E-04	2.74E-04
Pm-147	2.3690E-01	29,508.45	29,508.45	0.00E+00	6.99E+03	6.99E+03
Pu-238	-6.1800E-01	29,508.45	0.00	7.98E+03	0.00E+00	7.98E+03
Pu-239	-4.8280E-02	29,508.45	0.00	9.66E+02	0.00E+00	9.66E+02
Pu-240	-3.0095E-01	29,508.45	0.00	1.23E+03	0.00E+00	1.23E+03
Pu-241	-7.4000E+01	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	3.2167E-06	29,508.45	29,508.45	0.00E+00	9.49E-04	9.49E-04
Ra-228	5.9024E-07	29,508.45	29,508.45	0.00E+00	1.74E-02	1.74E-02
Ru-106	3.9140E-06	29,508.45	29,508.45	0.00E+00	1.15E-01	1.15E-01
Se-79	1.9184E-04	29,508.45	29,508.45	0.00E+00	5.66E+00	5.66E+00
Sn-126	1.6671E-04	29,508.45	29,508.45	0.00E+00	4.92E+00	4.92E+00
Sr-90	2.5126E+01	29,508.45	29,508.45	0.00E+00	7.41E+05	7.41E+05
Tc-99	6.7678E-03	29,508.45	29,508.45	0.00E+00	2.00E+02	2.00E+02
Th-229	1.2398E-06	29,508.45	29,508.45	0.00E+00	3.66E-02	3.66E-02
Th-230	4.1442E-06	29,508.45	29,508.45	0.00E+00	1.22E-01	1.22E-01
Th-232	-4.2431E-09	29,508.45	0.00	1.26E-03	1.13E-03	1.26E-03
Tl-208	9.6478E-05	29,508.45	29,508.45	0.00E+00	2.85E+00	2.85E+00
U-232	2.6103E-04	29,508.45	29,508.45	0.00E+00	7.70E+00	7.70E+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	2.5126E+01	29,508.45	29,508.45	0.00E+00	7.41E+05	7.41E+05
Other Radionuclides					2.07E+06	2.07E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.941E+16
0.0250	9.792E+15
0.0375	8.736E+15
0.0575	1.192E+16
0.0850	5.156E+15
0.1250	4.484E+15
0.2250	4.380E+15
0.3750	1.846E+15
0.5750	2.945E+16
0.8500	1.774E+15
1.2500	2.303E+17
1.7500	5.579E+13
2.2500	1.212E+12
2.7500	1.038E+11
3.5000	1.081E+08
5.0000	4.516E+07
7.0000	5.185E+06
11.0000	5.941E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.59E+04	6.82E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	FAST	(Worst Case)
Fuel Cladding:	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)
SNF ID #: 858
Fuel Units & Descr: 10 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=31.05kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1979
Estimates as of: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 25 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	1.9648E-06	29,508.45	29,508.45	0.00E+00	5.80E-02	5.80E-02
Am-241	7.8064E+00	29,508.45	29,508.45	0.00E+00	2.30E+05	2.30E+05
Am-242m	1.7632E-02	29,508.45	29,508.45	0.00E+00	5.20E+02	5.20E+02
Am-243	1.6336E-02	29,508.45	29,508.45	0.00E+00	4.82E+02	4.82E+02
C-14	1.2101E-01	29,508.45	29,508.45	0.00E+00	3.57E+03	3.57E+03
Cl-36	2.2849E-03	29,508.45	29,508.45	0.00E+00	6.74E+01	6.74E+01
Cm-243	1.1046E-03	29,508.45	29,508.45	0.00E+00	3.26E+01	3.26E+01
Cm-244	2.4704E-01	29,508.45	29,508.45	0.00E+00	7.29E+03	7.29E+03
Co-60	1.0466E+02	29,508.45	29,508.45	0.00E+00	3.09E+06	3.09E+06
Cs-134	9.8289E-03	29,508.45	29,508.45	0.00E+00	2.90E+02	2.90E+02
Cs-135	4.3976E-04	29,508.45	29,508.45	0.00E+00	1.30E+01	1.30E+01
Cs-137	2.6526E+01	29,508.45	29,508.45	0.00E+00	7.83E+05	7.83E+05
Eu-154	2.7975E+00	29,508.45	29,508.45	0.00E+00	8.26E+04	8.26E+04
Eu-155	2.7881E-01	29,508.45	29,508.45	0.00E+00	8.23E+03	8.23E+03
Fe-55	4.2151E+00	29,508.45	29,508.45	0.00E+00	1.24E+05	1.24E+05
H-3	4.2599E-01	29,508.45	29,508.45	0.00E+00	1.26E+04	1.26E+04
I-129	1.0618E-05	29,508.45	29,508.45	0.00E+00	3.13E-01	3.13E-01
Kr-85	1.1426E+00	29,508.45	29,508.45	0.00E+00	3.37E+04	3.37E+04
Np-237	1.5647E-04	29,508.45	29,508.45	0.00E+00	4.62E+00	4.62E+00
Pa-231	2.8624E-06	29,508.45	29,508.45	0.00E+00	8.45E-02	8.45E-02
Pb-210	9.2770E-09	29,508.45	29,508.45	0.00E+00	2.74E-04	2.74E-04
Pm-147	2.3690E-01	29,508.45	29,508.45	0.00E+00	6.99E+03	6.99E+03
Pu-238	-6.1800E-01	29,508.45	0.00	7.98E+03	0.00E+00	7.98E+03
Pu-239	-4.8280E-02	29,508.45	0.00	9.66E+02	0.00E+00	9.66E+02
Pu-240	-3.0095E-01	29,508.45	0.00	1.23E+03	0.00E+00	1.23E+03
Pu-241	-7.4000E+01	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	3.2167E-08	29,508.45	29,508.45	0.00E+00	9.49E-04	9.49E-04
Ra-228	5.9024E-07	29,508.45	29,508.45	0.00E+00	1.74E-02	1.74E-02
Ru-106	3.9140E-06	29,508.45	29,508.45	0.00E+00	1.15E-01	1.15E-01
Se-79	1.9184E-04	29,508.45	29,508.45	0.00E+00	5.66E+00	5.66E+00
Sn-126	1.6671E-04	29,508.45	29,508.45	0.00E+00	4.92E+00	4.92E+00
Sr-90	2.5126E+01	29,508.45	29,508.45	0.00E+00	7.41E+05	7.41E+05
Tc-99	6.7678E-03	29,508.45	29,508.45	0.00E+00	2.00E+02	2.00E+02
Th-229	1.2398E-06	29,508.45	29,508.45	0.00E+00	3.66E-02	3.66E-02
Th-230	4.1442E-06	29,508.45	29,508.45	0.00E+00	1.22E-01	1.22E-01
Th-232	-4.2431E-09	29,508.45	0.00	1.26E-03	1.13E-03	1.26E-03
Tl-208	9.6478E-05	29,508.45	29,508.45	0.00E+00	2.85E+00	2.85E+00
U-232	2.6103E-04	29,508.45	29,508.45	0.00E+00	7.70E+00	7.70E+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	2.5126E+01	29,508.45	29,508.45	0.00E+00	7.41E+05	7.41E+05
Other Radionuclides					2.07E+06	2.07E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.941E+16
0.0250	9.792E+15
0.0375	8.736E+15
0.0575	1.192E+16
0.0850	5.156E+15
0.1250	4.484E+15
0.2250	4.380E+15
0.3750	1.846E+15
0.5750	2.945E+16
0.8500	1.774E+15
1.2500	2.303E+17
1.7500	5.579E+13
2.2500	1.212E+12
2.7500	1.038E+11
3.5000	1.061E+08
5.0000	4.516E+07
7.0000	5.185E+06
11.0000	5.941E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.59E+04	6.62E+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
SNF ID #: 701
Fuel Units & Descr: 2856 - ROD
Heavy Metal Mass: BOL=6338.892kg; EOL=6144.97kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1981
Estimates as of: 2010
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: 25 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	6.6376E-10	185,919.70	224,650.33	0.00E+00	1.23E-04	1.49E-04
Am-241	1.3144E-01	185,919.70	224,650.33	0.00E+00	2.44E+04	2.95E+04
Am-242m	3.0039E-04	185,919.70	224,650.33	0.00E+00	5.58E+01	6.75E+01
Am-243	6.2629E-04	185,919.70	224,650.33	0.00E+00	1.16E+02	1.41E+02
C-14	4.7965E-06	185,919.70	224,650.33	0.00E+00	8.92E+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	3.1993E-04	185,919.70	224,650.33	0.00E+00	5.95E+01	7.19E+01
Cm-244	7.1851E-02	185,919.70	224,650.33	0.00E+00	1.34E+04	1.61E+04
Co-60	9.5220E-03	185,919.70	224,650.33	0.00E+00	1.77E+03	2.14E+03
Cs-134	1.1662E-03	185,919.70	224,650.33	0.00E+00	2.17E+02	2.62E+02
Cs-135	1.4433E-06	185,919.70	224,650.33	0.00E+00	2.68E+00	3.24E+00
Cs-137	1.7603E+00	185,919.70	224,650.33	0.00E+00	3.27E+05	3.95E+05
Eu-154	4.5203E-02	185,919.70	224,650.33	0.00E+00	8.40E+03	1.02E+04
Eu-155	7.1479E-03	185,919.70	224,650.33	0.00E+00	1.33E+03	1.61E+03
Fe-55	6.1919E-04	185,919.70	224,650.33	0.00E+00	1.15E+02	1.39E+02
H-3	3.6386E-02	185,919.70	224,650.33	0.00E+00	6.76E+03	8.17E+03
I-129	9.8288E-07	185,919.70	224,650.33	0.00E+00	1.83E-01	2.21E-01
Kr-85	5.3844E-02	185,919.70	224,650.33	0.00E+00	1.00E+04	1.21E+04
Np-237	1.0546E-05	185,919.70	224,650.33	0.00E+00	1.96E+00	2.37E+00
Pa-231	1.1370E-09	185,919.70	224,650.33	0.00E+00	2.11E-04	2.55E-04
Pb-210	3.3624E-11	185,919.70	224,650.33	0.00E+00	6.25E-06	7.55E-06
Pm-147	5.1211E-03	185,919.70	224,650.33	0.00E+00	9.52E+02	1.15E+03
Pu-238	8.0669E-02	185,919.70	224,650.33	0.00E+00	1.50E+04	1.81E+04
Pu-239	1.1626E-02	185,919.70	224,650.33	0.00E+00	2.16E+03	2.61E+03
Pu-240	1.5097E-02	185,919.70	224,650.33	0.00E+00	2.81E+03	3.39E+03
Pu-241	1.4567E+00	185,919.70	224,650.33	0.00E+00	2.71E+05	3.27E+05
Pu-242	6.4260E-05	185,919.70	224,650.33	0.00E+00	1.19E+01	1.44E+01
Ra-226	1.1392E-10	185,919.70	224,650.33	0.00E+00	2.12E-05	2.56E-05
Ra-228	5.1841E-12	185,919.70	224,650.33	0.00E+00	9.64E-07	1.16E-06
Ru-106	5.9012E-07	185,919.70	224,650.33	0.00E+00	1.10E-01	1.33E-01
Se-79	1.2379E-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	1.1630E+00	185,919.70	224,650.33	0.00E+00	2.16E+05	2.61E+05
Tc-99	3.9357E-04	185,919.70	224,650.33	0.00E+00	7.32E+01	8.84E+01
Th-229	8.5691E-11	185,919.70	224,650.33	0.00E+00	1.59E-05	1.93E-05
Th-230	1.4493E-08	185,919.70	224,650.33	0.00E+00	2.69E-03	3.26E-03
Th-232	5.2923E-12	185,919.70	224,650.33	0.00E+00	9.84E-07	1.19E-06
Tl-208	1.9202E-07	185,919.70	224,650.33	0.00E+00	3.57E-02	4.31E-02
U-232	5.2083E-07	185,919.70	224,650.33	0.00E+00	9.68E-02	1.17E-01
U-233	2.4386E-08	185,919.70	224,650.33	0.00E+00	4.53E-03	5.48E-03
U-234	4.7012E-05	185,919.70	224,650.33	0.00E+00	8.74E+00	1.06E+01
U-235	-1.4492E-08	185,919.70	0.00	3.60E-01	9.10E-02	3.60E-01
U-236	7.5759E-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	1.1631E+00	185,919.70	224,650.33	0.00E+00	2.16E+05	2.61E+05
Other Radionuclides					3.14E+05	3.80E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.528E+16
0.0250	3.094E+15
0.0375	2.994E+15
0.0575	3.267E+15
0.0850	1.731E+15
0.1250	1.264E+15
0.2250	1.486E+15
0.3750	6.376E+14
0.5750	1.465E+16
0.8500	2.892E+14
1.2500	3.906E+14
1.7500	8.559E+12
2.2500	1.581E+09
2.7500	1.777E+09
3.5000	2.328E+08
5.0000	9.951E+07
7.0000	1.147E+07
11.0000	1.318E+06

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.10E+03	6.15E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.631414612	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1981
Estimates as of: 2010
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: 25 years

Estimated Canister usage: 18"x15' 8.50

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6376E-10	481,493.98	962,987.96	0.00E+00	3.20E-04	6.39E-04	Avg. MeV	
Am-241	1.3144E-01	481,493.98	962,987.96	0.00E+00	6.33E+04	1.27E+05	0.0150	6.549E+16
Am-242m	3.0039E-04	481,493.98	962,987.96	0.00E+00	1.45E+02	2.89E+02	0.0250	1.326E+16
Am-243	6.2629E-04	481,493.98	962,987.96	0.00E+00	3.02E+02	6.03E+02	0.0375	1.284E+16
C-14	4.7965E-05	481,493.98	962,987.96	0.00E+00	2.31E+01	4.62E+01	0.0575	1.400E+16
Cl-36	8.0297E-07	481,493.98	962,987.96	0.00E+00	3.87E-01	7.73E-01	0.0850	7.420E+15
Cm-243	3.1993E-04	481,493.98	962,987.96	0.00E+00	1.54E+02	3.08E+02	0.1250	5.420E+15
Cm-244	7.1851E-02	481,493.98	962,987.96	0.00E+00	3.46E+04	6.92E+04	0.2250	6.370E+15
Co-60	9.5220E-03	481,493.98	962,987.96	0.00E+00	4.58E+03	9.17E+03	0.3750	2.733E+15
Cs-134	1.1662E-03	481,493.98	962,987.96	0.00E+00	5.62E+02	1.12E+03	0.5750	6.280E+16
Cs-135	1.4433E-05	481,493.98	962,987.96	0.00E+00	6.95E+00	1.39E+01	0.8500	1.240E+15
Cs-137	1.7603E+00	481,493.98	962,987.96	0.00E+00	8.48E+05	1.70E+06	1.2500	1.674E+15
Eu-154	4.5203E-02	481,493.98	962,987.96	0.00E+00	2.18E+04	4.35E+04	1.7500	3.669E+13
Eu-155	7.1479E-03	481,493.98	962,987.96	0.00E+00	3.44E+03	6.88E+03	2.2500	6.776E+09
Fe-55	6.1919E-04	481,493.98	962,987.96	0.00E+00	2.98E+02	5.96E+02	2.7500	7.616E+09
H-3	3.6386E-02	481,493.98	962,987.96	0.00E+00	1.75E+04	3.50E+04	3.5000	9.980E+08
I-129	9.8288E-07	481,493.98	962,987.96	0.00E+00	4.73E-01	9.47E-01	5.0000	4.265E+08
Kr-85	5.3844E-02	481,493.98	962,987.96	0.00E+00	2.59E+04	5.19E+04	7.0000	4.917E+07
Np-237	1.0546E-05	481,493.98	962,987.96	0.00E+00	5.08E+00	1.02E+01	11.0000	5.648E+06
Pa-231	1.1370E-09	481,493.98	962,987.96	0.00E+00	5.47E-04	1.09E-03		
Pb-210	3.3624E-11	481,493.98	962,987.96	0.00E+00	1.62E-05	3.24E-05		
Pm-147	5.1211E-03	481,493.98	962,987.96	0.00E+00	2.47E+03	4.93E+03		
Pu-238	8.0669E-02	481,493.98	962,987.96	0.00E+00	3.88E+04	7.77E+04		
Pu-239	1.1626E-02	481,493.98	962,987.96	0.00E+00	5.60E+03	1.12E+04		
Pu-240	1.5097E-02	481,493.98	962,987.96	0.00E+00	7.27E+03	1.45E+04		
Pu-241	1.4567E+00	481,493.98	962,987.96	0.00E+00	7.01E+05	1.40E+06		
Pu-242	6.4260E-05	481,493.98	962,987.96	0.00E+00	3.09E+01	6.19E+01		
Ra-226	1.1392E-10	481,493.98	962,987.96	0.00E+00	5.49E-05	1.10E-04		
Ra-228	5.1841E-12	481,493.98	962,987.96	0.00E+00	2.50E-06	4.99E-06		
Ru-106	5.9012E-07	481,493.98	962,987.96	0.00E+00	2.84E-01	5.68E-01		
Se-79	1.2379E-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	1.1630E+00	481,493.98	962,987.96	0.00E+00	5.60E+05	1.12E+06		
Tc-99	3.9357E-04	481,493.98	962,987.96	0.00E+00	1.90E+02	3.79E+02		
Th-229	8.5691E-11	481,493.98	962,987.96	0.00E+00	4.13E-05	8.25E-05		
Th-230	1.4493E-08	481,493.98	962,987.96	0.00E+00	6.98E-03	1.40E-02		
Th-232	5.2923E-12	481,493.98	962,987.96	0.00E+00	2.55E-06	5.10E-06		
Tl-208	1.9202E-07	481,493.98	962,987.96	0.00E+00	9.25E-02	1.85E-01		
U-232	5.2083E-07	481,493.98	962,987.96	0.00E+00	2.51E-01	5.02E-01	Thermal Power	
U-233	2.4386E-08	481,493.98	962,987.96	0.00E+00	1.17E-02	2.35E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	4.7012E-05	481,493.98	962,987.96	0.00E+00	2.26E+01	4.53E+01		
U-235	-1.4492E-06	481,493.98	0.00	9.81E-01	2.83E-01	9.81E-01		
U-236	7.5759E-06	481,493.98	962,987.96	0.00E+00	3.65E+00	7.30E+00	1.32E+04	2.64E+04
U-238	-2.6129E-07	481,493.98	0.00	5.06E+00	4.94E+00	5.06E+00	Total	Total
Y-90	1.1631E+00	481,493.98	962,987.96	0.00E+00	5.60E+05	1.12E+06		
Other Radionuclides					8.13E+05	1.63E+06		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.89	1.06	1.00
Bounding:	1.77	1.75	

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

[2]Total burnup for all fuel associated with this worksheet must be 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: 2010
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated Canister usage: Bare Fuel Transfer

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	1,566.22	3,132.44	0.00E+00	1.37E-06	2.75E-06
Am-241	1.4352E-01	1,566.22	3,132.44	0.00E+00	2.25E+02	4.50E+02
Am-242m	2.8698E-04	1,566.22	3,132.44	0.00E+00	4.49E-01	8.99E-01
Am-243	6.2565E-04	1,566.22	3,132.44	0.00E+00	9.80E-01	1.96E+00
C-14	4.7901E-05	1,566.22	3,132.44	0.00E+00	7.50E-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	2.5081E-04	1,566.22	3,132.44	0.00E+00	3.93E-01	7.86E-01
Cm-244	4.9015E-02	1,566.22	3,132.44	0.00E+00	7.68E+01	1.54E+02
Co-60	2.5581E-03	1,566.22	3,132.44	0.00E+00	4.01E+00	8.01E+00
Cs-134	4.0536E-05	1,566.22	3,132.44	0.00E+00	6.35E-02	1.27E-01
Cs-135	1.4433E-05	1,566.22	3,132.44	0.00E+00	2.26E-02	4.52E-02
Cs-137	1.3979E+00	1,566.22	3,132.44	0.00E+00	2.19E+03	4.38E+03
Eu-154	2.0203E-02	1,566.22	3,132.44	0.00E+00	3.16E+01	6.33E+01
Eu-155	1.7684E-03	1,566.22	3,132.44	0.00E+00	2.77E+00	5.54E+00
Fe-55	4.3136E-05	1,566.22	3,132.44	0.00E+00	6.76E-02	1.35E-01
H-3	2.0769E-02	1,566.22	3,132.44	0.00E+00	3.25E+01	6.51E+01
I-129	9.8288E-07	1,566.22	3,132.44	0.00E+00	1.54E-03	3.08E-03
Kr-85	2.8214E-02	1,566.22	3,132.44	0.00E+00	4.42E+01	8.84E+01
Np-237	1.1218E-05	1,566.22	3,132.44	0.00E+00	1.76E-02	3.51E-02
Pa-231	1.3036E-09	1,566.22	3,132.44	0.00E+00	2.04E-06	4.08E-06
Pb-210	8.5078E-11	1,566.22	3,132.44	0.00E+00	1.33E-07	2.67E-07
Pm-147	3.6531E-04	1,566.22	3,132.44	0.00E+00	5.72E-01	1.14E+00
Pu-238	7.4564E-02	1,566.22	3,132.44	0.00E+00	1.17E+02	2.34E+02
Pu-239	1.1623E-02	1,566.22	3,132.44	0.00E+00	1.82E+01	3.64E+01
Pu-240	1.5132E-02	1,566.22	3,132.44	0.00E+00	2.37E+01	4.74E+01
Pu-241	9.0036E-01	1,566.22	3,132.44	0.00E+00	1.41E+03	2.82E+03
Pu-242	6.4260E-05	1,566.22	3,132.44	0.00E+00	1.01E-01	2.01E-01
Ra-226	2.2804E-10	1,566.22	3,132.44	0.00E+00	3.57E-07	7.14E-07
Ra-228	5.2713E-12	1,566.22	3,132.44	0.00E+00	8.26E-09	1.65E-08
Ru-106	6.1160E-10	1,566.22	3,132.44	0.00E+00	9.58E-07	1.92E-06
Se-79	1.2377E-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	9.1667E-01	1,566.22	3,132.44	0.00E+00	1.44E+03	2.87E+03
Tc-99	3.9357E-04	1,566.22	3,132.44	0.00E+00	6.16E-01	1.23E+00
Th-229	1.2057E-10	1,566.22	3,132.44	0.00E+00	1.89E-07	3.78E-07
Th-230	2.1043E-08	1,566.22	3,132.44	0.00E+00	3.30E-05	6.59E-05
Th-232	5.2972E-12	1,566.22	3,132.44	0.00E+00	8.30E-09	1.66E-08
Tl-208	1.7474E-07	1,566.22	3,132.44	0.00E+00	2.74E-04	5.47E-04
U-232	4.7368E-07	1,566.22	3,132.44	0.00E+00	7.42E-04	1.48E-03
U-233	2.5097E-08	1,566.22	3,132.44	0.00E+00	3.93E-05	7.86E-05
U-234	5.0000E-05	1,566.22	3,132.44	0.00E+00	7.83E-02	1.57E-01
U-235	-1.4489E-06	1,566.22	0.00	3.62E-03	1.35E-03	3.62E-03
U-236	7.5824E-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	9.1699E-01	1,566.22	3,132.44	0.00E+00	1.44E+03	2.87E+03
Other Radionuclides					2.10E+03	4.20E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.685E+14
0.0250	3.399E+13
0.0375	3.242E+13
0.0575	3.745E+13
0.0850	1.886E+13
0.1250	1.309E+13
0.2250	1.617E+13
0.3750	6.954E+12
0.5750	1.617E+14
0.8500	2.238E+12
1.2500	2.198E+12
1.7500	6.582E+10
2.2500	1.060E+07
2.7500	2.171E+07
3.5000	2.236E+06
5.0000	9.580E+05
7.0000	1.102E+05
11.0000	1.265E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.60E+01	7.21E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	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
Nominal:	1,533.13	1,566.22
Bounding:		3,132.44

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: DRESDEN I (UN0064)
SNF ID #: 47
Fuel Units & Descr: 1 - 6 X 6 ROD ARRAY
Heavy Metal Mass: BOL=58.847kg; EOL=57.281kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1973
Estimates as of: 2010
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated Canister usage: Bare Fuel Transfer

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	1,489.19	2,978.38	0.00E+00	1.31E-06	2.61E-06
Am-241	1.4352E-01	1,489.19	2,978.38	0.00E+00	2.14E+02	4.27E+02
Am-242m	2.8698E-04	1,489.19	2,978.38	0.00E+00	4.27E-01	8.55E-01
Am-243	6.2565E-04	1,489.19	2,978.38	0.00E+00	9.32E-01	1.86E+00
C-14	4.7901E-05	1,489.19	2,978.38	0.00E+00	7.13E-02	1.43E-01
Cl-36	8.0297E-07	1,489.19	2,978.38	0.00E+00	1.20E-03	2.39E-03
Cm-243	2.5081E-04	1,489.19	2,978.38	0.00E+00	3.74E-01	7.47E-01
Cm-244	4.9015E-02	1,489.19	2,978.38	0.00E+00	7.30E+01	1.46E+02
Co-60	2.5581E-03	1,489.19	2,978.38	0.00E+00	3.81E+00	7.62E+00
Cs-134	4.0536E-05	1,489.19	2,978.38	0.00E+00	6.04E-02	1.21E-01
Cs-135	1.4433E-05	1,489.19	2,978.38	0.00E+00	2.15E-02	4.30E-02
Cs-137	1.3979E+00	1,489.19	2,978.38	0.00E+00	2.08E+03	4.16E+03
Eu-154	2.0203E-02	1,489.19	2,978.38	0.00E+00	3.01E+01	6.02E+01
Eu-155	1.7684E-03	1,489.19	2,978.38	0.00E+00	2.63E+00	5.27E+00
Fe-55	4.3136E-05	1,489.19	2,978.38	0.00E+00	6.42E-02	1.28E-01
H-3	2.0769E-02	1,489.19	2,978.38	0.00E+00	3.09E+01	6.19E+01
I-129	9.8288E-07	1,489.19	2,978.38	0.00E+00	1.46E-03	2.93E-03
Kr-85	2.8214E-02	1,489.19	2,978.38	0.00E+00	4.20E+01	8.40E+01
Np-237	1.1218E-05	1,489.19	2,978.38	0.00E+00	1.67E-02	3.34E-02
Pa-231	1.3036E-09	1,489.19	2,978.38	0.00E+00	1.94E-06	3.88E-06
Pb-210	8.5078E-11	1,489.19	2,978.38	0.00E+00	1.27E-07	2.53E-07
Pm-147	3.6531E-04	1,489.19	2,978.38	0.00E+00	5.44E-01	1.09E+00
Pu-238	7.4564E-02	1,489.19	2,978.38	0.00E+00	1.11E+02	2.22E+02
Pu-239	1.1623E-02	1,489.19	2,978.38	0.00E+00	1.73E+01	3.46E+01
Pu-240	1.5132E-02	1,489.19	2,978.38	0.00E+00	2.25E+01	4.51E+01
Pu-241	9.0036E-01	1,489.19	2,978.38	0.00E+00	1.34E+03	2.68E+03
Pu-242	6.4260E-05	1,489.19	2,978.38	0.00E+00	9.57E-02	1.91E-01
Ra-226	2.2804E-10	1,489.19	2,978.38	0.00E+00	3.40E-07	6.79E-07
Ra-228	5.2713E-12	1,489.19	2,978.38	0.00E+00	7.85E-09	1.57E-08
Ru-106	6.1160E-10	1,489.19	2,978.38	0.00E+00	9.11E-07	1.82E-06
Se-79	1.2377E-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	9.1667E-01	1,489.19	2,978.38	0.00E+00	1.37E+03	2.73E+03
Tc-99	3.9357E-04	1,489.19	2,978.38	0.00E+00	5.86E-01	1.17E+00
Th-229	1.2057E-10	1,489.19	2,978.38	0.00E+00	1.80E-07	3.59E-07
Th-230	2.1043E-08	1,489.19	2,978.38	0.00E+00	3.13E-05	6.27E-05
Th-232	5.2972E-12	1,489.19	2,978.38	0.00E+00	7.89E-09	1.58E-08
Tl-208	1.7474E-07	1,489.19	2,978.38	0.00E+00	2.60E-04	5.20E-04
U-232	4.7368E-07	1,489.19	2,978.38	0.00E+00	7.05E-04	1.41E-03
U-233	2.5097E-08	1,489.19	2,978.38	0.00E+00	3.74E-05	7.47E-05
U-234	5.0000E-05	1,489.19	2,978.38	0.00E+00	7.45E-02	1.49E-01
U-235	-1.4489E-06	1,489.19	0.00	1.91E-03	0.00E+00	1.91E-03
U-236	7.5824E-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	9.1699E-01	1,489.19	2,978.38	0.00E+00	1.37E+03	2.73E+03
Other Radionuclides					2.00E+03	4.00E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.603E+14
0.0250	3.232E+13
0.0375	3.082E+13
0.0575	3.561E+13
0.0850	1.793E+13
0.1250	1.244E+13
0.2250	1.538E+13
0.3750	6.612E+12
0.5750	1.538E+14
0.8500	2.127E+12
1.2500	2.090E+12
1.7500	6.258E+10
2.2500	1.008E+07
2.7500	2.065E+07
3.5000	2.126E+06
5.0000	9.069E+05
7.0000	1.048E+05
11.0000	1.203E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.43E+01	6.85E+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 %:	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: DRESR, 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: 2010
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: 25 years

Estimated Canister usage: 18"x10' = 0.01

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6376E-10	18,646.28	18,646.28	0.00E+00	1.24E-05	1.24E-05
Am-241	1.3144E-01	18,646.28	18,646.28	0.00E+00	2.45E+03	2.45E+03
Am-242m	3.0039E-04	18,646.28	18,646.28	0.00E+00	5.60E+00	5.60E+00
Am-243	6.2629E-04	18,646.28	18,646.28	0.00E+00	1.17E+01	1.17E+01
C-14	4.7965E-05	18,646.28	18,646.28	0.00E+00	8.94E-01	8.94E-01
Cl-36	8.0297E-07	18,646.28	18,646.28	0.00E+00	1.50E-02	1.50E-02
Cm-243	3.1993E-04	18,646.28	18,646.28	0.00E+00	5.97E+00	5.97E+00
Cm-244	7.1851E-02	18,646.28	18,646.28	0.00E+00	1.34E+03	1.34E+03
Co-60	9.5220E-03	18,646.28	18,646.28	0.00E+00	1.78E+02	1.78E+02
Cs-134	1.1662E-03	18,646.28	18,646.28	0.00E+00	2.17E+01	2.17E+01
Cs-135	1.4433E-05	18,646.28	18,646.28	0.00E+00	2.69E-01	2.69E-01
Cs-137	1.7603E+00	18,646.28	18,646.28	0.00E+00	3.28E+04	3.28E+04
Eu-154	4.5203E-02	18,646.28	18,646.28	0.00E+00	8.43E+02	8.43E+02
Eu-155	7.1479E-03	18,646.28	18,646.28	0.00E+00	1.33E+02	1.33E+02
Fe-55	6.1919E-04	18,646.28	18,646.28	0.00E+00	1.15E+01	1.15E+01
H-3	3.6386E-02	18,646.28	18,646.28	0.00E+00	6.78E+02	6.78E+02
I-129	9.8288E-07	18,646.28	18,646.28	0.00E+00	1.83E-02	1.83E-02
Kr-85	5.3844E-02	18,646.28	18,646.28	0.00E+00	1.00E+03	1.00E+03
Np-237	1.0546E-05	18,646.28	18,646.28	0.00E+00	1.97E-01	1.97E-01
Pa-231	1.1370E-09	18,646.28	18,646.28	0.00E+00	2.12E-05	2.12E-05
Pb-210	3.3624E-11	18,646.28	18,646.28	0.00E+00	6.27E-07	6.27E-07
Pm-147	5.1211E-03	18,646.28	18,646.28	0.00E+00	9.55E+01	9.55E+01
Pu-238	8.0669E-02	18,646.28	18,646.28	0.00E+00	1.50E+03	1.50E+03
Pu-239	1.1626E-02	18,646.28	18,646.28	0.00E+00	2.17E+02	2.17E+02
Pu-240	1.5097E-02	18,646.28	18,646.28	0.00E+00	2.82E+02	2.82E+02
Pu-241	1.4567E+00	18,646.28	18,646.28	0.00E+00	2.72E+04	2.72E+04
Pu-242	6.4260E-05	18,646.28	18,646.28	0.00E+00	1.20E+00	1.20E+00
Ra-226	1.1392E-10	18,646.28	18,646.28	0.00E+00	2.12E-06	2.12E-06
Ra-228	5.1841E-12	18,646.28	18,646.28	0.00E+00	9.67E-08	9.67E-08
Ru-106	5.9012E-07	18,646.28	18,646.28	0.00E+00	1.10E-02	1.10E-02
Se-79	1.2379E-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	1.1630E+00	18,646.28	18,646.28	0.00E+00	2.17E+04	2.17E+04
Tc-99	3.9357E-04	18,646.28	18,646.28	0.00E+00	7.34E+00	7.34E+00
Th-229	8.5691E-11	18,646.28	18,646.28	0.00E+00	1.60E-06	1.60E-06
Th-230	1.4493E-08	18,646.28	18,646.28	0.00E+00	2.70E-04	2.70E-04
Th-232	5.2923E-12	18,646.28	18,646.28	0.00E+00	9.87E-08	9.87E-08
Tl-208	1.9202E-07	18,646.28	18,646.28	0.00E+00	3.58E-03	3.58E-03
U-232	5.2083E-07	18,646.28	18,646.28	0.00E+00	9.71E-03	9.71E-03
U-233	2.4386E-08	18,646.28	18,646.28	0.00E+00	4.55E-04	4.55E-04
U-234	4.7012E-05	18,646.28	18,646.28	0.00E+00	8.77E-01	8.77E-01
U-235	-1.4492E-06	18,646.28	0.00	2.71E-03	0.00E+00	2.71E-03
U-238	7.5759E-08	18,646.28	18,646.28	0.00E+00	1.41E-01	1.41E-01
U-238	-2.6129E-07	18,646.28	0.00	1.28E-02	7.88E-03	1.28E-02
Y-90	1.1631E+00	18,646.28	18,646.28	0.00E+00	2.17E+04	2.17E+04
Other Radionuclides					3.15E+04	3.15E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.268E+15
0.0250	2.568E+14
0.0375	2.485E+14
0.0575	2.711E+14
0.0850	1.437E+14
0.1250	1.050E+14
0.2250	1.233E+14
0.3750	5.292E+13
0.5750	1.216E+15
0.8500	2.400E+13
1.2500	3.242E+13
1.7500	7.104E+11
2.2500	1.312E+06
2.7500	1.475E+06
3.5000	1.932E+07
5.0000	8.259E+06
7.0000	9.521E+05
11.0000	1.094E+05

Thermal Power

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	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: 1.59

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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: 2010
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: 15 years

Estimated Canister usage: 18"x10' 0.32

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	1.3735E-12	833.80	1,563.38	0.00E+00	1.15E-09	2.15E-09
Am-241	7.9527E-02	833.80	1,563.38	2.01E+01	8.64E+01	1.44E+02
Am-242m	2.1053E-03	833.80	1,563.38	0.00E+00	1.76E+00	3.29E+00
Am-243	1.0760E-04	833.80	1,563.38	0.00E+00	8.97E-02	1.68E-01
C-14	2.6141E-05	833.80	1,563.38	0.00E+00	2.18E-02	4.09E-02
Cl-36	3.4243E-10	833.80	1,563.38	0.00E+00	2.86E-07	5.35E-07
Cm-243	6.6092E-04	833.80	1,563.38	0.00E+00	5.51E-01	1.03E+00
Cm-244	2.9933E-03	833.80	1,563.38	0.00E+00	2.50E+00	4.68E+00
Co-60	1.5934E-02	833.80	1,563.38	0.00E+00	1.33E+01	2.49E+01
Cs-134	4.6356E-02	833.80	1,563.38	0.00E+00	3.87E+01	7.25E+01
Cs-135	4.7693E-05	833.80	1,563.38	0.00E+00	3.98E-02	7.46E-02
Cs-137	2.1113E+00	833.80	1,563.38	0.00E+00	1.76E+03	3.30E+03
Eu-154	4.8092E-02	833.80	1,563.38	0.00E+00	4.01E+01	7.52E+01
Eu-155	6.8447E-02	833.80	1,563.38	0.00E+00	5.71E+01	1.07E+02
Fe-55	5.8479E-03	833.80	1,563.38	0.00E+00	4.88E+00	9.14E+00
H-3	8.9300E-03	833.80	1,563.38	0.00E+00	7.45E+00	1.40E+01
I-129	1.2891E-06	833.80	1,563.38	0.00E+00	1.07E-03	2.02E-03
Kr-85	7.0941E-02	833.80	1,563.38	0.00E+00	5.92E+01	1.11E+02
Np-237	2.6541E-06	833.80	1,563.38	0.00E+00	2.21E-03	4.15E-03
Pa-231	4.8970E-12	833.80	1,563.38	0.00E+00	4.08E-09	7.66E-09
Pb-210	2.2170E-13	833.80	1,563.38	0.00E+00	1.85E-10	3.47E-10
Pm-147	2.3617E-01	833.80	1,563.38	0.00E+00	1.97E+02	3.69E+02
Pu-238	2.8636E-02	833.80	1,563.38	0.00E+00	2.39E+01	4.48E+01
Pu-239	-3.5520E-02	833.80	0.00	1.65E+02	1.35E+02	1.65E+02
Pu-240	2.0790E-02	833.80	1,563.38	8.38E+01	1.01E+02	1.16E+02
Pu-241	-4.8316E-01	833.80	0.00	3.76E+03	3.36E+03	3.76E+03
Pu-242	1.1052E-05	833.80	1,563.38	2.24E-02	3.16E-02	3.96E-02
Ra-226	5.7471E-13	833.80	1,563.38	0.00E+00	4.79E-10	8.98E-10
Ra-228	5.4957E-17	833.80	1,563.38	0.00E+00	4.58E-14	8.59E-14
Ru-106	1.4582E-02	833.80	1,563.38	0.00E+00	1.22E+01	2.28E+01
Se-79	1.0137E-05	833.80	1,563.38	0.00E+00	8.45E-03	1.58E-02
Sn-126	4.3922E-05	833.80	1,563.38	0.00E+00	3.66E-02	6.87E-02
Sr-90	7.6329E-01	833.80	1,563.38	0.00E+00	6.36E+02	1.19E+03
Tc-99	3.9412E-04	833.80	1,563.38	0.00E+00	3.29E-01	6.16E-01
Th-229	1.8457E-12	833.80	1,563.38	0.00E+00	1.37E-09	2.57E-09
Th-230	1.8822E-10	833.80	1,563.38	0.00E+00	1.57E-07	2.94E-07
Th-232	9.7601E-17	833.80	1,563.38	0.00E+00	8.14E-14	1.53E-13
Tl-208	5.2722E-07	833.80	1,563.38	0.00E+00	4.40E-04	8.24E-04
U-232	1.4925E-06	833.80	1,563.38	0.00E+00	1.24E-03	2.33E-03
U-233	2.1113E-10	833.80	1,563.38	0.00E+00	1.76E-07	3.30E-07
U-234	1.9528E-06	833.80	1,563.38	0.00E+00	1.63E-03	3.05E-03
U-235	-9.7920E-09	833.80	0.00	3.39E-05	2.57E-05	3.39E-05
U-236	1.1570E-07	833.80	1,563.38	0.00E+00	9.65E-05	1.81E-04
U-238	-1.7914E-07	833.80	0.00	2.47E-03	2.32E-03	2.47E-03
Y-90	7.6329E-01	833.80	1,563.38	0.00E+00	6.36E+02	1.19E+03
Other Radionuclides					1.81E+03	3.39E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.854E+13
0.0250	1.695E+13
0.0375	1.939E+13
0.0575	1.647E+13
0.0850	9.659E+12
0.1250	7.213E+12
0.2250	7.314E+12
0.3750	3.760E+12
0.5750	1.256E+14
0.8500	4.205E+12
1.2500	3.661E+12
1.7500	6.015E+10
2.2500	2.024E+09
2.7500	2.112E+08
3.5000	2.384E+07
5.0000	5.764E+04
7.0000	6.595E+03
11.0000	7.553E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.54E+01	4.19E+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: 2010
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: 15 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	1.3735E-12	8,040.82	20,102.04	0.00E+00	1.10E-08	2.76E-08
Am-241	7.9527E-02	8,040.82	20,102.04	1.94E+02	8.33E+02	1.79E+03
Am-242m	2.1053E-03	8,040.82	20,102.04	0.00E+00	1.69E+01	4.23E+01
Am-243	1.0760E-04	8,040.82	20,102.04	0.00E+00	8.65E-01	2.16E+00
C-14	2.6141E-05	8,040.82	20,102.04	0.00E+00	2.10E-01	5.25E-01
Cl-36	3.4243E-10	8,040.82	20,102.04	0.00E+00	2.75E-06	6.88E-06
Cm-243	6.6092E-04	8,040.82	20,102.04	0.00E+00	5.31E+00	1.33E+01
Cm-244	2.9933E-03	8,040.82	20,102.04	0.00E+00	2.41E+01	6.02E+01
Co-60	1.5934E-02	8,040.82	20,102.04	0.00E+00	1.28E+02	3.20E+02
Cs-134	4.6356E-02	8,040.82	20,102.04	0.00E+00	3.73E+02	9.32E+02
Cs-135	4.7693E-05	8,040.82	20,102.04	0.00E+00	3.83E-01	9.59E-01
Cs-137	2.1113E+00	8,040.82	20,102.04	0.00E+00	1.70E+04	4.24E+04
Eu-154	4.8092E-02	8,040.82	20,102.04	0.00E+00	3.87E+02	9.67E+02
Eu-155	6.8447E-02	8,040.82	20,102.04	0.00E+00	5.50E+02	1.38E+03
Fe-55	5.8479E-03	8,040.82	20,102.04	0.00E+00	4.70E+01	1.18E+02
H-3	8.9300E-03	8,040.82	20,102.04	0.00E+00	7.18E+01	1.80E+02
I-129	1.2891E-06	8,040.82	20,102.04	0.00E+00	1.04E-02	2.59E-02
Kr-85	7.0941E-02	8,040.82	20,102.04	0.00E+00	5.70E+02	1.43E+03
Np-237	2.6541E-06	8,040.82	20,102.04	0.00E+00	2.13E-02	5.34E-02
Pa-231	4.8970E-12	8,040.82	20,102.04	0.00E+00	3.94E-08	9.84E-08
Pb-210	2.2170E-13	8,040.82	20,102.04	0.00E+00	1.78E-09	4.46E-09
Pm-147	2.3817E-01	8,040.82	20,102.04	0.00E+00	1.90E+03	4.75E+03
Pu-238	2.8636E-02	8,040.82	20,102.04	0.00E+00	2.30E+02	5.76E+02
Pu-239	-3.5520E-02	8,040.82	0.00	1.59E+03	1.31E+03	1.59E+03
Pu-240	2.0790E-02	8,040.82	20,102.04	8.09E+02	9.76E+02	1.23E+03
Pu-241	-4.8316E-01	8,040.82	0.00	3.63E+04	3.24E+04	3.63E+04
Pu-242	1.1052E-05	8,040.82	20,102.04	2.16E-01	3.04E-01	4.38E-01
Ra-226	5.7471E-13	8,040.82	20,102.04	0.00E+00	4.62E-09	1.16E-08
Ra-228	5.4957E-17	8,040.82	20,102.04	0.00E+00	4.42E-13	1.10E-12
Ru-106	1.4582E-02	8,040.82	20,102.04	0.00E+00	1.17E+02	2.93E+02
Se-79	1.0137E-05	8,040.82	20,102.04	0.00E+00	8.15E-02	2.04E-01
Sn-126	4.3922E-05	8,040.82	20,102.04	0.00E+00	3.53E-01	8.83E-01
Sr-90	7.6329E-01	8,040.82	20,102.04	0.00E+00	6.14E+03	1.53E+04
Tc-99	3.9412E-04	8,040.82	20,102.04	0.00E+00	3.17E+00	7.92E+00
Th-229	1.6457E-12	8,040.82	20,102.04	0.00E+00	1.32E-08	3.31E-08
Th-230	1.8822E-10	8,040.82	20,102.04	0.00E+00	1.51E-06	3.78E-06
Th-232	9.7601E-17	8,040.82	20,102.04	0.00E+00	7.85E-13	1.96E-12
Tl-208	5.2722E-07	8,040.82	20,102.04	0.00E+00	4.24E-03	1.06E-02
U-232	1.4925E-06	8,040.82	20,102.04	0.00E+00	1.20E-02	3.00E-02
U-233	2.1113E-10	8,040.82	20,102.04	0.00E+00	1.70E-06	4.24E-06
U-234	1.9528E-06	8,040.82	20,102.04	0.00E+00	1.57E-02	3.93E-02
U-235	-9.7920E-09	8,040.82	0.00	3.27E-04	2.48E-04	3.27E-04
U-236	1.1570E-07	8,040.82	20,102.04	0.00E+00	9.30E-04	2.33E-03
U-238	-1.7914E-07	8,040.82	0.00	2.38E-02	2.23E-02	2.38E-02
Y-90	7.6329E-01	8,040.82	20,102.04	0.00E+00	6.14E+03	1.53E+04
Other Radionuclides					1.74E+04	4.36E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.006E+15
0.0250	2.179E+14
0.0375	2.493E+14
0.0575	2.109E+14
0.0850	1.242E+14
0.1250	9.275E+13
0.2250	9.405E+13
0.3750	4.835E+13
0.5750	1.615E+15
0.8500	5.407E+13
1.2500	4.708E+13
1.7500	7.733E+11
2.2500	2.603E+10
2.7500	2.715E+09
3.5000	3.064E+08
5.0000	6.771E+05
7.0000	7.752E+04
11.0000	8.879E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.45E+02	5.11E+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=56.966kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1994
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 2.86

II. Estimates

Radionuclide	a_n Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.3735E-12	4,956.09	12,390.22	0.00E+00	6.81E-09	1.70E-08
Am-241	7.9527E-02	4,956.09	12,390.22	1.19E+02	5.14E+02	1.10E+03
Am-242m	2.1053E-03	4,956.09	12,390.22	0.00E+00	1.04E+01	2.61E+01
Am-243	1.0760E-04	4,956.09	12,390.22	0.00E+00	5.33E-01	1.33E+00
C-14	2.6141E-05	4,956.09	12,390.22	0.00E+00	1.30E-01	3.24E-01
Cl-36	3.4243E-10	4,956.09	12,390.22	0.00E+00	1.70E-06	4.24E-06
Cm-243	6.6092E-04	4,956.09	12,390.22	0.00E+00	3.28E+00	8.19E+00
Cm-244	2.9933E-03	4,956.09	12,390.22	0.00E+00	1.48E+01	3.71E+01
Co-60	1.5934E-02	4,956.09	12,390.22	0.00E+00	7.90E+01	1.97E+02
Cs-134	4.6356E-02	4,956.09	12,390.22	0.00E+00	2.30E+02	5.74E+02
Cs-135	4.7693E-05	4,956.09	12,390.22	0.00E+00	2.36E-01	5.91E-01
Cs-137	2.1113E+00	4,956.09	12,390.22	0.00E+00	1.05E+04	2.62E+04
Eu-154	4.8092E-02	4,956.09	12,390.22	0.00E+00	2.38E+02	5.96E+02
Eu-155	6.8447E-02	4,956.09	12,390.22	0.00E+00	3.39E+02	8.48E+02
Fe-55	5.8479E-03	4,956.09	12,390.22	0.00E+00	2.90E+01	7.25E+01
H-3	8.9300E-03	4,956.09	12,390.22	0.00E+00	4.43E+01	1.11E+02
I-129	1.2891E-06	4,956.09	12,390.22	0.00E+00	6.39E-03	1.60E-02
Kr-85	7.0941E-02	4,956.09	12,390.22	0.00E+00	3.52E+02	8.79E+02
Np-237	2.6541E-06	4,956.09	12,390.22	0.00E+00	1.32E-02	3.29E-02
Pa-231	4.8970E-12	4,956.09	12,390.22	0.00E+00	2.43E-08	6.07E-08
Pb-210	2.2170E-13	4,956.09	12,390.22	0.00E+00	1.10E-09	2.75E-09
Pm-147	2.3617E-01	4,956.09	12,390.22	0.00E+00	1.17E+03	2.93E+03
Pu-238	2.8636E-02	4,956.09	12,390.22	0.00E+00	1.42E+02	3.55E+02
Pu-239	-3.5520E-02	4,956.09	0.00	9.81E+02	8.04E+02	9.81E+02
Pu-240	2.0790E-02	4,956.09	12,390.22	4.98E+02	6.01E+02	7.56E+02
Pu-241	-4.8316E-01	4,956.09	0.00	2.24E+04	2.00E+04	2.24E+04
Pu-242	1.1052E-05	4,956.09	12,390.22	1.33E-01	1.88E-01	2.70E-01
Ra-226	5.7471E-13	4,956.09	12,390.22	0.00E+00	2.85E-09	7.12E-09
Ra-228	5.4957E-17	4,956.09	12,390.22	0.00E+00	2.72E-13	6.81E-13
Ru-106	1.4582E-02	4,956.09	12,390.22	0.00E+00	7.23E+01	1.81E+02
Se-79	1.0137E-05	4,956.09	12,390.22	0.00E+00	5.02E-02	1.26E-01
Sn-126	4.3922E-05	4,956.09	12,390.22	0.00E+00	2.18E-01	5.44E-01
Sr-90	7.6329E-01	4,956.09	12,390.22	0.00E+00	3.78E+03	9.46E+03
Tc-99	3.9412E-04	4,956.09	12,390.22	0.00E+00	1.95E+00	4.88E+00
Th-229	1.6457E-12	4,956.09	12,390.22	0.00E+00	8.16E-09	2.04E-08
Th-230	1.8822E-10	4,956.09	12,390.22	0.00E+00	9.33E-07	2.33E-06
Th-232	9.7601E-17	4,956.09	12,390.22	0.00E+00	4.84E-13	1.21E-12
Tl-208	5.2722E-07	4,956.09	12,390.22	0.00E+00	2.61E-03	6.53E-03
U-232	1.4925E-06	4,956.09	12,390.22	0.00E+00	7.40E-03	1.85E-02
U-233	2.1113E-10	4,956.09	12,390.22	0.00E+00	1.05E-06	2.62E-06
U-234	1.9528E-06	4,956.09	12,390.22	0.00E+00	9.68E-03	2.42E-02
U-235	-9.7920E-09	4,956.09	0.00	2.01E-04	1.53E-04	2.01E-04
U-236	1.1570E-07	4,956.09	12,390.22	0.00E+00	5.73E-04	1.43E-03
U-238	-1.7914E-07	4,956.09	0.00	1.47E-02	1.38E-02	1.47E-02
Y-90	7.6329E-01	4,956.09	12,390.22	0.00E+00	3.78E+03	9.46E+03
Other Radionuclides					1.07E+04	2.69E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.203E+14
0.0250	1.343E+14
0.0375	1.536E+14
0.0575	1.300E+14
0.0850	7.655E+13
0.1250	5.717E+13
0.2250	5.797E+13
0.3750	2.980E+13
0.5750	9.957E+14
0.8500	3.333E+13
1.2500	2.902E+13
1.7500	4.767E+11
2.2500	1.604E+10
2.7500	1.674E+09
3.5000	1.888E+08
5.0000	4.173E+05
7.0000	4.778E+04
11.0000	5.473E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.51E+02	3.15E+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: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 25 years

Estimated Canister usage: 18"x10' 0.08

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.9648E-06	3,071.54	6,143.08	0.00E+00	6.03E-03	1.21E-02
Am-241	7.8064E+00	3,071.54	6,143.08	0.00E+00	2.40E+04	4.80E+04
Am-242m	1.7632E-02	3,071.54	6,143.08	0.00E+00	5.42E+01	1.08E+02
Am-243	1.6336E-02	3,071.54	6,143.08	0.00E+00	5.02E+01	1.00E+02
C-14	1.2101E-01	3,071.54	6,143.08	0.00E+00	3.72E+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	1.1046E-03	3,071.54	6,143.08	0.00E+00	3.39E+00	6.79E+00
Cm-244	2.4704E-01	3,071.54	6,143.08	0.00E+00	7.59E+02	1.52E+03
Co-60	1.0466E+02	3,071.54	6,143.08	0.00E+00	3.21E+05	6.43E+05
Cs-134	9.8289E-03	3,071.54	6,143.08	0.00E+00	3.02E+01	6.04E+01
Cs-135	4.3976E-04	3,071.54	6,143.08	0.00E+00	1.35E+00	2.70E+00
Cs-137	2.6526E+01	3,071.54	6,143.08	0.00E+00	8.15E+04	1.63E+05
Eu-154	2.7975E+00	3,071.54	6,143.08	0.00E+00	8.59E+03	1.72E+04
Eu-155	2.7881E-01	3,071.54	6,143.08	0.00E+00	8.56E+02	1.71E+03
Fe-55	4.2151E+00	3,071.54	6,143.08	0.00E+00	1.29E+04	2.59E+04
H-3	4.2599E-01	3,071.54	6,143.08	0.00E+00	1.31E+03	2.62E+03
I-129	1.0618E-05	3,071.54	6,143.08	0.00E+00	3.26E-02	6.52E-02
Kr-85	1.1426E+00	3,071.54	6,143.08	0.00E+00	3.51E+03	7.02E+03
Np-237	1.5647E-04	3,071.54	6,143.08	0.00E+00	4.81E-01	9.61E-01
Pa-231	2.8624E-06	3,071.54	6,143.08	0.00E+00	8.79E-03	1.76E-02
Pb-210	9.2770E-09	3,071.54	6,143.08	0.00E+00	2.85E-05	5.70E-05
Pm-147	2.3690E-01	3,071.54	6,143.08	0.00E+00	7.28E+02	1.46E+03
Pu-238	3.2240E+00	3,071.54	6,143.08	0.00E+00	9.90E+03	1.98E+04
Pu-239	4.1664E-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	7.8816E+01	3,071.54	6,143.08	0.00E+00	2.42E+05	4.84E+05
Pu-242	2.4560E-03	3,071.54	6,143.08	0.00E+00	7.54E+00	1.51E+01
Ra-226	3.2167E-08	3,071.54	6,143.08	0.00E+00	9.88E-05	1.98E-04
Ra-228	5.9024E-07	3,071.54	6,143.08	0.00E+00	1.81E-03	3.63E-03
Ru-106	3.9140E-06	3,071.54	6,143.08	0.00E+00	1.20E-02	2.40E-02
Se-79	1.9184E-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	2.5126E+01	3,071.54	6,143.08	0.00E+00	7.72E+04	1.54E+05
Tc-99	6.7678E-03	3,071.54	6,143.08	0.00E+00	2.08E+01	4.16E+01
Th-229	1.2398E-06	3,071.54	6,143.08	0.00E+00	3.81E-03	7.62E-03
Th-230	4.1442E-06	3,071.54	6,143.08	0.00E+00	1.27E-02	2.55E-02
Th-232	-4.2431E-09	3,071.54	0.00	1.83E-04	1.70E-04	1.83E-04
Tl-208	9.6478E-05	3,071.54	6,143.08	0.00E+00	2.96E-01	5.93E-01
U-232	2.6103E-04	3,071.54	6,143.08	0.00E+00	8.02E-01	1.60E+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	2.5126E+01	3,071.54	6,143.08	0.00E+00	7.72E+04	1.54E+05
Other Radionuclides					2.15E+05	4.31E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.042E+16
0.0250	2.038E+15
0.0375	1.819E+15
0.0575	2.482E+15
0.0850	1.073E+15
0.1250	9.336E+14
0.2250	9.118E+14
0.3750	3.843E+14
0.5750	6.130E+15
0.8500	3.694E+14
1.2500	4.794E+16
1.7500	1.161E+13
2.2500	2.524E+11
2.7500	2.162E+10
3.5000	2.421E+07
5.0000	1.029E+07
7.0000	1.179E+06
11.0000	1.350E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.26E+03	1.45E+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:	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: 331.59

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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: 2010
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: 25 years

Estimated Canister usage: 18"x10' 0.85

II. Estimates

	a_n	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	3.4503E-12	3,998.94	7,997.88	0.00E+00	1.38E-08	2.76E-08
Am-241	9.5092E-02	3,998.94	7,997.88	2.57E+01	4.06E+02	7.86E+02
Am-242m	2.0118E-03	3,998.94	7,997.88	0.00E+00	8.05E+00	1.61E+01
Am-243	1.0750E-04	3,998.94	7,997.88	0.00E+00	4.30E-01	8.60E-01
C-14	2.6108E-05	3,998.94	7,997.88	0.00E+00	1.04E-01	2.09E-01
Cl-36	3.4243E-10	3,998.94	7,997.88	0.00E+00	1.37E-06	2.74E-06
Cm-243	5.1824E-04	3,998.94	7,997.88	0.00E+00	2.07E+00	4.14E+00
Cm-244	2.1572E-03	3,998.94	7,997.88	0.00E+00	8.63E+00	1.73E+01
Co-60	5.6258E-03	3,998.94	7,997.88	0.00E+00	2.25E+01	4.50E+01
Cs-134	2.5942E-03	3,998.94	7,997.88	0.00E+00	1.04E+01	2.07E+01
Cs-135	4.7693E-05	3,998.94	7,997.88	0.00E+00	1.91E-01	3.81E-01
Cs-137	1.7121E+00	3,998.94	7,997.88	0.00E+00	6.85E+03	1.37E+04
Eu-154	2.5217E-02	3,998.94	7,997.88	0.00E+00	1.01E+02	2.02E+02
Eu-155	2.2684E-02	3,998.94	7,997.88	0.00E+00	9.07E+01	1.81E+02
Fe-55	6.3362E-04	3,998.94	7,997.88	0.00E+00	2.53E+00	5.07E+00
H-3	5.6054E-03	3,998.94	7,997.88	0.00E+00	2.24E+01	4.48E+01
I-129	1.2891E-06	3,998.94	7,997.88	0.00E+00	5.16E-03	1.03E-02
Kr-85	4.1743E-02	3,998.94	7,997.88	0.00E+00	1.67E+02	3.34E+02
Np-237	3.2028E-06	3,998.94	7,997.88	0.00E+00	1.28E-02	2.56E-02
Pa-231	8.5429E-12	3,998.94	7,997.88	0.00E+00	3.42E-08	6.83E-08
Pb-210	7.3535E-13	3,998.94	7,997.88	0.00E+00	2.94E-09	5.88E-09
Pm-147	2.6110E-02	3,998.94	7,997.88	0.00E+00	1.04E+02	2.09E+02
Pu-238	2.3318E-02	3,998.94	7,997.88	0.00E+00	9.32E+01	1.86E+02
Pu-239	-3.5520E-02	3,998.94	0.00	2.11E+02	6.89E+01	2.11E+02
Pu-240	2.0757E-02	3,998.94	7,997.88	1.07E+02	1.90E+02	2.73E+02
Pu-241	-1.1127E+00	3,998.94	0.00	4.81E+03	3.63E+02	4.81E+03
Pu-242	1.1152E-05	3,998.94	7,997.88	2.86E-02	7.32E-02	1.18E-01
Ra-226	2.8297E-12	3,998.94	7,997.88	0.00E+00	1.13E-08	2.26E-08
Ra-228	1.3510E-16	3,998.94	7,997.88	0.00E+00	5.40E-13	1.08E-12
Ru-106	2.5110E-05	3,998.94	7,997.88	0.00E+00	1.00E-01	2.01E-01
Se-79	1.0134E-05	3,998.94	7,997.88	0.00E+00	4.05E-02	8.11E-02
Sn-126	4.3902E-05	3,998.94	7,997.88	0.00E+00	1.76E-01	3.51E-01
Sr-90	6.1529E-01	3,998.94	7,997.88	0.00E+00	2.46E+03	4.92E+03
Tc-99	3.9412E-04	3,998.94	7,997.88	0.00E+00	1.58E+00	3.15E+00
Th-229	2.0554E-12	3,998.94	7,997.88	0.00E+00	8.22E-09	1.64E-08
Th-230	5.3680E-10	3,998.94	7,997.88	0.00E+00	2.15E-06	4.29E-06
Th-232	1.9522E-16	3,998.94	7,997.88	0.00E+00	7.81E-13	1.56E-12
Tl-208	5.1046E-07	3,998.94	7,997.88	0.00E+00	2.04E-03	4.08E-03
U-232	1.3883E-06	3,998.94	7,997.88	0.00E+00	5.55E-03	1.11E-02
U-233	3.7516E-10	3,998.94	7,997.88	0.00E+00	1.50E-06	3.00E-06
U-234	3.1909E-06	3,998.94	7,997.88	0.00E+00	1.28E-02	2.55E-02
U-235	-8.7842E-09	3,998.94	0.00	4.33E-05	8.19E-06	4.33E-05
U-236	1.4813E-07	3,998.94	7,997.88	0.00E+00	5.92E-04	1.18E-03
U-238	-1.7914E-07	3,998.94	0.00	3.15E-03	2.44E-03	3.15E-03
Y-90	6.1529E-01	3,998.94	7,997.88	0.00E+00	2.46E+03	4.92E+03
Other Radionuclides					6.88E+03	1.38E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.149E+14
0.0250	6.385E+13
0.0375	7.490E+13
0.0575	6.858E+13
0.0850	3.612E+13
0.1250	2.597E+13
0.2250	2.886E+13
0.3750	1.259E+13
0.5750	5.020E+14
0.8500	6.202E+12
1.2500	7.999E+12
1.7500	1.676E+11
2.2500	3.570E+07
2.7500	1.455E+08
3.5000	6.264E+05
5.0000	1.777E+05
7.0000	2.034E+04
11.0000	2.329E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.64E+01	1.51E+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: 2010
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"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	9.6110E-08	419.74	839.48	0.00E+00	4.03E-05	8.07E-05
Am-241	6.5601E-07	419.74	839.48	0.00E+00	2.75E-04	5.51E-04
Am-242m	0.0000E+00	419.74	839.48	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3770E-15	419.74	839.48	0.00E+00	3.52E-12	7.03E-12
C-14	2.1714E-05	419.74	839.48	0.00E+00	9.11E-03	1.82E-02
Cl-36	5.5188E-08	419.74	839.48	0.00E+00	2.32E-05	4.63E-05
Cm-243	1.5496E-14	419.74	839.48	0.00E+00	6.50E-12	1.30E-11
Cm-244	5.2375E-16	419.74	839.48	0.00E+00	2.20E-13	4.40E-13
Co-60	2.0947E-03	419.74	839.48	0.00E+00	8.79E-01	1.76E+00
Cs-134	6.2448E-07	419.74	839.48	0.00E+00	2.62E-04	5.24E-04
Cs-135	4.4996E-05	419.74	839.48	0.00E+00	1.89E-02	3.78E-02
Cs-137	1.3775E+00	419.74	839.48	0.00E+00	5.78E+02	1.16E+03
Eu-154	1.8510E-04	419.74	839.48	0.00E+00	7.77E-02	1.55E-01
Eu-155	1.4163E-03	419.74	839.48	0.00E+00	5.94E-01	1.19E+00
Fe-55	1.4179E-05	419.74	839.48	0.00E+00	5.95E-03	1.19E-02
H-3	3.5383E-03	419.74	839.48	0.00E+00	1.49E+00	2.97E+00
I-129	1.1426E-08	419.74	839.48	0.00E+00	4.80E-04	9.59E-04
Kr-85	3.8604E-02	419.74	839.48	0.00E+00	1.62E+01	3.24E+01
Np-237	3.3099E-06	419.74	839.48	0.00E+00	1.39E-03	2.78E-03
Pa-231	1.8953E-07	419.74	839.48	0.00E+00	7.96E-05	1.59E-04
Pb-210	8.9531E-12	419.74	839.48	0.00E+00	3.76E-09	7.52E-09
Pm-147	1.1588E-03	419.74	839.48	0.00E+00	4.86E-01	9.73E-01
Pu-238	1.7146E-04	419.74	839.48	0.00E+00	7.20E-02	1.44E-01
Pu-239	1.9464E-02	419.74	839.48	0.00E+00	8.17E+00	1.63E+01
Pu-240	6.7919E-05	419.74	839.48	0.00E+00	2.85E-02	5.70E-02
Pu-241	4.1774E-06	419.74	839.48	0.00E+00	1.75E-03	3.51E-03
Pu-242	4.3751E-13	419.74	839.48	0.00E+00	1.84E-10	3.67E-10
Ra-226	2.4219E-11	419.74	839.48	0.00E+00	1.02E-08	2.03E-08
Ra-228	2.3572E-11	419.74	839.48	0.00E+00	9.89E-09	1.98E-08
Ru-106	3.0951E-10	419.74	839.48	0.00E+00	1.30E-07	2.60E-07
Se-79	1.6488E-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	1.2052E+00	419.74	839.48	0.00E+00	5.06E+02	1.01E+03
Tc-99	4.4825E-04	419.74	839.48	0.00E+00	1.88E-01	3.76E-01
Th-229	4.6478E-11	419.74	839.48	0.00E+00	1.95E-08	3.90E-08
Th-230	2.2259E-09	419.74	839.48	0.00E+00	9.34E-07	1.87E-06
Th-232	2.3691E-11	419.74	839.48	0.00E+00	9.94E-09	1.99E-08
Tl-208	5.8256E-09	419.74	839.48	0.00E+00	2.45E-06	4.89E-06
U-232	1.5759E-06	419.74	839.48	0.00E+00	6.61E-06	1.32E-05
U-233	1.0110E-08	419.74	839.48	0.00E+00	4.24E-06	8.49E-06
U-234	4.9001E-06	419.74	839.48	0.00E+00	2.06E-03	4.11E-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	1.2053E+00	419.74	839.48	0.00E+00	5.06E+02	1.01E+03
Other Radionuclides					5.75E+02	1.15E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.555E+13
0.0250	1.154E+13
0.0375	1.015E+13
0.0575	1.075E+13
0.0850	6.503E+12
0.1250	4.212E+12
0.2250	5.582E+12
0.3750	2.432E+12
0.5750	4.297E+13
0.8500	3.968E+11
1.2500	2.632E+11
1.7500	1.024E+10
2.2500	1.806E+08
2.7500	1.741E+05
3.5000	1.660E+02
5.0000	5.707E+01
7.0000	4.951E+00
11.0000	4.617E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.48E+00	1.30E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	FAST	FAST
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	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: 2010
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"x10" 0.07

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	9.6110E-08	592.57	1,185.14	0.00E+00	5.70E-05	1.14E-04
Am-241	6.5601E-07	592.57	1,185.14	0.00E+00	3.89E-04	7.77E-04
Am-242m	0.0000E+00	592.57	1,185.14	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3770E-15	592.57	1,185.14	0.00E+00	4.96E-12	9.93E-12
C-14	2.1714E-05	592.57	1,185.14	0.00E+00	1.29E-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	1.5496E-14	592.57	1,185.14	0.00E+00	9.18E-12	1.84E-11
Cm-244	5.2375E-16	592.57	1,185.14	0.00E+00	3.10E-13	6.21E-13
Co-60	2.0947E-03	592.57	1,185.14	0.00E+00	1.24E+00	2.48E+00
Cs-134	6.2448E-07	592.57	1,185.14	0.00E+00	3.70E-04	7.40E-04
Cs-135	4.4996E-05	592.57	1,185.14	0.00E+00	2.67E-02	5.33E-02
Cs-137	1.3775E+00	592.57	1,185.14	0.00E+00	8.16E+02	1.63E+03
Eu-154	1.8510E-04	592.57	1,185.14	0.00E+00	1.10E-01	2.19E-01
Eu-155	1.4163E-03	592.57	1,185.14	0.00E+00	8.39E-01	1.68E+00
Fe-55	1.4179E-05	592.57	1,185.14	0.00E+00	8.40E-03	1.68E-02
H-3	3.5383E-03	592.57	1,185.14	0.00E+00	2.10E+00	4.19E+00
I-129	1.1426E-06	592.57	1,185.14	0.00E+00	6.77E-04	1.35E-03
Kr-85	3.8604E-02	592.57	1,185.14	0.00E+00	2.29E+01	4.58E+01
Np-237	3.3099E-06	592.57	1,185.14	0.00E+00	1.96E-03	3.92E-03
Pa-231	1.8953E-07	592.57	1,185.14	0.00E+00	1.12E-04	2.25E-04
Pb-210	8.9531E-12	592.57	1,185.14	0.00E+00	5.31E-09	1.06E-08
Pm-147	1.1588E-03	592.57	1,185.14	0.00E+00	6.87E-01	1.37E+00
Pu-238	1.7146E-04	592.57	1,185.14	0.00E+00	1.02E-01	2.03E-01
Pu-239	1.9464E-02	592.57	1,185.14	0.00E+00	1.15E+01	2.31E+01
Pu-240	6.7919E-05	592.57	1,185.14	0.00E+00	4.02E-02	8.05E-02
Pu-241	4.1774E-06	592.57	1,185.14	0.00E+00	2.48E-03	4.95E-03
Pu-242	4.3751E-13	592.57	1,185.14	0.00E+00	2.59E-10	5.19E-10
Ra-226	2.4219E-11	592.57	1,185.14	0.00E+00	1.44E-08	2.87E-08
Ra-228	2.3572E-11	592.57	1,185.14	0.00E+00	1.40E-08	2.79E-08
Ru-106	3.0951E-10	592.57	1,185.14	0.00E+00	1.83E-07	3.67E-07
Se-79	1.6488E-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	1.2052E+00	592.57	1,185.14	0.00E+00	7.14E+02	1.43E+03
Tc-99	4.4825E-04	592.57	1,185.14	0.00E+00	2.66E-01	5.31E-01
Th-229	4.6478E-11	592.57	1,185.14	0.00E+00	2.75E-08	5.51E-08
Th-230	2.2259E-09	592.57	1,185.14	0.00E+00	1.32E-06	2.64E-06
Th-232	2.3691E-11	592.57	1,185.14	0.00E+00	1.40E-08	2.81E-08
Tl-208	5.8256E-09	592.57	1,185.14	0.00E+00	3.45E-06	6.90E-06
U-232	1.5759E-08	592.57	1,185.14	0.00E+00	9.34E-06	1.87E-05
U-233	1.0110E-08	592.57	1,185.14	0.00E+00	5.99E-06	1.20E-05
U-234	4.9001E-06	592.57	1,185.14	0.00E+00	2.90E-03	5.81E-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	1.2053E+00	592.57	1,185.14	0.00E+00	7.14E+02	1.43E+03
Other Radionuclides					8.11E+02	1.62E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.842E+13
0.0250	1.629E+13
0.0375	1.433E+13
0.0575	1.518E+13
0.0850	9.181E+12
0.1250	5.946E+12
0.2250	7.880E+12
0.3750	3.434E+12
0.5750	6.066E+13
0.8500	5.802E+11
1.2500	3.716E+11
1.7500	1.446E+10
2.2500	2.549E+06
2.7500	2.458E+05
3.5000	2.580E+02
5.0000	9.077E+01
7.0000	8.165E+00
11.0000	7.869E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.14E+00	1.83E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	FAST	FAST
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	13.55265123	10 to 40

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	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	Estimated EOL HM/Given EOL HM
Nominal:	5.06	9.88	1.00
Bounding:	10.11	11.43	

[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: 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: 2010
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"x10' 0.25

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	17,384.91	34,769.81	0.00E+00	1.67E-03	3.34E-03
Am-241	6.5601E-07	17,384.91	34,769.81	0.00E+00	1.14E-02	2.28E-02
Am-242m	0.0000E+00	17,384.91	34,769.81	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3770E-15	17,384.91	34,769.81	0.00E+00	1.46E-10	2.91E-10
C-14	2.1714E-05	17,384.91	34,769.81	0.00E+00	3.77E-01	7.55E-01
Cl-36	5.5188E-08	17,384.91	34,769.81	0.00E+00	9.59E-04	1.92E-03
Cm-243	1.5496E-14	17,384.91	34,769.81	0.00E+00	2.69E-10	5.39E-10
Cm-244	5.2375E-16	17,384.91	34,769.81	0.00E+00	9.11E-12	1.82E-11
Co-60	2.0947E-03	17,384.91	34,769.81	0.00E+00	3.64E+01	7.28E+01
Cs-134	6.2448E-07	17,384.91	34,769.81	0.00E+00	1.09E-02	2.17E-02
Cs-135	4.4996E-05	17,384.91	34,769.81	0.00E+00	7.82E-01	1.56E+00
Cs-137	1.3775E+00	17,384.91	34,769.81	0.00E+00	2.39E+04	4.79E+04
Eu-154	1.8510E-04	17,384.91	34,769.81	0.00E+00	3.22E+00	6.44E+00
Eu-155	1.4163E-03	17,384.91	34,769.81	0.00E+00	2.46E+01	4.92E+01
Fe-55	1.4179E-05	17,384.91	34,769.81	0.00E+00	2.46E-01	4.93E-01
H-3	3.5383E-03	17,384.91	34,769.81	0.00E+00	6.15E+01	1.23E+02
I-129	1.1426E-06	17,384.91	34,769.81	0.00E+00	1.99E-02	3.97E-02
Kr-85	3.8604E-02	17,384.91	34,769.81	0.00E+00	6.71E+02	1.34E+03
Np-237	3.3099E-06	17,384.91	34,769.81	0.00E+00	5.75E-02	1.15E-01
Pa-231	1.8953E-07	17,384.91	34,769.81	0.00E+00	3.29E-03	6.59E-03
Pb-210	8.9531E-12	17,384.91	34,769.81	0.00E+00	1.56E-07	3.11E-07
Pm-147	1.1588E-03	17,384.91	34,769.81	0.00E+00	2.01E+01	4.03E+01
Pu-238	1.7146E-04	17,384.91	34,769.81	0.00E+00	2.98E+00	5.96E+00
Pu-239	1.9464E-02	17,384.91	34,769.81	0.00E+00	3.38E+02	6.77E+02
Pu-240	6.7919E-05	17,384.91	34,769.81	0.00E+00	1.18E+00	2.36E+00
Pu-241	4.1774E-06	17,384.91	34,769.81	0.00E+00	7.26E-02	1.45E-01
Pu-242	4.3751E-13	17,384.91	34,769.81	0.00E+00	7.61E-09	1.52E-08
Ra-226	2.4219E-11	17,384.91	34,769.81	0.00E+00	4.21E-07	8.42E-07
Ra-228	2.3572E-11	17,384.91	34,769.81	0.00E+00	4.10E-07	8.20E-07
Ru-106	3.0951E-10	17,384.91	34,769.81	0.00E+00	5.38E-06	1.08E-05
Se-79	1.6488E-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	1.2052E+00	17,384.91	34,769.81	0.00E+00	2.10E+04	4.19E+04
Tc-99	4.4825E-04	17,384.91	34,769.81	0.00E+00	7.79E+00	1.56E+01
Th-229	4.6478E-11	17,384.91	34,769.81	0.00E+00	8.08E-07	1.62E-06
Th-230	2.2259E-09	17,384.91	34,769.81	0.00E+00	3.87E-05	7.74E-05
Th-232	2.3691E-11	17,384.91	34,769.81	0.00E+00	4.12E-07	8.24E-07
Tl-208	5.8256E-09	17,384.91	34,769.81	0.00E+00	1.01E-04	2.03E-04
U-232	1.5759E-08	17,384.91	34,769.81	0.00E+00	2.74E-04	5.48E-04
U-233	1.0110E-08	17,384.91	34,769.81	0.00E+00	1.76E-04	3.52E-04
U-234	4.9001E-08	17,384.91	34,769.81	0.00E+00	8.52E-02	1.70E-01
U-235	-2.3191E-06	17,384.91	0.00	7.26E-02	3.22E-02	7.26E-02
U-238	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	1.2053E+00	17,384.91	34,769.81	0.00E+00	2.10E+04	4.19E+04
Other Radionuclides					2.38E+04	4.76E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.301E+15
0.0250	4.779E+14
0.0375	4.204E+14
0.0575	4.453E+14
0.0850	2.693E+14
0.1250	1.745E+14
0.2250	2.312E+14
0.3750	1.007E+14
0.5750	1.780E+15
0.8500	1.644E+13
1.2500	1.090E+13
1.7500	4.241E+11
2.2500	7.479E+07
2.7500	7.209E+08
3.5000	6.033E+03
5.0000	2.002E+03
7.0000	1.635E+02
11.0000	1.434E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.68E+02	5.37E+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: 2010
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"x10' 0.26

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	5,444.25	10,888.49	0.00E+00	5.23E-04	1.05E-03
Am-241	6.5601E-07	5,444.25	10,888.49	0.00E+00	3.57E-03	7.14E-03
Am-242m	0.0000E+00	5,444.25	10,888.49	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3770E-15	5,444.25	10,888.49	0.00E+00	4.56E-11	9.12E-11
C-14	2.1714E-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	1.5496E-14	5,444.25	10,888.49	0.00E+00	8.44E-11	1.69E-10
Cm-244	5.2375E-16	5,444.25	10,888.49	0.00E+00	2.85E-12	5.70E-12
Co-60	2.0947E-03	5,444.25	10,888.49	0.00E+00	1.14E+01	2.28E+01
Cs-134	6.2448E-07	5,444.25	10,888.49	0.00E+00	3.40E-03	6.80E-03
Cs-135	4.4996E-05	5,444.25	10,888.49	0.00E+00	2.45E-01	4.90E-01
Cs-137	1.3775E+00	5,444.25	10,888.49	0.00E+00	7.50E+03	1.50E+04
Eu-154	1.8510E-04	5,444.25	10,888.49	0.00E+00	1.01E+00	2.02E+00
Eu-155	1.4163E-03	5,444.25	10,888.49	0.00E+00	7.71E+00	1.54E+01
Fe-55	1.4179E-05	5,444.25	10,888.49	0.00E+00	7.72E-02	1.54E-01
H-3	3.5383E-03	5,444.25	10,888.49	0.00E+00	1.93E+01	3.85E+01
I-129	1.1426E-06	5,444.25	10,888.49	0.00E+00	6.22E-03	1.24E-02
Kr-85	3.8604E-02	5,444.25	10,888.49	0.00E+00	2.10E+02	4.20E+02
Np-237	3.3099E-06	5,444.25	10,888.49	0.00E+00	1.80E-02	3.60E-02
Pa-231	1.8953E-07	5,444.25	10,888.49	0.00E+00	1.03E-03	2.06E-03
Pb-210	8.9531E-12	5,444.25	10,888.49	0.00E+00	4.87E-08	9.75E-08
Pm-147	1.1588E-03	5,444.25	10,888.49	0.00E+00	6.31E+00	1.26E+01
Pu-238	1.7146E-04	5,444.25	10,888.49	0.00E+00	9.33E-01	1.87E+00
Pu-239	1.9464E-02	5,444.25	10,888.49	0.00E+00	1.06E+02	2.12E+02
Pu-240	6.7919E-05	5,444.25	10,888.49	0.00E+00	3.70E-01	7.40E-01
Pu-241	4.1774E-06	5,444.25	10,888.49	0.00E+00	2.27E-02	4.55E-02
Pu-242	4.3751E-13	5,444.25	10,888.49	0.00E+00	2.38E-09	4.76E-09
Ra-226	2.4219E-11	5,444.25	10,888.49	0.00E+00	1.32E-07	2.64E-07
Ra-228	2.3572E-11	5,444.25	10,888.49	0.00E+00	1.28E-07	2.57E-07
Ru-106	3.0951E-10	5,444.25	10,888.49	0.00E+00	1.69E-06	3.37E-06
Se-79	1.6488E-05	5,444.25	10,888.49	0.00E+00	8.98E-02	1.80E-01
Sn-126	3.7564E-05	5,444.25	10,888.49	0.00E+00	2.05E-01	4.09E-01
Sr-90	1.2052E+00	5,444.25	10,888.49	0.00E+00	6.56E+03	1.31E+04
Tc-99	4.4825E-04	5,444.25	10,888.49	0.00E+00	2.44E+00	4.88E+00
Th-229	4.6478E-11	5,444.25	10,888.49	0.00E+00	2.53E-07	5.06E-07
Th-230	2.2259E-09	5,444.25	10,888.49	0.00E+00	1.21E-05	2.42E-05
Th-232	2.3691E-11	5,444.25	10,888.49	0.00E+00	1.29E-07	2.58E-07
Tl-208	5.8256E-09	5,444.25	10,888.49	0.00E+00	3.17E-05	6.34E-05
U-232	1.5759E-08	5,444.25	10,888.49	0.00E+00	8.58E-05	1.72E-04
U-233	1.0110E-08	5,444.25	10,888.49	0.00E+00	5.50E-05	1.10E-04
U-234	4.9001E-06	5,444.25	10,888.49	0.00E+00	2.67E-02	5.34E-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	3.26E-02	3.23E-02	3.26E-02
Y-90	1.2053E+00	5,444.25	10,888.49	0.00E+00	6.56E+03	1.31E+04
Other Radionuclides					7.45E+03	1.49E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.205E+14
0.0250	1.497E+14
0.0375	1.317E+14
0.0575	1.395E+14
0.0850	8.435E+13
0.1250	5.463E+13
0.2250	7.240E+13
0.3750	3.155E+13
0.5750	5.573E+14
0.8500	5.147E+12
1.2500	3.414E+12
1.7500	1.328E+11
2.2500	2.342E+07
2.7500	2.258E+06
3.5000	2.011E+03
5.0000	6.794E+02
7.0000	5.722E+01
11.0000	5.183E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.40E+01	1.68E+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
Nominal:	209.96	5,444.25
Bounding:	362.83	10,888.49

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	13.28	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: 2010
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"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	9.6110E-08	740.71	1,481.43	0.00E+00	7.12E-05	1.42E-04
Am-241	6.5601E-07	740.71	1,481.43	0.00E+00	4.86E-04	9.72E-04
Am-242m	0.0000E+00	740.71	1,481.43	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3770E-15	740.71	1,481.43	0.00E+00	6.20E-12	1.24E-11
C-14	2.1714E-05	740.71	1,481.43	0.00E+00	1.61E-02	3.22E-02
Cl-36	5.5188E-08	740.71	1,481.43	0.00E+00	4.09E-05	8.18E-05
Cm-243	1.5496E-14	740.71	1,481.43	0.00E+00	1.15E-11	2.30E-11
Cm-244	5.2375E-16	740.71	1,481.43	0.00E+00	3.88E-13	7.76E-13
Co-60	2.0947E-03	740.71	1,481.43	0.00E+00	1.55E+00	3.10E+00
Cs-134	6.2448E-07	740.71	1,481.43	0.00E+00	4.63E-04	9.25E-04
Cs-135	4.4996E-05	740.71	1,481.43	0.00E+00	3.33E-02	6.67E-02
Cs-137	1.3775E+00	740.71	1,481.43	0.00E+00	1.02E+03	2.04E+03
Eu-154	1.8510E-04	740.71	1,481.43	0.00E+00	1.37E-01	2.74E-01
Eu-155	1.4163E-03	740.71	1,481.43	0.00E+00	1.05E+00	2.10E+00
Fe-55	1.4179E-05	740.71	1,481.43	0.00E+00	1.05E-02	2.10E-02
H-3	3.5383E-03	740.71	1,481.43	0.00E+00	2.62E+00	5.24E+00
I-129	1.1426E-06	740.71	1,481.43	0.00E+00	8.46E-04	1.69E-03
Kr-85	3.8604E-02	740.71	1,481.43	0.00E+00	2.86E+01	5.72E+01
Np-237	3.3099E-06	740.71	1,481.43	0.00E+00	2.45E-03	4.90E-03
Pa-231	1.8953E-07	740.71	1,481.43	0.00E+00	1.40E-04	2.81E-04
Pb-210	8.9531E-12	740.71	1,481.43	0.00E+00	6.63E-09	1.33E-08
Pm-147	1.1588E-03	740.71	1,481.43	0.00E+00	8.58E-01	1.72E+00
Pu-238	1.7146E-04	740.71	1,481.43	0.00E+00	1.27E-01	2.54E-01
Pu-239	1.9464E-02	740.71	1,481.43	0.00E+00	1.44E+01	2.88E+01
Pu-240	6.7919E-05	740.71	1,481.43	0.00E+00	5.03E-02	1.01E-01
Pu-241	4.1774E-06	740.71	1,481.43	0.00E+00	3.09E-03	6.19E-03
Pu-242	4.3751E-13	740.71	1,481.43	0.00E+00	3.24E-10	6.48E-10
Ra-226	2.4219E-11	740.71	1,481.43	0.00E+00	1.79E-08	3.59E-08
Ra-228	2.3572E-11	740.71	1,481.43	0.00E+00	1.75E-08	3.49E-08
Ru-106	3.0951E-10	740.71	1,481.43	0.00E+00	2.29E-07	4.59E-07
Se-79	1.6488E-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	1.2052E+00	740.71	1,481.43	0.00E+00	8.93E+02	1.79E+03
Tc-99	4.4825E-04	740.71	1,481.43	0.00E+00	3.32E-01	6.64E-01
Th-229	4.6478E-11	740.71	1,481.43	0.00E+00	3.44E-08	6.89E-08
Th-230	2.2259E-09	740.71	1,481.43	0.00E+00	1.65E-06	3.30E-06
Th-232	2.3691E-11	740.71	1,481.43	0.00E+00	1.75E-08	3.51E-08
Tl-208	5.8256E-09	740.71	1,481.43	0.00E+00	4.32E-06	8.63E-06
U-232	1.5759E-08	740.71	1,481.43	0.00E+00	1.17E-05	2.33E-05
U-233	1.0110E-08	740.71	1,481.43	0.00E+00	7.49E-06	1.50E-05
U-234	4.9001E-06	740.71	1,481.43	0.00E+00	3.63E-03	7.26E-03
U-235	-2.3191E-08	740.71	0.00	3.12E-02	2.95E-02	3.12E-02
U-236	1.2633E-05	740.71	1,481.43	0.00E+00	9.36E-03	1.87E-02
U-238	-9.5407E-08	740.71	0.00	1.40E-02	1.40E-02	1.40E-02
Y-90	1.2053E+00	740.71	1,481.43	0.00E+00	8.93E+02	1.79E+03
Other Radionuclides					1.01E+03	2.03E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.802E+13
0.0250	2.036E+13
0.0375	1.791E+13
0.0575	1.897E+13
0.0850	1.148E+13
0.1250	7.433E+12
0.2250	9.851E+12
0.3750	4.292E+12
0.5750	7.582E+13
0.8500	7.002E+11
1.2500	4.645E+11
1.7500	1.807E+10
2.2500	3.187E+08
2.7500	3.072E+05
3.5000	3.254E+02
5.0000	1.147E+02
7.0000	1.035E+01
11.0000	9.995E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.14E+01	2.29E+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 Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	89.98	740.71
Bounding:	155.50	1,481.43

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

[2]Total burnup for all fuel associated with this worksheet must be 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: 2010
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"x10' 7.07

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	9.6110E-08	62,269.34	124,538.69	0.00E+00	5.98E-03	1.20E-02
Am-241	6.5601E-07	62,269.34	124,538.69	0.00E+00	4.08E-02	8.17E-02
Am-242m	0.0000E+00	62,269.34	124,538.69	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3770E-15	62,269.34	124,538.69	0.00E+00	5.22E-10	1.04E-09
C-14	2.1714E-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	1.5496E-14	62,269.34	124,538.69	0.00E+00	9.65E-10	1.93E-09
Cm-244	5.2375E-16	62,269.34	124,538.69	0.00E+00	3.26E-11	6.52E-11
Co-60	2.0947E-03	62,269.34	124,538.69	0.00E+00	1.30E+02	2.61E+02
Cs-134	6.2448E-07	62,269.34	124,538.69	0.00E+00	3.89E-02	7.78E-02
Cs-135	4.4996E-05	62,269.34	124,538.69	0.00E+00	2.80E+00	5.60E+00
Cs-137	1.3775E+00	62,269.34	124,538.69	0.00E+00	8.58E+04	1.72E+05
Eu-154	1.8510E-04	62,269.34	124,538.69	0.00E+00	1.15E+01	2.31E+01
Eu-155	1.4163E-03	62,269.34	124,538.69	0.00E+00	8.82E+01	1.76E+02
Fe-55	1.4179E-05	62,269.34	124,538.69	0.00E+00	8.83E-01	1.77E+00
H-3	3.5383E-03	62,269.34	124,538.69	0.00E+00	2.20E+02	4.41E+02
I-129	1.1426E-06	62,269.34	124,538.69	0.00E+00	7.11E-02	1.42E-01
Kr-85	3.8604E-02	62,269.34	124,538.69	0.00E+00	2.40E+03	4.81E+03
Np-237	3.3099E-06	62,269.34	124,538.69	0.00E+00	2.06E-01	4.12E-01
Pa-231	1.8953E-07	62,269.34	124,538.69	0.00E+00	1.18E-02	2.36E-02
Pb-210	8.9531E-12	62,269.34	124,538.69	0.00E+00	5.58E-07	1.12E-06
Pm-147	1.1588E-03	62,269.34	124,538.69	0.00E+00	7.22E+01	1.44E+02
Pu-238	1.7146E-04	62,269.34	124,538.69	0.00E+00	1.07E+01	2.14E+01
Pu-239	1.9464E-02	62,269.34	124,538.69	0.00E+00	1.21E+03	2.42E+03
Pu-240	6.7919E-05	62,269.34	124,538.69	0.00E+00	4.23E+00	8.46E+00
Pu-241	4.1774E-06	62,269.34	124,538.69	0.00E+00	2.60E-01	5.20E-01
Pu-242	4.3751E-13	62,269.34	124,538.69	0.00E+00	2.72E-08	5.45E-08
Ra-226	2.4219E-11	62,269.34	124,538.69	0.00E+00	1.51E-06	3.02E-06
Ra-228	2.3572E-11	62,269.34	124,538.69	0.00E+00	1.47E-06	2.94E-06
Ru-106	3.0951E-10	62,269.34	124,538.69	0.00E+00	1.93E-05	3.85E-05
Se-79	1.6488E-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	1.2052E+00	62,269.34	124,538.69	0.00E+00	7.50E+04	1.50E+05
Tc-99	4.4825E-04	62,269.34	124,538.69	0.00E+00	2.79E+01	5.58E+01
Th-229	4.6478E-11	62,269.34	124,538.69	0.00E+00	2.89E-06	5.79E-06
Th-230	2.2259E-09	62,269.34	124,538.69	0.00E+00	1.39E-04	2.77E-04
Th-232	2.3691E-11	62,269.34	124,538.69	0.00E+00	1.48E-06	2.95E-06
Tl-208	5.8256E-09	62,269.34	124,538.69	0.00E+00	3.63E-04	7.26E-04
U-232	1.5759E-08	62,269.34	124,538.69	0.00E+00	9.81E-04	1.96E-03
U-233	1.0110E-08	62,269.34	124,538.69	0.00E+00	6.30E-04	1.26E-03
U-234	4.9001E-06	62,269.34	124,538.69	0.00E+00	3.05E-01	6.10E-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	1.2053E+00	62,269.34	124,538.69	0.00E+00	7.51E+04	1.50E+05
Other Radionuclides					8.53E+04	1.71E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.241E+15
0.0250	1.712E+15
0.0375	1.506E+15
0.0575	1.595E+15
0.0850	9.647E+14
0.1250	6.249E+14
0.2250	8.281E+14
0.3750	3.606E+14
0.5750	6.374E+15
0.8500	5.887E+13
1.2500	3.905E+13
1.7500	1.519E+12
2.2500	2.679E+08
2.7500	2.582E+07
3.5000	2.589E+04
5.0000	9.009E+03
7.0000	7.969E+02
11.0000	7.566E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.81E+02	1.92E+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: 2010
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: 15 years

Estimated Canister usage: 18"x10" 0.31

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.3735E-12	525.78	652.69	0.00E+00	7.22E-10	8.96E-10
Am-241	7.9527E-02	525.78	652.69	1.52E+01	5.70E+01	6.71E+01
Am-242m	2.1053E-03	525.78	652.69	0.00E+00	1.11E+00	1.37E+00
Am-243	1.0760E-04	525.78	652.69	0.00E+00	5.66E-02	7.02E-02
C-14	2.6141E-05	525.78	652.69	0.00E+00	1.37E-02	1.71E-02
Cl-36	3.4243E-10	525.78	652.69	0.00E+00	1.80E-07	2.24E-07
Cm-243	6.6092E-04	525.78	652.69	0.00E+00	3.47E-01	4.31E-01
Cm-244	2.9933E-03	525.78	652.69	0.00E+00	1.57E+00	1.95E+00
Co-60	1.5934E-02	525.78	652.69	0.00E+00	8.38E+00	1.04E+01
Cs-134	4.6356E-02	525.78	652.69	0.00E+00	2.44E+01	3.03E+01
Cs-135	4.7693E-05	525.78	652.69	0.00E+00	2.51E-02	3.11E-02
Cs-137	2.1113E+00	525.78	652.69	0.00E+00	1.11E+03	1.38E+03
Eu-154	4.8092E-02	525.78	652.69	0.00E+00	2.53E+01	3.14E+01
Eu-155	6.8447E-02	525.78	652.69	0.00E+00	3.60E+01	4.47E+01
Fe-55	5.8479E-03	525.78	652.69	0.00E+00	3.07E+00	3.82E+00
H-3	8.9300E-03	525.78	652.69	0.00E+00	4.70E+00	5.83E+00
I-129	1.2891E-06	525.78	652.69	0.00E+00	6.78E-04	8.41E-04
Kr-85	7.0941E-02	525.78	652.69	0.00E+00	3.73E+01	4.63E+01
Np-237	2.6541E-06	525.78	652.69	0.00E+00	1.40E-03	1.73E-03
Pa-231	4.8970E-12	525.78	652.69	0.00E+00	2.57E-09	3.20E-09
Pb-210	2.2170E-13	525.78	652.69	0.00E+00	1.17E-10	1.45E-10
Pm-147	2.3617E-01	525.78	652.69	0.00E+00	1.24E+02	1.54E+02
Pu-238	2.8636E-02	525.78	652.69	0.00E+00	1.51E+01	1.87E+01
Pu-239	-3.5520E-02	525.78	0.00	1.25E+02	1.06E+02	1.25E+02
Pu-240	2.0790E-02	525.78	652.69	6.34E+01	7.43E+01	7.70E+01
Pu-241	-4.8316E-01	525.78	0.00	2.85E+03	2.59E+03	2.85E+03
Pu-242	1.1052E-05	525.78	652.69	1.69E-02	2.27E-02	2.41E-02
Ra-226	5.7471E-13	525.78	652.69	0.00E+00	3.02E-10	3.75E-10
Ra-228	5.4957E-17	525.78	652.69	0.00E+00	2.89E-14	3.59E-14
Ru-106	1.4582E-02	525.78	652.69	0.00E+00	7.67E+00	9.52E+00
Se-79	1.0137E-05	525.78	652.69	0.00E+00	5.33E-03	6.62E-03
Sn-126	4.3922E-05	525.78	652.69	0.00E+00	2.31E-02	2.87E-02
Sr-90	7.6329E-01	525.78	652.69	0.00E+00	4.01E+02	4.98E+02
Tc-99	3.9412E-04	525.78	652.69	0.00E+00	2.07E-01	2.57E-01
Th-229	1.6457E-12	525.78	652.69	0.00E+00	8.65E-10	1.07E-09
Th-230	1.8822E-10	525.78	652.69	0.00E+00	9.90E-08	1.23E-07
Th-232	9.7601E-17	525.78	652.69	0.00E+00	5.13E-14	6.37E-14
Tl-208	5.2722E-07	525.78	652.69	0.00E+00	2.77E-04	3.44E-04
U-232	1.4925E-06	525.78	652.69	0.00E+00	7.85E-04	9.74E-04
U-233	2.1113E-10	525.78	652.69	0.00E+00	1.11E-07	1.38E-07
U-234	1.9528E-06	525.78	652.69	0.00E+00	1.03E-03	1.27E-03
U-235	-9.7920E-09	525.78	0.00	2.56E-05	2.05E-05	2.56E-05
U-236	1.1570E-07	525.78	652.69	0.00E+00	6.08E-05	7.55E-05
U-238	-1.7914E-07	525.78	0.00	1.86E-03	1.77E-03	1.86E-03
Y-90	7.6329E-01	525.78	652.69	0.00E+00	4.01E+02	4.98E+02
Other Radionuclides					1.14E+03	1.41E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.316E+13
0.0250	7.084E+12
0.0375	8.094E+12
0.0575	6.973E+12
0.0850	4.032E+12
0.1250	3.012E+12
0.2250	3.054E+12
0.3750	1.570E+12
0.5750	5.245E+13
0.8500	1.756E+12
1.2500	1.528E+12
1.7500	2.511E+10
2.2500	8.452E+08
2.7500	8.818E+07
3.5000	9.968E+06
5.0000	3.081E+04
7.0000	3.521E+03
11.0000	4.031E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.71E+01	2.04E+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: 2010
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: 15 years

Estimated Canister usage: 18"x10' 0.02

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.3735E-12	33.98	62.29	0.00E+00	4.67E-11	8.56E-11
Am-241	7.9527E-02	33.98	62.29	5.46E-01	3.25E+00	5.50E+00
Am-242m	2.1053E-03	33.98	62.29	0.00E+00	7.15E-02	1.31E-01
Am-243	1.0760E-04	33.98	62.29	0.00E+00	3.66E-03	6.70E-03
C-14	2.6141E-05	33.98	62.29	0.00E+00	8.88E-04	1.63E-03
Cl-36	3.4243E-10	33.98	62.29	0.00E+00	1.16E-08	2.13E-08
Cm-243	6.6092E-04	33.98	62.29	0.00E+00	2.25E-02	4.12E-02
Cm-244	2.9933E-03	33.98	62.29	0.00E+00	1.02E-01	1.86E-01
Co-60	1.5934E-02	33.98	62.29	0.00E+00	5.41E-01	9.93E-01
Cs-134	4.6356E-02	33.98	62.29	0.00E+00	1.58E+00	2.89E+00
Cs-135	4.7693E-05	33.98	62.29	0.00E+00	1.62E-03	2.97E-03
Cs-137	2.1113E+00	33.98	62.29	0.00E+00	7.17E+01	1.32E+02
Eu-154	4.8092E-02	33.98	62.29	0.00E+00	1.63E+00	3.00E+00
Eu-155	6.8447E-02	33.98	62.29	0.00E+00	2.33E+00	4.26E+00
Fe-55	5.8479E-03	33.98	62.29	0.00E+00	1.99E-01	3.64E-01
H-3	8.9300E-03	33.98	62.29	0.00E+00	3.03E-01	5.56E-01
I-129	1.2891E-06	33.98	62.29	0.00E+00	4.38E-05	8.03E-05
Kr-85	7.0941E-02	33.98	62.29	0.00E+00	2.41E+00	4.42E+00
Np-237	2.6541E-06	33.98	62.29	0.00E+00	9.02E-05	1.65E-04
Pa-231	4.8970E-12	33.98	62.29	0.00E+00	1.66E-10	3.05E-10
Pb-210	2.2170E-13	33.98	62.29	0.00E+00	7.53E-12	1.38E-11
Pm-147	2.3617E-01	33.98	62.29	0.00E+00	8.02E+00	1.47E+01
Pu-238	2.8636E-02	33.98	62.29	0.00E+00	9.73E-01	1.78E+00
Pu-239	-3.5520E-02	33.98	0.00	4.48E+00	3.27E+00	4.48E+00
Pu-240	2.0790E-02	33.98	62.29	2.28E+00	2.98E+00	3.57E+00
Pu-241	-4.8316E-01	33.98	0.00	1.02E+02	8.58E+01	1.02E+02
Pu-242	1.1052E-05	33.98	62.29	6.07E-04	9.83E-04	1.30E-03
Ra-226	5.7471E-13	33.98	62.29	0.00E+00	1.95E-11	3.58E-11
Ra-228	5.4957E-17	33.98	62.29	0.00E+00	1.87E-15	3.42E-15
Ru-106	1.4582E-02	33.98	62.29	0.00E+00	4.95E-01	9.08E-01
Se-79	1.0137E-05	33.98	62.29	0.00E+00	3.44E-04	6.31E-04
Sn-126	4.3922E-05	33.98	62.29	0.00E+00	1.49E-03	2.74E-03
Sr-90	7.6329E-01	33.98	62.29	0.00E+00	2.59E+01	4.75E+01
Tc-99	3.9412E-04	33.98	62.29	0.00E+00	1.34E-02	2.45E-02
Th-229	1.6457E-12	33.98	62.29	0.00E+00	5.59E-11	1.03E-10
Th-230	1.8822E-10	33.98	62.29	0.00E+00	6.40E-09	1.17E-08
Th-232	9.7601E-17	33.98	62.29	0.00E+00	3.32E-15	6.08E-15
Tl-208	5.2722E-07	33.98	62.29	0.00E+00	1.79E-05	3.28E-05
U-232	1.4925E-06	33.98	62.29	0.00E+00	5.07E-05	9.30E-05
U-233	2.1113E-10	33.98	62.29	0.00E+00	7.17E-09	1.32E-08
U-234	1.9528E-06	33.98	62.29	0.00E+00	6.64E-05	1.22E-04
U-235	-9.7920E-09	33.98	0.00	9.20E-07	5.87E-07	9.20E-07
U-236	1.1570E-07	33.98	62.29	0.00E+00	3.93E-06	7.21E-06
U-238	-1.7914E-07	33.98	0.00	6.70E-05	6.09E-05	6.70E-05
Y-90	7.6329E-01	33.98	62.29	0.00E+00	2.59E+01	4.75E+01
Other Radionuclides					7.36E+01	1.35E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.115E+12
0.0250	6.752E+11
0.0375	7.724E+11
0.0575	6.529E+11
0.0850	3.848E+11
0.1250	2.874E+11
0.2250	2.914E+11
0.3750	1.498E+11
0.5750	5.006E+12
0.8500	1.675E+11
1.2500	1.459E+11
1.7500	2.396E+09
2.2500	8.066E+07
2.7500	8.413E+06
3.5000	9.492E+05
5.0000	2.044E+03
7.0000	2.341E+02
11.0000	2.681E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.19E-01	1.56E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		33.98
Bounding:		62.29

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FSVR
SNF ID #: 86
Fuel Units & Descr: 1464 - CARBON COATED PART
Heavy Metal Mass: BOL=15366.583kg; EOL=14725.937kg
ROD Storage Site: FSV

[1]Fuel decay start date: 1989
Estimates as of: 2010
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: 20 years

Estimated Canister usage: 18"x15' 292.80

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8411E-06	605,875.77	722,229.41	0.00E+00	1.72E+00	2.05E+00	Avg. MeV	
Am-241	2.5254E-03	605,875.77	722,229.41	0.00E+00	1.53E+03	1.82E+03	0.0150	7.252E+16
Am-242m	2.5664E-06	605,875.77	722,229.41	0.00E+00	1.55E+00	1.85E+00	0.0250	1.491E+16
Am-243	4.6132E-05	605,875.77	722,229.41	0.00E+00	2.80E+01	3.33E+01	0.0375	1.316E+16
C-14	2.3168E-05	605,875.77	722,229.41	0.00E+00	1.40E+01	1.67E+01	0.0575	1.398E+16
Cl-36	1.0667E-06	605,875.77	722,229.41	0.00E+00	6.46E-01	7.70E-01	0.0850	8.474E+15
Cm-243	3.6520E-05	605,875.77	722,229.41	0.00E+00	2.21E+01	2.64E+01	0.1250	6.033E+15
Cm-244	1.1446E-02	605,875.77	722,229.41	0.00E+00	6.94E+03	8.27E+03	0.2250	7.354E+15
Co-60	3.2379E-03	605,875.77	722,229.41	0.00E+00	1.96E+03	2.34E+03	0.3750	3.172E+15
Cs-134	5.8964E-03	605,875.77	722,229.41	0.00E+00	3.57E+03	4.26E+03	0.5750	5.090E+16
Cs-135	2.4711E-05	605,875.77	722,229.41	0.00E+00	1.50E+01	1.78E+01	0.8500	1.328E+15
Cs-137	1.8775E+00	605,875.77	722,229.41	0.00E+00	1.14E+06	1.36E+06	1.2500	1.094E+15
Eu-154	5.2619E-02	605,875.77	722,229.41	0.00E+00	3.19E+04	3.80E+04	1.7500	3.707E+13
Eu-155	8.4785E-03	605,875.77	722,229.41	0.00E+00	5.14E+03	6.12E+03	2.2500	2.677E+09
Fe-55	2.4381E-06	605,875.77	722,229.41	0.00E+00	1.48E+00	1.76E+00	2.7500	1.745E+13
H-3	9.0768E-03	605,875.77	722,229.41	0.00E+00	5.50E+03	6.56E+03	3.5000	1.242E+08
I-129	1.0092E-06	605,875.77	722,229.41	0.00E+00	6.11E-01	7.29E-01	5.0000	5.268E+07
Kr-85	1.0423E-01	605,875.77	722,229.41	0.00E+00	6.32E+04	7.53E+04	7.0000	6.062E+06
Np-237	1.2517E-05	605,875.77	722,229.41	0.00E+00	7.58E+00	9.04E+00	11.0000	6.955E+05
Pa-231	4.7391E-06	605,875.77	722,229.41	0.00E+00	2.87E+00	3.42E+00		
Pb-210	7.3244E-10	605,875.77	722,229.41	0.00E+00	4.44E-04	5.29E-04		
Pm-147	7.9747E-03	605,875.77	722,229.41	0.00E+00	4.83E+03	5.76E+03		
Pu-238	1.8295E-01	605,875.77	722,229.41	0.00E+00	1.11E+05	1.32E+05		
Pu-239	1.3580E-04	605,875.77	722,229.41	0.00E+00	8.23E+01	9.81E+01		
Pu-240	2.5601E-04	605,875.77	722,229.41	0.00E+00	1.55E+02	1.85E+02		
Pu-241	3.9810E-02	605,875.77	722,229.41	0.00E+00	2.41E+04	2.88E+04		
Pu-242	3.8868E-06	605,875.77	722,229.41	0.00E+00	2.35E+00	2.81E+00		
Ra-226	1.1163E-09	605,875.77	722,229.41	0.00E+00	6.76E-04	8.06E-04		
Ra-228	8.9587E-07	605,875.77	722,229.41	0.00E+00	5.43E-01	6.47E-01		
Ru-106	1.0628E-06	605,875.77	722,229.41	0.00E+00	6.44E-01	7.68E-01		
Se-79	2.1082E-05	605,875.77	722,229.41	0.00E+00	1.28E+01	1.52E+01		
Sn-126	2.2200E-05	605,875.77	722,229.41	0.00E+00	1.35E+01	1.60E+01		
Sr-90	1.8098E+00	605,875.77	722,229.41	0.00E+00	1.10E+06	1.31E+06		
Tc-99	3.3331E-04	605,875.77	722,229.41	0.00E+00	2.02E+02	2.41E+02		
Th-229	5.7665E-06	605,875.77	722,229.41	0.00E+00	3.49E+00	4.16E+00		
Th-230	1.2493E-07	605,875.77	722,229.41	0.00E+00	7.57E-02	9.02E-02		
Th-232	-6.9673E-08	605,875.77	0.00	1.52E+00	1.48E+00	1.52E+00		
Tl-208	6.8796E-04	605,875.77	722,229.41	0.00E+00	4.17E+02	4.97E+02		
U-232	1.8618E-03	605,875.77	722,229.41	0.00E+00	1.13E+03	1.34E+03		
U-233	2.0602E-03	605,875.77	722,229.41	0.00E+00	1.25E+03	1.49E+03		
U-234	2.7805E-04	605,875.77	722,229.41	0.00E+00	1.68E+02	2.01E+02		
U-235	-1.7343E-08	605,875.77	0.00	3.04E+00	1.99E+00	3.04E+00		
U-238	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	1.8098E+00	605,875.77	722,229.41	0.00E+00	1.10E+06	1.31E+06		
Other Radionuclides					1.09E+06	1.30E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.76E+04	2.10E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	GRAPHITE	GRAPHITE
Fuel Cladding:	GRAPHITE	GRAPHITE
BOL HM Constituents:	Th and U	Th and U
BOL Enrichment %:	93.15	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1980
Estimates as of: 2010
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: 18"x15" 148.80

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	3.3583E-06	145,508.60	412,660.86	0.00E+00	4.89E-01	1.39E+00
Am-241	2.8805E-03	145,508.60	412,660.86	0.00E+00	4.19E+02	1.19E+03
Am-242m	2.5089E-06	145,508.60	412,660.86	0.00E+00	3.65E-01	1.04E+00
Am-243	4.6116E-05	145,508.60	412,660.86	0.00E+00	6.71E+00	1.90E+01
C-14	2.3152E-05	145,508.60	412,660.86	0.00E+00	3.37E+00	9.55E+00
Cl-36	1.0667E-06	145,508.60	412,660.86	0.00E+00	1.55E-01	4.40E-01
Cm-243	3.2339E-05	145,508.60	412,660.86	0.00E+00	4.71E+00	1.33E+01
Cm-244	9.4546E-03	145,508.60	412,660.86	0.00E+00	1.38E+03	3.90E+03
Co-60	1.6776E-03	145,508.60	412,660.86	0.00E+00	2.44E+02	6.92E+02
Cs-134	1.0974E-03	145,508.60	412,660.86	0.00E+00	1.60E+02	4.53E+02
Cs-135	2.4711E-05	145,508.60	412,660.86	0.00E+00	3.60E+00	1.02E+01
Cs-137	1.6729E+00	145,508.60	412,660.86	0.00E+00	2.43E+05	6.90E+05
Eu-154	3.5166E-02	145,508.60	412,660.86	0.00E+00	5.12E+03	1.45E+04
Eu-155	4.2148E-03	145,508.60	412,660.86	0.00E+00	6.13E+02	1.74E+03
Fe-55	6.4301E-07	145,508.60	412,660.86	0.00E+00	9.36E-02	2.65E-01
H-3	6.8528E-03	145,508.60	412,660.86	0.00E+00	9.97E+02	2.83E+03
I-129	1.0092E-06	145,508.60	412,660.86	0.00E+00	1.47E-01	4.16E-01
Kr-85	7.5440E-02	145,508.60	412,660.86	0.00E+00	1.10E+04	3.11E+04
Np-237	1.2525E-05	145,508.60	412,660.86	0.00E+00	1.82E+00	5.17E+00
Pa-231	4.7383E-06	145,508.60	412,660.86	0.00E+00	6.89E-01	1.96E+00
Pb-210	9.1476E-10	145,508.60	412,660.86	0.00E+00	1.33E-04	3.77E-04
Pm-147	2.1271E-03	145,508.60	412,660.86	0.00E+00	3.10E+02	8.78E+02
Pu-238	1.7587E-01	145,508.60	412,660.86	0.00E+00	2.56E+04	7.26E+04
Pu-239	1.3580E-04	145,508.60	412,660.86	0.00E+00	1.98E+01	5.60E+01
Pu-240	2.6404E-04	145,508.60	412,660.86	0.00E+00	3.84E+01	1.09E+02
Pu-241	3.1300E-02	145,508.60	412,660.86	0.00E+00	4.55E+03	1.29E+04
Pu-242	3.8866E-06	145,508.60	412,660.86	0.00E+00	5.66E-01	1.60E+00
Ra-226	1.7059E-09	145,508.60	412,660.86	0.00E+00	2.48E-04	7.04E-04
Ra-228	9.1083E-07	145,508.60	412,660.86	0.00E+00	1.33E-01	3.76E-01
Ru-106	3.4126E-08	145,508.60	412,660.86	0.00E+00	4.97E-03	1.41E-02
Se-79	2.1082E-05	145,508.60	412,660.86	0.00E+00	3.07E+00	8.70E+00
Sn-126	2.2200E-05	145,508.60	412,660.86	0.00E+00	3.23E+00	9.16E+00
Sr-90	1.6067E+00	145,508.60	412,660.86	0.00E+00	2.34E+05	6.63E+05
Tc-99	3.3331E-04	145,508.60	412,660.86	0.00E+00	4.85E+01	1.38E+02
Th-229	7.7062E-06	145,508.60	412,660.86	0.00E+00	1.12E+00	3.18E+00
Th-230	1.5020E-07	145,508.60	412,660.86	0.00E+00	2.19E-02	6.20E-02
Th-232	-6.9673E-08	145,508.60	0.00	8.68E-01	8.58E-01	8.68E-01
Tl-208	6.5584E-04	145,508.60	412,660.86	0.00E+00	9.54E+01	2.71E+02
U-232	1.7744E-03	145,508.60	412,660.86	0.00E+00	2.58E+02	7.32E+02
U-233	2.0602E-03	145,508.60	412,660.86	0.00E+00	3.00E+02	8.50E+02
U-234	2.8285E-04	145,508.60	412,660.86	0.00E+00	4.12E+01	1.17E+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	1.6067E+00	145,508.60	412,660.86	0.00E+00	2.34E+05	6.63E+05
Other Radionuclides					2.33E+05	6.61E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.674E+16
0.0250	7.543E+15
0.0375	6.621E+15
0.0575	7.074E+15
0.0850	4.278E+15
0.1250	2.978E+15
0.2250	3.714E+15
0.3750	1.803E+15
0.5750	2.581E+16
0.8500	5.340E+14
1.2500	4.217E+14
1.7500	1.608E+13
2.2500	1.117E+09
2.7500	9.503E+12
3.5000	5.886E+07
5.0000	2.511E+07
7.0000	2.889E+06
11.0000	3.314E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.80E+03	1.68E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	GRAPHITE	GRAPHITE
Fuel Cladding:	GRAPHITE	GRAPHITE
BOL HM Constituents:	Th and U	Th and U
BOL Enrichment %:	93.13638737	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: 2010
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: 10 years

Estimated Canister usage: HIC: 1.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.1295E-06	76.23	152.45	0.00E+00	1.62E-04	3.25E-04	Avg. MeV	
Am-241	1.9169E-03	76.23	152.45	0.00E+00	1.46E-01	2.92E-01	0.0150	1.962E+13
Am-242m	2.6860E-06	76.23	152.45	0.00E+00	2.05E-04	4.09E-04	0.0250	4.081E+12
Am-243	4.6179E-05	76.23	152.45	0.00E+00	3.52E-03	7.04E-03	0.0375	3.657E+12
C-14	2.3192E-05	76.23	152.45	0.00E+00	1.77E-03	3.54E-03	0.0575	3.794E+12
Cl-36	1.0667E-06	76.23	152.45	0.00E+00	8.13E-05	1.63E-04	0.0850	2.327E+12
Cm-243	4.6573E-05	76.23	152.45	0.00E+00	3.55E-03	7.10E-03	0.1250	1.765E+12
Cm-244	1.6784E-02	76.23	152.45	0.00E+00	1.28E+00	2.56E+00	0.2250	2.004E+12
Co-60	1.2060E-02	76.23	152.45	0.00E+00	9.19E-01	1.84E+00	0.3750	8.817E+11
Cs-134	1.7004E-01	76.23	152.45	0.00E+00	1.30E+01	2.59E+01	0.5750	1.477E+13
Cs-135	2.4711E-05	76.23	152.45	0.00E+00	1.88E-03	3.77E-03	0.8500	1.301E+12
Cs-137	2.3656E+00	76.23	152.45	0.00E+00	1.80E+02	3.61E+02	1.2500	5.885E+11
Eu-154	1.1785E-01	76.23	152.45	0.00E+00	8.98E+00	1.80E+01	1.7500	1.445E+10
Eu-155	3.4292E-02	76.23	152.45	0.00E+00	2.61E+00	5.23E+00	2.2500	7.140E+07
Fe-55	3.5071E-05	76.23	152.45	0.00E+00	2.67E-03	5.35E-03	2.7500	4.001E+09
H-3	1.5902E-02	76.23	152.45	0.00E+00	1.21E+00	2.42E+00	3.5000	2.009E+05
I-129	1.0092E-06	76.23	152.45	0.00E+00	7.69E-05	1.54E-04	5.0000	1.605E+04
Kr-85	1.9901E-01	76.23	152.45	0.00E+00	1.52E+01	3.03E+01	7.0000	1.848E+03
Np-237	1.2509E-05	76.23	152.45	0.00E+00	9.54E-04	1.91E-03	11.0000	2.121E+02
Pa-231	4.7399E-06	76.23	152.45	0.00E+00	3.61E-04	7.23E-04		
Pb-210	7.0481E-10	76.23	152.45	0.00E+00	5.37E-08	1.07E-07		
Pm-147	1.1194E-01	76.23	152.45	0.00E+00	8.53E+00	1.71E+01		
Pu-238	1.9799E-01	76.23	152.45	0.00E+00	1.51E+01	3.02E+01		
Pu-239	1.3580E-04	76.23	152.45	0.00E+00	1.04E-02	2.07E-02		
Pu-240	2.4404E-04	76.23	152.45	0.00E+00	1.86E-02	3.72E-02		
Pu-241	6.4427E-02	76.23	152.45	0.00E+00	4.91E+00	9.82E+00		
Pu-242	3.8866E-06	76.23	152.45	0.00E+00	2.96E-04	5.93E-04		
Ra-226	6.3223E-10	76.23	152.45	0.00E+00	4.82E-08	9.64E-08		
Ra-228	8.5178E-07	76.23	152.45	0.00E+00	6.49E-05	1.30E-04		
Ru-106	1.0305E-03	76.23	152.45	0.00E+00	7.85E-02	1.57E-01		
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	2.2964E+00	76.23	152.45	0.00E+00	1.75E+02	3.50E+02		
Tc-99	3.3331E-04	76.23	152.45	0.00E+00	2.54E-02	5.08E-02		
Th-229	3.8252E-08	76.23	152.45	0.00E+00	2.92E-04	5.83E-04		
Th-230	1.0014E-07	76.23	152.45	0.00E+00	7.63E-06	1.53E-05		
Th-232	-6.9673E-08	76.23	0.00	2.14E-04	2.09E-04	2.14E-04		
Tl-208	7.4724E-04	76.23	152.45	0.00E+00	5.70E-02	1.14E-01		
U-232	2.0499E-03	76.23	152.45	0.00E+00	1.56E-01	3.13E-01		
U-233	2.0810E-03	76.23	152.45	0.00E+00	1.57E-01	3.14E-01		
U-234	2.7293E-04	76.23	152.45	0.00E+00	2.08E-02	4.16E-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	2.2964E+00	76.23	152.45	0.00E+00	1.75E+02	3.50E+02		
Other Radionuclides					1.74E+02	3.48E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.90E+00	5.79E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	GRAPHITE	GRAPHITE
Fuel Cladding:	GRAPHITE	GRAPHITE
BOL HM Constituents:	Th and U	Th and U
BOL Enrichment %:	92.189	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		76.23
Bounding:		152.45

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: HIC = 0.50

II. Estimates

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

Gamma Sources

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

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.33E+01	8.66E+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: 2010
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"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	2.3344E-08	17.15	34.31	0.00E+00	4.00E-07	8.01E-07
Am-241	1.1135E-04	17.15	34.31	0.00E+00	1.91E-03	3.82E-03
Am-242m	8.5075E-09	17.15	34.31	0.00E+00	1.46E-07	2.92E-07
Am-243	9.8519E-10	17.15	34.31	0.00E+00	1.69E-08	3.38E-08
C-14	2.3012E-04	17.15	34.31	0.00E+00	3.95E-03	7.90E-03
Cl-36	1.2261E-08	17.15	34.31	0.00E+00	2.10E-05	4.21E-05
Cm-243	2.4875E-10	17.15	34.31	0.00E+00	4.27E-09	8.53E-09
Cm-244	2.3178E-09	17.15	34.31	0.00E+00	3.98E-08	7.95E-08
Co-60	7.0849E-02	17.15	34.31	0.00E+00	1.22E+00	2.43E+00
Cs-134	3.0266E-06	17.15	34.31	0.00E+00	5.19E-05	1.04E-04
Cs-135	3.0316E-05	17.15	34.31	0.00E+00	5.20E-04	1.04E-03
Cs-137	1.4511E+00	17.15	34.31	0.00E+00	2.49E+01	4.98E+01
Eu-154	6.6955E-04	17.15	34.31	0.00E+00	1.15E-02	2.30E-02
Eu-155	6.9850E-04	17.15	34.31	0.00E+00	1.20E-02	2.40E-02
Fe-55	1.2318E-03	17.15	34.31	0.00E+00	2.11E-02	4.23E-02
H-3	2.5141E-03	17.15	34.31	0.00E+00	4.31E-02	8.63E-02
I-129	7.3195E-07	17.15	34.31	0.00E+00	1.26E-05	2.51E-05
Kr-85	4.1281E-02	17.15	34.31	0.00E+00	7.08E-01	1.42E+00
Np-237	1.1489E-06	17.15	34.31	0.00E+00	1.97E-05	3.94E-05
Pa-231	4.5241E-08	17.15	34.31	0.00E+00	7.76E-07	1.55E-06
Pb-210	6.4476E-13	17.15	34.31	0.00E+00	1.11E-11	2.21E-11
Pm-147	1.1651E-03	17.15	34.31	0.00E+00	2.00E-02	4.00E-02
Pu-238	2.9517E-04	17.15	34.31	0.00E+00	5.06E-03	1.01E-02
Pu-239	6.6772E-04	17.15	34.31	0.00E+00	1.15E-02	2.29E-02
Pu-240	8.6839E-05	17.15	34.31	0.00E+00	1.49E-03	2.98E-03
Pu-241	7.1514E-04	17.15	34.31	0.00E+00	1.23E-02	2.45E-02
Pu-242	1.9717E-09	17.15	34.31	0.00E+00	3.38E-08	6.76E-08
Ra-226	1.7654E-12	17.15	34.31	0.00E+00	3.03E-11	6.06E-11
Ra-228	8.2928E-12	17.15	34.31	0.00E+00	1.42E-10	2.85E-10
Ru-106	1.8419E-10	17.15	34.31	0.00E+00	3.16E-09	6.32E-09
Se-79	1.3223E-05	17.15	34.31	0.00E+00	2.27E-04	4.54E-04
Sn-126	1.1493E-05	17.15	34.31	0.00E+00	1.97E-04	3.94E-04
Sr-90	1.3649E+00	17.15	34.31	0.00E+00	2.34E+01	4.68E+01
Tc-99	4.6656E-04	17.15	34.31	0.00E+00	8.00E-03	1.60E-02
Th-229	1.4547E-11	17.15	34.31	0.00E+00	2.50E-10	4.99E-10
Th-230	1.6617E-10	17.15	34.31	0.00E+00	2.85E-09	5.70E-09
Th-232	8.3361E-12	17.15	34.31	0.00E+00	1.43E-10	2.86E-10
Tl-208	2.1664E-08	17.15	34.31	0.00E+00	3.72E-07	7.43E-07
U-232	5.8669E-08	17.15	34.31	0.00E+00	1.01E-06	2.01E-06
U-233	3.1847E-09	17.15	34.31	0.00E+00	5.46E-08	1.09E-07
U-234	3.8769E-07	17.15	34.31	0.00E+00	6.65E-06	1.33E-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	1.3652E+00	17.15	34.31	0.00E+00	2.34E+01	4.68E+01
Other Radionuclides					2.83E+01	5.66E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.561E+12
0.0250	5.322E+11
0.0375	4.603E+11
0.0575	4.961E+11
0.0850	2.998E+11
0.1250	1.946E+11
0.2250	2.581E+11
0.3750	1.126E+11
0.5750	1.854E+12
0.8500	1.877E+10
1.2500	1.865E+11
1.7500	4.841E+08
2.2500	1.005E+08
2.7500	2.905E+04
3.5000	2.206E+00
5.0000	9.088E-01
7.0000	1.005E-01
11.0000	1.129E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.00E-01	8.99E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	NONE	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.282	60 to 100

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		17.15
Bounding:		34.31

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

Checks

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

Estimated EOL HM/Given EOL HM: 0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1961
Estimates as of: 2010
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012682
Template Decay Time: 35 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	2.3344E-08	1.40	2.79	0.00E+00	3.26E-08	6.52E-08
Am-241	1.1135E-04	1.40	2.79	0.00E+00	1.55E-04	3.11E-04
Am-242m	8.5075E-09	1.40	2.79	0.00E+00	1.19E-08	2.38E-08
Am-243	9.8519E-10	1.40	2.79	0.00E+00	1.38E-09	2.75E-09
C-14	2.3012E-04	1.40	2.79	0.00E+00	3.21E-04	6.43E-04
Cl-36	1.2261E-06	1.40	2.79	0.00E+00	1.71E-06	3.42E-06
Cm-243	2.4875E-10	1.40	2.79	0.00E+00	3.47E-10	6.95E-10
Cm-244	2.3178E-09	1.40	2.79	0.00E+00	3.24E-09	6.47E-09
Co-60	7.0849E-02	1.40	2.79	0.00E+00	9.89E-02	1.98E-01
Cs-134	3.0266E-06	1.40	2.79	0.00E+00	4.23E-06	8.45E-06
Cs-135	3.0316E-05	1.40	2.79	0.00E+00	4.23E-05	8.47E-05
Cs-137	1.4511E+00	1.40	2.79	0.00E+00	2.03E+00	4.05E+00
Eu-154	6.6955E-04	1.40	2.79	0.00E+00	9.35E-04	1.87E-03
Eu-155	6.9850E-04	1.40	2.79	0.00E+00	9.75E-04	1.95E-03
Fe-55	1.2318E-03	1.40	2.79	0.00E+00	1.72E-03	3.44E-03
H-3	2.5141E-03	1.40	2.79	0.00E+00	3.51E-03	7.02E-03
I-129	7.3195E-07	1.40	2.79	0.00E+00	1.02E-06	2.04E-06
Kr-85	4.1281E-02	1.40	2.79	0.00E+00	5.76E-02	1.15E-01
Np-237	1.1489E-06	1.40	2.79	0.00E+00	1.60E-06	3.21E-06
Pa-231	4.5241E-06	1.40	2.79	0.00E+00	6.32E-06	1.26E-07
Pb-210	6.4476E-13	1.40	2.79	0.00E+00	9.00E-13	1.80E-12
Pm-147	1.1651E-03	1.40	2.79	0.00E+00	1.63E-03	3.25E-03
Pu-238	2.9517E-04	1.40	2.79	0.00E+00	4.12E-04	8.24E-04
Pu-239	6.6772E-04	1.40	2.79	0.00E+00	9.32E-04	1.86E-03
Pu-240	8.6839E-05	1.40	2.79	0.00E+00	1.21E-04	2.42E-04
Pu-241	7.1514E-04	1.40	2.79	0.00E+00	9.98E-04	2.00E-03
Pu-242	1.9717E-09	1.40	2.79	0.00E+00	2.75E-09	5.51E-09
Ra-226	1.7654E-12	1.40	2.79	0.00E+00	2.46E-12	4.93E-12
Ra-228	8.2928E-12	1.40	2.79	0.00E+00	1.16E-11	2.32E-11
Ru-106	1.8419E-10	1.40	2.79	0.00E+00	2.57E-10	5.14E-10
Se-79	1.3223E-05	1.40	2.79	0.00E+00	1.85E-05	3.69E-05
Sn-126	1.1493E-05	1.40	2.79	0.00E+00	1.60E-05	3.21E-05
Sr-90	1.3649E+00	1.40	2.79	0.00E+00	1.91E+00	3.81E+00
Tc-99	4.6656E-04	1.40	2.79	0.00E+00	6.51E-04	1.30E-03
Th-229	1.4547E-11	1.40	2.79	0.00E+00	2.03E-11	4.06E-11
Th-230	1.6617E-10	1.40	2.79	0.00E+00	2.32E-10	4.64E-10
Th-232	8.3361E-12	1.40	2.79	0.00E+00	1.16E-11	2.33E-11
Tl-208	2.1664E-08	1.40	2.79	0.00E+00	3.02E-08	6.05E-08
U-232	5.8669E-08	1.40	2.79	0.00E+00	8.19E-08	1.64E-07
U-233	3.1847E-09	1.40	2.79	0.00E+00	4.45E-09	8.89E-09
U-234	3.8769E-07	1.40	2.79	0.00E+00	5.41E-07	1.08E-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	1.3652E+00	1.40	2.79	0.00E+00	1.91E+00	3.81E+00
Other Radionuclides					2.30E+00	4.61E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.084E+11
0.0250	4.331E+10
0.0375	3.746E+10
0.0575	4.038E+10
0.0850	2.440E+10
0.1250	1.584E+10
0.2250	2.100E+10
0.3750	9.160E+09
0.5750	1.509E+11
0.8500	1.527E+09
1.2500	1.518E+10
1.7500	3.940E+07
2.2500	8.180E+04
2.7500	2.364E+03
3.5000	1.798E-01
5.0000	7.406E-02
7.0000	8.190E-03
11.0000	9.199E-04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.44E-02	4.88E-02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	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: 2010
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: 25 years

Estimated Canister usage: HIC = 1.56

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.3562E-08	119.03	238.05	0.00E+00	1.61E-06	3.23E-06
Am-241	1.0168E-04	119.03	238.05	0.00E+00	1.21E-02	2.42E-02
Am-242m	8.9052E-09	119.03	238.05	0.00E+00	1.06E-06	2.12E-06
Am-243	9.8602E-10	119.03	238.05	0.00E+00	1.17E-07	2.35E-07
C-14	2.3045E-04	119.03	238.05	0.00E+00	2.74E-02	5.49E-02
Cl-36	1.2261E-06	119.03	238.05	0.00E+00	1.46E-04	2.92E-04
Cm-243	3.1730E-10	119.03	238.05	0.00E+00	3.78E-08	7.55E-08
Cm-244	3.3977E-09	119.03	238.05	0.00E+00	4.04E-07	8.09E-07
Co-60	2.6373E-01	119.03	238.05	0.00E+00	3.14E+01	6.28E+01
Cs-134	8.7072E-05	119.03	238.05	0.00E+00	1.04E-02	2.07E-02
Cs-135	3.0316E-05	119.03	238.05	0.00E+00	3.61E-03	7.22E-03
Cs-137	1.8286E+00	119.03	238.05	0.00E+00	2.18E+02	4.35E+02
Eu-154	1.4982E-03	119.03	238.05	0.00E+00	1.78E-01	3.57E-01
Eu-155	2.8236E-03	119.03	238.05	0.00E+00	3.36E-01	6.72E-01
Fe-55	1.7687E-02	119.03	238.05	0.00E+00	2.11E+00	4.21E+00
H-3	4.4043E-03	119.03	238.05	0.00E+00	5.24E-01	1.05E+00
I-129	7.3195E-07	119.03	238.05	0.00E+00	8.71E-05	1.74E-04
Kr-85	7.8769E-02	119.03	238.05	0.00E+00	9.38E+00	1.88E+01
Np-237	1.1484E-06	119.03	238.05	0.00E+00	1.37E-04	2.73E-04
Pa-231	3.2396E-06	119.03	238.05	0.00E+00	3.86E-06	7.71E-06
Pb-210	2.4409E-13	119.03	238.05	0.00E+00	2.91E-11	5.81E-11
Pm-147	1.6331E-02	119.03	238.05	0.00E+00	1.94E+00	3.89E+00
Pu-238	3.1947E-04	119.03	238.05	0.00E+00	3.80E-02	7.60E-02
Pu-239	6.6789E-04	119.03	238.05	0.00E+00	7.95E-02	1.59E-01
Pu-240	8.6922E-05	119.03	238.05	0.00E+00	1.03E-02	2.07E-02
Pu-241	1.1567E-03	119.03	238.05	0.00E+00	1.38E-01	2.75E-01
Pu-242	1.9717E-09	119.03	238.05	0.00E+00	2.35E-07	4.69E-07
Ra-226	8.6190E-13	119.03	238.05	0.00E+00	1.03E-10	2.05E-10
Ra-228	8.1498E-12	119.03	238.05	0.00E+00	9.70E-10	1.94E-09
Ru-106	1.7770E-07	119.03	238.05	0.00E+00	2.12E-05	4.23E-05
Se-79	1.3225E-05	119.03	238.05	0.00E+00	1.57E-03	3.15E-03
Sn-126	1.1493E-05	119.03	238.05	0.00E+00	1.37E-03	2.74E-03
Sr-90	1.7321E+00	119.03	238.05	0.00E+00	2.06E+02	4.12E+02
Tc-99	4.6656E-04	119.03	238.05	0.00E+00	5.55E-02	1.11E-01
Th-229	1.0110E-11	119.03	238.05	0.00E+00	1.20E-09	2.41E-09
Th-230	1.1466E-10	119.03	238.05	0.00E+00	1.36E-08	2.73E-08
Th-232	8.3245E-12	119.03	238.05	0.00E+00	9.91E-10	1.98E-09
Tl-208	2.3860E-06	119.03	238.05	0.00E+00	2.84E-06	5.68E-06
U-232	6.4576E-06	119.03	238.05	0.00E+00	7.69E-06	1.54E-05
U-233	3.1082E-09	119.03	238.05	0.00E+00	3.70E-07	7.40E-07
U-234	3.7587E-07	119.03	238.05	0.00E+00	4.47E-05	8.95E-05
U-235	-2.7761E-06	119.03	0.00	9.14E-03	8.81E-03	9.14E-03
U-238	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	1.7321E+00	119.03	238.05	0.00E+00	2.06E+02	4.12E+02
Other Radionuclides					2.42E+02	4.83E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.265E+13
0.0250	4.706E+12
0.0375	4.062E+12
0.0575	4.382E+12
0.0850	2.650E+12
0.1250	1.722E+12
0.2250	2.274E+12
0.3750	9.927E+11
0.5750	1.621E+13
0.8500	1.690E+11
1.2500	4.708E+12
1.7500	4.354E+09
2.2500	2.508E+07
2.7500	2.760E+05
3.5000	5.907E+01
5.0000	6.232E+00
7.0000	6.887E-01
11.0000	7.733E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.95E+00	5.91E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	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: 2010
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated Canister usage: 18"x15" 1.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	6,732.94	13,465.87	0.00E+00	5.91E-06	1.18E-05
Am-241	1.4352E-01	6,732.94	13,465.87	0.00E+00	9.66E+02	1.93E+03
Am-242m	2.8698E-04	6,732.94	13,465.87	0.00E+00	1.93E+00	3.86E+00
Am-243	6.2565E-04	6,732.94	13,465.87	0.00E+00	4.21E+00	8.42E+00
C-14	4.7901E-05	6,732.94	13,465.87	0.00E+00	3.23E-01	6.45E-01
Cl-36	8.0297E-07	6,732.94	13,465.87	0.00E+00	5.41E-03	1.08E-02
Cm-243	2.5081E-04	6,732.94	13,465.87	0.00E+00	1.69E+00	3.38E+00
Cm-244	4.9015E-02	6,732.94	13,465.87	0.00E+00	3.30E+02	6.60E+02
Co-60	2.5581E-03	6,732.94	13,465.87	0.00E+00	1.72E+01	3.44E+01
Cs-134	4.0536E-05	6,732.94	13,465.87	0.00E+00	2.73E-01	5.46E-01
Cs-135	1.4433E-05	6,732.94	13,465.87	0.00E+00	9.72E-02	1.94E-01
Cs-137	1.3979E+00	6,732.94	13,465.87	0.00E+00	9.41E+03	1.88E+04
Eu-154	2.0203E-02	6,732.94	13,465.87	0.00E+00	1.36E+02	2.72E+02
Eu-155	1.7684E-03	6,732.94	13,465.87	0.00E+00	1.19E+01	2.38E+01
Fe-55	4.3136E-05	6,732.94	13,465.87	0.00E+00	2.90E-01	5.81E-01
H-3	2.0769E-02	6,732.94	13,465.87	0.00E+00	1.40E+02	2.80E+02
I-129	9.8288E-07	6,732.94	13,465.87	0.00E+00	6.62E-03	1.32E-02
Kr-85	2.8214E-02	6,732.94	13,465.87	0.00E+00	1.90E+02	3.80E+02
Np-237	1.1218E-05	6,732.94	13,465.87	0.00E+00	7.55E-02	1.51E-01
Pa-231	1.3036E-09	6,732.94	13,465.87	0.00E+00	8.78E-06	1.76E-05
Pb-210	8.5078E-11	6,732.94	13,465.87	0.00E+00	5.73E-07	1.15E-06
Pm-147	3.6531E-04	6,732.94	13,465.87	0.00E+00	2.46E+00	4.92E+00
Pu-238	7.4564E-02	6,732.94	13,465.87	0.00E+00	5.02E+02	1.00E+03
Pu-239	1.1623E-02	6,732.94	13,465.87	0.00E+00	7.83E+01	1.57E+02
Pu-240	1.5132E-02	6,732.94	13,465.87	0.00E+00	1.02E+02	2.04E+02
Pu-241	9.0036E-01	6,732.94	13,465.87	0.00E+00	6.06E+03	1.21E+04
Pu-242	6.4260E-05	6,732.94	13,465.87	0.00E+00	4.33E-01	8.65E-01
Ra-226	2.2804E-10	6,732.94	13,465.87	0.00E+00	1.54E-06	3.07E-06
Ra-228	5.2713E-12	6,732.94	13,465.87	0.00E+00	3.55E-08	7.10E-08
Ru-106	6.1160E-10	6,732.94	13,465.87	0.00E+00	4.12E-06	8.24E-06
Se-79	1.2377E-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	9.1667E-01	6,732.94	13,465.87	0.00E+00	6.17E+03	1.23E+04
Tc-99	3.9357E-04	6,732.94	13,465.87	0.00E+00	2.65E+00	5.30E+00
Th-229	1.2057E-10	6,732.94	13,465.87	0.00E+00	8.12E-07	1.62E-06
Th-230	2.1043E-08	6,732.94	13,465.87	0.00E+00	1.42E-04	2.83E-04
Th-232	5.2972E-12	6,732.94	13,465.87	0.00E+00	3.57E-08	7.13E-08
Tl-208	1.7474E-07	6,732.94	13,465.87	0.00E+00	1.18E-03	2.35E-03
U-232	4.7368E-07	6,732.94	13,465.87	0.00E+00	3.19E-03	6.38E-03
U-233	2.5097E-08	6,732.94	13,465.87	0.00E+00	1.69E-04	3.38E-04
U-234	5.0000E-05	6,732.94	13,465.87	0.00E+00	3.37E-01	6.73E-01
U-235	-1.4489E-06	6,732.94	0.00	1.48E-02	5.05E-03	1.48E-02
U-236	7.5824E-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	9.1699E-01	6,732.94	13,465.87	0.00E+00	6.17E+03	1.23E+04
Other Radionuclides					9.04E+03	1.81E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.245E+14
0.0250	1.461E+14
0.0375	1.393E+14
0.0575	1.610E+14
0.0850	8.107E+13
0.1250	5.626E+13
0.2250	6.952E+13
0.3750	2.989E+13
0.5750	6.953E+14
0.8500	9.619E+12
1.2500	9.448E+12
1.7500	2.829E+11
2.2500	4.556E+07
2.7500	9.334E+07
3.5000	9.611E+06
5.0000	4.109E+06
7.0000	4.736E+05
11.0000	5.440E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.85E+02	3.10E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	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	Estimated EOL HM/Given EOL HM
Nominal:	0.81	1.02	1.00
Bounding:	1.63		

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

[2]Total burnup for all fuel associated with this worksheet must be 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: 2010
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: 12.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	4,021.39	8,042.78	0.00E+00	3.53E-06	7.06E-06	Avg. MeV	
Am-241	1.4352E-01	4,021.39	8,042.78	0.00E+00	5.77E+02	1.15E+03	0.0150	4.327E+14
Am-242m	2.8698E-04	4,021.39	8,042.78	0.00E+00	1.15E+00	2.31E+00	0.0250	8.726E+13
Am-243	6.2565E-04	4,021.39	8,042.78	0.00E+00	2.52E+00	5.03E+00	0.0375	8.323E+13
C-14	4.7901E-05	4,021.39	8,042.78	0.00E+00	1.93E-01	3.85E-01	0.0575	9.617E+13
Cl-36	8.0297E-07	4,021.39	8,042.78	0.00E+00	3.23E-03	6.46E-03	0.0850	4.842E+13
Cm-243	2.5081E-04	4,021.39	8,042.78	0.00E+00	1.01E+00	2.02E+00	0.1250	3.360E+13
Cm-244	4.9015E-02	4,021.39	8,042.78	0.00E+00	1.97E+02	3.94E+02	0.2250	4.152E+13
Co-60	2.5581E-03	4,021.39	8,042.78	0.00E+00	1.03E+01	2.06E+01	0.3750	1.785E+13
Cs-134	4.0536E-05	4,021.39	8,042.78	0.00E+00	1.63E-01	3.26E-01	0.5750	4.153E+14
Cs-135	1.4433E-05	4,021.39	8,042.78	0.00E+00	5.80E-02	1.16E-01	0.8500	5.745E+12
Cs-137	1.3979E+00	4,021.39	8,042.78	0.00E+00	5.62E+03	1.12E+04	1.2500	5.643E+12
Eu-154	2.0203E-02	4,021.39	8,042.78	0.00E+00	8.12E+01	1.62E+02	1.7500	1.690E+11
Eu-155	1.7684E-03	4,021.39	8,042.78	0.00E+00	7.11E+00	1.42E+01	2.2500	2.721E+07
Fe-55	4.3136E-05	4,021.39	8,042.78	0.00E+00	1.73E-01	3.47E-01	2.7500	5.575E+07
H-3	2.0769E-02	4,021.39	8,042.78	0.00E+00	8.35E+01	1.67E+02	3.5000	5.740E+06
I-129	9.8288E-07	4,021.39	8,042.78	0.00E+00	3.95E-03	7.91E-03	5.0000	2.454E+06
Kr-85	2.8214E-02	4,021.39	8,042.78	0.00E+00	1.13E+02	2.27E+02	7.0000	2.829E+05
Np-237	1.1218E-05	4,021.39	8,042.78	0.00E+00	4.51E-02	9.02E-02	11.0000	3.249E+04
Pa-231	1.3036E-09	4,021.39	8,042.78	0.00E+00	5.24E-06	1.05E-05		
Pb-210	8.5078E-11	4,021.39	8,042.78	0.00E+00	3.42E-07	6.84E-07		
Pm-147	3.6531E-04	4,021.39	8,042.78	0.00E+00	1.47E+00	2.94E+00		
Pu-238	7.4564E-02	4,021.39	8,042.78	0.00E+00	3.00E+02	6.00E+02		
Pu-239	1.1623E-02	4,021.39	8,042.78	0.00E+00	4.67E+01	9.35E+01		
Pu-240	1.5132E-02	4,021.39	8,042.78	0.00E+00	6.09E+01	1.22E+02		
Pu-241	9.0036E-01	4,021.39	8,042.78	0.00E+00	3.62E+03	7.24E+03		
Pu-242	6.4260E-05	4,021.39	8,042.78	0.00E+00	2.58E-01	5.17E-01		
Ra-226	2.2804E-10	4,021.39	8,042.78	0.00E+00	9.17E-07	1.83E-06		
Ra-228	5.2713E-12	4,021.39	8,042.78	0.00E+00	2.12E-08	4.24E-08		
Ru-106	6.1160E-10	4,021.39	8,042.78	0.00E+00	2.46E-06	4.92E-06		
Se-79	1.2377E-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	9.1667E-01	4,021.39	8,042.78	0.00E+00	3.69E+03	7.37E+03		
Tc-99	3.9357E-04	4,021.39	8,042.78	0.00E+00	1.58E+00	3.17E+00		
Th-229	1.2057E-10	4,021.39	8,042.78	0.00E+00	4.85E-07	9.70E-07		
Th-230	2.1043E-06	4,021.39	8,042.78	0.00E+00	8.46E-05	1.69E-04		
Th-232	5.2972E-12	4,021.39	8,042.78	0.00E+00	2.13E-08	4.26E-08		
Tl-208	1.7474E-07	4,021.39	8,042.78	0.00E+00	7.03E-04	1.41E-03		
U-232	4.7368E-07	4,021.39	8,042.78	0.00E+00	1.90E-03	3.81E-03		
U-233	2.5097E-08	4,021.39	8,042.78	0.00E+00	1.01E-04	2.02E-04		
U-234	5.0000E-05	4,021.39	8,042.78	0.00E+00	2.01E-01	4.02E-01		
U-235	-1.4489E-06	4,021.39	0.00	1.57E-03	0.00E+00	1.57E-03		
U-236	7.5824E-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	9.1699E-01	4,021.39	8,042.78	0.00E+00	3.69E+03	7.38E+03		
Other Radionuclides					5.40E+03	1.08E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.25E+01	1.85E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	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	Estimated EOL HM/Given EOL HM
Nominal:	4.58	5.72	1.10
Bounding:	9.16		

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

[2]Total burnup for all fuel associated with this worksheet must be 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: 2010
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]Template Burnup(MWd): 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 25 years

Estimated Canister usage: 18"x10' 6.11

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	5.4520E-10	22,675.71	45,351.43	0.00E+00	1.24E-05	2.47E-05
Am-241	9.2284E-03	22,675.71	45,351.43	0.00E+00	2.09E+02	4.19E+02
Am-242m	1.3390E-06	22,675.71	45,351.43	0.00E+00	3.04E-02	6.07E-02
Am-243	3.7084E-05	22,675.71	45,351.43	0.00E+00	8.41E-01	1.68E+00
C-14	2.6452E-08	22,675.71	45,351.43	0.00E+00	6.00E-04	1.20E-03
Cl-36	4.4441E-31	22,675.71	45,351.43	0.00E+00	1.01E-26	2.02E-26
Cm-243	5.0498E-06	22,675.71	45,351.43	0.00E+00	1.15E-01	2.29E-01
Cm-244	3.8451E-03	22,675.71	45,351.43	0.00E+00	8.72E+01	1.74E+02
Co-60	2.5225E-05	22,675.71	45,351.43	0.00E+00	5.72E-01	1.14E+00
Cs-134	1.9630E-03	22,675.71	45,351.43	0.00E+00	4.50E+01	8.99E+01
Cs-135	4.2564E-06	22,675.71	45,351.43	0.00E+00	9.65E-02	1.93E-01
Cs-137	1.8141E+00	22,675.71	45,351.43	0.00E+00	4.11E+04	8.23E+04
Eu-154	3.4733E-02	22,675.71	45,351.43	0.00E+00	7.88E+02	1.58E+03
Eu-155	7.1081E-03	22,675.71	45,351.43	0.00E+00	1.61E+02	3.22E+02
Fe-55	3.5790E-04	22,675.71	45,351.43	0.00E+00	8.12E+00	1.62E+01
H-3	3.4945E-03	22,675.71	45,351.43	0.00E+00	7.92E+01	1.58E+02
I-129	6.6403E-07	22,675.71	45,351.43	0.00E+00	1.51E-02	3.01E-02
Kr-85	7.8250E-02	22,675.71	45,351.43	0.00E+00	1.77E+03	3.55E+03
Np-237	3.1567E-05	22,675.71	45,351.43	0.00E+00	7.16E-01	1.43E+00
Pa-231	1.3372E-09	22,675.71	45,351.43	0.00E+00	3.03E-05	6.06E-05
Pb-210	3.0644E-11	22,675.71	45,351.43	0.00E+00	6.95E-07	1.39E-06
Pm-147	6.5188E-03	22,675.71	45,351.43	0.00E+00	1.48E+02	2.96E+02
Pu-238	1.4769E-01	22,675.71	45,351.43	0.00E+00	3.35E+03	6.70E+03
Pu-239	6.9502E-04	22,675.71	45,351.43	0.00E+00	1.58E+01	3.15E+01
Pu-240	3.7928E-04	22,675.71	45,351.43	0.00E+00	8.60E+00	1.72E+01
Pu-241	1.0565E-01	22,675.71	45,351.43	0.00E+00	2.40E+03	4.79E+03
Pu-242	3.0911E-06	22,675.71	45,351.43	0.00E+00	7.01E-02	1.40E-01
Ra-226	1.1081E-10	22,675.71	45,351.43	0.00E+00	2.51E-06	5.03E-06
Ra-228	2.1185E-14	22,675.71	45,351.43	0.00E+00	4.80E-10	9.61E-10
Ru-106	2.3621E-07	22,675.71	45,351.43	0.00E+00	5.36E-03	1.07E-02
Se-79	1.2339E-05	22,675.71	45,351.43	0.00E+00	2.80E-01	5.60E-01
Sn-126	1.0194E-05	22,675.71	45,351.43	0.00E+00	2.31E-01	4.62E-01
Sr-90	1.6932E+00	22,675.71	45,351.43	0.00E+00	3.84E+04	7.68E+04
Tc-99	3.8056E-04	22,675.71	45,351.43	0.00E+00	8.63E+00	1.73E+01
Th-229	9.1252E-12	22,675.71	45,351.43	0.00E+00	2.07E-07	4.14E-07
Th-230	1.5407E-08	22,675.71	45,351.43	0.00E+00	3.49E-04	6.99E-04
Th-232	2.8937E-14	22,675.71	45,351.43	0.00E+00	6.56E-10	1.31E-09
Tl-208	4.7272E-08	22,675.71	45,351.43	0.00E+00	1.07E-03	2.14E-03
U-232	1.2855E-07	22,675.71	45,351.43	0.00E+00	2.92E-03	5.83E-03
U-233	5.1470E-09	22,675.71	45,351.43	0.00E+00	1.17E-04	2.33E-04
U-234	5.6069E-05	22,675.71	45,351.43	0.00E+00	1.27E+00	2.54E+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	1.6932E+00	22,675.71	45,351.43	0.00E+00	3.84E+04	7.68E+04
Other Radionuclides					3.94E+04	7.87E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.252E+15
0.0250	8.751E+14
0.0375	7.727E+14
0.0575	8.241E+14
0.0850	4.960E+14
0.1250	3.442E+14
0.2250	4.281E+14
0.3750	1.854E+14
0.5750	3.073E+15
0.8500	6.053E+13
1.2500	4.085E+13
1.7500	1.691E+12
2.2500	9.114E+07
2.7500	7.835E+07
3.5000	2.690E+06
5.0000	1.140E+06
7.0000	1.308E+05
11.0000	1.498E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.88E+02	1.18E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.06510638	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.83	
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: 2010
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]Template Burnup(MWd): 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 25 years

Estimated Canister usage: 18"x10' 0.56

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	5.4520E-10	2,061.43	4,122.86	0.00E+00	1.12E-06	2.25E-06
Am-241	9.2284E-03	2,061.43	4,122.86	0.00E+00	1.90E+01	3.80E+01
Am-242m	1.3390E-06	2,061.43	4,122.86	0.00E+00	2.76E-03	5.52E-03
Am-243	3.7084E-05	2,061.43	4,122.86	0.00E+00	7.64E-02	1.53E-01
C-14	2.6452E-06	2,061.43	4,122.86	0.00E+00	5.45E-05	1.09E-04
Cl-36	4.4441E-31	2,061.43	4,122.86	0.00E+00	9.16E-28	1.83E-27
Cm-243	5.0498E-06	2,061.43	4,122.86	0.00E+00	1.04E-02	2.08E-02
Cm-244	3.8451E-03	2,061.43	4,122.86	0.00E+00	7.93E+00	1.59E+01
Co-60	2.5225E-05	2,061.43	4,122.86	0.00E+00	5.20E-02	1.04E-01
Cs-134	1.9830E-03	2,061.43	4,122.86	0.00E+00	4.09E+00	8.18E+00
Cs-135	4.2564E-06	2,061.43	4,122.86	0.00E+00	8.77E-03	1.75E-02
Cs-137	1.8141E+00	2,061.43	4,122.86	0.00E+00	3.74E+03	7.48E+03
Eu-154	3.4733E-02	2,061.43	4,122.86	0.00E+00	7.16E+01	1.43E+02
Eu-155	7.1081E-03	2,061.43	4,122.86	0.00E+00	1.47E+01	2.93E+01
Fe-55	3.5790E-04	2,061.43	4,122.86	0.00E+00	7.38E-01	1.48E+00
H-3	3.4945E-03	2,061.43	4,122.86	0.00E+00	7.20E+00	1.44E+01
I-129	6.6403E-07	2,061.43	4,122.86	0.00E+00	1.37E-03	2.74E-03
Kr-85	7.8250E-02	2,061.43	4,122.86	0.00E+00	1.61E+02	3.23E+02
Np-237	3.1567E-05	2,061.43	4,122.86	0.00E+00	6.51E-02	1.30E-01
Pa-231	1.3372E-09	2,061.43	4,122.86	0.00E+00	2.76E-06	5.51E-06
Pb-210	3.0644E-11	2,061.43	4,122.86	0.00E+00	6.32E-08	1.26E-07
Pm-147	6.5188E-03	2,061.43	4,122.86	0.00E+00	1.34E+01	2.69E+01
Pu-238	1.4769E-01	2,061.43	4,122.86	0.00E+00	3.04E+02	6.09E+02
Pu-239	6.9502E-04	2,061.43	4,122.86	0.00E+00	1.43E+00	2.87E+00
Pu-240	3.7928E-04	2,061.43	4,122.86	0.00E+00	7.82E-01	1.56E+00
Pu-241	1.0565E-01	2,061.43	4,122.86	0.00E+00	2.18E+02	4.36E+02
Pu-242	3.0911E-06	2,061.43	4,122.86	0.00E+00	6.37E-03	1.27E-02
Ra-226	1.1081E-10	2,061.43	4,122.86	0.00E+00	2.28E-07	4.57E-07
Ra-228	2.1185E-14	2,061.43	4,122.86	0.00E+00	4.37E-11	8.73E-11
Ru-106	2.3621E-07	2,061.43	4,122.86	0.00E+00	4.87E-04	9.74E-04
Se-79	1.2339E-05	2,061.43	4,122.86	0.00E+00	2.54E-02	5.09E-02
Sn-126	1.0194E-05	2,061.43	4,122.86	0.00E+00	2.10E-02	4.20E-02
Sr-90	1.6932E+00	2,061.43	4,122.86	0.00E+00	3.49E+03	6.98E+03
Tc-99	3.8056E-04	2,061.43	4,122.86	0.00E+00	7.84E-01	1.57E+00
Th-229	9.1252E-12	2,061.43	4,122.86	0.00E+00	1.88E-08	3.76E-08
Th-230	1.5407E-08	2,061.43	4,122.86	0.00E+00	3.18E-05	6.35E-05
Th-232	2.8937E-14	2,061.43	4,122.86	0.00E+00	5.97E-11	1.19E-10
Tl-208	4.7272E-08	2,061.43	4,122.86	0.00E+00	9.74E-05	1.95E-04
U-232	1.2855E-07	2,061.43	4,122.86	0.00E+00	2.65E-04	5.30E-04
U-233	5.1470E-09	2,061.43	4,122.86	0.00E+00	1.06E-05	2.12E-05
U-234	5.6069E-05	2,061.43	4,122.86	0.00E+00	1.16E-01	2.31E-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	1.6932E+00	2,061.43	4,122.86	0.00E+00	3.49E+03	6.98E+03
Other Radionuclides					3.58E+03	7.16E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.865E+14
0.0250	7.955E+13
0.0375	7.024E+13
0.0575	7.492E+13
0.0850	4.509E+13
0.1250	3.129E+13
0.2250	3.892E+13
0.3750	1.685E+13
0.5750	2.794E+14
0.8500	5.503E+12
1.2500	3.714E+12
1.7500	1.537E+11
2.2500	8.285E+08
2.7500	7.123E+08
3.5000	2.445E+05
5.0000	1.037E+05
7.0000	1.189E+04
11.0000	1.362E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.35E+01	1.07E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.08510638	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2,061.43
Bounding:		4,122.86

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.63	
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: 2010
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: 15 years

Estimated Canister usage: 18"x10' 0.01

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.9744E-09	23,240.11	23,240.11	0.00E+00	4.59E-05	4.59E-05
Am-241	2.8150E-03	23,240.11	23,240.11	0.00E+00	6.54E+01	6.54E+01
Am-242m	1.3501E-06	23,240.11	23,240.11	0.00E+00	3.14E-02	3.14E-02
Am-243	1.4761E-07	23,240.11	23,240.11	0.00E+00	3.43E-03	3.43E-03
C-14	1.2854E-04	23,240.11	23,240.11	0.00E+00	2.99E+00	2.99E+00
Cl-36	2.8120E-06	23,240.11	23,240.11	0.00E+00	6.54E-02	6.54E-02
Cm-243	1.4075E-07	23,240.11	23,240.11	0.00E+00	3.27E-03	3.27E-03
Cm-244	1.1570E-06	23,240.11	23,240.11	0.00E+00	2.69E-02	2.69E-02
Co-60	3.4481E-01	23,240.11	23,240.11	0.00E+00	8.01E+03	8.01E+03
Cs-134	3.1474E-03	23,240.11	23,240.11	0.00E+00	7.31E+01	7.31E+01
Cs-135	3.2195E-05	23,240.11	23,240.11	0.00E+00	7.48E-01	7.48E-01
Cs-137	2.1880E+00	23,240.11	23,240.11	0.00E+00	5.08E+04	5.08E+04
Eu-154	6.8647E-03	23,240.11	23,240.11	0.00E+00	1.60E+02	1.60E+02
Eu-155	7.2481E-03	23,240.11	23,240.11	0.00E+00	1.68E+02	1.68E+02
Fe-55	5.3744E-02	23,240.11	23,240.11	0.00E+00	1.25E+03	1.25E+03
H-3	6.3414E-03	23,240.11	23,240.11	0.00E+00	1.47E+02	1.47E+02
I-129	7.3684E-07	23,240.11	23,240.11	0.00E+00	1.71E-02	1.71E-02
Kr-85	1.3236E-01	23,240.11	23,240.11	0.00E+00	3.08E+03	3.08E+03
Np-237	1.2504E-06	23,240.11	23,240.11	0.00E+00	2.91E-02	2.91E-02
Pa-231	5.9774E-09	23,240.11	23,240.11	0.00E+00	1.39E-04	1.39E-04
Pb-210	3.3534E-14	23,240.11	23,240.11	0.00E+00	7.79E-10	7.79E-10
Pm-147	1.5002E-01	23,240.11	23,240.11	0.00E+00	3.49E+03	3.49E+03
Pu-238	9.5970E-04	23,240.11	23,240.11	0.00E+00	2.23E+01	2.23E+01
Pu-239	5.5278E-03	23,240.11	23,240.11	0.00E+00	1.28E+02	1.28E+02
Pu-240	2.1248E-03	23,240.11	23,240.11	0.00E+00	4.94E+01	4.94E+01
Pu-241	6.3023E-02	23,240.11	23,240.11	0.00E+00	1.46E+03	1.46E+03
Pu-242	2.3128E-07	23,240.11	23,240.11	0.00E+00	5.37E-03	5.37E-03
Ra-226	1.6346E-13	23,240.11	23,240.11	0.00E+00	3.80E-09	3.80E-09
Ra-228	2.3173E-10	23,240.11	23,240.11	0.00E+00	5.39E-06	5.39E-06
Ru-106	9.5038E-05	23,240.11	23,240.11	0.00E+00	2.21E+00	2.21E+00
Se-79	1.3017E-05	23,240.11	23,240.11	0.00E+00	3.03E-01	3.03E-01
Sn-126	1.2165E-05	23,240.11	23,240.11	0.00E+00	2.83E-01	2.83E-01
Sr-90	2.0541E+00	23,240.11	23,240.11	0.00E+00	4.77E+04	4.77E+04
Tc-99	4.4241E-04	23,240.11	23,240.11	0.00E+00	1.03E+01	1.03E+01
Th-229	2.5218E-10	23,240.11	23,240.11	0.00E+00	5.86E-06	5.86E-06
Th-230	3.3654E-11	23,240.11	23,240.11	0.00E+00	7.82E-07	7.82E-07
Th-232	2.5278E-10	23,240.11	23,240.11	0.00E+00	5.87E-06	5.87E-06
Tl-208	1.6511E-08	23,240.11	23,240.11	0.00E+00	3.84E-04	3.84E-04
U-232	4.4722E-08	23,240.11	23,240.11	0.00E+00	1.04E-03	1.04E-03
U-233	1.2209E-07	23,240.11	23,240.11	0.00E+00	2.84E-03	2.84E-03
U-234	1.8662E-07	23,240.11	23,240.11	0.00E+00	4.34E-03	4.34E-03
U-235	-2.6194E-06	23,240.11	0.00	2.10E-02	0.00E+00	2.10E-02
U-236	1.2693E-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	2.0541E+00	23,240.11	23,240.11	0.00E+00	4.77E+04	4.77E+04
Other Radionuclides					5.03E+04	5.03E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.636E+15
0.0250	5.510E+14
0.0375	4.757E+14
0.0575	5.104E+14
0.0850	3.087E+14
0.1250	2.022E+14
0.2250	2.643E+14
0.3750	1.172E+14
0.5750	1.901E+15
0.8500	2.405E+13
1.2500	6.028E+14
1.7500	5.743E+11
2.2500	3.625E+09
2.7500	4.108E+07
3.5000	2.325E+06
5.0000	1.213E+04
7.0000	1.370E+03
11.0000	1.559E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.89E+02	7.89E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	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: 2010
Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
[2]Template Burnup(MWd): 1270.275
Template BOL Heavy Metal Mass (MT): 0.012702752
Template Decay Time: 35 years

Estimated Canister usage: 18"x15" 1.62

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.8818E-06	2,252.15	4,504.30	0.00E+00	8.74E-03	1.75E-02	Avg. MeV	
Am-241	3.1387E-03	2,252.15	4,504.30	0.00E+00	7.07E+00	1.41E+01	0.0150	3.161E+14
Am-242m	2.3971E-06	2,252.15	4,504.30	0.00E+00	5.40E-03	1.08E-02	0.0250	6.475E+13
Am-243	4.6069E-05	2,252.15	4,504.30	0.00E+00	1.04E-01	2.08E-01	0.0375	5.643E+13
C-14	2.3121E-05	2,252.15	4,504.30	0.00E+00	5.21E-02	1.04E-01	0.0575	6.070E+13
Cl-36	1.0667E-06	2,252.15	4,504.30	0.00E+00	2.40E-03	4.80E-03	0.0850	3.665E+13
Cm-243	2.5357E-05	2,252.15	4,504.30	0.00E+00	5.71E-02	1.14E-01	0.1250	2.472E+13
Cm-244	6.4458E-03	2,252.15	4,504.30	0.00E+00	1.45E+01	2.90E+01	0.2250	3.179E+13
Co-60	4.5014E-04	2,252.15	4,504.30	0.00E+00	1.01E+00	2.03E+00	0.3750	1.375E+13
Cs-134	3.8086E-05	2,252.15	4,504.30	0.00E+00	8.58E-02	1.72E-01	0.5750	2.231E+14
Cs-135	2.4711E-05	2,252.15	4,504.30	0.00E+00	5.57E-02	1.11E-01	0.8500	3.525E+12
Cs-137	1.3273E+00	2,252.15	4,504.30	0.00E+00	2.99E+03	5.98E+03	1.2500	2.273E+12
Eu-154	1.5705E-02	2,252.15	4,504.30	0.00E+00	3.54E+01	7.07E+01	1.7500	1.079E+11
Eu-155	1.0415E-03	2,252.15	4,504.30	0.00E+00	2.35E+00	4.69E+00	2.2500	7.952E+08
Fe-55	4.4707E-08	2,252.15	4,504.30	0.00E+00	1.01E-04	2.01E-04	2.7500	9.415E+10
H-3	3.9094E-03	2,252.15	4,504.30	0.00E+00	8.80E+00	1.76E+01	3.5000	4.497E+05
I-129	1.0092E-06	2,252.15	4,504.30	0.00E+00	2.27E-03	4.55E-03	5.0000	1.918E+05
Kr-85	3.9519E-02	2,252.15	4,504.30	0.00E+00	8.90E+01	1.78E+02	7.0000	2.204E+04
Np-237	1.2541E-05	2,252.15	4,504.30	0.00E+00	2.82E-02	5.65E-02	11.0000	2.527E+03
Pa-231	4.7376E-06	2,252.15	4,504.30	0.00E+00	1.07E-02	2.13E-02		
Pb-210	1.4194E-09	2,252.15	4,504.30	0.00E+00	3.20E-06	6.39E-06		
Pm-147	1.5146E-04	2,252.15	4,504.30	0.00E+00	3.41E-01	6.82E-01		
Pu-238	1.6248E-01	2,252.15	4,504.30	0.00E+00	3.66E+02	7.32E+02		
Pu-239	1.3580E-04	2,252.15	4,504.30	0.00E+00	3.06E-01	6.12E-01		
Pu-240	2.7136E-04	2,252.15	4,504.30	0.00E+00	6.11E-01	1.22E+00		
Pu-241	1.9342E-02	2,252.15	4,504.30	0.00E+00	4.36E+01	8.71E+01		
Pu-242	3.8866E-06	2,252.15	4,504.30	0.00E+00	8.75E-03	1.75E-02		
Ra-226	2.7923E-09	2,252.15	4,504.30	0.00E+00	6.29E-06	1.26E-05		
Ra-228	9.1791E-07	2,252.15	4,504.30	0.00E+00	2.07E-03	4.13E-03		
Ru-106	3.5205E-11	2,252.15	4,504.30	0.00E+00	7.93E-08	1.59E-07		
Se-79	2.1082E-05	2,252.15	4,504.30	0.00E+00	4.75E-02	9.50E-02		
Sn-126	2.2192E-05	2,252.15	4,504.30	0.00E+00	5.00E-02	1.00E-01		
Sr-90	1.2667E+00	2,252.15	4,504.30	0.00E+00	2.85E+03	5.71E+03		
Tc-99	3.3331E-04	2,252.15	4,504.30	0.00E+00	7.51E-01	1.50E+00		
Th-229	1.0612E-05	2,252.15	4,504.30	0.00E+00	2.39E-02	4.78E-02		
Th-230	1.8878E-07	2,252.15	4,504.30	0.00E+00	4.25E-04	8.50E-04		
Th-232	-6.9673E-08	2,252.15	0.00	1.85E-03	1.69E-03	1.85E-03		
Tl-208	5.9530E-04	2,252.15	4,504.30	0.00E+00	1.34E+00	2.68E+00		
U-232	1.6115E-03	2,252.15	4,504.30	0.00E+00	3.63E+00	7.26E+00		
U-233	2.0602E-03	2,252.15	4,504.30	0.00E+00	4.64E+00	9.28E+00		
U-234	2.8939E-04	2,252.15	4,504.30	0.00E+00	6.52E-01	1.30E+00		
U-235	-1.7343E-08	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-06		
Y-90	1.2667E+00	2,252.15	4,504.30	0.00E+00	2.85E+03	5.71E+03		
Other Radionuclides					2.87E+03	5.74E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.80E+01	9.59E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	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	Estimated EOL HM/Given EOL HM
Nominal:	1.20	1.82	1.01
Bounding:	2.41	3.31	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1979
Estimates as of: 2010
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: 25 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	8.3425E-05	27.25	54.50	0.00E+00	2.27E-03	4.55E-03
Am-241	2.2387E-04	27.25	54.50	0.00E+00	6.10E-03	1.22E-02
Am-242m	1.5512E-06	27.25	54.50	0.00E+00	4.23E-05	8.45E-05
Am-243	3.1181E-07	27.25	54.50	0.00E+00	8.50E-06	1.70E-05
C-14	9.2539E-05	27.25	54.50	0.00E+00	2.52E-03	5.04E-03
Cl-36	1.8103E-06	27.25	54.50	0.00E+00	4.93E-05	9.87E-05
Cm-243	3.9020E-07	27.25	54.50	0.00E+00	1.06E-05	2.13E-05
Cm-244	2.0742E-05	27.25	54.50	0.00E+00	5.65E-04	1.13E-03
Co-60	3.2554E-03	27.25	54.50	0.00E+00	8.87E-02	1.77E-01
Cs-134	7.3823E-04	27.25	54.50	0.00E+00	2.01E-02	4.02E-02
Cs-135	2.8639E-05	27.25	54.50	0.00E+00	7.80E-04	1.56E-03
Cs-137	1.8609E+00	27.25	54.50	0.00E+00	5.07E+01	1.01E+02
Eu-154	1.9262E-02	27.25	54.50	0.00E+00	5.25E-01	1.05E+00
Eu-155	2.6721E-03	27.25	54.50	0.00E+00	7.28E-02	1.46E-01
Fe-55	3.3099E-05	27.25	54.50	0.00E+00	9.02E-04	1.80E-03
H-3	3.7296E-03	27.25	54.50	0.00E+00	1.02E-01	2.03E-01
I-129	1.5853E-06	27.25	54.50	0.00E+00	4.32E-05	8.64E-05
Kr-85	1.1958E-01	27.25	54.50	0.00E+00	3.26E+00	6.52E+00
Np-237	1.2513E-07	27.25	54.50	0.00E+00	3.41E-06	6.82E-06
Pa-231	1.2017E-04	27.25	54.50	0.00E+00	3.27E-03	6.55E-03
Pb-210	1.1939E-08	27.25	54.50	0.00E+00	3.25E-07	6.51E-07
Pm-147	3.6819E-03	27.25	54.50	0.00E+00	1.00E-01	2.01E-01
Pu-238	4.5953E-04	27.25	54.50	0.00E+00	1.25E-02	2.50E-02
Pu-239	2.7529E-05	27.25	54.50	0.00E+00	7.50E-04	1.50E-03
Pu-240	1.6184E-05	27.25	54.50	0.00E+00	4.41E-04	8.82E-04
Pu-241	2.3780E-03	27.25	54.50	0.00E+00	6.48E-02	1.30E-01
Pu-242	4.0821E-08	27.25	54.50	0.00E+00	1.11E-06	2.22E-06
Ra-226	1.4471E-08	27.25	54.50	0.00E+00	3.94E-07	7.89E-07
Ra-228	4.5651E-06	27.25	54.50	0.00E+00	1.24E-04	2.49E-04
Ru-106	3.8971E-08	27.25	54.50	0.00E+00	1.06E-06	2.12E-06
Se-79	3.5417E-05	27.25	54.50	0.00E+00	9.65E-04	1.93E-03
Sn-126	3.9848E-05	27.25	54.50	0.00E+00	1.09E-03	2.17E-03
Sr-90	1.8940E+00	27.25	54.50	0.00E+00	5.16E+01	1.03E+02
Tc-99	3.2534E-04	27.25	54.50	0.00E+00	8.87E-03	1.77E-02
Th-229	4.6839E-05	27.25	54.50	0.00E+00	1.28E-03	2.55E-03
Th-230	1.0322E-06	27.25	54.50	0.00E+00	2.81E-05	5.63E-05
Th-232	-9.0328E-08	27.25	0.00	2.57E-02	2.57E-02	2.57E-02
Tl-208	1.5386E-02	27.25	54.50	0.00E+00	4.19E-01	8.38E-01
U-232	4.1639E-02	27.25	54.50	0.00E+00	1.13E+00	2.27E+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	1.8940E+00	27.25	54.50	0.00E+00	5.16E+01	1.03E+02
Other Radionuclides					5.61E+01	1.12E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.963E+12
0.0250	1.178E+12
0.0375	1.011E+12
0.0575	1.100E+12
0.0850	6.989E+11
0.1250	4.479E+11
0.2250	6.241E+11
0.3750	2.533E+11
0.5750	3.828E+12
0.8500	7.575E+10
1.2500	4.791E+10
1.7500	4.568E+09
2.2500	1.854E+05
2.7500	2.944E+10
3.5000	6.749E+02
5.0000	2.032E+02
7.0000	1.358E+01
11.0000	9.047E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.40E+00	4.28E+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)
SNF ID #: 127
Fuel Units & Descr: 4 - 15 X 15 ROD ARRAY
Heavy Metal Mass: BOL=814.001kg; EOL=813.286kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1975
Estimates as of: 2010
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" 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	8.7758E-10	803.42	1,108.67	0.00E+00	7.05E-07	9.73E-07
Am-241	1.4352E-01	803.42	1,108.67	0.00E+00	1.15E+02	1.59E+02
Am-242m	2.8698E-04	803.42	1,108.67	0.00E+00	2.31E-01	3.18E-01
Am-243	6.2565E-04	803.42	1,108.67	0.00E+00	5.03E-01	6.94E-01
C-14	4.7901E-05	803.42	1,108.67	0.00E+00	3.85E-02	5.31E-02
Cl-36	8.0297E-07	803.42	1,108.67	0.00E+00	6.45E-04	8.90E-04
Cm-243	2.5081E-04	803.42	1,108.67	0.00E+00	2.02E-01	2.78E-01
Cm-244	4.9015E-02	803.42	1,108.67	0.00E+00	3.94E+01	5.43E+01
Co-60	2.5581E-03	803.42	1,108.67	0.00E+00	2.06E+00	2.84E+00
Cs-134	4.0536E-05	803.42	1,108.67	0.00E+00	3.26E-02	4.49E-02
Cs-135	1.4433E-05	803.42	1,108.67	0.00E+00	1.16E-02	1.60E-02
Cs-137	1.3979E+00	803.42	1,108.67	0.00E+00	1.12E+03	1.55E+03
Eu-154	2.0203E-02	803.42	1,108.67	0.00E+00	1.62E+01	2.24E+01
Eu-155	1.7684E-03	803.42	1,108.67	0.00E+00	1.42E+00	1.96E+00
Fe-55	4.3136E-05	803.42	1,108.67	0.00E+00	3.47E-02	4.78E-02
H-3	2.0769E-02	803.42	1,108.67	0.00E+00	1.67E+01	2.30E+01
I-129	9.8288E-07	803.42	1,108.67	0.00E+00	7.90E-04	1.09E-03
Kr-85	2.8214E-02	803.42	1,108.67	0.00E+00	2.27E+01	3.13E+01
Np-237	1.1218E-05	803.42	1,108.67	0.00E+00	9.01E-03	1.24E-02
Pa-231	1.3036E-09	803.42	1,108.67	0.00E+00	1.05E-06	1.45E-06
Pb-210	8.5078E-11	803.42	1,108.67	0.00E+00	6.84E-08	9.43E-08
Pm-147	3.6531E-04	803.42	1,108.67	0.00E+00	2.93E-01	4.05E-01
Pu-238	7.4564E-02	803.42	1,108.67	0.00E+00	5.99E+01	8.27E+01
Pu-239	1.1623E-02	803.42	1,108.67	0.00E+00	9.34E+00	1.29E+01
Pu-240	1.5132E-02	803.42	1,108.67	0.00E+00	1.22E+01	1.68E+01
Pu-241	9.0036E-01	803.42	1,108.67	0.00E+00	7.23E+02	9.98E+02
Pu-242	6.4260E-05	803.42	1,108.67	0.00E+00	5.16E-02	7.12E-02
Ra-226	2.2804E-10	803.42	1,108.67	0.00E+00	1.83E-07	2.53E-07
Ra-228	5.2713E-12	803.42	1,108.67	0.00E+00	4.24E-09	5.84E-09
Ru-106	6.1160E-10	803.42	1,108.67	0.00E+00	4.91E-07	6.78E-07
Se-79	1.2377E-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	9.1667E-01	803.42	1,108.67	0.00E+00	7.36E+02	1.02E+03
Tc-99	3.9357E-04	803.42	1,108.67	0.00E+00	3.16E-01	4.36E-01
Th-229	1.2057E-10	803.42	1,108.67	0.00E+00	9.69E-08	1.34E-07
Th-230	2.1043E-08	803.42	1,108.67	0.00E+00	1.69E-05	2.33E-05
Th-232	5.2972E-12	803.42	1,108.67	0.00E+00	4.26E-09	5.87E-09
Tl-208	1.7474E-07	803.42	1,108.67	0.00E+00	1.40E-04	1.94E-04
U-232	4.7368E-07	803.42	1,108.67	0.00E+00	3.81E-04	5.25E-04
U-233	2.5097E-08	803.42	1,108.67	0.00E+00	2.02E-05	2.78E-05
U-234	5.0000E-05	803.42	1,108.67	0.00E+00	4.02E-02	5.54E-02
U-235	-1.4489E-06	803.42	0.00	7.12E-02	7.00E-02	7.12E-02
U-236	7.5824E-06	803.42	1,108.67	0.00E+00	6.09E-03	8.41E-03
U-238	-2.6129E-07	803.42	0.00	2.63E-01	2.62E-01	2.63E-01
Y-90	9.1699E-01	803.42	1,108.67	0.00E+00	7.37E+02	1.02E+03
Other Radionuclides					1.08E+03	1.49E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.966E+13
0.0250	1.203E+13
0.0375	1.147E+13
0.0575	1.326E+13
0.0850	6.675E+12
0.1250	4.632E+12
0.2250	5.725E+12
0.3750	2.461E+12
0.5750	5.724E+13
0.8500	7.919E+11
1.2500	7.779E+11
1.7500	2.329E+10
2.2500	3.754E+08
2.7500	7.686E+06
3.5000	7.927E+05
5.0000	3.389E+05
7.0000	3.906E+04
11.0000	4.486E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.85E+01	2.55E+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
Nominal:	803.42	679.36
Bounding:	1,108.67	1,358.72

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: LOFT CENTER FUEL MODULE (FP-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: 2010
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' = 0.50

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	200.85	277.17	0.00E+00	1.76E-07	2.43E-07	Avg. MeV	
Am-241	1.4352E-01	200.85	277.17	0.00E+00	2.88E+01	3.98E+01	0.0150	1.491E+13
Am-242m	2.8698E-04	200.85	277.17	0.00E+00	5.76E-02	7.95E-02	0.0250	3.007E+12
Am-243	6.2565E-04	200.85	277.17	0.00E+00	1.26E-01	1.73E-01	0.0375	2.868E+12
C-14	4.7901E-05	200.85	277.17	0.00E+00	9.62E-03	1.33E-02	0.0575	3.314E+12
Cl-36	8.0297E-07	200.85	277.17	0.00E+00	1.61E-04	2.23E-04	0.0850	1.669E+12
Cm-243	2.5081E-04	200.85	277.17	0.00E+00	5.04E-02	6.95E-02	0.1250	1.158E+12
Cm-244	4.9015E-02	200.85	277.17	0.00E+00	9.84E+00	1.36E+01	0.2250	1.431E+12
Co-60	2.5581E-03	200.85	277.17	0.00E+00	5.14E-01	7.09E-01	0.3750	6.153E+11
Cs-134	4.0536E-05	200.85	277.17	0.00E+00	8.14E-03	1.12E-02	0.5750	1.431E+13
Cs-135	1.4433E-05	200.85	277.17	0.00E+00	2.90E-03	4.00E-03	0.8500	1.980E+11
Cs-137	1.3979E+00	200.85	277.17	0.00E+00	2.81E+02	3.87E+02	1.2500	1.945E+11
Eu-154	2.0203E-02	200.85	277.17	0.00E+00	4.06E+00	5.60E+00	1.7500	5.824E+09
Eu-155	1.7684E-03	200.85	277.17	0.00E+00	3.55E-01	4.90E-01	2.2500	9.384E+05
Fe-55	4.3136E-05	200.85	277.17	0.00E+00	8.66E-03	1.20E-02	2.7500	1.922E+06
H-3	2.0769E-02	200.85	277.17	0.00E+00	4.17E+00	5.76E+00	3.5000	1.982E+05
I-129	9.8288E-07	200.85	277.17	0.00E+00	1.97E-04	2.72E-04	5.0000	8.473E+04
Kr-85	2.8214E-02	200.85	277.17	0.00E+00	5.67E+00	7.82E+00	7.0000	9.766E+03
Np-237	1.1218E-05	200.85	277.17	0.00E+00	2.25E-03	3.11E-03	11.0000	1.122E+03
Pa-231	1.3036E-09	200.85	277.17	0.00E+00	2.62E-07	3.61E-07		
Pb-210	8.5078E-11	200.85	277.17	0.00E+00	1.71E-08	2.36E-08		
Pm-147	3.6531E-04	200.85	277.17	0.00E+00	7.34E-02	1.01E-01		
Pu-238	7.4564E-02	200.85	277.17	0.00E+00	1.50E+01	2.07E+01		
Pu-239	1.1623E-02	200.85	277.17	0.00E+00	2.33E+00	3.22E+00		
Pu-240	1.5132E-02	200.85	277.17	0.00E+00	3.04E+00	4.19E+00		
Pu-241	9.0036E-01	200.85	277.17	0.00E+00	1.81E+02	2.50E+02		
Pu-242	6.4260E-05	200.85	277.17	0.00E+00	1.29E-02	1.78E-02		
Ra-226	2.2804E-10	200.85	277.17	0.00E+00	4.58E-08	6.32E-08		
Ra-228	5.2713E-12	200.85	277.17	0.00E+00	1.06E-09	1.46E-09		
Ru-106	6.1160E-10	200.85	277.17	0.00E+00	1.23E-07	1.70E-07		
Se-79	1.2377E-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	9.1667E-01	200.85	277.17	0.00E+00	1.84E+02	2.54E+02		
Tc-99	3.9357E-04	200.85	277.17	0.00E+00	7.91E-02	1.09E-01		
Th-229	1.2057E-10	200.85	277.17	0.00E+00	2.42E-08	3.34E-08		
Th-230	2.1043E-08	200.85	277.17	0.00E+00	4.23E-06	5.83E-06		
Th-232	5.2972E-12	200.85	277.17	0.00E+00	1.06E-09	1.47E-09		
Tl-208	1.7474E-07	200.85	277.17	0.00E+00	3.51E-05	4.84E-05		
U-232	4.7368E-07	200.85	277.17	0.00E+00	9.51E-05	1.31E-04		
U-233	2.5097E-06	200.85	277.17	0.00E+00	5.04E-06	6.96E-06		
U-234	5.0000E-05	200.85	277.17	0.00E+00	1.00E-02	1.39E-02		
U-235	-1.4489E-06	200.85	0.00	1.78E-02	1.75E-02	1.78E-02		
U-236	7.5824E-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	9.1699E-01	200.85	277.17	0.00E+00	1.84E+02	2.54E+02		
Other Radionuclides					2.70E+02	3.72E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.62E+00	6.38E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	4.047	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	200.85	169.84
Bounding:	277.17	339.68

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1975
Estimates as of: 2010
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' 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	49.45	98.90	0.00E+00	4.34E-08	8.68E-08
Am-241	1.4352E-01	49.45	98.90	0.00E+00	7.10E+00	1.42E+01
Am-242m	2.8698E-04	49.45	98.90	0.00E+00	1.42E-02	2.84E-02
Am-243	6.2565E-04	49.45	98.90	0.00E+00	3.09E-02	6.19E-02
C-14	4.7901E-05	49.45	98.90	0.00E+00	2.37E-03	4.74E-03
Cl-36	8.0297E-07	49.45	98.90	0.00E+00	3.97E-05	7.94E-05
Cm-243	2.5081E-04	49.45	98.90	0.00E+00	1.24E-02	2.48E-02
Cm-244	4.9015E-02	49.45	98.90	0.00E+00	2.42E+00	4.85E+00
Co-60	2.5581E-03	49.45	98.90	0.00E+00	1.26E-01	2.53E-01
Cs-134	4.0536E-05	49.45	98.90	0.00E+00	2.00E-03	4.01E-03
Cs-135	1.4433E-05	49.45	98.90	0.00E+00	7.14E-04	1.43E-03
Cs-137	1.3979E+00	49.45	98.90	0.00E+00	6.91E+01	1.38E+02
Eu-154	2.0203E-02	49.45	98.90	0.00E+00	9.99E-01	2.00E+00
Eu-155	1.7684E-03	49.45	98.90	0.00E+00	8.74E-02	1.75E-01
Fe-55	4.3136E-05	49.45	98.90	0.00E+00	2.13E-03	4.27E-03
H-3	2.0769E-02	49.45	98.90	0.00E+00	1.03E+00	2.05E+00
I-129	9.8288E-07	49.45	98.90	0.00E+00	4.86E-05	9.72E-05
Kr-85	2.8214E-02	49.45	98.90	0.00E+00	1.40E+00	2.79E+00
Np-237	1.1218E-05	49.45	98.90	0.00E+00	5.55E-04	1.11E-03
Pa-231	1.3036E-09	49.45	98.90	0.00E+00	6.45E-08	1.29E-07
Pb-210	8.5078E-11	49.45	98.90	0.00E+00	4.21E-09	8.41E-09
Pm-147	3.6531E-04	49.45	98.90	0.00E+00	1.81E-02	3.61E-02
Pu-238	7.4564E-02	49.45	98.90	0.00E+00	3.69E+00	7.37E+00
Pu-239	1.1623E-02	49.45	98.90	0.00E+00	5.75E-01	1.15E+00
Pu-240	1.5132E-02	49.45	98.90	0.00E+00	7.48E-01	1.50E+00
Pu-241	9.0036E-01	49.45	98.90	0.00E+00	4.45E+01	8.90E+01
Pu-242	6.4260E-05	49.45	98.90	0.00E+00	3.18E-03	6.36E-03
Ra-226	2.2804E-10	49.45	98.90	0.00E+00	1.13E-08	2.26E-08
Ra-228	5.2713E-12	49.45	98.90	0.00E+00	2.61E-10	5.21E-10
Ru-106	6.1160E-10	49.45	98.90	0.00E+00	3.02E-08	6.05E-08
Se-79	1.2377E-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	9.1667E-01	49.45	98.90	0.00E+00	4.53E+01	9.07E+01
Tc-99	3.9357E-04	49.45	98.90	0.00E+00	1.95E-02	3.89E-02
Th-229	1.2057E-10	49.45	98.90	0.00E+00	5.96E-09	1.19E-08
Th-230	2.1043E-08	49.45	98.90	0.00E+00	1.04E-06	2.08E-06
Th-232	5.2972E-12	49.45	98.90	0.00E+00	2.62E-10	5.24E-10
Tl-208	1.7474E-07	49.45	98.90	0.00E+00	8.64E-06	1.73E-05
U-232	4.7368E-07	49.45	98.90	0.00E+00	2.34E-05	4.68E-05
U-233	2.5097E-08	49.45	98.90	0.00E+00	1.24E-06	2.48E-06
U-234	5.0000E-05	49.45	98.90	0.00E+00	2.47E-03	4.94E-03
U-235	-1.4489E-06	49.45	0.00	2.10E-02	2.10E-02	2.10E-02
U-236	7.5824E-06	49.45	98.90	0.00E+00	3.75E-04	7.50E-04
U-238	-2.6129E-07	49.45	0.00	3.03E-02	3.03E-02	3.03E-02
Y-90	9.1699E-01	49.45	98.90	0.00E+00	4.53E+01	9.07E+01
Other Radionuclides					6.64E+01	1.33E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.322E+12
0.0250	1.073E+12
0.0375	1.023E+12
0.0575	1.183E+12
0.0850	5.955E+11
0.1250	4.133E+11
0.2250	5.110E+11
0.3750	2.196E+11
0.5750	5.106E+12
0.8500	7.064E+10
1.2500	6.939E+10
1.7500	2.078E+09
2.2500	3.349E+05
2.7500	6.857E+05
3.5000	7.075E+04
5.0000	3.025E+04
7.0000	3.486E+03
11.0000	4.004E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.14E+00	2.28E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	47.48	49.45
Bounding:		98.90

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.01	1.04
Bounding:	0.03	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: LOFT CORNER FUEL MODULE
SNF ID #: 128
Fuel Units & Descr: 4 - 11 X 11 ROD ARRAY
Heavy Metal Mass: BOL=279.864kg; EOL=279.053kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1975
Estimates as of: 2010
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' = 2.00

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	780.26	1,560.52	0.00E+00	6.85E-07	1.37E-06
Am-241	1.4352E-01	780.26	1,560.52	0.00E+00	1.12E+02	2.24E+02
Am-242m	2.8698E-04	780.26	1,560.52	0.00E+00	2.24E-01	4.48E-01
Am-243	6.2565E-04	780.26	1,560.52	0.00E+00	4.88E-01	9.76E-01
C-14	4.7901E-05	780.26	1,560.52	0.00E+00	3.74E-02	7.47E-02
Cl-36	8.0297E-07	780.26	1,560.52	0.00E+00	6.27E-04	1.25E-03
Cm-243	2.5081E-04	780.26	1,560.52	0.00E+00	1.96E-01	3.91E-01
Cm-244	4.9015E-02	780.26	1,560.52	0.00E+00	3.82E+01	7.65E+01
Co-60	2.5581E-03	780.26	1,560.52	0.00E+00	2.00E+00	3.99E+00
Cs-134	4.0536E-05	780.26	1,560.52	0.00E+00	3.16E-02	6.33E-02
Cs-135	1.4433E-05	780.26	1,560.52	0.00E+00	1.13E-02	2.25E-02
Cs-137	1.3979E+00	780.26	1,560.52	0.00E+00	1.09E+03	2.18E+03
Eu-154	2.0203E-02	780.26	1,560.52	0.00E+00	1.58E+01	3.15E+01
Eu-155	1.7684E-03	780.26	1,560.52	0.00E+00	1.38E+00	2.76E+00
Fe-55	4.3136E-05	780.26	1,560.52	0.00E+00	3.37E-02	6.73E-02
H-3	2.0769E-02	780.26	1,560.52	0.00E+00	1.62E+01	3.24E+01
I-129	9.8288E-07	780.26	1,560.52	0.00E+00	7.67E-04	1.53E-03
Kr-85	2.8214E-02	780.26	1,560.52	0.00E+00	2.20E+01	4.40E+01
Np-237	1.1218E-05	780.26	1,560.52	0.00E+00	8.75E-03	1.75E-02
Pa-231	1.3036E-09	780.26	1,560.52	0.00E+00	1.02E-06	2.03E-06
Pb-210	8.5078E-11	780.26	1,560.52	0.00E+00	6.64E-08	1.33E-07
Pm-147	3.6531E-04	780.26	1,560.52	0.00E+00	2.85E-01	5.70E-01
Pu-238	7.4564E-02	780.26	1,560.52	0.00E+00	5.82E+01	1.16E+02
Pu-239	1.1623E-02	780.26	1,560.52	0.00E+00	9.07E+00	1.81E+01
Pu-240	1.5132E-02	780.26	1,560.52	0.00E+00	1.18E+01	2.36E+01
Pu-241	9.0036E-01	780.26	1,560.52	0.00E+00	7.03E+02	1.41E+03
Pu-242	6.4260E-05	780.26	1,560.52	0.00E+00	5.01E-02	1.00E-01
Ra-226	2.2804E-10	780.26	1,560.52	0.00E+00	1.78E-07	3.56E-07
Ra-228	5.2713E-12	780.26	1,560.52	0.00E+00	4.11E-09	8.23E-09
Ru-106	6.1160E-10	780.26	1,560.52	0.00E+00	4.77E-07	9.54E-07
Se-79	1.2377E-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	9.1667E-01	780.26	1,560.52	0.00E+00	7.15E+02	1.43E+03
Tc-99	3.9357E-04	780.26	1,560.52	0.00E+00	3.07E-01	6.14E-01
Th-229	1.2057E-10	780.26	1,560.52	0.00E+00	9.41E-08	1.88E-07
Th-230	2.1043E-06	780.26	1,560.52	0.00E+00	1.64E-05	3.28E-05
Th-232	5.2972E-12	780.26	1,560.52	0.00E+00	4.13E-09	8.27E-09
Tl-208	1.7474E-07	780.26	1,560.52	0.00E+00	1.36E-04	2.73E-04
U-232	4.7368E-07	780.26	1,560.52	0.00E+00	3.70E-04	7.39E-04
U-233	2.5097E-06	780.26	1,560.52	0.00E+00	1.96E-05	3.92E-05
U-234	5.0000E-05	780.26	1,560.52	0.00E+00	3.90E-02	7.80E-02
U-235	-1.4489E-06	780.26	0.00	2.42E-02	2.31E-02	2.42E-02
U-236	7.5824E-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	9.1699E-01	780.26	1,560.52	0.00E+00	7.15E+02	1.43E+03
Other Radionuclides					1.05E+03	2.09E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.397E+13
0.0250	1.693E+13
0.0375	1.615E+13
0.0575	1.866E+13
0.0850	9.395E+12
0.1250	6.520E+12
0.2250	8.057E+12
0.3750	3.464E+12
0.5750	8.057E+13
0.8500	1.115E+12
1.2500	1.095E+12
1.7500	3.279E+10
2.2500	5.281E+06
2.7500	1.082E+07
3.5000	1.114E+06
5.0000	4.764E+05
7.0000	5.491E+04
11.0000	6.306E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.80E+01	3.89E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	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	Estimated EOL HM/Given EOL HM
Nominal:	0.08	0.99	1.00
Bounding:	0.16		

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

[2]Total burnup for all fuel associated with this worksheet must be 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: 2010
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' 0.67

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	11.83	23.65	0.00E+00	1.04E-08	2.08E-08
Am-241	1.4352E-01	11.83	23.65	0.00E+00	1.70E+00	3.39E+00
Am-242m	2.8698E-04	11.83	23.65	0.00E+00	3.39E-03	6.79E-03
Am-243	6.2565E-04	11.83	23.65	0.00E+00	7.40E-03	1.48E-02
C-14	4.7901E-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	2.5081E-04	11.83	23.65	0.00E+00	2.97E-03	5.93E-03
Cm-244	4.9015E-02	11.83	23.65	0.00E+00	5.80E-01	1.16E+00
Co-60	2.5581E-03	11.83	23.65	0.00E+00	3.03E-02	6.05E-02
Cs-134	4.0536E-05	11.83	23.65	0.00E+00	4.79E-04	9.59E-04
Cs-135	1.4433E-05	11.83	23.65	0.00E+00	1.71E-04	3.41E-04
Cs-137	1.3979E+00	11.83	23.65	0.00E+00	1.65E+01	3.31E+01
Eu-154	2.0203E-02	11.83	23.65	0.00E+00	2.39E-01	4.78E-01
Eu-155	1.7684E-03	11.83	23.65	0.00E+00	2.09E-02	4.18E-02
Fe-55	4.3136E-05	11.83	23.65	0.00E+00	5.10E-04	1.02E-03
H-3	2.0769E-02	11.83	23.65	0.00E+00	2.46E-01	4.91E-01
I-129	9.8288E-07	11.83	23.65	0.00E+00	1.16E-05	2.32E-05
Kr-85	2.8214E-02	11.83	23.65	0.00E+00	3.34E-01	6.67E-01
Np-237	1.1218E-05	11.83	23.65	0.00E+00	1.33E-04	2.65E-04
Pa-231	1.3036E-09	11.83	23.65	0.00E+00	1.54E-08	3.08E-08
Pb-210	8.5078E-11	11.83	23.65	0.00E+00	1.01E-09	2.01E-09
Pm-147	3.6531E-04	11.83	23.65	0.00E+00	4.32E-03	8.64E-03
Pu-238	7.4564E-02	11.83	23.65	0.00E+00	8.82E-01	1.76E+00
Pu-239	1.1623E-02	11.83	23.65	0.00E+00	1.37E-01	2.75E-01
Pu-240	1.5132E-02	11.83	23.65	0.00E+00	1.79E-01	3.58E-01
Pu-241	9.0036E-01	11.83	23.65	0.00E+00	1.06E+01	2.13E+01
Pu-242	6.4260E-05	11.83	23.65	0.00E+00	7.60E-04	1.52E-03
Ra-226	2.2804E-10	11.83	23.65	0.00E+00	2.70E-09	5.39E-09
Ra-228	5.2713E-12	11.83	23.65	0.00E+00	6.23E-11	1.25E-10
Ru-106	6.1160E-10	11.83	23.65	0.00E+00	7.23E-09	1.45E-08
Se-79	1.2377E-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	9.1667E-01	11.83	23.65	0.00E+00	1.08E+01	2.17E+01
Tc-99	3.9357E-04	11.83	23.65	0.00E+00	4.65E-03	9.31E-03
Th-229	1.2057E-10	11.83	23.65	0.00E+00	1.43E-09	2.85E-09
Th-230	2.1043E-08	11.83	23.65	0.00E+00	2.49E-07	4.98E-07
Th-232	5.2972E-12	11.83	23.65	0.00E+00	6.26E-11	1.25E-10
Tl-208	1.7474E-07	11.83	23.65	0.00E+00	2.07E-06	4.13E-06
U-232	4.7368E-07	11.83	23.65	0.00E+00	5.60E-06	1.12E-05
U-233	2.5097E-08	11.83	23.65	0.00E+00	2.97E-07	5.94E-07
U-234	5.0000E-05	11.83	23.65	0.00E+00	5.91E-04	1.18E-03
U-235	-1.4489E-06	11.83	0.00	1.32E-04	1.15E-04	1.32E-04
U-236	7.5824E-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	9.1699E-01	11.83	23.65	0.00E+00	1.08E+01	2.17E+01
Other Radionuclides					1.59E+01	3.17E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.273E+12
0.0250	2.566E+11
0.0375	2.448E+11
0.0575	2.828E+11
0.0850	1.424E+11
0.1250	9.882E+10
0.2250	1.221E+11
0.3750	5.251E+10
0.5750	1.221E+12
0.8500	1.689E+10
1.2500	1.660E+10
1.7500	4.970E+08
2.2500	8.003E+04
2.7500	1.640E+05
3.5000	1.688E+04
5.0000	7.219E+03
7.0000	8.320E+02
11.0000	9.556E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.72E-01	6.44E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		11.83
Bounding:		23.65

Basis for burnup used in estimate:
Nominal burnup taken from SFD and converted to MWd using BOL=1.907kg
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.18	
Bounding:	0.35	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: LOFT SQUARE FUEL MODULE
SNF ID #: 129
Fuel Units & Descr: 4 - 15 X 15 ROD ARRAY
Heavy Metal Mass: BOL=815.6kg; EOL=813.026kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1975
Estimates as of: 2010
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" 4.00

II. Estimates	m	x_n	x_b	b	y_n	y_b
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (CI)	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)
Ac-227	8.7758E-10	2,447.37	4,894.74	0.00E+00	2.15E-06	4.30E-06
Am-241	1.4352E-01	2,447.37	4,894.74	0.00E+00	3.51E+02	7.03E+02
Am-242m	2.8696E-04	2,447.37	4,894.74	0.00E+00	7.02E-01	1.40E+00
Am-243	6.2565E-04	2,447.37	4,894.74	0.00E+00	1.53E+00	3.06E+00
C-14	4.7901E-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	2.5081E-04	2,447.37	4,894.74	0.00E+00	6.14E-01	1.23E+00
Cm-244	4.9015E-02	2,447.37	4,894.74	0.00E+00	1.20E+02	2.40E+02
Co-60	2.5581E-03	2,447.37	4,894.74	0.00E+00	6.26E+00	1.25E+01
Cs-134	4.0536E-05	2,447.37	4,894.74	0.00E+00	9.92E-02	1.98E-01
Cs-135	1.4433E-05	2,447.37	4,894.74	0.00E+00	3.53E-02	7.06E-02
Cs-137	1.3979E+00	2,447.37	4,894.74	0.00E+00	3.42E+03	6.84E+03
Eu-154	2.0203E-02	2,447.37	4,894.74	0.00E+00	4.94E+01	9.89E+01
Eu-155	1.7684E-03	2,447.37	4,894.74	0.00E+00	4.33E+00	8.66E+00
Fe-55	4.3136E-05	2,447.37	4,894.74	0.00E+00	1.06E-01	2.11E-01
H-3	2.0769E-02	2,447.37	4,894.74	0.00E+00	5.08E+01	1.02E+02
I-129	9.8288E-07	2,447.37	4,894.74	0.00E+00	2.41E-03	4.81E-03
Kr-85	2.8214E-02	2,447.37	4,894.74	0.00E+00	6.90E+01	1.38E+02
Np-237	1.1218E-05	2,447.37	4,894.74	0.00E+00	2.75E-02	5.49E-02
Pa-231	1.3036E-09	2,447.37	4,894.74	0.00E+00	3.19E-06	6.38E-06
Pb-210	8.5078E-11	2,447.37	4,894.74	0.00E+00	2.08E-07	4.16E-07
Pm-147	3.6531E-04	2,447.37	4,894.74	0.00E+00	8.94E-01	1.79E+00
Pu-238	7.4564E-02	2,447.37	4,894.74	0.00E+00	1.82E+02	3.65E+02
Pu-239	1.1623E-02	2,447.37	4,894.74	0.00E+00	2.84E+01	5.69E+01
Pu-240	1.5132E-02	2,447.37	4,894.74	0.00E+00	3.70E+01	7.41E+01
Pu-241	9.0036E-01	2,447.37	4,894.74	0.00E+00	2.20E+03	4.41E+03
Pu-242	6.4260E-05	2,447.37	4,894.74	0.00E+00	1.57E-01	3.15E-01
Ra-226	2.2804E-10	2,447.37	4,894.74	0.00E+00	5.58E-07	1.12E-06
Ra-228	5.2713E-12	2,447.37	4,894.74	0.00E+00	1.29E-08	2.58E-08
Ru-106	6.1160E-10	2,447.37	4,894.74	0.00E+00	1.50E-06	2.99E-06
Se-79	1.2377E-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	9.1667E-01	2,447.37	4,894.74	0.00E+00	2.24E+03	4.49E+03
Tc-99	3.9357E-04	2,447.37	4,894.74	0.00E+00	9.63E-01	1.93E+00
Th-229	1.2057E-10	2,447.37	4,894.74	0.00E+00	2.95E-07	5.90E-07
Th-230	2.1043E-08	2,447.37	4,894.74	0.00E+00	5.15E-05	1.03E-04
Th-232	5.2972E-12	2,447.37	4,894.74	0.00E+00	1.30E-08	2.59E-08
Tl-208	1.7474E-07	2,447.37	4,894.74	0.00E+00	4.28E-04	8.55E-04
U-232	4.7368E-07	2,447.37	4,894.74	0.00E+00	1.16E-03	2.32E-03
U-233	2.5097E-08	2,447.37	4,894.74	0.00E+00	6.14E-05	1.23E-04
U-234	5.0000E-05	2,447.37	4,894.74	0.00E+00	1.22E-01	2.45E-01
U-235	-1.4489E-06	2,447.37	0.00	7.05E-02	6.70E-02	7.05E-02
U-236	7.5824E-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	9.1699E-01	2,447.37	4,894.74	0.00E+00	2.24E+03	4.49E+03
Other Radionuclides					3.29E+03	6.57E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.634E+14
0.0250	5.311E+13
0.0375	5.065E+13
0.0575	5.853E+13
0.0850	2.947E+13
0.1250	2.045E+13
0.2250	2.527E+13
0.3750	1.087E+13
0.5750	2.527E+14
0.8500	3.496E+12
1.2500	3.434E+12
1.7500	1.028E+11
2.2500	1.656E+07
2.7500	3.393E+07
3.5000	3.495E+06
5.0000	1.494E+06
7.0000	1.722E+05
11.0000	1.978E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.83E+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	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	2,418.25	2,447.37
Bounding:		4,894.74

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:	0.09	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: 2010
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: 25 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	1.3562E-08	293,891.20	293,891.20	0.00E+00	3.99E-03	3.99E-03
Am-241	1.0168E-04	293,891.20	293,891.20	0.00E+00	2.99E+01	2.99E+01
Am-242m	8.9052E-09	293,891.20	293,891.20	0.00E+00	2.62E-03	2.62E-03
Am-243	9.8602E-10	293,891.20	293,891.20	0.00E+00	2.90E-04	2.90E-04
C-14	2.3045E-04	293,891.20	293,891.20	0.00E+00	6.77E+01	6.77E+01
Cl-36	1.2261E-06	293,891.20	293,891.20	0.00E+00	3.60E-01	3.60E-01
Cm-243	3.1730E-10	293,891.20	293,891.20	0.00E+00	9.33E-05	9.33E-05
Cm-244	3.3977E-09	293,891.20	293,891.20	0.00E+00	9.99E-04	9.99E-04
Co-60	2.6373E-01	293,891.20	293,891.20	0.00E+00	7.75E+04	7.75E+04
Cs-134	8.7072E-05	293,891.20	293,891.20	0.00E+00	2.56E+01	2.56E+01
Cs-135	3.0316E-05	293,891.20	293,891.20	0.00E+00	8.91E+00	8.91E+00
Cs-137	1.8286E+00	293,891.20	293,891.20	0.00E+00	5.37E+05	5.37E+05
Eu-154	1.4982E-03	293,891.20	293,891.20	0.00E+00	4.40E+02	4.40E+02
Eu-155	2.8236E-03	293,891.20	293,891.20	0.00E+00	8.30E+02	8.30E+02
Fe-55	1.7687E-02	293,891.20	293,891.20	0.00E+00	5.20E+03	5.20E+03
H-3	4.4043E-03	293,891.20	293,891.20	0.00E+00	1.29E+03	1.29E+03
I-129	7.3195E-07	293,891.20	293,891.20	0.00E+00	2.15E-01	2.15E-01
Kr-85	7.8769E-02	293,891.20	293,891.20	0.00E+00	2.31E+04	2.31E+04
Np-237	1.1484E-08	293,891.20	293,891.20	0.00E+00	3.38E-01	3.38E-01
Pa-231	3.2396E-08	293,891.20	293,891.20	0.00E+00	9.52E-03	9.52E-03
Pb-210	2.4409E-13	293,891.20	293,891.20	0.00E+00	7.17E-08	7.17E-08
Pm-147	1.6331E-02	293,891.20	293,891.20	0.00E+00	4.80E+03	4.80E+03
Pu-238	3.1947E-04	293,891.20	293,891.20	0.00E+00	9.39E+01	9.39E+01
Pu-239	6.6789E-04	293,891.20	293,891.20	0.00E+00	1.96E+02	1.96E+02
Pu-240	8.6922E-05	293,891.20	293,891.20	0.00E+00	2.55E+01	2.55E+01
Pu-241	1.1567E-03	293,891.20	293,891.20	0.00E+00	3.40E+02	3.40E+02
Pu-242	1.9717E-09	293,891.20	293,891.20	0.00E+00	5.79E-04	5.79E-04
Ra-226	8.6190E-13	293,891.20	293,891.20	0.00E+00	2.53E-07	2.53E-07
Ra-228	8.1498E-12	293,891.20	293,891.20	0.00E+00	2.40E-06	2.40E-06
Ru-106	1.7770E-07	293,891.20	293,891.20	0.00E+00	5.22E-02	5.22E-02
Se-79	1.3225E-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	1.7321E+00	293,891.20	293,891.20	0.00E+00	5.09E+05	5.09E+05
Tc-99	4.6656E-04	293,891.20	293,891.20	0.00E+00	1.37E+02	1.37E+02
Th-229	1.0110E-11	293,891.20	293,891.20	0.00E+00	2.97E-06	2.97E-06
Th-230	1.1466E-10	293,891.20	293,891.20	0.00E+00	3.37E-05	3.37E-05
Th-232	8.3245E-12	293,891.20	293,891.20	0.00E+00	2.45E-06	2.45E-06
Tl-208	2.3860E-08	293,891.20	293,891.20	0.00E+00	7.01E-03	7.01E-03
U-232	6.4576E-08	293,891.20	293,891.20	0.00E+00	1.90E-02	1.90E-02
U-233	3.1082E-09	293,891.20	293,891.20	0.00E+00	9.13E-04	9.13E-04
U-234	3.7587E-07	293,891.20	293,891.20	0.00E+00	1.10E-01	1.10E-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	1.7321E+00	293,891.20	293,891.20	0.00E+00	5.09E+05	5.09E+05
Other Radionuclides					5.96E+05	5.96E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.796E+16
0.0250	5.810E+15
0.0375	5.015E+15
0.0575	5.410E+15
0.0850	3.272E+15
0.1250	2.126E+15
0.2250	2.807E+15
0.3750	1.225E+15
0.5750	2.001E+16
0.8500	2.087E+14
1.2500	5.812E+15
1.7500	5.375E+12
2.2500	3.096E+10
2.7500	3.407E+08
3.5000	7.197E+04
5.0000	7.292E+03
7.0000	8.051E+02
11.0000	9.033E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.29E+03	7.29E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		293,891.20
Bounding:		293,891.20

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1963
Estimates as of: 2010
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: 25 years

Estimated Canister usage: 18"x10' 0.69

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6376E-10	7,263.66	14,527.32	0.00E+00	4.82E-06	9.64E-06
Am-241	1.3144E-01	7,263.66	14,527.32	0.00E+00	9.55E+02	1.91E+03
Am-242m	3.0039E-04	7,263.66	14,527.32	0.00E+00	2.18E+00	4.36E+00
Am-243	6.2629E-04	7,263.66	14,527.32	0.00E+00	4.55E+00	9.10E+00
C-14	4.7965E-05	7,263.66	14,527.32	0.00E+00	3.48E-01	6.97E-01
Cl-36	8.0297E-07	7,263.66	14,527.32	0.00E+00	5.83E-03	1.17E-02
Cm-243	3.1993E-04	7,263.66	14,527.32	0.00E+00	2.32E+00	4.65E+00
Cm-244	7.1851E-02	7,263.66	14,527.32	0.00E+00	5.22E+02	1.04E+03
Co-60	9.5220E-03	7,263.66	14,527.32	0.00E+00	6.92E+01	1.38E+02
Cs-134	1.1662E-03	7,263.66	14,527.32	0.00E+00	8.47E+00	1.69E+01
Cs-135	1.4433E-05	7,263.66	14,527.32	0.00E+00	1.05E-01	2.10E-01
Cs-137	1.7603E+00	7,263.66	14,527.32	0.00E+00	1.28E+04	2.56E+04
Eu-154	4.5203E-02	7,263.66	14,527.32	0.00E+00	3.28E+02	6.57E+02
Eu-155	7.1479E-03	7,263.66	14,527.32	0.00E+00	5.19E+01	1.04E+02
Fe-55	6.1919E-04	7,263.66	14,527.32	0.00E+00	4.50E+00	9.00E+00
H-3	3.6386E-02	7,263.66	14,527.32	0.00E+00	2.64E+02	5.29E+02
I-129	9.8288E-07	7,263.66	14,527.32	0.00E+00	7.14E-03	1.43E-02
Kr-85	5.3844E-02	7,263.66	14,527.32	0.00E+00	3.91E+02	7.82E+02
Np-237	1.0546E-05	7,263.66	14,527.32	0.00E+00	7.66E-02	1.53E-01
Pa-231	1.1370E-09	7,263.66	14,527.32	0.00E+00	8.26E-06	1.65E-05
Pb-210	3.3624E-11	7,263.66	14,527.32	0.00E+00	2.44E-07	4.88E-07
Pm-147	5.1211E-03	7,263.66	14,527.32	0.00E+00	3.72E+01	7.44E+01
Pu-238	8.0669E-02	7,263.66	14,527.32	0.00E+00	5.86E+02	1.17E+03
Pu-239	1.1626E-02	7,263.66	14,527.32	0.00E+00	8.44E+01	1.69E+02
Pu-240	1.5097E-02	7,263.66	14,527.32	0.00E+00	1.10E+02	2.19E+02
Pu-241	1.4567E+00	7,263.66	14,527.32	0.00E+00	1.06E+04	2.12E+04
Pu-242	6.4260E-05	7,263.66	14,527.32	0.00E+00	4.67E-01	9.34E-01
Ra-226	1.1392E-10	7,263.66	14,527.32	0.00E+00	8.27E-07	1.65E-06
Ra-228	5.1841E-12	7,263.66	14,527.32	0.00E+00	3.77E-08	7.53E-08
Ru-106	5.9012E-07	7,263.66	14,527.32	0.00E+00	4.29E-03	8.57E-03
Se-79	1.2379E-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	1.1630E+00	7,263.66	14,527.32	0.00E+00	8.45E+03	1.69E+04
Tc-99	3.9357E-04	7,263.66	14,527.32	0.00E+00	2.86E+00	5.72E+00
Th-229	8.5691E-11	7,263.66	14,527.32	0.00E+00	6.22E-07	1.24E-06
Th-230	1.4493E-08	7,263.66	14,527.32	0.00E+00	1.05E-04	2.11E-04
Th-232	5.2923E-12	7,263.66	14,527.32	0.00E+00	3.84E-08	7.69E-08
Tl-208	1.9202E-07	7,263.66	14,527.32	0.00E+00	1.39E-03	2.79E-03
U-232	5.2083E-07	7,263.66	14,527.32	0.00E+00	3.78E-03	7.57E-03
U-233	2.4386E-08	7,263.66	14,527.32	0.00E+00	1.77E-04	3.54E-04
U-234	4.7012E-05	7,263.66	14,527.32	0.00E+00	3.41E-01	6.83E-01
U-235	-1.4492E-06	7,263.66	0.00	1.37E-02	3.20E-03	1.37E-02
U-236	7.5759E-06	7,263.66	14,527.32	0.00E+00	5.50E-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	1.1631E+00	7,263.66	14,527.32	0.00E+00	8.45E+03	1.69E+04
Other Radionuclides					1.23E+04	2.45E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.879E+14
0.0250	2.001E+14
0.0375	1.936E+14
0.0575	2.112E+14
0.0850	1.119E+14
0.1250	8.177E+13
0.2250	9.609E+13
0.3750	4.123E+13
0.5750	9.474E+14
0.8500	1.870E+13
1.2500	2.526E+13
1.7500	5.535E+11
2.2500	1.022E+08
2.7500	1.149E+08
3.5000	1.506E+07
5.0000	6.434E+06
7.0000	7.418E+05
11.0000	8.521E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.99E+02	3.98E+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: 2010
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: 15 years

Estimated Canister usage: 18"x10' 2.00

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.3735E-12	12,522.18	28,967.98	0.00E+00	1.72E-08	3.98E-08
Am-241	7.9527E-02	12,522.18	28,967.98	8.05E+03	9.04E+03	1.04E+04
Am-242m	2.1053E-03	12,522.18	28,967.98	0.00E+00	2.64E+01	6.10E+01
Am-243	1.0760E-04	12,522.18	28,967.98	0.00E+00	1.35E+00	3.12E+00
C-14	2.6141E-05	12,522.18	28,967.98	0.00E+00	3.27E-01	7.57E-01
Cl-36	3.4243E-10	12,522.18	28,967.98	0.00E+00	4.29E-06	9.92E-06
Cm-243	6.6092E-04	12,522.18	28,967.98	0.00E+00	8.28E+00	1.91E+01
Cm-244	2.9933E-03	12,522.18	28,967.98	0.00E+00	3.75E+01	8.67E+01
Co-60	1.5934E-02	12,522.18	28,967.98	0.00E+00	2.00E+02	4.62E+02
Cs-134	4.6356E-02	12,522.18	28,967.98	0.00E+00	5.80E+02	1.34E+03
Cs-135	4.7693E-05	12,522.18	28,967.98	0.00E+00	5.97E-01	1.38E+00
Cs-137	2.1113E+00	12,522.18	28,967.98	0.00E+00	2.64E+04	6.12E+04
Eu-154	4.8092E-02	12,522.18	28,967.98	0.00E+00	6.02E+02	1.39E+03
Eu-155	6.8447E-02	12,522.18	28,967.98	0.00E+00	8.57E+02	1.98E+03
Fe-55	5.8479E-03	12,522.18	28,967.98	0.00E+00	7.32E+01	1.69E+02
H-3	8.9300E-03	12,522.18	28,967.98	0.00E+00	1.12E+02	2.59E+02
I-129	1.2891E-06	12,522.18	28,967.98	0.00E+00	1.61E-02	3.73E-02
Kr-85	7.0941E-02	12,522.18	28,967.98	0.00E+00	8.88E+02	2.06E+03
Np-237	2.6541E-06	12,522.18	28,967.98	0.00E+00	3.32E-02	7.69E-02
Pa-231	4.8970E-12	12,522.18	28,967.98	0.00E+00	6.13E-08	1.42E-07
Pb-210	2.2170E-13	12,522.18	28,967.98	0.00E+00	2.78E-09	6.42E-09
Pm-147	2.3617E-01	12,522.18	28,967.98	0.00E+00	2.96E+03	6.84E+03
Pu-238	2.8636E-02	12,522.18	28,967.98	0.00E+00	3.59E+02	8.30E+02
Pu-239	-3.5520E-02	12,522.18	0.00	6.61E+04	6.56E+04	6.61E+04
Pu-240	2.0790E-02	12,522.18	28,967.98	3.36E+04	3.38E+04	3.42E+04
Pu-241	-4.8316E-01	12,522.18	0.00	1.51E+06	1.50E+06	1.51E+06
Pu-242	1.1052E-05	12,522.18	28,967.98	8.95E+00	9.09E+00	9.27E+00
Ra-226	5.7471E-13	12,522.18	28,967.98	0.00E+00	7.20E-09	1.66E-08
Ra-228	5.4957E-17	12,522.18	28,967.98	0.00E+00	6.88E-13	1.59E-12
Ru-106	1.4582E-02	12,522.18	28,967.98	0.00E+00	1.83E+02	4.22E+02
Se-79	1.0137E-05	12,522.18	28,967.98	0.00E+00	1.27E-01	2.94E-01
Sn-126	4.3922E-05	12,522.18	28,967.98	0.00E+00	5.50E-01	1.27E+00
Sr-90	7.6329E-01	12,522.18	28,967.98	0.00E+00	9.56E+03	2.21E+04
Tc-99	3.9412E-04	12,522.18	28,967.98	0.00E+00	4.94E+00	1.14E+01
Th-229	1.6457E-12	12,522.18	28,967.98	0.00E+00	2.06E-08	4.77E-08
Th-230	1.8822E-10	12,522.18	28,967.98	0.00E+00	2.36E-06	5.45E-06
Th-232	9.7601E-17	12,522.18	28,967.98	0.00E+00	1.22E-12	2.83E-12
Tl-208	5.2722E-07	12,522.18	28,967.98	0.00E+00	6.60E-03	1.53E-02
U-232	1.4925E-06	12,522.18	28,967.98	0.00E+00	1.87E-02	4.32E-02
U-233	2.1113E-10	12,522.18	28,967.98	0.00E+00	2.64E-06	6.12E-06
U-234	1.9528E-06	12,522.18	28,967.98	0.00E+00	2.45E-02	5.66E-02
U-235	-9.7920E-09	12,522.18	0.00	1.36E-02	1.34E-02	1.36E-02
U-236	1.1570E-07	12,522.18	28,967.98	0.00E+00	1.45E-03	3.35E-03
U-238	-1.7914E-07	12,522.18	0.00	9.87E-01	9.85E-01	9.87E-01
Y-90	7.6329E-01	12,522.18	28,967.98	0.00E+00	9.56E+03	2.21E+04
Other Radionuclides					2.71E+04	6.28E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.869E+15
0.0250	3.213E+14
0.0375	3.599E+14
0.0575	4.118E+14
0.0850	1.791E+14
0.1250	1.340E+14
0.2250	1.356E+14
0.3750	6.983E+13
0.5750	2.328E+15
0.8500	7.792E+13
1.2500	6.784E+13
1.7500	1.114E+12
2.2500	3.755E+10
2.7500	3.933E+09
3.5000	4.596E+08
5.0000	8.673E+08
7.0000	9.878E+05
11.0000	1.129E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.65E+03	4.02E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown) and BOL heavy metal (it is mostly U with a little Pu).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		12,522.18
Bounding:		28,967.98

Basis for burnup used in estimate:

Nominal burnup taken from SFD and converted to MWd using BOL=4174.061kg
Bounding burnup taken from SFD and converted to MWd using BOL=4174.061kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.02	
Bounding:	0.05	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: MISCELLANEOUS TREAT FUEL (MOX)
SNF ID #: 369
Fuel Units & Descr: 1 - UNKNOWN
Heavy Metal Mass: BOL= ; EOL=0.12kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1994
Estimates as of: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 15 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	1.4157E-06	114.14	114.14	0.00E+00	1.62E-04	1.62E-04
Am-241	6.2608E+00	114.14	114.14	0.00E+00	7.15E+02	7.15E+02
Am-242m	1.8448E-02	114.14	114.14	0.00E+00	2.11E+00	2.11E+00
Am-243	1.6352E-02	114.14	114.14	0.00E+00	1.87E+00	1.87E+00
C-14	1.2112E-01	114.14	114.14	0.00E+00	1.38E+01	1.38E+01
Cl-36	2.2860E-03	114.14	114.14	0.00E+00	2.61E-01	2.61E-01
Cm-243	1.4088E-03	114.14	114.14	0.00E+00	1.61E-01	1.61E-01
Cm-244	3.6224E-01	114.14	114.14	0.00E+00	4.13E+01	4.13E+01
Co-60	3.8998E+02	114.14	114.14	0.00E+00	4.45E+04	4.45E+04
Cs-134	2.8276E-01	114.14	114.14	0.00E+00	3.23E+01	3.23E+01
Cs-135	4.3976E-04	114.14	114.14	0.00E+00	5.02E-02	5.02E-02
Cs-137	3.3405E+01	114.14	114.14	0.00E+00	3.81E+03	3.81E+03
Eu-154	6.2585E+00	114.14	114.14	0.00E+00	7.14E+02	7.14E+02
Eu-155	1.1271E+00	114.14	114.14	0.00E+00	1.29E+02	1.29E+02
Fe-55	6.0624E+01	114.14	114.14	0.00E+00	6.92E+03	6.92E+03
H-3	7.4678E-01	114.14	114.14	0.00E+00	8.52E+01	8.52E+01
I-129	1.0618E-05	114.14	114.14	0.00E+00	1.21E-03	1.21E-03
Kr-85	2.1802E+00	114.14	114.14	0.00E+00	2.49E+02	2.49E+02
Np-237	1.5626E-04	114.14	114.14	0.00E+00	1.78E-02	1.78E-02
Pa-231	2.8608E-06	114.14	114.14	0.00E+00	3.27E-04	3.27E-04
Pb-210	2.0448E-09	114.14	114.14	0.00E+00	2.33E-07	2.33E-07
Pm-147	3.3212E+00	114.14	114.14	0.00E+00	3.79E+02	3.79E+02
Pu-238	-3.5400E-01	114.14	0.00	3.09E+01	0.00E+00	3.09E+01
Pu-239	-4.8280E-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	-2.5280E+01	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	1.0977E-08	114.14	114.14	0.00E+00	1.25E-06	1.25E-06
Ra-228	5.4624E-07	114.14	114.14	0.00E+00	6.23E-05	6.23E-05
Ru-106	3.7939E-03	114.14	114.14	0.00E+00	4.33E-01	4.33E-01
Se-79	1.9186E-04	114.14	114.14	0.00E+00	2.19E-02	2.19E-02
Sn-126	1.6673E-04	114.14	114.14	0.00E+00	1.90E-02	1.90E-02
Sr-90	3.1860E+01	114.14	114.14	0.00E+00	3.64E+03	3.64E+03
Tc-99	6.7678E-03	114.14	114.14	0.00E+00	7.72E-01	7.72E-01
Th-229	7.2928E-07	114.14	114.14	0.00E+00	8.32E-05	8.32E-05
Th-230	2.4191E-06	114.14	114.14	0.00E+00	2.76E-04	2.76E-04
Th-232	6.0208E-07	114.14	114.14	0.00E+00	6.87E-05	6.87E-05
Tl-208	1.0599E-04	114.14	114.14	0.00E+00	1.21E-02	1.21E-02
U-232	2.8743E-04	114.14	114.14	0.00E+00	3.28E-02	3.28E-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	3.1860E+01	114.14	114.14	0.00E+00	3.64E+03	3.64E+03
Other Radionuclides					9.17E+03	9.17E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.995E+14
0.0250	5.846E+13
0.0375	5.221E+13
0.0575	6.027E+13
0.0850	2.903E+13
0.1250	2.823E+13
0.2250	2.283E+13
0.3750	9.530E+12
0.5750	1.464E+14
0.8500	1.526E+13
1.2500	3.308E+15
1.7500	4.548E+11
2.2500	1.755E+10
2.7500	4.829E+08
3.5000	1.045E+06
5.0000	2.536E+05
7.0000	2.918E+04
11.0000	3.348E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.74E+02	7.75E+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: 2010
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: 15 years

Estimated Canister usage: 18"x10' 0.01

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00
Am-241	7.2313E-02	126.70	126.70	0.00E+00	9.16E+00	9.16E+00
Am-242m	6.2011E-05	126.70	126.70	0.00E+00	7.86E-03	7.86E-03
Am-243	4.6336E-05	126.70	126.70	0.00E+00	5.87E-03	5.87E-03
C-14	9.2170E-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	7.4511E-04	126.70	126.70	0.00E+00	9.44E-02	9.44E-02
Co-60	3.4842E-04	126.70	126.70	0.00E+00	4.41E-02	4.41E-02
Cs-134	1.0795E-03	126.70	126.70	0.00E+00	1.37E-01	1.37E-01
Cs-135	1.0066E-05	126.70	126.70	0.00E+00	1.28E-03	1.28E-03
Cs-137	1.6092E+00	126.70	126.70	0.00E+00	2.04E+02	2.04E+02
Eu-154	1.8822E-02	126.70	126.70	0.00E+00	2.38E+00	2.38E+00
Eu-155	1.7672E-03	126.70	126.70	0.00E+00	2.24E-01	2.24E-01
Fe-55	9.0172E-05	126.70	126.70	0.00E+00	1.14E-02	1.14E-02
H-3	4.3506E-03	126.70	126.70	0.00E+00	5.51E-01	5.51E-01
I-129	8.6006E-07	126.70	126.70	0.00E+00	1.09E-04	1.09E-04
Kr-85	6.1652E-02	126.70	126.70	0.00E+00	7.81E+00	7.81E+00
Np-237	7.7672E-06	126.70	126.70	0.00E+00	9.84E-04	9.84E-04
Pa-231	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00
Pb-210	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00
Pm-147	1.8175E-02	126.70	126.70	0.00E+00	2.30E+00	2.30E+00
Pu-238	2.2170E-02	126.70	126.70	0.00E+00	2.81E+00	2.81E+00
Pu-239	2.8836E-02	126.70	126.70	0.00E+00	3.65E+00	3.65E+00
Pu-240	2.2830E-02	126.70	126.70	0.00E+00	2.89E+00	2.89E+00
Pu-241	1.1362E+00	126.70	126.70	0.00E+00	1.44E+02	1.44E+02
Pu-242	1.4526E-05	126.70	126.70	0.00E+00	1.84E-03	1.84E-03
Ra-226	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00
Ra-228	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00
Ru-106	4.2672E-06	126.70	126.70	0.00E+00	5.41E-04	5.41E-04
Se-79	1.0901E-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	1.1546E+00	126.70	126.70	0.00E+00	1.46E+02	1.46E+02
Tc-99	3.6494E-04	126.70	126.70	0.00E+00	4.62E-02	4.62E-02
Th-229	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00
Th-230	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00
Th-232	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00
Tl-208	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00
U-232	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00
U-233	0.0000E+00	126.70	126.70	0.00E+00	0.00E+00	0.00E+00
U-234	6.3994E-05	126.70	126.70	0.00E+00	8.11E-03	8.11E-03
U-235	-1.2944E-06	126.70	0.00	4.92E-06	0.00E+00	4.92E-06
U-236	1.1932E-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	1.1550E+00	126.70	126.70	0.00E+00	1.46E+02	1.46E+02
Other Radionuclides					1.95E+02	1.95E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.322E+12
0.0250	1.708E+12
0.0375	1.593E+12
0.0575	1.710E+12
0.0850	9.536E+11
0.1250	6.513E+11
0.2250	8.195E+11
0.3750	3.536E+11
0.5750	7.554E+12
0.8500	1.036E+11
1.2500	6.918E+10
1.7500	2.863E+09
2.2500	2.188E+05
2.7500	7.870E+03
3.5000	3.692E+03
5.0000	1.326E+03
7.0000	1.510E+02
11.0000	1.724E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.61E+00	2.61E+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: 1.84

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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: 2010
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: 25 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	6.6376E-10	266.26	532.51	0.00E+00	1.77E-07	3.53E-07
Am-241	1.3144E-01	266.26	532.51	0.00E+00	3.50E+01	7.00E+01
Am-242m	3.0039E-04	266.26	532.51	0.00E+00	8.00E-02	1.60E-01
Am-243	6.2629E-04	266.26	532.51	0.00E+00	1.67E-01	3.34E-01
C-14	4.7965E-05	266.26	532.51	0.00E+00	1.28E-02	2.55E-02
Cl-36	8.0297E-07	266.26	532.51	0.00E+00	2.14E-04	4.28E-04
Cm-243	3.1993E-04	266.26	532.51	0.00E+00	8.52E-02	1.70E-01
Cm-244	7.1851E-02	266.26	532.51	0.00E+00	1.91E+01	3.83E+01
Co-60	9.5220E-03	266.26	532.51	0.00E+00	2.54E+00	5.07E+00
Cs-134	1.1662E-03	266.26	532.51	0.00E+00	3.11E-01	6.21E-01
Cs-135	1.4433E-05	266.26	532.51	0.00E+00	3.84E-03	7.69E-03
Cs-137	1.7603E+00	266.26	532.51	0.00E+00	4.69E+02	9.37E+02
Eu-154	4.5203E-02	266.26	532.51	0.00E+00	1.20E+01	2.41E+01
Eu-155	7.1479E-03	266.26	532.51	0.00E+00	1.90E+00	3.81E+00
Fe-55	6.1919E-04	266.26	532.51	0.00E+00	1.65E-01	3.30E-01
H-3	3.6386E-02	266.26	532.51	0.00E+00	9.69E+00	1.94E+01
I-129	9.8288E-07	266.26	532.51	0.00E+00	2.62E-04	5.23E-04
Kr-85	5.3844E-02	266.26	532.51	0.00E+00	1.43E+01	2.87E+01
Np-237	1.0546E-05	266.26	532.51	0.00E+00	2.81E-03	5.62E-03
Pa-231	1.1370E-09	266.26	532.51	0.00E+00	3.03E-07	6.05E-07
Pb-210	3.3624E-11	266.26	532.51	0.00E+00	8.95E-09	1.79E-08
Pm-147	5.1211E-03	266.26	532.51	0.00E+00	1.36E+00	2.73E+00
Pu-238	8.0669E-02	266.26	532.51	0.00E+00	2.15E+01	4.30E+01
Pu-239	1.1626E-02	266.26	532.51	0.00E+00	3.10E+00	6.19E+00
Pu-240	1.5097E-02	266.26	532.51	0.00E+00	4.02E+00	8.04E+00
Pu-241	1.4567E+00	266.26	532.51	0.00E+00	3.88E+02	7.76E+02
Pu-242	6.4260E-05	266.26	532.51	0.00E+00	1.71E-02	3.42E-02
Ra-226	1.1392E-10	266.26	532.51	0.00E+00	3.03E-08	6.07E-08
Ra-228	5.1841E-12	266.26	532.51	0.00E+00	1.38E-09	2.76E-09
Ru-106	5.9012E-07	266.26	532.51	0.00E+00	1.57E-04	3.14E-04
Se-79	1.2379E-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	1.1630E+00	266.26	532.51	0.00E+00	3.10E+02	6.19E+02
Tc-99	3.9357E-04	266.26	532.51	0.00E+00	1.05E-01	2.10E-01
Th-229	8.5691E-11	266.26	532.51	0.00E+00	2.28E-08	4.56E-08
Th-230	1.4493E-08	266.26	532.51	0.00E+00	3.86E-06	7.72E-06
Th-232	5.2923E-12	266.26	532.51	0.00E+00	1.41E-09	2.82E-09
Tl-208	1.9202E-07	266.26	532.51	0.00E+00	5.11E-05	1.02E-04
U-232	5.2063E-07	266.26	532.51	0.00E+00	1.39E-04	2.77E-04
U-233	2.4386E-08	266.26	532.51	0.00E+00	6.49E-06	1.30E-05
U-234	4.7012E-05	266.26	532.51	0.00E+00	1.25E-02	2.50E-02
U-235	-1.4492E-06	266.26	0.00	1.84E-02	1.80E-02	1.84E-02
U-236	7.5759E-06	266.26	532.51	0.00E+00	2.02E-03	4.03E-03
U-238	-2.6129E-07	266.26	0.00	8.66E-02	8.65E-02	8.66E-02
Y-90	1.1631E+00	266.26	532.51	0.00E+00	3.10E+02	6.19E+02
Other Radionuclides					4.50E+02	9.00E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.621E+13
0.0250	7.334E+12
0.0375	7.098E+12
0.0575	7.744E+12
0.0850	4.103E+12
0.1250	2.997E+12
0.2250	3.523E+12
0.3750	1.511E+12
0.5750	3.473E+13
0.8500	6.855E+11
1.2500	9.259E+11
1.7500	2.029E+10
2.2500	3.748E+06
2.7500	4.212E+06
3.5000	5.523E+05
5.0000	2.361E+05
7.0000	2.721E+04
11.0000	3.126E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.30E+00	1.46E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:		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: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated Canister usage: 18"x10' 1.33

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	1.1465E-09	4,521.60	9,043.20	0.00E+00	5.18E-06	1.04E-05
Am-241	2.3056E-03	4,521.60	9,043.20	0.00E+00	1.04E+01	2.08E+01
Am-242m	4.1476E-07	4,521.60	9,043.20	0.00E+00	1.88E-03	3.75E-03
Am-243	1.4894E-06	4,521.60	9,043.20	0.00E+00	6.73E-03	1.35E-02
C-14	5.7108E-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	1.4562E-07	4,521.60	9,043.20	0.00E+00	6.58E-04	1.32E-03
Cm-244	2.4221E-05	4,521.60	9,043.20	0.00E+00	1.10E-01	2.19E-01
Co-60	2.7560E-06	4,521.60	9,043.20	0.00E+00	1.25E-02	2.49E-02
Cs-134	5.8851E-04	4,521.60	9,043.20	0.00E+00	2.66E+00	5.32E+00
Cs-135	3.4477E-06	4,521.60	9,043.20	0.00E+00	1.56E-02	3.12E-02
Cs-137	1.8099E+00	4,521.60	9,043.20	0.00E+00	8.18E+03	1.64E+04
Eu-154	1.6386E-02	4,521.60	9,043.20	0.00E+00	7.41E+01	1.48E+02
Eu-155	2.3957E-03	4,521.60	9,043.20	0.00E+00	1.08E+01	2.17E+01
Fe-55	3.2707E-05	4,521.60	9,043.20	0.00E+00	1.48E-01	2.96E-01
H-3	3.4504E-03	4,521.60	9,043.20	0.00E+00	1.56E+01	3.12E+01
I-129	7.5300E-07	4,521.60	9,043.20	0.00E+00	3.40E-03	6.81E-03
Kr-85	7.8540E-02	4,521.60	9,043.20	0.00E+00	3.55E+02	7.10E+02
Np-237	9.5615E-06	4,521.60	9,043.20	0.00E+00	4.32E-02	8.65E-02
Pa-231	2.7968E-09	4,521.60	9,043.20	0.00E+00	1.26E-05	2.53E-05
Pb-210	1.2612E-10	4,521.60	9,043.20	0.00E+00	5.70E-07	1.14E-06
Pm-147	1.2952E-02	4,521.60	9,043.20	0.00E+00	5.86E+01	1.17E+02
Pu-238	1.7549E-02	4,521.60	9,043.20	0.00E+00	7.93E+01	1.59E+02
Pu-239	4.2810E-04	4,521.60	9,043.20	0.00E+00	1.94E+00	3.87E+00
Pu-240	2.4357E-04	4,521.60	9,043.20	0.00E+00	1.10E+00	2.20E+00
Pu-241	2.6277E-02	4,521.60	9,043.20	0.00E+00	1.19E+02	2.38E+02
Pu-242	3.6329E-07	4,521.60	9,043.20	0.00E+00	1.64E-03	3.29E-03
Ra-226	4.4444E-10	4,521.60	9,043.20	0.00E+00	2.01E-06	4.02E-06
Ra-228	1.9714E-14	4,521.60	9,043.20	0.00E+00	8.91E-11	1.78E-10
Ru-106	2.0477E-07	4,521.60	9,043.20	0.00E+00	9.26E-04	1.85E-03
Se-79	1.2933E-05	4,521.60	9,043.20	0.00E+00	5.85E-02	1.17E-01
Sn-126	1.1574E-05	4,521.60	9,043.20	0.00E+00	5.23E-02	1.05E-01
Sr-90	1.7092E+00	4,521.60	9,043.20	0.00E+00	7.73E+03	1.55E+04
Tc-99	4.2239E-04	4,521.60	9,043.20	0.00E+00	1.91E+00	3.82E+00
Th-229	7.7260E-12	4,521.60	9,043.20	0.00E+00	3.49E-08	6.99E-08
Th-230	5.8497E-06	4,521.60	9,043.20	0.00E+00	2.64E-04	5.29E-04
Th-232	2.6906E-14	4,521.60	9,043.20	0.00E+00	1.22E-10	2.43E-10
Tl-208	4.4336E-08	4,521.60	9,043.20	0.00E+00	2.00E-04	4.01E-04
U-232	1.2037E-07	4,521.60	9,043.20	0.00E+00	5.44E-04	1.09E-03
U-233	3.0011E-09	4,521.60	9,043.20	0.00E+00	1.36E-05	2.71E-05
U-234	1.8497E-04	4,521.60	9,043.20	0.00E+00	8.36E-01	1.67E+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	1.7094E+00	4,521.60	9,043.20	0.00E+00	7.73E+03	1.55E+04
Other Radionuclides					7.79E+03	1.56E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.462E+14
0.0250	1.758E+14
0.0375	1.531E+14
0.0575	1.644E+14
0.0850	9.920E+13
0.1250	6.644E+13
0.2250	8.564E+13
0.3750	3.723E+13
0.5750	6.104E+14
0.8500	8.796E+12
1.2500	4.891E+12
1.7500	2.417E+11
2.2500	1.722E+07
2.7500	1.410E+07
3.5000	1.064E+04
5.0000	3.580E+03
7.0000	3.940E+02
11.0000	4.407E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.56E+01	1.91E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.5	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	4,521.60	3,215.32	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		9,043.20	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	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
SNF ID #: 962
Fuel Units & Descr: 24 - 24 CURVED PLATES
Heavy Metal Mass: BOL=18.84kg; EOL=16.294kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1985
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100% U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated Canister usage: 18"x10' 1.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	3,391.20	6,782.40	0.00E+00	3.89E-06	7.78E-06
Am-241	2.3056E-03	3,391.20	6,782.40	0.00E+00	7.82E+00	1.56E+01
Am-242m	4.1476E-07	3,391.20	6,782.40	0.00E+00	1.41E-03	2.81E-03
Am-243	1.4894E-06	3,391.20	6,782.40	0.00E+00	5.05E-03	1.01E-02
C-14	5.7108E-09	3,391.20	6,782.40	0.00E+00	1.94E-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	1.4562E-07	3,391.20	6,782.40	0.00E+00	4.94E-04	9.88E-04
Cm-244	2.4221E-05	3,391.20	6,782.40	0.00E+00	8.21E-02	1.64E-01
Co-60	2.7560E-06	3,391.20	6,782.40	0.00E+00	9.35E-03	1.87E-02
Cs-134	5.8851E-04	3,391.20	6,782.40	0.00E+00	2.00E+00	3.99E+00
Cs-135	3.4477E-06	3,391.20	6,782.40	0.00E+00	1.17E-02	2.34E-02
Cs-137	1.8099E+00	3,391.20	6,782.40	0.00E+00	6.14E+03	1.23E+04
Eu-154	1.6386E-02	3,391.20	6,782.40	0.00E+00	5.56E+01	1.11E+02
Eu-155	2.3957E-03	3,391.20	6,782.40	0.00E+00	8.12E+00	1.62E+01
Fe-55	3.2707E-05	3,391.20	6,782.40	0.00E+00	1.11E-01	2.22E-01
H-3	3.4504E-03	3,391.20	6,782.40	0.00E+00	1.17E+01	2.34E+01
I-129	7.5300E-07	3,391.20	6,782.40	0.00E+00	2.55E-03	5.11E-03
Kr-85	7.8540E-02	3,391.20	6,782.40	0.00E+00	2.66E+02	5.33E+02
Np-237	9.5615E-06	3,391.20	6,782.40	0.00E+00	3.24E-02	6.49E-02
Pa-231	2.7968E-09	3,391.20	6,782.40	0.00E+00	9.48E-06	1.90E-05
Pb-210	1.2612E-10	3,391.20	6,782.40	0.00E+00	4.28E-07	8.55E-07
Pm-147	1.2952E-02	3,391.20	6,782.40	0.00E+00	4.39E+01	8.78E+01
Pu-238	1.7549E-02	3,391.20	6,782.40	0.00E+00	5.95E+01	1.19E+02
Pu-239	4.2810E-04	3,391.20	6,782.40	0.00E+00	1.45E+00	2.90E+00
Pu-240	2.4357E-04	3,391.20	6,782.40	0.00E+00	8.26E-01	1.65E+00
Pu-241	2.6277E-02	3,391.20	6,782.40	0.00E+00	8.91E+01	1.78E+02
Pu-242	3.6329E-07	3,391.20	6,782.40	0.00E+00	1.23E-03	2.46E-03
Ra-226	4.4444E-10	3,391.20	6,782.40	0.00E+00	1.51E-06	3.01E-06
Ra-228	1.9714E-14	3,391.20	6,782.40	0.00E+00	6.69E-11	1.34E-10
Ru-106	2.0477E-07	3,391.20	6,782.40	0.00E+00	6.94E-04	1.39E-03
Se-79	1.2933E-05	3,391.20	6,782.40	0.00E+00	4.39E-02	8.77E-02
Sn-126	1.1574E-05	3,391.20	6,782.40	0.00E+00	3.93E-02	7.85E-02
Sr-90	1.7092E+00	3,391.20	6,782.40	0.00E+00	5.80E+03	1.16E+04
Tc-99	4.2239E-04	3,391.20	6,782.40	0.00E+00	1.43E+00	2.86E+00
Th-229	7.7260E-12	3,391.20	6,782.40	0.00E+00	2.62E-08	5.24E-08
Th-230	5.8497E-08	3,391.20	6,782.40	0.00E+00	1.98E-04	3.97E-04
Th-232	2.6906E-14	3,391.20	6,782.40	0.00E+00	9.12E-11	1.82E-10
Tl-208	4.4336E-08	3,391.20	6,782.40	0.00E+00	1.50E-04	3.01E-04
U-232	1.2037E-07	3,391.20	6,782.40	0.00E+00	4.08E-04	8.16E-04
U-233	3.0011E-09	3,391.20	6,782.40	0.00E+00	1.02E-05	2.04E-05
U-234	1.8497E-04	3,391.20	6,782.40	0.00E+00	6.27E-01	1.25E+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	1.7094E+00	3,391.20	6,782.40	0.00E+00	5.80E+03	1.16E+04
Other Radionuclides					5.84E+03	1.17E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.347E+14
0.0250	1.318E+14
0.0375	1.148E+14
0.0575	1.233E+14
0.0850	7.440E+13
0.1250	4.983E+13
0.2250	6.423E+13
0.3750	2.792E+13
0.5750	4.578E+14
0.8500	6.597E+12
1.2500	3.668E+12
1.7500	1.812E+11
2.2500	1.292E+07
2.7500	1.058E+07
3.5000	7.983E+03
5.0000	2.685E+03
7.0000	2.955E+02
11.0000	3.305E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.17E+01	1.43E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.5	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

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

Checks

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

Estimated EOL HM/Given EOL HM: 0.95

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

[2]Total burnup for all fuel associated with this worksheet must be 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=31.963kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1986
Estimates as of: 2010
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: 20 years

Estimated Canister usage: 18"x10' = 0.78

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	5.0630E-10	6,863.03	13,726.05	0.00E+00	3.47E-06	6.95E-06	Avg. MeV	
Am-241	1.1489E-01	6,863.03	13,726.05	0.00E+00	7.88E+02	1.58E+03	0.0150	1.051E+15
Am-242m	3.0733E-04	6,863.03	13,726.05	0.00E+00	2.11E+00	4.22E+00	0.0250	2.138E+14
Am-243	6.2661E-04	6,863.03	13,726.05	0.00E+00	4.30E+00	8.60E+00	0.0375	2.090E+14
C-14	4.7997E-05	6,863.03	13,726.05	0.00E+00	3.29E-01	6.59E-01	0.0575	2.195E+14
Cl-36	8.0313E-07	6,863.03	13,726.05	0.00E+00	5.51E-03	1.10E-02	0.0850	1.203E+14
Cm-243	3.6127E-04	6,863.03	13,726.05	0.00E+00	2.48E+00	4.96E+00	0.1250	9.109E+13
Cm-244	8.6999E-02	6,863.03	13,726.05	0.00E+00	5.97E+02	1.19E+03	0.2250	1.031E+14
Co-60	1.8379E-02	6,863.03	13,726.05	0.00E+00	1.26E+02	2.52E+02	0.3750	4.444E+13
Cs-134	6.2548E-03	6,863.03	13,726.05	0.00E+00	4.29E+01	8.59E+01	0.5750	1.009E+15
Cs-135	1.4433E-05	6,863.03	13,726.05	0.00E+00	9.91E-02	1.98E-01	0.8500	2.615E+13
Cs-137	1.9767E+00	6,863.03	13,726.05	0.00E+00	1.36E+04	2.71E+04	1.2500	3.927E+13
Eu-154	6.7603E-02	6,863.03	13,726.05	0.00E+00	4.64E+02	9.28E+02	1.7500	7.230E+11
Eu-155	1.4373E-02	6,863.03	13,726.05	0.00E+00	9.86E+01	1.97E+02	2.2500	1.676E+08
Fe-55	2.3466E-03	6,863.03	13,726.05	0.00E+00	1.61E+01	3.22E+01	2.7500	1.176E+08
H-3	4.8143E-02	6,863.03	13,726.05	0.00E+00	3.30E+02	6.61E+02	3.5000	1.741E+07
I-129	9.8288E-07	6,863.03	13,726.05	0.00E+00	6.75E-03	1.35E-02	5.0000	7.333E+06
Kr-85	7.4386E-02	6,863.03	13,726.05	0.00E+00	5.11E+02	1.02E+03	7.0000	8.455E+05
Np-237	1.0145E-05	6,863.03	13,726.05	0.00E+00	6.96E-02	1.39E-01	11.0000	9.713E+04
Pa-231	1.0258E-09	6,863.03	13,726.05	0.00E+00	7.04E-06	1.41E-05		
Pb-210	1.4163E-11	6,863.03	13,726.05	0.00E+00	9.72E-08	1.94E-07		
Pm-147	1.9170E-02	6,863.03	13,726.05	0.00E+00	1.32E+02	2.63E+02		
Pu-238	8.3915E-02	6,863.03	13,726.05	0.00E+00	5.76E+02	1.15E+03		
Pu-239	1.1628E-02	6,863.03	13,726.05	0.00E+00	7.98E+01	1.60E+02		
Pu-240	1.5050E-02	6,863.03	13,726.05	0.00E+00	1.03E+02	2.07E+02		
Pu-241	1.8524E+00	6,863.03	13,726.05	0.00E+00	1.27E+04	2.54E+04		
Pu-242	6.4260E-05	6,863.03	13,726.05	0.00E+00	4.41E-01	8.82E-01		
Ra-226	6.0562E-11	6,863.03	13,726.05	0.00E+00	4.16E-07	8.31E-07		
Ra-228	4.9919E-12	6,863.03	13,726.05	0.00E+00	3.43E-08	6.85E-08		
Ru-106	1.8330E-05	6,863.03	13,726.05	0.00E+00	1.26E-01	2.52E-01		
Se-79	1.2379E-05	6,863.03	13,726.05	0.00E+00	8.50E-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	1.3098E+00	6,863.03	13,726.05	0.00E+00	8.99E+03	1.80E+04		
Tc-99	3.9357E-04	6,863.03	13,726.05	0.00E+00	2.70E+00	5.40E+00		
Th-229	6.2968E-11	6,863.03	13,726.05	0.00E+00	4.32E-07	8.64E-07		
Th-230	1.0362E-08	6,863.03	13,726.05	0.00E+00	7.11E-05	1.42E-04		
Th-232	5.2891E-12	6,863.03	13,726.05	0.00E+00	3.63E-08	7.26E-08		
Tl-208	1.9977E-07	6,863.03	13,726.05	0.00E+00	1.37E-03	2.74E-03		
U-232	5.4490E-07	6,863.03	13,726.05	0.00E+00	3.74E-03	7.48E-03		
U-233	2.3934E-08	6,863.03	13,726.05	0.00E+00	1.64E-04	3.29E-04		
U-234	4.4816E-05	6,863.03	13,726.05	0.00E+00	3.08E-01	6.15E-01		
U-235	-1.4492E-08	6,863.03	0.00	1.75E-03	0.00E+00	1.75E-03		
U-236	7.5711E-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	1.3101E+00	6,863.03	13,726.05	0.00E+00	8.99E+03	1.80E+04		
Other Radionuclides					1.30E+04	2.60E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.06E+02	4.11E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	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=4.961kg; EOL=3.252kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1985
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: *25 years*

Estimated Canister usage:
18"x10'
0.47

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	1,637.30	3,274.60	0.00E+00	1.88E-06	3.75E-06	Avg. MeV	
Am-241	2.3056E-03	1,637.30	3,274.60	0.00E+00	3.77E+00	7.55E+00	0.0150	3.064E+14
Am-242m	4.1476E-07	1,637.30	3,274.60	0.00E+00	6.79E-04	1.36E-03	0.0250	6.366E+13
Am-243	1.4894E-06	1,637.30	3,274.60	0.00E+00	2.44E-03	4.88E-03	0.0375	5.544E+13
C-14	5.7108E-09	1,637.30	3,274.60	0.00E+00	9.35E-06	1.87E-05	0.0575	5.953E+13
Cl-36	1.3124E-32	1,637.30	3,274.60	0.00E+00	2.15E-29	4.30E-29	0.0850	3.592E+13
Cm-243	1.4562E-07	1,637.30	3,274.60	0.00E+00	2.38E-04	4.77E-04	0.1250	2.406E+13
Cm-244	2.4221E-05	1,637.30	3,274.60	0.00E+00	3.97E-02	7.93E-02	0.2250	3.101E+13
Co-60	2.7560E-06	1,637.30	3,274.60	0.00E+00	4.51E-03	9.02E-03	0.3750	1.348E+13
Cs-134	5.8851E-04	1,637.30	3,274.60	0.00E+00	9.64E-01	1.93E+00	0.5750	2.210E+14
Cs-135	3.4477E-06	1,637.30	3,274.60	0.00E+00	5.64E-03	1.13E-02	0.8500	3.185E+12
Cs-137	1.8099E+00	1,637.30	3,274.60	0.00E+00	2.96E+03	5.93E+03	1.2500	1.771E+12
Eu-154	1.6386E-02	1,637.30	3,274.60	0.00E+00	2.68E+01	5.37E+01	1.7500	8.750E+10
Eu-155	2.3957E-03	1,637.30	3,274.60	0.00E+00	3.92E+00	7.84E+00	2.2500	6.237E+06
Fe-55	3.2707E-05	1,637.30	3,274.60	0.00E+00	5.36E-02	1.07E-01	2.7500	5.107E+06
H-3	3.4504E-03	1,637.30	3,274.60	0.00E+00	5.65E+00	1.13E+01	3.5000	3.854E+03
I-129	7.5300E-07	1,637.30	3,274.60	0.00E+00	1.23E-03	2.47E-03	5.0000	1.296E+03
Kr-85	7.8540E-02	1,637.30	3,274.60	0.00E+00	1.29E+02	2.57E+02	7.0000	1.426E+02
Np-237	9.5615E-06	1,637.30	3,274.60	0.00E+00	1.57E-02	3.13E-02	11.0000	1.595E+01
Pa-231	2.7968E-09	1,637.30	3,274.60	0.00E+00	4.58E-06	9.16E-06		
Pb-210	1.2612E-10	1,637.30	3,274.60	0.00E+00	2.06E-07	4.13E-07		
Pm-147	1.2952E-02	1,637.30	3,274.60	0.00E+00	2.12E+01	4.24E+01		
Pu-238	1.7549E-02	1,637.30	3,274.60	0.00E+00	2.87E+01	5.75E+01		
Pu-239	4.2810E-04	1,637.30	3,274.60	0.00E+00	7.01E-01	1.40E+00		
Pu-240	2.4357E-04	1,637.30	3,274.60	0.00E+00	3.99E-01	7.98E-01		
Pu-241	2.6277E-02	1,637.30	3,274.60	0.00E+00	4.30E+01	8.60E+01		
Pu-242	3.6329E-07	1,637.30	3,274.60	0.00E+00	5.95E-04	1.19E-03		
Ra-226	4.4444E-10	1,637.30	3,274.60	0.00E+00	7.28E-07	1.46E-06		
Ra-228	1.9714E-14	1,637.30	3,274.60	0.00E+00	3.23E-11	6.46E-11		
Ru-106	2.0477E-07	1,637.30	3,274.60	0.00E+00	3.35E-04	6.71E-04		
Se-79	1.2933E-05	1,637.30	3,274.60	0.00E+00	2.12E-02	4.24E-02		
Sn-126	1.1574E-05	1,637.30	3,274.60	0.00E+00	1.90E-02	3.79E-02		
Sr-90	1.7092E+00	1,637.30	3,274.60	0.00E+00	2.80E+03	5.60E+03		
Tc-99	4.2239E-04	1,637.30	3,274.60	0.00E+00	6.92E-01	1.38E+00		
Th-229	7.7260E-12	1,637.30	3,274.60	0.00E+00	1.26E-08	2.53E-08		
Th-230	5.8497E-06	1,637.30	3,274.60	0.00E+00	9.58E-05	1.92E-04		
Th-232	2.6906E-14	1,637.30	3,274.60	0.00E+00	4.41E-11	8.81E-11		
Tl-208	4.4336E-06	1,637.30	3,274.60	0.00E+00	7.26E-05	1.45E-04		
U-232	1.2037E-07	1,637.30	3,274.60	0.00E+00	1.97E-04	3.94E-04	Thermal Power	
U-233	3.0011E-09	1,637.30	3,274.60	0.00E+00	4.91E-06	9.83E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8497E-04	1,637.30	3,274.60	0.00E+00	3.03E-01	6.06E-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	3.46E+01	6.93E+01
U-238	-4.2851E-09	1,637.30	0.00	1.14E-04	1.07E-04	1.14E-04	Total	Total
Y-90	1.7094E+00	1,637.30	3,274.60	0.00E+00	2.80E+03	5.60E+03		
Other Radionuclides					2.82E+03	5.64E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.19412969	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.47	1,637.30
Bounding:		3,274.60

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.04	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: 2010
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"x10'
3.57

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.3344E-08	1,824.78	3,649.55	0.00E+00	4.26E-05	8.52E-05
Am-241	1.1135E-04	1,824.78	3,649.55	0.00E+00	2.03E-01	4.06E-01
Am-242m	8.5075E-09	1,824.78	3,649.55	0.00E+00	1.55E-05	3.10E-05
Am-243	9.8519E-10	1,824.78	3,649.55	0.00E+00	1.80E-06	3.60E-06
C-14	2.3012E-04	1,824.78	3,649.55	0.00E+00	4.20E-01	8.40E-01
Cl-36	1.2261E-06	1,824.78	3,649.55	0.00E+00	2.24E-03	4.47E-03
Cm-243	2.4875E-10	1,824.78	3,649.55	0.00E+00	4.54E-07	9.08E-07
Cm-244	2.3178E-09	1,824.78	3,649.55	0.00E+00	4.23E-06	8.46E-06
Co-60	7.0849E-02	1,824.78	3,649.55	0.00E+00	1.29E+02	2.59E+02
Cs-134	3.0266E-06	1,824.78	3,649.55	0.00E+00	5.52E-03	1.10E-02
Cs-135	3.0316E-05	1,824.78	3,649.55	0.00E+00	5.53E-02	1.11E-01
Cs-137	1.4511E+00	1,824.78	3,649.55	0.00E+00	2.65E+03	5.30E+03
Eu-154	6.6955E-04	1,824.78	3,649.55	0.00E+00	1.22E+00	2.44E+00
Eu-155	6.9850E-04	1,824.78	3,649.55	0.00E+00	1.27E+00	2.55E+00
Fe-55	1.2318E-03	1,824.78	3,649.55	0.00E+00	2.25E+00	4.50E+00
H-3	2.5141E-03	1,824.78	3,649.55	0.00E+00	4.59E+00	9.18E+00
I-129	7.3195E-07	1,824.78	3,649.55	0.00E+00	1.34E-03	2.67E-03
Kr-85	4.1281E-02	1,824.78	3,649.55	0.00E+00	7.53E+01	1.51E+02
Np-237	1.1489E-06	1,824.78	3,649.55	0.00E+00	2.10E-03	4.19E-03
Pa-231	4.5241E-06	1,824.78	3,649.55	0.00E+00	8.26E-05	1.65E-04
Pb-210	6.4476E-13	1,824.78	3,649.55	0.00E+00	1.18E-09	2.35E-09
Pm-147	1.1651E-03	1,824.78	3,649.55	0.00E+00	2.13E+00	4.25E+00
Pu-238	2.9517E-04	1,824.78	3,649.55	0.00E+00	5.39E-01	1.08E+00
Pu-239	6.6772E-04	1,824.78	3,649.55	0.00E+00	1.22E+00	2.44E+00
Pu-240	8.6839E-05	1,824.78	3,649.55	0.00E+00	1.58E-01	3.17E-01
Pu-241	7.1514E-04	1,824.78	3,649.55	0.00E+00	1.30E+00	2.61E+00
Pu-242	1.9717E-09	1,824.78	3,649.55	0.00E+00	3.60E-06	7.20E-06
Ra-226	1.7654E-12	1,824.78	3,649.55	0.00E+00	3.22E-09	6.44E-09
Ra-228	8.2928E-12	1,824.78	3,649.55	0.00E+00	1.51E-08	3.03E-08
Ru-106	1.8419E-10	1,824.78	3,649.55	0.00E+00	3.36E-07	6.72E-07
Se-79	1.3223E-05	1,824.78	3,649.55	0.00E+00	2.41E-02	4.83E-02
Sn-126	1.1493E-05	1,824.78	3,649.55	0.00E+00	2.10E-02	4.19E-02
Sr-90	1.3649E+00	1,824.78	3,649.55	0.00E+00	2.49E+03	4.98E+03
Tc-99	4.6656E-04	1,824.78	3,649.55	0.00E+00	8.51E-01	1.70E+00
Th-229	1.4547E-11	1,824.78	3,649.55	0.00E+00	2.65E-08	5.31E-08
Th-230	1.6617E-10	1,824.78	3,649.55	0.00E+00	3.03E-07	6.06E-07
Th-232	8.3361E-12	1,824.78	3,649.55	0.00E+00	1.52E-08	3.04E-08
Tl-208	2.1664E-06	1,824.78	3,649.55	0.00E+00	3.95E-05	7.91E-05
U-232	5.8669E-06	1,824.78	3,649.55	0.00E+00	1.07E-04	2.14E-04
U-233	3.1847E-09	1,824.78	3,649.55	0.00E+00	5.81E-06	1.16E-05
U-234	3.8769E-07	1,824.78	3,649.55	0.00E+00	7.07E-04	1.41E-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	1.3652E+00	1,824.78	3,649.55	0.00E+00	2.49E+03	4.98E+03
Other Radionuclides					3.01E+03	6.02E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.724E+14
0.0250	5.661E+13
0.0375	4.896E+13
0.0575	5.277E+13
0.0850	3.189E+13
0.1250	2.070E+13
0.2250	2.745E+13
0.3750	1.197E+13
0.5750	1.972E+14
0.8500	1.996E+12
1.2500	1.984E+13
1.7500	5.149E+10
2.2500	1.069E+08
2.7500	3.090E+06
3.5000	2.269E+02
5.0000	9.340E+01
7.0000	1.032E+01
11.0000	1.159E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.19E+01	6.37E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	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: 2010
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"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	2.3344E-08	15.04	30.09	0.00E+00	3.51E-07	7.02E-07
Am-241	1.1135E-04	15.04	30.09	0.00E+00	1.67E-03	3.35E-03
Am-242m	8.5075E-09	15.04	30.09	0.00E+00	1.28E-07	2.56E-07
Am-243	9.8519E-10	15.04	30.09	0.00E+00	1.48E-08	2.96E-08
C-14	2.3012E-04	15.04	30.09	0.00E+00	3.46E-03	6.92E-03
Cl-36	1.2261E-06	15.04	30.09	0.00E+00	1.84E-05	3.69E-05
Cm-243	2.4875E-10	15.04	30.09	0.00E+00	3.74E-09	7.48E-09
Cm-244	2.3178E-09	15.04	30.09	0.00E+00	3.49E-08	6.97E-08
Co-60	7.0849E-02	15.04	30.09	0.00E+00	1.07E+00	2.13E+00
Cs-134	3.0266E-06	15.04	30.09	0.00E+00	4.55E-05	9.11E-05
Cs-135	3.0316E-05	15.04	30.09	0.00E+00	4.56E-04	9.12E-04
Cs-137	1.4511E+00	15.04	30.09	0.00E+00	2.18E+01	4.37E+01
Eu-154	6.6955E-04	15.04	30.09	0.00E+00	1.01E-02	2.01E-02
Eu-155	6.9850E-04	15.04	30.09	0.00E+00	1.05E-02	2.10E-02
Fe-55	1.2318E-03	15.04	30.09	0.00E+00	1.85E-02	3.71E-02
H-3	2.5141E-03	15.04	30.09	0.00E+00	3.78E-02	7.56E-02
I-129	7.3195E-07	15.04	30.09	0.00E+00	1.10E-05	2.20E-05
Kr-85	4.1281E-02	15.04	30.09	0.00E+00	6.21E-01	1.24E+00
Np-237	1.1489E-06	15.04	30.09	0.00E+00	1.73E-05	3.46E-05
Pa-231	4.5241E-06	15.04	30.09	0.00E+00	6.81E-07	1.36E-06
Pb-210	6.4476E-13	15.04	30.09	0.00E+00	9.70E-12	1.94E-11
Pm-147	1.1651E-03	15.04	30.09	0.00E+00	1.75E-02	3.51E-02
Pu-238	2.9517E-04	15.04	30.09	0.00E+00	4.44E-03	8.88E-03
Pu-239	6.6772E-04	15.04	30.09	0.00E+00	1.00E-02	2.01E-02
Pu-240	8.6839E-05	15.04	30.09	0.00E+00	1.31E-03	2.61E-03
Pu-241	7.1514E-04	15.04	30.09	0.00E+00	1.08E-02	2.15E-02
Pu-242	1.9717E-09	15.04	30.09	0.00E+00	2.97E-08	5.93E-08
Ra-226	1.7654E-12	15.04	30.09	0.00E+00	2.66E-11	5.31E-11
Ra-228	8.2928E-12	15.04	30.09	0.00E+00	1.25E-10	2.49E-10
Ru-106	1.8419E-10	15.04	30.09	0.00E+00	2.77E-09	5.54E-09
Se-79	1.3223E-05	15.04	30.09	0.00E+00	1.99E-04	3.98E-04
Sn-126	1.1493E-05	15.04	30.09	0.00E+00	1.73E-04	3.46E-04
Sr-90	1.3649E+00	15.04	30.09	0.00E+00	2.05E+01	4.11E+01
Tc-99	4.6656E-04	15.04	30.09	0.00E+00	7.02E-03	1.40E-02
Th-229	1.4547E-11	15.04	30.09	0.00E+00	2.19E-10	4.38E-10
Th-230	1.6617E-10	15.04	30.09	0.00E+00	2.50E-09	5.00E-09
Th-232	8.3361E-12	15.04	30.09	0.00E+00	1.25E-10	2.51E-10
Tl-208	2.1664E-08	15.04	30.09	0.00E+00	3.26E-07	6.52E-07
U-232	5.8669E-08	15.04	30.09	0.00E+00	8.83E-07	1.77E-06
U-233	3.1847E-09	15.04	30.09	0.00E+00	4.79E-08	9.58E-08
U-234	3.8769E-07	15.04	30.09	0.00E+00	5.83E-06	1.17E-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	1.3652E+00	15.04	30.09	0.00E+00	2.05E+01	4.11E+01
Other Radionuclides					2.48E+01	4.97E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.246E+12
0.0250	4.666E+11
0.0375	4.036E+11
0.0575	4.351E+11
0.0850	2.629E+11
0.1250	1.707E+11
0.2250	2.263E+11
0.3750	9.869E+10
0.5750	1.626E+12
0.8500	1.646E+10
1.2500	1.636E+11
1.7500	4.245E+08
2.2500	8.813E+05
2.7500	2.547E+04
3.5000	1.936E+00
5.0000	7.977E-01
7.0000	8.821E-02
11.0000	9.907E-03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.63E-01	5.25E-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 %:	93.14242615	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: 2010
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: 25 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	1.3562E-08	9,621.24	19,242.47	0.00E+00	1.30E-04	2.61E-04
Am-241	1.0168E-04	9,621.24	19,242.47	0.00E+00	9.78E-01	1.96E+00
Am-242m	8.9052E-09	9,621.24	19,242.47	0.00E+00	8.57E-05	1.71E-04
Am-243	9.8602E-10	9,621.24	19,242.47	0.00E+00	9.49E-06	1.90E-05
C-14	2.3045E-04	9,621.24	19,242.47	0.00E+00	2.22E+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	3.1730E-10	9,621.24	19,242.47	0.00E+00	3.05E-06	6.11E-06
Cm-244	3.3977E-09	9,621.24	19,242.47	0.00E+00	3.27E-05	6.54E-05
Co-60	2.6373E-01	9,621.24	19,242.47	0.00E+00	2.54E+03	5.07E+03
Cs-134	8.7072E-05	9,621.24	19,242.47	0.00E+00	8.38E-01	1.68E+00
Cs-135	3.0316E-05	9,621.24	19,242.47	0.00E+00	2.92E-01	5.83E-01
Cs-137	1.8286E+00	9,621.24	19,242.47	0.00E+00	1.76E+04	3.52E+04
Eu-154	1.4982E-03	9,621.24	19,242.47	0.00E+00	1.44E+01	2.88E+01
Eu-155	2.8236E-03	9,621.24	19,242.47	0.00E+00	2.72E+01	5.43E+01
Fe-55	1.7687E-02	9,621.24	19,242.47	0.00E+00	1.70E+02	3.40E+02
H-3	4.4043E-03	9,621.24	19,242.47	0.00E+00	4.24E+01	8.48E+01
I-129	7.3195E-07	9,621.24	19,242.47	0.00E+00	7.04E-03	1.41E-02
Kr-85	7.8769E-02	9,621.24	19,242.47	0.00E+00	7.58E+02	1.52E+03
Np-237	1.1484E-06	9,621.24	19,242.47	0.00E+00	1.10E-02	2.21E-02
Pa-231	3.2396E-08	9,621.24	19,242.47	0.00E+00	3.12E-04	6.23E-04
Pb-210	2.4409E-13	9,621.24	19,242.47	0.00E+00	2.35E-09	4.70E-09
Pm-147	1.6331E-02	9,621.24	19,242.47	0.00E+00	1.57E+02	3.14E+02
Pu-238	3.1947E-04	9,621.24	19,242.47	0.00E+00	3.07E+00	6.15E+00
Pu-239	6.6789E-04	9,621.24	19,242.47	0.00E+00	6.43E+00	1.29E+01
Pu-240	8.6922E-05	9,621.24	19,242.47	0.00E+00	8.36E-01	1.67E+00
Pu-241	1.1567E-03	9,621.24	19,242.47	0.00E+00	1.11E+01	2.23E+01
Pu-242	1.9717E-09	9,621.24	19,242.47	0.00E+00	1.90E-05	3.79E-05
Ra-226	8.6190E-13	9,621.24	19,242.47	0.00E+00	8.29E-09	1.66E-08
Ra-228	8.1498E-12	9,621.24	19,242.47	0.00E+00	7.84E-08	1.57E-07
Ru-106	1.7770E-07	9,621.24	19,242.47	0.00E+00	1.71E-03	3.42E-03
Se-79	1.3225E-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	1.7321E+00	9,621.24	19,242.47	0.00E+00	1.67E+04	3.33E+04
Tc-99	4.6656E-04	9,621.24	19,242.47	0.00E+00	4.49E+00	8.98E+00
Th-229	1.0110E-11	9,621.24	19,242.47	0.00E+00	9.73E-08	1.95E-07
Th-230	1.1466E-10	9,621.24	19,242.47	0.00E+00	1.10E-06	2.21E-06
Th-232	8.3245E-12	9,621.24	19,242.47	0.00E+00	8.01E-08	1.60E-07
Tl-208	2.3860E-08	9,621.24	19,242.47	0.00E+00	2.30E-04	4.59E-04
U-232	6.4576E-08	9,621.24	19,242.47	0.00E+00	6.21E-04	1.24E-03
U-233	3.1082E-09	9,621.24	19,242.47	0.00E+00	2.99E-05	5.98E-05
U-234	3.7587E-07	9,621.24	19,242.47	0.00E+00	3.62E-03	7.23E-03
U-235	-2.7761E-06	9,621.24	0.00	2.28E-01	2.02E-01	2.28E-01
U-238	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	1.7321E+00	9,621.24	19,242.47	0.00E+00	1.67E+04	3.33E+04
Other Radionuclides					1.95E+04	3.90E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.831E+15
0.0250	3.804E+14
0.0375	3.283E+14
0.0575	3.542E+14
0.0850	2.142E+14
0.1250	1.392E+14
0.2250	1.838E+14
0.3750	8.024E+13
0.5750	1.310E+15
0.8500	1.366E+13
1.2500	3.806E+14
1.7500	3.519E+11
2.2500	2.027E+09
2.7500	2.231E+07
3.5000	5.547E+03
5.0000	8.362E+02
7.0000	9.402E+01
11.0000	1.066E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.39E+02	4.77E+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: 2010
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: 25 years

Estimated Canister usage: 18"x15' 1.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6376E-10	2,881.39	5,762.77	0.00E+00	1.91E-06	3.83E-06
Am-241	1.3144E-01	2,881.39	5,762.77	0.00E+00	3.79E+02	7.57E+02
Am-242m	3.0039E-04	2,881.39	5,762.77	0.00E+00	8.66E-01	1.73E+00
Am-243	6.2629E-04	2,881.39	5,762.77	0.00E+00	1.80E+00	3.61E+00
C-14	4.7965E-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	3.1993E-04	2,881.39	5,762.77	0.00E+00	9.22E-01	1.84E+00
Cm-244	7.1851E-02	2,881.39	5,762.77	0.00E+00	2.07E+02	4.14E+02
Co-60	9.5220E-03	2,881.39	5,762.77	0.00E+00	2.74E+01	5.49E+01
Cs-134	1.1662E-03	2,881.39	5,762.77	0.00E+00	3.36E+00	6.72E+00
Cs-135	1.4433E-05	2,881.39	5,762.77	0.00E+00	4.16E-02	8.32E-02
Cs-137	1.7603E+00	2,881.39	5,762.77	0.00E+00	5.07E+03	1.01E+04
Eu-154	4.5203E-02	2,881.39	5,762.77	0.00E+00	1.30E+02	2.60E+02
Eu-155	7.1479E-03	2,881.39	5,762.77	0.00E+00	2.06E+01	4.12E+01
Fe-55	6.1919E-04	2,881.39	5,762.77	0.00E+00	1.78E+00	3.57E+00
H-3	3.6386E-02	2,881.39	5,762.77	0.00E+00	1.05E+02	2.10E+02
I-129	9.8288E-07	2,881.39	5,762.77	0.00E+00	2.83E-03	5.66E-03
Kr-85	5.3844E-02	2,881.39	5,762.77	0.00E+00	1.55E+02	3.10E+02
Np-237	1.0546E-05	2,881.39	5,762.77	0.00E+00	3.04E-02	6.08E-02
Pa-231	1.1370E-09	2,881.39	5,762.77	0.00E+00	3.28E-06	6.55E-06
Pb-210	3.3624E-11	2,881.39	5,762.77	0.00E+00	9.69E-08	1.94E-07
Pm-147	5.1211E-03	2,881.39	5,762.77	0.00E+00	1.48E+01	2.95E+01
Pu-238	8.0669E-02	2,881.39	5,762.77	0.00E+00	2.32E+02	4.65E+02
Pu-239	1.1626E-02	2,881.39	5,762.77	0.00E+00	3.35E+01	6.70E+01
Pu-240	1.5097E-02	2,881.39	5,762.77	0.00E+00	4.35E+01	8.70E+01
Pu-241	1.4567E+00	2,881.39	5,762.77	0.00E+00	4.20E+03	8.39E+03
Pu-242	6.4260E-05	2,881.39	5,762.77	0.00E+00	1.85E-01	3.70E-01
Ra-226	1.1392E-10	2,881.39	5,762.77	0.00E+00	3.28E-07	6.57E-07
Ra-228	5.1841E-12	2,881.39	5,762.77	0.00E+00	1.49E-08	2.99E-08
Ru-106	5.9012E-07	2,881.39	5,762.77	0.00E+00	1.70E-03	3.40E-03
Se-79	1.2379E-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	1.1630E+00	2,881.39	5,762.77	0.00E+00	3.35E+03	6.70E+03
Tc-99	3.9357E-04	2,881.39	5,762.77	0.00E+00	1.13E+00	2.27E+00
Th-229	8.5691E-11	2,881.39	5,762.77	0.00E+00	2.47E-07	4.94E-07
Th-230	1.4493E-08	2,881.39	5,762.77	0.00E+00	4.18E-05	8.35E-05
Th-232	5.2923E-12	2,881.39	5,762.77	0.00E+00	1.52E-08	3.05E-08
Tl-208	1.9202E-07	2,881.39	5,762.77	0.00E+00	5.53E-04	1.11E-03
U-232	5.2083E-07	2,881.39	5,762.77	0.00E+00	1.50E-03	3.00E-03
U-233	2.4386E-08	2,881.39	5,762.77	0.00E+00	7.03E-05	1.41E-04
U-234	4.7012E-05	2,881.39	5,762.77	0.00E+00	1.35E-01	2.71E-01
U-235	-1.4492E-06	2,881.39	0.00	1.51E-02	1.10E-02	1.51E-02
U-236	7.5759E-06	2,881.39	5,762.77	0.00E+00	2.18E-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	1.1631E+00	2,881.39	5,762.77	0.00E+00	3.35E+03	6.70E+03
Other Radionuclides					4.87E+03	9.74E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.919E+14
0.0250	7.937E+13
0.0375	7.681E+13
0.0575	8.380E+13
0.0850	4.440E+13
0.1250	3.244E+13
0.2250	3.812E+13
0.3750	1.636E+13
0.5750	3.758E+14
0.8500	7.418E+12
1.2500	1.002E+13
1.7500	2.195E+11
2.2500	4.055E+07
2.7500	4.558E+07
3.5000	5.973E+06
5.0000	2.553E+06
7.0000	2.943E+05
11.0000	3.380E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.90E+01	1.58E+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)[1]

	From SFD	Estimated
Nominal:	2,476.80	2,881.39
Bounding:	2,479.97	5,762.77

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.29	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: 2010
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: 25 years

Estimated Canister usage: HIC = 0.57

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6376E-10	7,493.51	14,987.01	0.00E+00	4.97E-06	9.95E-06	Avg. MeV	
Am-241	1.3144E-01	7,493.51	14,987.01	0.00E+00	9.85E+02	1.97E+03	0.0150	1.019E+15
Am-242m	3.0039E-04	7,493.51	14,987.01	0.00E+00	2.25E+00	4.50E+00	0.0250	2.064E+14
Am-243	6.2629E-04	7,493.51	14,987.01	0.00E+00	4.69E+00	9.39E+00	0.0375	1.938E+14
C-14	4.7965E-05	7,493.51	14,987.01	0.00E+00	3.59E-01	7.19E-01	0.0575	2.179E+14
Cl-36	8.0297E-07	7,493.51	14,987.01	0.00E+00	6.02E-03	1.20E-02	0.0850	1.155E+14
Cm-243	3.1993E-04	7,493.51	14,987.01	0.00E+00	2.40E+00	4.79E+00	0.1250	8.436E+13
Cm-244	7.1851E-02	7,493.51	14,987.01	0.00E+00	5.38E+02	1.08E+03	0.2250	9.913E+13
Co-60	9.5220E-03	7,493.51	14,987.01	0.00E+00	7.14E+01	1.43E+02	0.3750	4.254E+13
Cs-134	1.1662E-03	7,493.51	14,987.01	0.00E+00	8.74E+00	1.75E+01	0.5750	9.774E+14
Cs-135	1.4433E-05	7,493.51	14,987.01	0.00E+00	1.08E-01	2.16E-01	0.8500	1.929E+13
Cs-137	1.7603E+00	7,493.51	14,987.01	0.00E+00	1.32E+04	2.64E+04	1.2500	2.606E+13
Eu-154	4.5203E-02	7,493.51	14,987.01	0.00E+00	3.39E+02	6.77E+02	1.7500	5.710E+11
Eu-155	7.1479E-03	7,493.51	14,987.01	0.00E+00	5.36E+01	1.07E+02	2.2500	1.055E+08
Fe-55	6.1919E-04	7,493.51	14,987.01	0.00E+00	4.64E+00	9.28E+00	2.7500	1.185E+08
H-3	3.6386E-02	7,493.51	14,987.01	0.00E+00	2.73E+02	5.45E+02	3.5000	1.553E+07
I-129	9.8288E-07	7,493.51	14,987.01	0.00E+00	7.37E-03	1.47E-02	5.0000	6.638E+06
Kr-85	5.3844E-02	7,493.51	14,987.01	0.00E+00	4.03E+02	8.07E+02	7.0000	7.653E+05
Np-237	1.0546E-05	7,493.51	14,987.01	0.00E+00	7.90E-02	1.58E-01	11.0000	8.790E+04
Pa-231	1.1370E-09	7,493.51	14,987.01	0.00E+00	8.52E-06	1.70E-05		
Pb-210	3.3624E-11	7,493.51	14,987.01	0.00E+00	2.52E-07	5.04E-07		
Pm-147	5.1211E-03	7,493.51	14,987.01	0.00E+00	3.84E+01	7.68E+01		
Pu-238	8.0669E-02	7,493.51	14,987.01	0.00E+00	6.04E+02	1.21E+03		
Pu-239	1.1626E-02	7,493.51	14,987.01	0.00E+00	8.71E+01	1.74E+02		
Pu-240	1.5097E-02	7,493.51	14,987.01	0.00E+00	1.13E+02	2.26E+02		
Pu-241	1.4567E+00	7,493.51	14,987.01	0.00E+00	1.09E+04	2.18E+04		
Pu-242	6.4260E-05	7,493.51	14,987.01	0.00E+00	4.82E-01	9.63E-01		
Ra-226	1.1392E-10	7,493.51	14,987.01	0.00E+00	8.54E-07	1.71E-06		
Ra-228	5.1841E-12	7,493.51	14,987.01	0.00E+00	3.88E-08	7.77E-08		
Ru-106	5.9012E-07	7,493.51	14,987.01	0.00E+00	4.42E-03	8.84E-03		
Se-79	1.2379E-05	7,493.51	14,987.01	0.00E+00	9.28E-02	1.86E-01		
Sn-126	2.5210E-05	7,493.51	14,987.01	0.00E+00	1.89E-01	3.78E-01		
Sr-90	1.1630E+00	7,493.51	14,987.01	0.00E+00	8.71E+03	1.74E+04		
Tc-99	3.9357E-04	7,493.51	14,987.01	0.00E+00	2.95E+00	5.90E+00		
Th-229	8.5691E-11	7,493.51	14,987.01	0.00E+00	6.42E-07	1.28E-06		
Th-230	1.4493E-08	7,493.51	14,987.01	0.00E+00	1.09E-04	2.17E-04		
Th-232	5.2923E-12	7,493.51	14,987.01	0.00E+00	3.97E-08	7.93E-08		
Tl-208	1.9202E-07	7,493.51	14,987.01	0.00E+00	1.44E-03	2.88E-03		
U-232	5.2083E-07	7,493.51	14,987.01	0.00E+00	3.90E-03	7.81E-03		
U-233	2.4386E-08	7,493.51	14,987.01	0.00E+00	1.83E-04	3.65E-04		
U-234	4.7012E-05	7,493.51	14,987.01	0.00E+00	3.52E-01	7.05E-01		
U-235	-1.4492E-06	7,493.51	0.00	4.15E-03	0.00E+00	4.15E-03		
U-236	7.5759E-06	7,493.51	14,987.01	0.00E+00	5.68E-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	1.1631E+00	7,493.51	14,987.01	0.00E+00	8.72E+03	1.74E+04		
Other Radionuclides					1.27E+04	2.53E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.05E+02	4.11E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	809.75	7,493.51
Bounding:	943.26	14,987.01

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	2.71	9.25
Bounding:	5.42	15.89

Estimated EOL HM/Given EOL HM: 1.05

[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: 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: 2010
Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
[2]Template Burnup(MWd): 1270.275
Template BOL Heavy Metal Mass (MT): 0.012702752
Template Decay Time: 35 years

Estimated Canister usage: 18"x15" 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	3.8818E-06	176.28	352.57	0.00E+00	6.84E-04	1.37E-03
Am-241	3.1387E-03	176.28	352.57	0.00E+00	5.53E-01	1.11E+00
Am-242m	2.3971E-06	176.28	352.57	0.00E+00	4.23E-04	8.45E-04
Am-243	4.6069E-05	176.28	352.57	0.00E+00	8.12E-03	1.62E-02
C-14	2.3121E-05	176.28	352.57	0.00E+00	4.08E-03	8.15E-03
Cl-36	1.0667E-06	176.28	352.57	0.00E+00	1.88E-04	3.76E-04
Cm-243	2.5357E-05	176.28	352.57	0.00E+00	4.47E-03	8.94E-03
Cm-244	6.4458E-03	176.28	352.57	0.00E+00	1.14E+00	2.27E+00
Co-60	4.5014E-04	176.28	352.57	0.00E+00	7.94E-02	1.59E-01
Cs-134	3.8066E-05	176.28	352.57	0.00E+00	6.71E-03	1.34E-02
Cs-135	2.4711E-05	176.28	352.57	0.00E+00	4.36E-03	8.71E-03
Cs-137	1.3273E+00	176.28	352.57	0.00E+00	2.34E+02	4.68E+02
Eu-154	1.5705E-02	176.28	352.57	0.00E+00	2.77E+00	5.54E+00
Eu-155	1.0415E-03	176.28	352.57	0.00E+00	1.84E-01	3.67E-01
Fe-55	4.4707E-06	176.28	352.57	0.00E+00	7.88E-06	1.58E-05
H-3	3.9094E-03	176.28	352.57	0.00E+00	6.89E-01	1.38E+00
I-129	1.0092E-06	176.28	352.57	0.00E+00	1.78E-04	3.56E-04
Kr-85	3.9519E-02	176.28	352.57	0.00E+00	6.97E+00	1.39E+01
Np-237	1.2541E-05	176.28	352.57	0.00E+00	2.21E-03	4.42E-03
Pa-231	4.7376E-06	176.28	352.57	0.00E+00	8.35E-04	1.67E-03
Pb-210	1.4194E-09	176.28	352.57	0.00E+00	2.50E-07	5.00E-07
Pm-147	1.5146E-04	176.28	352.57	0.00E+00	2.67E-02	5.34E-02
Pu-238	1.6248E-01	176.28	352.57	0.00E+00	2.86E+01	5.73E+01
Pu-239	1.3580E-04	176.28	352.57	0.00E+00	2.39E-02	4.79E-02
Pu-240	2.7136E-04	176.28	352.57	0.00E+00	4.78E-02	9.57E-02
Pu-241	1.9342E-02	176.28	352.57	0.00E+00	3.41E+00	6.82E+00
Pu-242	3.8866E-06	176.28	352.57	0.00E+00	6.85E-04	1.37E-03
Ra-226	2.7923E-09	176.28	352.57	0.00E+00	4.92E-07	9.84E-07
Ra-228	9.1791E-07	176.28	352.57	0.00E+00	1.62E-04	3.24E-04
Ru-106	3.5205E-11	176.28	352.57	0.00E+00	6.21E-09	1.24E-08
Se-79	2.1082E-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	1.2667E+00	176.28	352.57	0.00E+00	2.23E+02	4.47E+02
Tc-99	3.3331E-04	176.28	352.57	0.00E+00	5.88E-02	1.18E-01
Th-229	1.0612E-05	176.28	352.57	0.00E+00	1.87E-03	3.74E-03
Th-230	1.8878E-07	176.28	352.57	0.00E+00	3.33E-05	6.66E-05
Th-232	-6.9673E-08	176.28	0.00	3.71E-04	3.58E-04	3.71E-04
Tl-208	5.9530E-04	176.28	352.57	0.00E+00	1.05E-01	2.10E-01
U-232	1.6115E-03	176.28	352.57	0.00E+00	2.84E-01	5.68E-01
U-233	2.0602E-03	176.28	352.57	0.00E+00	3.63E-01	7.26E-01
U-234	2.8939E-04	176.28	352.57	0.00E+00	5.10E-02	1.02E-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	1.2667E+00	176.28	352.57	0.00E+00	2.23E+02	4.47E+02
Other Radionuclides					2.25E+02	4.49E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.474E+13
0.0250	5.068E+12
0.0375	4.417E+12
0.0575	4.751E+12
0.0850	2.869E+12
0.1250	1.935E+12
0.2250	2.489E+12
0.3750	1.076E+12
0.5750	1.746E+13
0.8500	2.759E+11
1.2500	1.779E+11
1.7500	8.449E+09
2.2500	6.224E+05
2.7500	7.370E+09
3.5000	3.520E+04
5.0000	1.501E+04
7.0000	1.725E+03
11.0000	1.978E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.75E+00	7.51E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	GRAPHITE	GRAPHITE
Fuel Cladding:	GRAPHITE	GRAPHITE
BOL HM Constituents:	Th and U	Th and U
BOL Enrichment %:	93.333	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		176.28
Bounding:	115.37	352.57

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.47	
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: 2010
Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
[2]Template Burnup(MWd): 1270.275
Template BOL Heavy Metal Mass (MT): 0.012702752
Template Decay Time: 35 years

Estimated Canister usage: 18"x15" 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	3.8818E-06	44,649.60	52,578.31	0.00E+00	1.73E-01	2.04E-01
Am-241	3.1387E-03	44,649.60	52,578.31	0.00E+00	1.40E+02	1.65E+02
Am-242m	2.3971E-06	44,649.60	52,578.31	0.00E+00	1.07E-01	1.26E-01
Am-243	4.6069E-05	44,649.60	52,578.31	0.00E+00	2.06E+00	2.42E+00
C-14	2.3121E-05	44,649.60	52,578.31	0.00E+00	1.03E+00	1.22E+00
Cl-36	1.0667E-06	44,649.60	52,578.31	0.00E+00	4.76E-02	5.61E-02
Cm-243	2.5357E-05	44,649.60	52,578.31	0.00E+00	1.13E+00	1.33E+00
Cm-244	6.4458E-03	44,649.60	52,578.31	0.00E+00	2.88E+02	3.39E+02
Co-60	4.5014E-04	44,649.60	52,578.31	0.00E+00	2.01E+01	2.37E+01
Cs-134	3.8086E-05	44,649.60	52,578.31	0.00E+00	1.70E+00	2.00E+00
Cs-135	2.4711E-05	44,649.60	52,578.31	0.00E+00	1.10E+00	1.30E+00
Cs-137	1.3273E+00	44,649.60	52,578.31	0.00E+00	5.93E+04	6.98E+04
Eu-154	1.5705E-02	44,649.60	52,578.31	0.00E+00	7.01E+02	8.26E+02
Eu-155	1.0415E-03	44,649.60	52,578.31	0.00E+00	4.65E+01	5.48E+01
Fe-55	4.4707E-08	44,649.60	52,578.31	0.00E+00	2.00E-03	2.35E-03
H-3	3.9094E-03	44,649.60	52,578.31	0.00E+00	1.75E+02	2.06E+02
I-129	1.0092E-06	44,649.60	52,578.31	0.00E+00	4.51E-02	5.31E-02
Kr-85	3.9519E-02	44,649.60	52,578.31	0.00E+00	1.76E+03	2.08E+03
Np-237	1.2541E-05	44,649.60	52,578.31	0.00E+00	5.60E-01	6.59E-01
Pa-231	4.7376E-06	44,649.60	52,578.31	0.00E+00	2.12E-01	2.49E-01
Pb-210	1.4194E-09	44,649.60	52,578.31	0.00E+00	6.34E-05	7.46E-05
Pm-147	1.5146E-04	44,649.60	52,578.31	0.00E+00	6.76E+00	7.96E+00
Pu-238	1.6248E-01	44,649.60	52,578.31	0.00E+00	7.25E+03	8.54E+03
Pu-239	1.3580E-04	44,649.60	52,578.31	0.00E+00	6.06E+00	7.14E+00
Pu-240	2.7136E-04	44,649.60	52,578.31	0.00E+00	1.21E+01	1.43E+01
Pu-241	1.9342E-02	44,649.60	52,578.31	0.00E+00	8.64E+02	1.02E+03
Pu-242	3.8866E-06	44,649.60	52,578.31	0.00E+00	1.74E-01	2.04E-01
Ra-226	2.7923E-09	44,649.60	52,578.31	0.00E+00	1.25E-04	1.47E-04
Ra-228	9.1791E-07	44,649.60	52,578.31	0.00E+00	4.10E-02	4.83E-02
Ru-106	3.5205E-11	44,649.60	52,578.31	0.00E+00	1.57E-06	1.85E-06
Se-79	2.1082E-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	1.2667E+00	44,649.60	52,578.31	0.00E+00	5.66E+04	6.66E+04
Tc-99	3.3331E-04	44,649.60	52,578.31	0.00E+00	1.49E+01	1.75E+01
Th-229	1.0612E-05	44,649.60	52,578.31	0.00E+00	4.74E-01	5.58E-01
Th-230	1.8878E-07	44,649.60	52,578.31	0.00E+00	8.43E-03	9.93E-03
Th-232	-6.9673E-08	44,649.60	0.00	1.69E-01	1.66E-01	1.69E-01
Tl-208	5.9530E-04	44,649.60	52,578.31	0.00E+00	2.66E+01	3.13E+01
U-232	1.6115E-03	44,649.60	52,578.31	0.00E+00	7.20E+01	8.47E+01
U-233	2.0602E-03	44,649.60	52,578.31	0.00E+00	9.20E+01	1.08E+02
U-234	2.8939E-04	44,649.60	52,578.31	0.00E+00	1.29E+01	1.52E+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	1.2667E+00	44,649.60	52,578.31	0.00E+00	5.66E+04	6.66E+04
Other Radionuclides					5.69E+04	6.70E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.690E+15
0.0250	7.558E+14
0.0375	6.587E+14
0.0575	7.086E+14
0.0850	4.278E+14
0.1250	2.886E+14
0.2250	3.711E+14
0.3750	1.605E+14
0.5750	2.604E+15
0.8500	4.115E+13
1.2500	2.653E+13
1.7500	1.260E+12
2.2500	9.283E+07
2.7500	1.099E+12
3.5000	5.249E+06
5.0000	2.238E+06
7.0000	2.572E+05
11.0000	2.950E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.51E+02	1.12E+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 %:	93.1525882	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		44,649.60	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	52,578.31	89,299.20	Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
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: 2010
Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
[2]Template Burnup(MWd): 1270.275
Template BOL Heavy Metal Mass (MT): 0.012702752
Template Decay Time: 35 years

Estimated Canister usage: 18"x15" 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	3.8818E-06	94,003.34	101,007.91	0.00E+00	3.65E-01	3.92E-01
Am-241	3.1387E-03	94,003.34	101,007.91	0.00E+00	2.95E+02	3.17E+02
Am-242m	2.3971E-06	94,003.34	101,007.91	0.00E+00	2.25E-01	2.42E-01
Am-243	4.6069E-05	94,003.34	101,007.91	0.00E+00	4.33E+00	4.65E+00
C-14	2.3121E-05	94,003.34	101,007.91	0.00E+00	2.17E+00	2.34E+00
Cl-36	1.0667E-06	94,003.34	101,007.91	0.00E+00	1.00E-01	1.08E-01
Cm-243	2.5357E-05	94,003.34	101,007.91	0.00E+00	2.38E+00	2.56E+00
Cm-244	6.4458E-03	94,003.34	101,007.91	0.00E+00	6.06E+02	6.51E+02
Co-60	4.5014E-04	94,003.34	101,007.91	0.00E+00	4.23E+01	4.55E+01
Cs-134	3.8086E-05	94,003.34	101,007.91	0.00E+00	3.58E+00	3.85E+00
Cs-135	2.4711E-05	94,003.34	101,007.91	0.00E+00	2.32E+00	2.50E+00
Cs-137	1.3273E+00	94,003.34	101,007.91	0.00E+00	1.25E+05	1.34E+05
Eu-154	1.5705E-02	94,003.34	101,007.91	0.00E+00	1.48E+03	1.59E+03
Eu-155	1.0415E-03	94,003.34	101,007.91	0.00E+00	9.79E+01	1.05E+02
Fe-55	4.4707E-06	94,003.34	101,007.91	0.00E+00	4.20E-03	4.52E-03
H-3	3.9094E-03	94,003.34	101,007.91	0.00E+00	3.67E+02	3.95E+02
I-129	1.0092E-06	94,003.34	101,007.91	0.00E+00	9.49E-02	1.02E-01
Kr-85	3.9519E-02	94,003.34	101,007.91	0.00E+00	3.71E+03	3.99E+03
Np-237	1.2541E-05	94,003.34	101,007.91	0.00E+00	1.18E+00	1.27E+00
Pa-231	4.7376E-06	94,003.34	101,007.91	0.00E+00	4.45E-01	4.79E-01
Pb-210	1.4194E-09	94,003.34	101,007.91	0.00E+00	1.33E-04	1.43E-04
Pm-147	1.5146E-04	94,003.34	101,007.91	0.00E+00	1.42E+01	1.53E+01
Pu-238	1.6248E-01	94,003.34	101,007.91	0.00E+00	1.53E+04	1.64E+04
Pu-239	1.3580E-04	94,003.34	101,007.91	0.00E+00	1.28E+01	1.37E+01
Pu-240	2.7136E-04	94,003.34	101,007.91	0.00E+00	2.55E+01	2.74E+01
Pu-241	1.9342E-02	94,003.34	101,007.91	0.00E+00	1.82E+03	1.95E+03
Pu-242	3.8866E-06	94,003.34	101,007.91	0.00E+00	3.65E-01	3.93E-01
Ra-226	2.7923E-09	94,003.34	101,007.91	0.00E+00	2.62E-04	2.82E-04
Ra-228	9.1791E-07	94,003.34	101,007.91	0.00E+00	8.63E-02	9.27E-02
Ru-106	3.5205E-11	94,003.34	101,007.91	0.00E+00	3.31E-06	3.56E-06
Se-79	2.1082E-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	1.2667E+00	94,003.34	101,007.91	0.00E+00	1.19E+05	1.28E+05
Tc-99	3.3331E-04	94,003.34	101,007.91	0.00E+00	3.13E+01	3.37E+01
Th-229	1.0612E-05	94,003.34	101,007.91	0.00E+00	9.98E-01	1.07E+00
Th-230	1.8878E-07	94,003.34	101,007.91	0.00E+00	1.77E-02	1.91E-02
Th-232	-6.9673E-08	94,003.34	0.00	1.37E-01	1.31E-01	1.37E-01
Tl-208	5.9530E-04	94,003.34	101,007.91	0.00E+00	5.60E+01	6.01E+01
U-232	1.6115E-03	94,003.34	101,007.91	0.00E+00	1.51E+02	1.63E+02
U-233	2.0602E-03	94,003.34	101,007.91	0.00E+00	1.94E+02	2.08E+02
U-234	2.8939E-04	94,003.34	101,007.91	0.00E+00	2.72E+01	2.92E+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	1.2667E+00	94,003.34	101,007.91	0.00E+00	1.19E+05	1.28E+05
Other Radionuclides					1.20E+05	1.29E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.088E+15
0.0250	1.452E+15
0.0375	1.265E+15
0.0575	1.361E+15
0.0850	8.218E+14
0.1250	5.544E+14
0.2250	7.129E+14
0.3750	3.082E+14
0.5750	5.003E+15
0.8500	7.905E+13
1.2500	5.096E+13
1.7500	2.420E+12
2.2500	1.783E+08
2.7500	2.111E+12
3.5000	1.008E+07
5.0000	4.300E+06
7.0000	4.942E+05
11.0000	5.867E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.00E+03	2.18E+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
Nominal:		94,003.34
Bounding:	101,007.91	188,006.68

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:	0.68	
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: 2010
Template: FSV (Graphite, Graphite, 60 to 100%, Th & U)
[2]Template Burnup(MWd): 1270.275
Template BOL Heavy Metal Mass (MT): 0.012702752
Template Decay Time: 35 years

Estimated Canister usage: 18"x15" 0.69

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.8818E-06	674.97	867.05	0.00E+00	2.62E-03	3.37E-03	Avg. MeV	
Am-241	3.1387E-03	674.97	867.05	0.00E+00	2.12E+00	2.72E+00	0.0150	6.084E+13
Am-242m	2.3971E-06	674.97	867.05	0.00E+00	1.62E-03	2.08E-03	0.0250	1.246E+13
Am-243	4.6069E-05	674.97	867.05	0.00E+00	3.11E-02	3.99E-02	0.0375	1.086E+13
C-14	2.3121E-05	674.97	867.05	0.00E+00	1.56E-02	2.00E-02	0.0575	1.169E+13
Cl-36	1.0667E-06	674.97	867.05	0.00E+00	7.20E-04	9.25E-04	0.0850	7.055E+12
Cm-243	2.5357E-05	674.97	867.05	0.00E+00	1.71E-02	2.20E-02	0.1250	4.759E+12
Cm-244	6.4458E-03	674.97	867.05	0.00E+00	4.35E+00	5.59E+00	0.2250	6.120E+12
Co-60	4.5014E-04	674.97	867.05	0.00E+00	3.04E-01	3.90E-01	0.3750	2.646E+12
Cs-134	3.8086E-05	674.97	867.05	0.00E+00	2.57E-02	3.30E-02	0.5750	4.295E+13
Cs-135	2.4711E-05	674.97	867.05	0.00E+00	1.67E-02	2.14E-02	0.8500	6.786E+11
Cs-137	1.3273E+00	674.97	867.05	0.00E+00	8.96E+02	1.15E+03	1.2500	4.375E+11
Eu-154	1.5705E-02	674.97	867.05	0.00E+00	1.06E+01	1.36E+01	1.7500	2.078E+10
Eu-155	1.0415E-03	674.97	867.05	0.00E+00	7.03E-01	9.03E-01	2.2500	1.531E+08
Fe-55	4.4707E-08	674.97	867.05	0.00E+00	3.02E-05	3.88E-05	2.7500	1.812E+10
H-3	3.9094E-03	674.97	867.05	0.00E+00	2.64E+00	3.39E+00	3.5000	8.657E+04
I-129	1.0092E-08	674.97	867.05	0.00E+00	6.81E-04	8.75E-04	5.0000	3.691E+04
Kr-85	3.9519E-02	674.97	867.05	0.00E+00	2.67E+01	3.43E+01	7.0000	4.242E+03
Np-237	1.2541E-05	674.97	867.05	0.00E+00	8.46E-03	1.09E-02	11.0000	4.864E+02
Pa-231	4.7376E-08	674.97	867.05	0.00E+00	3.20E-03	4.11E-03		
Pb-210	1.4194E-09	674.97	867.05	0.00E+00	9.58E-07	1.23E-06		
Pm-147	1.5146E-04	674.97	867.05	0.00E+00	1.02E-01	1.31E-01		
Pu-238	1.6248E-01	674.97	867.05	0.00E+00	1.10E+02	1.41E+02		
Pu-239	1.3580E-04	674.97	867.05	0.00E+00	9.17E-02	1.18E-01		
Pu-240	2.7136E-04	674.97	867.05	0.00E+00	1.83E-01	2.35E-01		
Pu-241	1.9342E-02	674.97	867.05	0.00E+00	1.31E+01	1.68E+01		
Pu-242	3.8866E-06	674.97	867.05	0.00E+00	2.62E-03	3.37E-03		
Ra-226	2.7923E-09	674.97	867.05	0.00E+00	1.88E-06	2.42E-06		
Ra-228	9.1791E-07	674.97	867.05	0.00E+00	6.20E-04	7.96E-04		
Ru-106	3.5205E-11	674.97	867.05	0.00E+00	2.38E-08	3.05E-08		
Se-79	2.1082E-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	1.2667E+00	674.97	867.05	0.00E+00	8.55E+02	1.10E+03		
Tc-99	3.3331E-04	674.97	867.05	0.00E+00	2.25E-01	2.89E-01		
Th-229	1.0612E-05	674.97	867.05	0.00E+00	7.16E-03	9.20E-03		
Th-230	1.8878E-07	674.97	867.05	0.00E+00	1.27E-04	1.64E-04		
Th-232	-6.9673E-08	674.97	0.00	1.18E-03	1.13E-03	1.18E-03		
Tl-208	5.9530E-04	674.97	867.05	0.00E+00	4.02E-01	5.16E-01		
U-232	1.6115E-03	674.97	867.05	0.00E+00	1.09E+00	1.40E+00		
U-233	2.0602E-03	674.97	867.05	0.00E+00	1.39E+00	1.79E+00		
U-234	2.8939E-04	674.97	867.05	0.00E+00	1.95E-01	2.51E-01		
U-235	-1.7343E-08	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	1.2667E+00	674.97	867.05	0.00E+00	8.55E+02	1.10E+03		
Other Radionuclides					8.60E+02	1.10E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.44E+01	1.85E+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
Nominal:	674.97	-49.37
Bounding:	867.05	-98.73

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

Checks

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

Estimated EOL HM/Given EOL HM: 0.94

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL MIXED MATERIAL EXP.DCC-1
SNF ID #: 430
Fuel Units & Descr: 1 - EXPERIMENT CAPSULE
Heavy Metal Mass: BOL= ; EOL=23.828kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1983
Estimates as of: 2010
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: 25 years

Estimated Canister usage: 18"x15" 0.07

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.3562E-08	22,320.13	22,320.13	0.00E+00	3.03E-04	3.03E-04
Am-241	1.0168E-04	22,320.13	22,320.13	0.00E+00	2.27E+00	2.27E+00
Am-242m	8.9052E-09	22,320.13	22,320.13	0.00E+00	1.99E-04	1.99E-04
Am-243	9.8602E-10	22,320.13	22,320.13	0.00E+00	2.20E-05	2.20E-05
C-14	2.3045E-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	3.1730E-10	22,320.13	22,320.13	0.00E+00	7.08E-06	7.08E-06
Cm-244	3.3977E-09	22,320.13	22,320.13	0.00E+00	7.58E-05	7.58E-05
Co-60	2.6373E-01	22,320.13	22,320.13	0.00E+00	5.89E+03	5.89E+03
Cs-134	8.7072E-05	22,320.13	22,320.13	0.00E+00	1.94E+00	1.94E+00
Cs-135	3.0316E-05	22,320.13	22,320.13	0.00E+00	6.77E-01	6.77E-01
Cs-137	1.8286E+00	22,320.13	22,320.13	0.00E+00	4.08E+04	4.08E+04
Eu-154	1.4982E-03	22,320.13	22,320.13	0.00E+00	3.34E+01	3.34E+01
Eu-155	2.8236E-03	22,320.13	22,320.13	0.00E+00	6.30E+01	6.30E+01
Fe-55	1.7687E-02	22,320.13	22,320.13	0.00E+00	3.95E+02	3.95E+02
H-3	4.4043E-03	22,320.13	22,320.13	0.00E+00	9.83E+01	9.83E+01
I-129	7.3195E-07	22,320.13	22,320.13	0.00E+00	1.63E-02	1.63E-02
Kr-85	7.8769E-02	22,320.13	22,320.13	0.00E+00	1.76E+03	1.76E+03
Np-237	1.1484E-06	22,320.13	22,320.13	0.00E+00	2.56E-02	2.56E-02
Pa-231	3.2396E-08	22,320.13	22,320.13	0.00E+00	7.23E-04	7.23E-04
Pb-210	2.4409E-13	22,320.13	22,320.13	0.00E+00	5.45E-09	5.45E-09
Pm-147	1.6331E-02	22,320.13	22,320.13	0.00E+00	3.65E+02	3.65E+02
Pu-238	3.1947E-04	22,320.13	22,320.13	0.00E+00	7.13E+00	7.13E+00
Pu-239	6.6789E-04	22,320.13	22,320.13	0.00E+00	1.49E+01	1.49E+01
Pu-240	8.6922E-05	22,320.13	22,320.13	0.00E+00	1.94E+00	1.94E+00
Pu-241	1.1567E-03	22,320.13	22,320.13	0.00E+00	2.58E+01	2.58E+01
Pu-242	1.9717E-09	22,320.13	22,320.13	0.00E+00	4.40E-05	4.40E-05
Ra-226	8.6190E-13	22,320.13	22,320.13	0.00E+00	1.92E-08	1.92E-08
Ra-228	8.1498E-12	22,320.13	22,320.13	0.00E+00	1.82E-07	1.82E-07
Ru-106	1.7770E-07	22,320.13	22,320.13	0.00E+00	3.97E-03	3.97E-03
Se-79	1.3225E-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	1.7321E+00	22,320.13	22,320.13	0.00E+00	3.87E+04	3.87E+04
Tc-99	4.6656E-04	22,320.13	22,320.13	0.00E+00	1.04E+01	1.04E+01
Th-229	1.0110E-11	22,320.13	22,320.13	0.00E+00	2.26E-07	2.26E-07
Th-230	1.1466E-10	22,320.13	22,320.13	0.00E+00	2.56E-06	2.56E-06
Th-232	8.3245E-12	22,320.13	22,320.13	0.00E+00	1.86E-07	1.86E-07
Tl-208	2.3860E-08	22,320.13	22,320.13	0.00E+00	5.33E-04	5.33E-04
U-232	6.4576E-08	22,320.13	22,320.13	0.00E+00	1.44E-03	1.44E-03
U-233	3.1082E-09	22,320.13	22,320.13	0.00E+00	6.94E-05	6.94E-05
U-234	3.7587E-07	22,320.13	22,320.13	0.00E+00	8.39E-03	8.39E-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	1.7321E+00	22,320.13	22,320.13	0.00E+00	3.87E+04	3.87E+04
Other Radionuclides					4.53E+04	4.53E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.124E+15
0.0250	4.413E+14
0.0375	3.809E+14
0.0575	4.109E+14
0.0850	2.485E+14
0.1250	1.614E+14
0.2250	2.132E+14
0.3750	9.307E+13
0.5750	1.520E+15
0.8500	1.585E+13
1.2500	4.414E+14
1.7500	4.082E+11
2.2500	2.352E+09
2.7500	2.588E+07
3.5000	5.466E+03
5.0000	5.538E+02
7.0000	6.114E+01
11.0000	6.860E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.54E+02	8.54E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		22,320.13
Bounding:		22,320.13

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL MIXED MATERIAL EXP.DCC-2
SNF ID #: 431
Fuel Units & Descr: 1 - EXPERIMENT CAPSULE
Heavy Metal Mass: BOL= : EOL=20.631kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1984
Estimates as of: 2010
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: 25 years

Estimated Canister usage: 18"x15" 0.07

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3562E-08	19,489.03	19,489.03	0.00E+00	2.64E-04	2.64E-04	Avg. MeV	
Am-241	1.0168E-04	19,489.03	19,489.03	0.00E+00	1.98E+00	1.98E+00	0.0150	1.854E+15
Am-242m	8.9052E-09	19,489.03	19,489.03	0.00E+00	1.74E-04	1.74E-04	0.0250	3.853E+14
Am-243	9.8602E-10	19,489.03	19,489.03	0.00E+00	1.92E-05	1.92E-05	0.0375	3.326E+14
C-14	2.3045E-04	19,489.03	19,489.03	0.00E+00	4.49E+00	4.49E+00	0.0575	3.588E+14
Cl-36	1.2261E-06	19,489.03	19,489.03	0.00E+00	2.39E-02	2.39E-02	0.0850	2.170E+14
Cm-243	3.1730E-10	19,489.03	19,489.03	0.00E+00	6.18E-06	6.18E-06	0.1250	1.410E+14
Cm-244	3.3977E-09	19,489.03	19,489.03	0.00E+00	6.62E-05	6.62E-05	0.2250	1.862E+14
Co-60	2.6373E-01	19,489.03	19,489.03	0.00E+00	5.14E+03	5.14E+03	0.3750	8.127E+13
Cs-134	8.7072E-05	19,489.03	19,489.03	0.00E+00	1.70E+00	1.70E+00	0.5750	1.327E+15
Cs-135	3.0316E-05	19,489.03	19,489.03	0.00E+00	5.91E-01	5.91E-01	0.8500	1.384E+13
Cs-137	1.8286E+00	19,489.03	19,489.03	0.00E+00	3.56E+04	3.56E+04	1.2500	3.854E+14
Eu-154	1.4982E-03	19,489.03	19,489.03	0.00E+00	2.92E+01	2.92E+01	1.7500	3.565E+11
Eu-155	2.8236E-03	19,489.03	19,489.03	0.00E+00	5.50E+01	5.50E+01	2.2500	2.053E+09
Fe-55	1.7687E-02	19,489.03	19,489.03	0.00E+00	3.45E+02	3.45E+02	2.7500	2.259E+07
H-3	4.4043E-03	19,489.03	19,489.03	0.00E+00	8.58E+01	8.58E+01	3.5000	4.773E+03
I-129	7.3195E-07	19,489.03	19,489.03	0.00E+00	1.43E-02	1.43E-02	5.0000	4.836E+02
Kr-85	7.8769E-02	19,489.03	19,489.03	0.00E+00	1.54E+03	1.54E+03	7.0000	5.339E+01
Np-237	1.1484E-06	19,489.03	19,489.03	0.00E+00	2.24E-02	2.24E-02	11.0000	5.990E+00
Pa-231	3.2396E-08	19,489.03	19,489.03	0.00E+00	6.31E-04	6.31E-04		
Pb-210	2.4409E-13	19,489.03	19,489.03	0.00E+00	4.76E-09	4.76E-09		
Pm-147	1.6331E-02	19,489.03	19,489.03	0.00E+00	3.18E+02	3.18E+02		
Pu-238	3.1947E-04	19,489.03	19,489.03	0.00E+00	6.23E+00	6.23E+00		
Pu-239	6.6789E-04	19,489.03	19,489.03	0.00E+00	1.30E+01	1.30E+01		
Pu-240	8.6922E-05	19,489.03	19,489.03	0.00E+00	1.69E+00	1.69E+00		
Pu-241	1.1567E-03	19,489.03	19,489.03	0.00E+00	2.25E+01	2.25E+01		
Pu-242	1.9717E-09	19,489.03	19,489.03	0.00E+00	3.84E-05	3.84E-05		
Ra-226	8.6190E-13	19,489.03	19,489.03	0.00E+00	1.68E-08	1.68E-08		
Ra-228	8.1498E-12	19,489.03	19,489.03	0.00E+00	1.59E-07	1.59E-07		
Ru-106	1.7770E-07	19,489.03	19,489.03	0.00E+00	3.46E-03	3.46E-03		
Se-79	1.3225E-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	1.7321E+00	19,489.03	19,489.03	0.00E+00	3.38E+04	3.38E+04		
Tc-99	4.6656E-04	19,489.03	19,489.03	0.00E+00	9.09E+00	9.09E+00		
Th-229	1.0110E-11	19,489.03	19,489.03	0.00E+00	1.97E-07	1.97E-07		
Th-230	1.1466E-10	19,489.03	19,489.03	0.00E+00	2.23E-06	2.23E-06		
Th-232	8.3245E-12	19,489.03	19,489.03	0.00E+00	1.62E-07	1.62E-07		
Tl-208	2.3860E-08	19,489.03	19,489.03	0.00E+00	4.65E-04	4.65E-04		
U-232	6.4576E-08	19,489.03	19,489.03	0.00E+00	1.26E-03	1.26E-03		
U-233	3.1082E-09	19,489.03	19,489.03	0.00E+00	6.06E-05	6.06E-05		
U-234	3.7587E-07	19,489.03	19,489.03	0.00E+00	7.33E-03	7.33E-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	1.7321E+00	19,489.03	19,489.03	0.00E+00	3.38E+04	3.38E+04		
Other Radionuclides					3.95E+04	3.95E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.84E+02	4.84E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	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: 2010
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: 25 years

Estimated Canister usage:
18"x15'
0.07

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.3562E-08	19,237.75	19,237.75	0.00E+00	2.61E-04	2.61E-04
Am-241	1.0168E-04	19,237.75	19,237.75	0.00E+00	1.96E+00	1.96E+00
Am-242m	8.9052E-09	19,237.75	19,237.75	0.00E+00	1.71E-04	1.71E-04
Am-243	9.8602E-10	19,237.75	19,237.75	0.00E+00	1.90E-05	1.90E-05
C-14	2.3045E-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	3.1730E-10	19,237.75	19,237.75	0.00E+00	6.10E-06	6.10E-06
Cm-244	3.3977E-09	19,237.75	19,237.75	0.00E+00	6.54E-05	6.54E-05
Co-60	2.6373E-01	19,237.75	19,237.75	0.00E+00	5.07E+03	5.07E+03
Cs-134	8.7072E-05	19,237.75	19,237.75	0.00E+00	1.68E+00	1.68E+00
Cs-135	3.0316E-05	19,237.75	19,237.75	0.00E+00	5.83E-01	5.83E-01
Cs-137	1.8286E+00	19,237.75	19,237.75	0.00E+00	3.52E+04	3.52E+04
Eu-154	1.4982E-03	19,237.75	19,237.75	0.00E+00	2.88E+01	2.88E+01
Eu-155	2.8236E-03	19,237.75	19,237.75	0.00E+00	5.43E+01	5.43E+01
Fe-55	1.7687E-02	19,237.75	19,237.75	0.00E+00	3.40E+02	3.40E+02
H-3	4.4043E-03	19,237.75	19,237.75	0.00E+00	8.47E+01	8.47E+01
I-129	7.3195E-07	19,237.75	19,237.75	0.00E+00	1.41E-02	1.41E-02
Kr-85	7.8769E-02	19,237.75	19,237.75	0.00E+00	1.52E+03	1.52E+03
Np-237	1.1484E-06	19,237.75	19,237.75	0.00E+00	2.21E-02	2.21E-02
Pa-231	3.2396E-08	19,237.75	19,237.75	0.00E+00	6.23E-04	6.23E-04
Pb-210	2.4409E-13	19,237.75	19,237.75	0.00E+00	4.70E-09	4.70E-09
Pm-147	1.6331E-02	19,237.75	19,237.75	0.00E+00	3.14E+02	3.14E+02
Pu-238	3.1947E-04	19,237.75	19,237.75	0.00E+00	6.15E+00	6.15E+00
Pu-239	6.6789E-04	19,237.75	19,237.75	0.00E+00	1.28E+01	1.28E+01
Pu-240	8.6922E-05	19,237.75	19,237.75	0.00E+00	1.67E+00	1.67E+00
Pu-241	1.1567E-03	19,237.75	19,237.75	0.00E+00	2.23E+01	2.23E+01
Pu-242	1.9717E-09	19,237.75	19,237.75	0.00E+00	3.79E-05	3.79E-05
Ra-226	8.6190E-13	19,237.75	19,237.75	0.00E+00	1.66E-08	1.66E-08
Ra-228	8.1498E-12	19,237.75	19,237.75	0.00E+00	1.57E-07	1.57E-07
Ru-106	1.7770E-07	19,237.75	19,237.75	0.00E+00	3.42E-03	3.42E-03
Se-79	1.3225E-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	1.7321E+00	19,237.75	19,237.75	0.00E+00	3.33E+04	3.33E+04
Tc-99	4.6656E-04	19,237.75	19,237.75	0.00E+00	8.98E+00	8.98E+00
Th-229	1.0110E-11	19,237.75	19,237.75	0.00E+00	1.94E-07	1.94E-07
Th-230	1.1466E-10	19,237.75	19,237.75	0.00E+00	2.21E-06	2.21E-06
Th-232	8.3245E-12	19,237.75	19,237.75	0.00E+00	1.60E-07	1.60E-07
Tl-208	2.3860E-08	19,237.75	19,237.75	0.00E+00	4.59E-04	4.59E-04
U-232	6.4576E-08	19,237.75	19,237.75	0.00E+00	1.24E-03	1.24E-03
U-233	3.1082E-09	19,237.75	19,237.75	0.00E+00	5.98E-05	5.98E-05
U-234	3.7587E-07	19,237.75	19,237.75	0.00E+00	7.23E-03	7.23E-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	1.7321E+00	19,237.75	19,237.75	0.00E+00	3.33E+04	3.33E+04
Other Radionuclides					3.90E+04	3.90E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.831E+15
0.0250	3.803E+14
0.0375	3.283E+14
0.0575	3.542E+14
0.0850	2.142E+14
0.1250	1.391E+14
0.2250	1.838E+14
0.3750	8.022E+13
0.5750	1.310E+15
0.8500	1.366E+13
1.2500	3.805E+14
1.7500	3.519E+11
2.2500	2.027E+09
2.7500	2.230E+07
3.5000	4.711E+03
5.0000	4.773E+02
7.0000	5.270E+01
11.0000	5.913E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.77E+02	4.77E+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: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 20 years

Estimated Canister usage: 18"x15' = 0.36

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.6288E-06	218.58	218.58	0.00E+00	3.56E-04	3.56E-04	Avg. MeV	
Am-241	6.9216E+00	218.58	218.58	0.00E+00	1.51E+03	1.51E+03	0.0150	4.467E+14
Am-242m	1.8032E-02	218.58	218.58	0.00E+00	3.94E+00	3.94E+00	0.0250	8.798E+13
Am-243	1.6336E-02	218.58	218.58	0.00E+00	3.57E+00	3.57E+00	0.0375	7.895E+13
C-14	1.2112E-01	218.58	218.58	0.00E+00	2.65E+01	2.65E+01	0.0575	9.858E+13
Cl-36	2.2860E-03	218.58	218.58	0.00E+00	5.00E-01	5.00E-01	0.0850	4.533E+13
Cm-243	1.2475E-03	218.58	218.58	0.00E+00	2.73E-01	2.73E-01	0.1250	4.178E+13
Cm-244	2.9920E-01	218.58	218.58	0.00E+00	6.54E+01	6.54E+01	0.2250	3.746E+13
Co-60	2.0197E+02	218.58	218.58	0.00E+00	4.41E+04	4.41E+04	0.3750	1.567E+13
Cs-134	5.2728E-02	218.58	218.58	0.00E+00	1.15E+01	1.15E+01	0.5750	2.462E+14
Cs-135	4.3976E-04	218.58	218.58	0.00E+00	9.61E-02	9.61E-02	0.8500	1.914E+13
Cs-137	2.9760E+01	218.58	218.58	0.00E+00	6.50E+03	6.50E+03	1.2500	3.286E+15
Eu-154	4.1838E+00	218.58	218.58	0.00E+00	9.14E+02	9.14E+02	1.7500	5.975E+11
Eu-155	5.6060E-01	218.58	218.58	0.00E+00	1.23E+02	1.23E+02	2.2500	1.733E+10
Fe-55	1.5985E+01	218.58	218.58	0.00E+00	3.49E+03	3.49E+03	2.7500	8.316E+08
H-3	5.6412E-01	218.58	218.58	0.00E+00	1.23E+02	1.23E+02	3.5000	9.726E+05
I-129	1.0618E-05	218.58	218.58	0.00E+00	2.32E-03	2.32E-03	5.0000	4.029E+05
Kr-85	1.5783E+00	218.58	218.58	0.00E+00	3.45E+02	3.45E+02	7.0000	4.631E+04
Np-237	1.5632E-04	218.58	218.58	0.00E+00	3.42E-02	3.42E-02	11.0000	5.311E+03
Pa-231	2.8608E-08	218.58	218.58	0.00E+00	6.25E-04	6.25E-04		
Pb-210	3.7448E-09	218.58	218.58	0.00E+00	8.19E-07	8.19E-07		
Pm-147	8.8701E-01	218.58	218.58	0.00E+00	1.94E+02	1.94E+02		
Pu-238	-4.8840E-01	218.58	0.00	5.91E+01	0.00E+00	5.91E+01		
Pu-239	-4.8280E-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	-5.2560E+01	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	1.6815E-08	218.58	218.58	0.00E+00	3.68E-06	3.68E-06		
Ra-228	5.6880E-07	218.58	218.58	0.00E+00	1.24E-04	1.24E-04		
Ru-106	1.2188E-04	218.58	218.58	0.00E+00	2.66E-02	2.66E-02		
Se-79	1.9186E-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	2.8288E+01	218.58	218.58	0.00E+00	6.18E+03	6.18E+03		
Tc-99	6.7678E-03	218.58	218.58	0.00E+00	1.48E+00	1.48E+00		
Th-229	8.9952E-07	218.58	218.58	0.00E+00	1.97E-04	1.97E-04		
Th-230	2.9941E-06	218.58	218.58	0.00E+00	6.54E-04	6.54E-04		
Th-232	6.0208E-07	218.58	218.58	0.00E+00	1.32E-04	1.32E-04		
Tl-208	1.0120E-04	218.58	218.58	0.00E+00	2.21E-02	2.21E-02		
U-232	2.7388E-04	218.58	218.58	0.00E+00	5.99E-02	5.99E-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	2.8288E+01	218.58	218.58	0.00E+00	6.18E+03	6.18E+03		
Other Radionuclides					1.64E+04	1.64E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.25E+02	8.27E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		218.58
Bounding:		218.58

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	14.21	
Bounding:	14.21	

Estimated EOL HM/Given EOL HM: 591.64

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PNL MOX FUEL
SNF ID #: 415
Fuel Units & Descr: 7 - FUEL MELTED IN EXP
Heavy Metal Mass: BOL= ; EOL=0.01kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1968
Estimates as of: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 20 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	1.6288E-06	9.31	9.31	0.00E+00	1.52E-05	1.52E-05
Am-241	6.9216E+00	9.31	9.31	0.00E+00	6.45E+01	6.45E+01
Am-242m	1.8032E-02	9.31	9.31	0.00E+00	1.68E-01	1.68E-01
Am-243	1.6336E-02	9.31	9.31	0.00E+00	1.52E-01	1.52E-01
C-14	1.2112E-01	9.31	9.31	0.00E+00	1.13E+00	1.13E+00
Cl-36	2.2860E-03	9.31	9.31	0.00E+00	2.13E-02	2.13E-02
Cm-243	1.2475E-03	9.31	9.31	0.00E+00	1.16E-02	1.16E-02
Cm-244	2.9920E-01	9.31	9.31	0.00E+00	2.79E+00	2.79E+00
Co-60	2.0197E+02	9.31	9.31	0.00E+00	1.88E+03	1.88E+03
Cs-134	5.2728E-02	9.31	9.31	0.00E+00	4.91E-01	4.91E-01
Cs-135	4.3976E-04	9.31	9.31	0.00E+00	4.10E-03	4.10E-03
Cs-137	2.9760E+01	9.31	9.31	0.00E+00	2.77E+02	2.77E+02
Eu-154	4.1838E+00	9.31	9.31	0.00E+00	3.90E+01	3.90E+01
Eu-155	5.8060E-01	9.31	9.31	0.00E+00	5.22E+00	5.22E+00
Fe-55	1.5985E+01	9.31	9.31	0.00E+00	1.49E+02	1.49E+02
H-3	5.6412E-01	9.31	9.31	0.00E+00	5.25E+00	5.25E+00
I-129	1.0618E-05	9.31	9.31	0.00E+00	9.89E-05	9.89E-05
Kr-85	1.5783E+00	9.31	9.31	0.00E+00	1.47E+01	1.47E+01
Np-237	1.5632E-04	9.31	9.31	0.00E+00	1.46E-03	1.46E-03
Pa-231	2.8608E-06	9.31	9.31	0.00E+00	2.66E-05	2.66E-05
Pb-210	3.7448E-09	9.31	9.31	0.00E+00	3.49E-08	3.49E-08
Pm-147	8.8701E-01	9.31	9.31	0.00E+00	8.26E+00	8.26E+00
Pu-238	-4.8840E-01	9.31	0.00	2.52E+00	0.00E+00	2.52E+00
Pu-239	-4.8280E-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	-5.2560E+01	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	1.6815E-08	9.31	9.31	0.00E+00	1.57E-07	1.57E-07
Ra-228	5.6880E-07	9.31	9.31	0.00E+00	5.30E-06	5.30E-06
Ru-106	1.2188E-04	9.31	9.31	0.00E+00	1.14E-03	1.14E-03
Se-79	1.9186E-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	2.8288E+01	9.31	9.31	0.00E+00	2.63E+02	2.63E+02
Tc-99	6.7678E-03	9.31	9.31	0.00E+00	6.30E-02	6.30E-02
Th-229	8.9952E-07	9.31	9.31	0.00E+00	8.38E-06	8.38E-06
Th-230	2.9941E-06	9.31	9.31	0.00E+00	2.79E-05	2.79E-05
Th-232	6.0208E-07	9.31	9.31	0.00E+00	5.61E-06	5.61E-06
Tl-208	1.0120E-04	9.31	9.31	0.00E+00	9.43E-04	9.43E-04
U-232	2.7388E-04	9.31	9.31	0.00E+00	2.55E-03	2.55E-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	2.8288E+01	9.31	9.31	0.00E+00	2.63E+02	2.63E+02
Other Radionuclides					6.98E+02	6.98E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.903E+13
0.0250	3.749E+12
0.0375	3.364E+12
0.0575	4.201E+12
0.0850	1.932E+12
0.1250	1.780E+12
0.2250	1.596E+12
0.3750	6.675E+11
0.5750	1.049E+13
0.8500	8.155E+11
1.2500	1.400E+14
1.7500	2.546E+10
2.2500	7.382E+08
2.7500	3.543E+07
3.5000	4.144E+04
5.0000	1.717E+04
7.0000	1.973E+03
11.0000	2.263E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.51E+01	3.52E+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:		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: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 20 years

Estimated Canister usage: 18"x15" 0.88

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.6288E-06	54.74	54.74	0.00E+00	8.92E-05	8.92E-05	Avg. MeV	
Am-241	6.9216E+00	54.74	54.74	0.00E+00	3.79E+02	3.79E+02	0.0150	1.119E+14
Am-242m	1.8032E-02	54.74	54.74	0.00E+00	9.87E-01	9.87E-01	0.0250	2.203E+13
Am-243	1.6336E-02	54.74	54.74	0.00E+00	8.94E-01	8.94E-01	0.0375	1.977E+13
C-14	1.2112E-01	54.74	54.74	0.00E+00	6.63E+00	6.63E+00	0.0575	2.469E+13
Cl-36	2.2860E-03	54.74	54.74	0.00E+00	1.25E-01	1.25E-01	0.0850	1.135E+13
Cm-243	1.2475E-03	54.74	54.74	0.00E+00	6.83E-02	6.83E-02	0.1250	1.046E+13
Cm-244	2.9920E-01	54.74	54.74	0.00E+00	1.64E+01	1.64E+01	0.2250	9.382E+12
Co-60	2.0197E+02	54.74	54.74	0.00E+00	1.11E+04	1.11E+04	0.3750	3.924E+12
Cs-134	5.2728E-02	54.74	54.74	0.00E+00	2.89E+00	2.89E+00	0.5750	6.165E+13
Cs-135	4.3976E-04	54.74	54.74	0.00E+00	2.41E-02	2.41E-02	0.8500	4.793E+12
Cs-137	2.9760E+01	54.74	54.74	0.00E+00	1.63E+03	1.63E+03	1.2500	8.229E+14
Eu-154	4.1838E+00	54.74	54.74	0.00E+00	2.29E+02	2.29E+02	1.7500	1.496E+11
Eu-155	5.6060E-01	54.74	54.74	0.00E+00	3.07E+01	3.07E+01	2.2500	4.339E+09
Fe-55	1.5985E+01	54.74	54.74	0.00E+00	8.75E+02	8.75E+02	2.7500	2.083E+08
H-3	5.6412E-01	54.74	54.74	0.00E+00	3.09E+01	3.09E+01	3.5000	2.436E+05
I-129	1.0618E-05	54.74	54.74	0.00E+00	5.81E-04	5.81E-04	5.0000	1.009E+05
Kr-85	1.5783E+00	54.74	54.74	0.00E+00	8.64E+01	8.64E+01	7.0000	1.160E+04
Np-237	1.5632E-04	54.74	54.74	0.00E+00	8.56E-03	8.56E-03	11.0000	1.330E+03
Pa-231	2.8608E-06	54.74	54.74	0.00E+00	1.57E-04	1.57E-04		
Pb-210	3.7448E-09	54.74	54.74	0.00E+00	2.05E-07	2.05E-07		
Pm-147	8.8701E-01	54.74	54.74	0.00E+00	4.86E+01	4.86E+01		
Pu-238	-4.8840E-01	54.74	0.00	1.48E+01	0.00E+00	1.48E+01		
Pu-239	-4.8280E-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	-5.2560E+01	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	1.6815E-06	54.74	54.74	0.00E+00	9.20E-07	9.20E-07		
Ra-228	5.6880E-07	54.74	54.74	0.00E+00	3.11E-05	3.11E-05		
Ru-106	1.2188E-04	54.74	54.74	0.00E+00	6.67E-03	6.67E-03		
Se-79	1.9186E-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	2.8288E+01	54.74	54.74	0.00E+00	1.55E+03	1.55E+03		
Tc-99	6.7678E-03	54.74	54.74	0.00E+00	3.70E-01	3.70E-01		
Th-229	8.9952E-07	54.74	54.74	0.00E+00	4.92E-05	4.92E-05		
Th-230	2.9941E-06	54.74	54.74	0.00E+00	1.64E-04	1.64E-04		
Th-232	6.0208E-07	54.74	54.74	0.00E+00	3.30E-05	3.30E-05		
Tl-208	1.0120E-04	54.74	54.74	0.00E+00	5.54E-03	5.54E-03		
U-232	2.7388E-04	54.74	54.74	0.00E+00	1.50E-02	1.50E-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	2.8288E+01	54.74	54.74	0.00E+00	1.55E+03	1.55E+03		
Other Radionuclides					4.10E+03	4.10E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.06E+02	2.07E+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:		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: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 20 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	1.6288E-06	2,318.86	2,318.86	0.00E+00	3.78E-03	3.78E-03
Am-241	6.9216E+00	2,318.86	2,318.86	0.00E+00	1.61E+04	1.61E+04
Am-242m	1.8032E-02	2,318.86	2,318.86	0.00E+00	4.18E+01	4.18E+01
Am-243	1.6336E-02	2,318.86	2,318.86	0.00E+00	3.79E+01	3.79E+01
C-14	1.2112E-01	2,318.86	2,318.86	0.00E+00	2.81E+02	2.81E+02
Cl-36	2.2860E-03	2,318.86	2,318.86	0.00E+00	5.30E+00	5.30E+00
Cm-243	1.2475E-03	2,318.86	2,318.86	0.00E+00	2.89E+00	2.89E+00
Cm-244	2.9920E-01	2,318.86	2,318.86	0.00E+00	6.94E+02	6.94E+02
Co-60	2.0197E+02	2,318.86	2,318.86	0.00E+00	4.68E+05	4.68E+05
Cs-134	5.2728E-02	2,318.86	2,318.86	0.00E+00	1.22E+02	1.22E+02
Cs-135	4.3976E-04	2,318.86	2,318.86	0.00E+00	1.02E+00	1.02E+00
Cs-137	2.9760E+01	2,318.86	2,318.86	0.00E+00	6.90E+04	6.90E+04
Eu-154	4.1838E+00	2,318.86	2,318.86	0.00E+00	9.70E+03	9.70E+03
Eu-155	5.6060E-01	2,318.86	2,318.86	0.00E+00	1.30E+03	1.30E+03
Fe-55	1.5985E+01	2,318.86	2,318.86	0.00E+00	3.71E+04	3.71E+04
H-3	5.6412E-01	2,318.86	2,318.86	0.00E+00	1.31E+03	1.31E+03
I-129	1.0618E-05	2,318.86	2,318.86	0.00E+00	2.46E-02	2.46E-02
Kr-85	1.5783E+00	2,318.86	2,318.86	0.00E+00	3.66E+03	3.66E+03
Np-237	1.5632E-04	2,318.86	2,318.86	0.00E+00	3.62E-01	3.62E-01
Pa-231	2.8608E-06	2,318.86	2,318.86	0.00E+00	6.63E-03	6.63E-03
Pb-210	3.7448E-09	2,318.86	2,318.86	0.00E+00	8.68E-06	8.68E-06
Pm-147	8.8701E-01	2,318.86	2,318.86	0.00E+00	2.06E+03	2.06E+03
Pu-238	-4.8840E-01	2,318.86	0.00	6.27E+02	0.00E+00	6.27E+02
Pu-239	-4.8260E-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	-5.2560E+01	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	1.6815E-08	2,318.86	2,318.86	0.00E+00	3.90E-05	3.90E-05
Ra-228	5.6880E-07	2,318.86	2,318.86	0.00E+00	1.32E-03	1.32E-03
Ru-106	1.2188E-04	2,318.86	2,318.86	0.00E+00	2.83E-01	2.83E-01
Se-79	1.9186E-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	2.8288E+01	2,318.86	2,318.86	0.00E+00	6.56E+04	6.56E+04
Tc-99	6.7678E-03	2,318.86	2,318.86	0.00E+00	1.57E+01	1.57E+01
Th-229	8.9952E-07	2,318.86	2,318.86	0.00E+00	2.09E-03	2.09E-03
Th-230	2.9941E-06	2,318.86	2,318.86	0.00E+00	6.94E-03	6.94E-03
Th-232	6.0208E-07	2,318.86	2,318.86	0.00E+00	1.40E-03	1.40E-03
Tl-208	1.0120E-04	2,318.86	2,318.86	0.00E+00	2.35E-01	2.35E-01
U-232	2.7388E-04	2,318.86	2,318.86	0.00E+00	6.35E-01	6.35E-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	2.8288E+01	2,318.86	2,318.86	0.00E+00	6.56E+04	6.56E+04
Other Radionuclides					1.74E+05	1.74E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.739E+15
0.0250	9.334E+14
0.0375	8.376E+14
0.0575	1.046E+15
0.0850	4.809E+14
0.1250	4.432E+14
0.2250	3.974E+14
0.3750	1.662E+14
0.5750	2.612E+15
0.8500	2.030E+14
1.2500	3.486E+16
1.7500	6.339E+12
2.2500	1.838E+11
2.7500	8.822E+09
3.5000	1.032E+07
5.0000	4.274E+06
7.0000	4.913E+05
11.0000	5.634E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.75E+03	8.77E+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: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 20 years

Estimated Canister usage: 18"x18" 0.07

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.6288E-06	614.88	614.88	0.00E+00	1.00E-03	1.00E-03
Am-241	6.9216E+00	614.88	614.88	0.00E+00	4.26E+03	4.26E+03
Am-242m	1.8032E-02	614.88	614.88	0.00E+00	1.11E+01	1.11E+01
Am-243	1.6336E-02	614.88	614.88	0.00E+00	1.00E+01	1.00E+01
C-14	1.2112E-01	614.88	614.88	0.00E+00	7.45E+01	7.45E+01
Cl-36	2.2860E-03	614.88	614.88	0.00E+00	1.41E+00	1.41E+00
Cm-243	1.2475E-03	614.88	614.88	0.00E+00	7.67E-01	7.67E-01
Cm-244	2.9920E-01	614.88	614.88	0.00E+00	1.84E+02	1.84E+02
Co-60	2.0197E+02	614.88	614.88	0.00E+00	1.24E+05	1.24E+05
Cs-134	5.2728E-02	614.88	614.88	0.00E+00	3.24E+01	3.24E+01
Cs-135	4.3976E-04	614.88	614.88	0.00E+00	2.70E-01	2.70E-01
Cs-137	2.9760E+01	614.88	614.88	0.00E+00	1.83E+04	1.83E+04
Eu-154	4.1838E+00	614.88	614.88	0.00E+00	2.57E+03	2.57E+03
Eu-155	5.6060E-01	614.88	614.88	0.00E+00	3.45E+02	3.45E+02
Fe-55	1.5985E+01	614.88	614.88	0.00E+00	9.83E+03	9.83E+03
H-3	5.6412E-01	614.88	614.88	0.00E+00	3.47E+02	3.47E+02
I-129	1.0618E-05	614.88	614.88	0.00E+00	6.53E-03	6.53E-03
Kr-85	1.5783E+00	614.88	614.88	0.00E+00	9.70E+02	9.70E+02
Np-237	1.5632E-04	614.88	614.88	0.00E+00	9.61E-02	9.61E-02
Pa-231	2.8608E-06	614.88	614.88	0.00E+00	1.76E-03	1.76E-03
Pb-210	3.7448E-09	614.88	614.88	0.00E+00	2.30E-06	2.30E-06
Pm-147	8.8701E-01	614.88	614.88	0.00E+00	5.45E+02	5.45E+02
Pu-238	-4.8840E-01	614.88	0.00	1.66E+02	0.00E+00	1.66E+02
Pu-239	-4.8280E-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	-5.2560E+01	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	1.6815E-08	614.88	614.88	0.00E+00	1.03E-05	1.03E-05
Ra-228	5.6880E-07	614.88	614.88	0.00E+00	3.50E-04	3.50E-04
Ru-106	1.2188E-04	614.88	614.88	0.00E+00	7.49E-02	7.49E-02
Se-79	1.9186E-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	2.8288E+01	614.88	614.88	0.00E+00	1.74E+04	1.74E+04
Tc-99	6.7678E-03	614.88	614.88	0.00E+00	4.16E+00	4.16E+00
Th-229	8.9952E-07	614.88	614.88	0.00E+00	5.53E-04	5.53E-04
Th-230	2.9941E-06	614.88	614.88	0.00E+00	1.84E-03	1.84E-03
Th-232	6.0208E-07	614.88	614.88	0.00E+00	3.70E-04	3.70E-04
Tl-208	1.0120E-04	614.88	614.88	0.00E+00	6.22E-02	6.22E-02
U-232	2.7388E-04	614.88	614.88	0.00E+00	1.68E-01	1.68E-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	2.8288E+01	614.88	614.88	0.00E+00	1.74E+04	1.74E+04
Other Radionuclides					4.61E+04	4.61E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.257E+15
0.0250	2.475E+14
0.0375	2.221E+14
0.0575	2.773E+14
0.0850	1.275E+14
0.1250	1.175E+14
0.2250	1.054E+14
0.3750	4.407E+13
0.5750	6.925E+14
0.8500	5.384E+13
1.2500	9.243E+15
1.7500	1.681E+12
2.2500	4.874E+10
2.7500	2.339E+09
3.5000	2.736E+08
5.0000	1.133E+08
7.0000	1.303E+05
11.0000	1.494E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.32E+03	2.33E+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:		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: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 20 years

Estimated Canister usage: 18"x15' 0.07

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.6288E-06	4.75	4.75	0.00E+00	7.74E-06	7.74E-06	Avg. MeV	
Am-241	6.9216E+00	4.75	4.75	0.00E+00	3.29E+01	3.29E+01	0.0150	9.711E+12
Am-242m	1.8032E-02	4.75	4.75	0.00E+00	8.57E-02	8.57E-02	0.0250	1.913E+12
Am-243	1.6336E-02	4.75	4.75	0.00E+00	7.76E-02	7.76E-02	0.0375	1.716E+12
C-14	1.2112E-01	4.75	4.75	0.00E+00	5.76E-01	5.76E-01	0.0575	2.143E+12
Cl-36	2.2860E-03	4.75	4.75	0.00E+00	1.09E-02	1.09E-02	0.0850	9.855E+11
Cm-243	1.2475E-03	4.75	4.75	0.00E+00	5.93E-03	5.93E-03	0.1250	9.082E+11
Cm-244	2.9920E-01	4.75	4.75	0.00E+00	1.42E+00	1.42E+00	0.2250	8.144E+11
Co-60	2.0197E+02	4.75	4.75	0.00E+00	9.60E+02	9.60E+02	0.3750	3.406E+11
Cs-134	5.2728E-02	4.75	4.75	0.00E+00	2.51E-01	2.51E-01	0.5750	5.352E+12
Cs-135	4.3976E-04	4.75	4.75	0.00E+00	2.09E-03	2.09E-03	0.8500	4.161E+11
Cs-137	2.9760E+01	4.75	4.75	0.00E+00	1.41E+02	1.41E+02	1.2500	7.143E+13
Eu-154	4.1838E+00	4.75	4.75	0.00E+00	1.99E+01	1.99E+01	1.7500	1.299E+10
Eu-155	5.6060E-01	4.75	4.75	0.00E+00	2.66E+00	2.66E+00	2.2500	3.767E+08
Fe-55	1.5985E+01	4.75	4.75	0.00E+00	7.60E+01	7.60E+01	2.7500	1.808E+07
H-3	5.6412E-01	4.75	4.75	0.00E+00	2.68E+00	2.68E+00	3.5000	2.114E+04
I-129	1.0618E-05	4.75	4.75	0.00E+00	5.05E-05	5.05E-05	5.0000	8.759E+03
Kr-85	1.5783E+00	4.75	4.75	0.00E+00	7.50E+00	7.50E+00	7.0000	1.007E+03
Np-237	1.5632E-04	4.75	4.75	0.00E+00	7.43E-04	7.43E-04	11.0000	1.155E+02
Pa-231	2.8608E-06	4.75	4.75	0.00E+00	1.36E-05	1.36E-05		
Pb-210	3.7448E-09	4.75	4.75	0.00E+00	1.78E-08	1.78E-08		
Pm-147	8.8701E-01	4.75	4.75	0.00E+00	4.21E+00	4.21E+00		
Pu-238	-4.8840E-01	4.75	0.00	1.29E+00	0.00E+00	1.29E+00		
Pu-239	-4.8280E-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	-5.2560E+01	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	1.6815E-08	4.75	4.75	0.00E+00	7.99E-08	7.99E-08		
Ra-228	5.6880E-07	4.75	4.75	0.00E+00	2.70E-06	2.70E-06		
Ru-106	1.2188E-04	4.75	4.75	0.00E+00	5.79E-04	5.79E-04		
Se-79	1.9186E-04	4.75	4.75	0.00E+00	9.12E-04	9.12E-04		
Sn-126	1.6671E-04	4.75	4.75	0.00E+00	7.92E-04	7.92E-04		
Sr-90	2.8288E+01	4.75	4.75	0.00E+00	1.34E+02	1.34E+02		
Tc-99	6.7678E-03	4.75	4.75	0.00E+00	3.22E-02	3.22E-02		
Th-229	8.9952E-07	4.75	4.75	0.00E+00	4.27E-06	4.27E-06		
Th-230	2.9941E-06	4.75	4.75	0.00E+00	1.42E-05	1.42E-05		
Th-232	6.0208E-07	4.75	4.75	0.00E+00	2.86E-06	2.86E-06		
Tl-208	1.0120E-04	4.75	4.75	0.00E+00	4.81E-04	4.81E-04		
U-232	2.7388E-04	4.75	4.75	0.00E+00	1.30E-03	1.30E-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	2.8288E+01	4.75	4.75	0.00E+00	1.34E+02	1.34E+02		
Other Radionuclides					3.56E+02	3.56E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.79E+01	1.80E+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:	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: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 25 years

Estimated Canister usage: 18"x15" 0.07

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.9648E-06	52.27	52.27	0.00E+00	1.03E-04	1.03E-04
Am-241	7.8064E+00	52.27	52.27	0.00E+00	4.08E+02	4.08E+02
Am-242m	1.7632E-02	52.27	52.27	0.00E+00	9.22E-01	9.22E-01
Am-243	1.6336E-02	52.27	52.27	0.00E+00	8.54E-01	8.54E-01
C-14	1.2101E-01	52.27	52.27	0.00E+00	6.33E+00	6.33E+00
Cl-36	2.2849E-03	52.27	52.27	0.00E+00	1.19E-01	1.19E-01
Cm-243	1.1046E-03	52.27	52.27	0.00E+00	5.77E-02	5.77E-02
Cm-244	2.4704E-01	52.27	52.27	0.00E+00	1.29E+01	1.29E+01
Co-60	1.0466E+02	52.27	52.27	0.00E+00	5.47E+03	5.47E+03
Cs-134	9.8289E-03	52.27	52.27	0.00E+00	5.14E-01	5.14E-01
Cs-135	4.3976E-04	52.27	52.27	0.00E+00	2.30E-02	2.30E-02
Cs-137	2.6526E+01	52.27	52.27	0.00E+00	1.39E+03	1.39E+03
Eu-154	2.7975E+00	52.27	52.27	0.00E+00	1.46E+02	1.46E+02
Eu-155	2.7881E-01	52.27	52.27	0.00E+00	1.46E+01	1.46E+01
Fe-55	4.2151E+00	52.27	52.27	0.00E+00	2.20E+02	2.20E+02
H-3	4.2599E-01	52.27	52.27	0.00E+00	2.23E+01	2.23E+01
I-129	1.0618E-05	52.27	52.27	0.00E+00	5.55E-04	5.55E-04
Kr-85	1.1426E+00	52.27	52.27	0.00E+00	5.97E+01	5.97E+01
Np-237	1.5647E-04	52.27	52.27	0.00E+00	8.18E-03	8.18E-03
Pa-231	2.8624E-06	52.27	52.27	0.00E+00	1.50E-04	1.50E-04
Pb-210	9.2770E-09	52.27	52.27	0.00E+00	4.85E-07	4.85E-07
Pm-147	2.3690E-01	52.27	52.27	0.00E+00	1.24E+01	1.24E+01
Pu-238	-6.1800E-01	52.27	0.00	1.41E+01	0.00E+00	1.41E+01
Pu-239	-4.8280E-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	-7.4000E+01	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	3.2167E-06	52.27	52.27	0.00E+00	1.68E-06	1.68E-06
Ra-228	5.9024E-07	52.27	52.27	0.00E+00	3.09E-05	3.09E-05
Ru-106	3.9140E-06	52.27	52.27	0.00E+00	2.05E-04	2.05E-04
Se-79	1.9184E-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	2.5126E+01	52.27	52.27	0.00E+00	1.31E+03	1.31E+03
Tc-99	6.7678E-03	52.27	52.27	0.00E+00	3.54E-01	3.54E-01
Th-229	1.2398E-06	52.27	52.27	0.00E+00	6.48E-05	6.48E-05
Th-230	4.1442E-06	52.27	52.27	0.00E+00	2.17E-04	2.17E-04
Th-232	6.0208E-07	52.27	52.27	0.00E+00	3.15E-05	3.15E-05
Tl-208	9.6478E-05	52.27	52.27	0.00E+00	5.04E-03	5.04E-03
U-232	2.6103E-04	52.27	52.27	0.00E+00	1.36E-02	1.36E-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	2.5126E+01	52.27	52.27	0.00E+00	1.31E+03	1.31E+03
Other Radionuclides					3.66E+03	3.66E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.753E+13
0.0250	1.734E+13
0.0375	1.547E+13
0.0575	2.112E+13
0.0850	9.133E+12
0.1250	7.943E+12
0.2250	7.759E+12
0.3750	3.270E+12
0.5750	5.216E+13
0.8500	3.143E+12
1.2500	4.079E+14
1.7500	9.883E+10
2.2500	2.147E+09
2.7500	1.839E+08
3.5000	1.880E+05
5.0000	7.999E+04
7.0000	9.184E+03
11.0000	1.052E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.17E+02	1.17E+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:		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: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 25 years

Estimated Canister usage: 18"x15' = 0.07

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.9648E-06	57.02	57.02	0.00E+00	1.12E-04	1.12E-04
Am-241	7.8064E+00	57.02	57.02	0.00E+00	4.45E+02	4.45E+02
Am-242m	1.7632E-02	57.02	57.02	0.00E+00	1.01E+00	1.01E+00
Am-243	1.6336E-02	57.02	57.02	0.00E+00	9.31E-01	9.31E-01
C-14	1.2101E-01	57.02	57.02	0.00E+00	6.90E+00	6.90E+00
Cl-36	2.2849E-03	57.02	57.02	0.00E+00	1.30E-01	1.30E-01
Cm-243	1.1046E-03	57.02	57.02	0.00E+00	6.30E-02	6.30E-02
Cm-244	2.4704E-01	57.02	57.02	0.00E+00	1.41E+01	1.41E+01
Co-60	1.0466E+02	57.02	57.02	0.00E+00	5.97E+03	5.97E+03
Cs-134	9.8289E-03	57.02	57.02	0.00E+00	5.60E-01	5.60E-01
Cs-135	4.3976E-04	57.02	57.02	0.00E+00	2.51E-02	2.51E-02
Cs-137	2.6526E+01	57.02	57.02	0.00E+00	1.51E+03	1.51E+03
Eu-154	2.7975E+00	57.02	57.02	0.00E+00	1.60E+02	1.60E+02
Eu-155	2.7881E-01	57.02	57.02	0.00E+00	1.59E+01	1.59E+01
Fe-55	4.2151E+00	57.02	57.02	0.00E+00	2.40E+02	2.40E+02
H-3	4.2599E-01	57.02	57.02	0.00E+00	2.43E+01	2.43E+01
I-129	1.0618E-05	57.02	57.02	0.00E+00	6.05E-04	6.05E-04
Kr-85	1.1426E+00	57.02	57.02	0.00E+00	6.52E+01	6.52E+01
Np-237	1.5847E-04	57.02	57.02	0.00E+00	8.92E-03	8.92E-03
Pa-231	2.8624E-06	57.02	57.02	0.00E+00	1.63E-04	1.63E-04
Pb-210	9.2770E-09	57.02	57.02	0.00E+00	5.29E-07	5.29E-07
Pm-147	2.3690E-01	57.02	57.02	0.00E+00	1.35E+01	1.35E+01
Pu-238	-6.1800E-01	57.02	0.00	1.54E+01	0.00E+00	1.54E+01
Pu-239	-4.8280E-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	-7.4000E+01	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	3.2167E-06	57.02	57.02	0.00E+00	1.83E-06	1.83E-06
Ra-228	5.9024E-07	57.02	57.02	0.00E+00	3.37E-05	3.37E-05
Ru-106	3.9140E-06	57.02	57.02	0.00E+00	2.23E-04	2.23E-04
Se-79	1.9184E-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	2.5126E+01	57.02	57.02	0.00E+00	1.43E+03	1.43E+03
Tc-99	6.7678E-03	57.02	57.02	0.00E+00	3.86E-01	3.86E-01
Th-229	1.2398E-06	57.02	57.02	0.00E+00	7.07E-05	7.07E-05
Th-230	4.1442E-06	57.02	57.02	0.00E+00	2.36E-04	2.36E-04
Th-232	6.0208E-07	57.02	57.02	0.00E+00	3.43E-05	3.43E-05
Tl-208	9.6478E-05	57.02	57.02	0.00E+00	5.50E-03	5.50E-03
U-232	2.6103E-04	57.02	57.02	0.00E+00	1.49E-02	1.49E-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	2.5126E+01	57.02	57.02	0.00E+00	1.43E+03	1.43E+03
Other Radionuclides					4.00E+03	4.00E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.548E+13
0.0250	1.892E+13
0.0375	1.688E+13
0.0575	2.304E+13
0.0850	9.963E+12
0.1250	8.665E+12
0.2250	8.464E+12
0.3750	3.567E+12
0.5750	5.690E+13
0.8500	3.429E+12
1.2500	4.450E+14
1.7500	1.078E+11
2.2500	2.343E+09
2.7500	2.006E+08
3.5000	2.051E+05
5.0000	8.726E+04
7.0000	1.002E+04
11.0000	1.148E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.27E+02	1.28E+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:		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: 591.84

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186985
Template Decay Time: 25 years

Estimated Canister usage: 18"x15' = 0.07

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.9648E-06	132.10	132.10	0.00E+00	2.60E-04	2.60E-04
Am-241	7.8064E+00	132.10	132.10	0.00E+00	1.03E+03	1.03E+03
Am-242m	1.7632E-02	132.10	132.10	0.00E+00	2.33E+00	2.33E+00
Am-243	1.6336E-02	132.10	132.10	0.00E+00	2.16E+00	2.16E+00
C-14	1.2101E-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	1.1046E-03	132.10	132.10	0.00E+00	1.46E-01	1.46E-01
Cm-244	2.4704E-01	132.10	132.10	0.00E+00	3.26E+01	3.26E+01
Co-60	1.0466E+02	132.10	132.10	0.00E+00	1.38E+04	1.38E+04
Cs-134	9.8289E-03	132.10	132.10	0.00E+00	1.30E+00	1.30E+00
Cs-135	4.3976E-04	132.10	132.10	0.00E+00	5.81E-02	5.81E-02
Cs-137	2.6526E+01	132.10	132.10	0.00E+00	3.50E+03	3.50E+03
Eu-154	2.7975E+00	132.10	132.10	0.00E+00	3.70E+02	3.70E+02
Eu-155	2.7881E-01	132.10	132.10	0.00E+00	3.68E+01	3.68E+01
Fe-55	4.2151E+00	132.10	132.10	0.00E+00	5.57E+02	5.57E+02
H-3	4.2599E-01	132.10	132.10	0.00E+00	5.63E+01	5.63E+01
I-129	1.0618E-05	132.10	132.10	0.00E+00	1.40E-03	1.40E-03
Kr-85	1.1426E+00	132.10	132.10	0.00E+00	1.51E+02	1.51E+02
Np-237	1.5647E-04	132.10	132.10	0.00E+00	2.07E-02	2.07E-02
Pa-231	2.8624E-08	132.10	132.10	0.00E+00	3.78E-04	3.78E-04
Pb-210	9.2770E-09	132.10	132.10	0.00E+00	1.23E-06	1.23E-06
Pm-147	2.3690E-01	132.10	132.10	0.00E+00	3.13E+01	3.13E+01
Pu-238	-6.1800E-01	132.10	0.00	3.57E+01	0.00E+00	3.57E+01
Pu-239	-4.8280E-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	-7.4000E+01	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	3.2167E-08	132.10	132.10	0.00E+00	4.25E-06	4.25E-06
Ra-228	5.9024E-07	132.10	132.10	0.00E+00	7.80E-05	7.80E-05
Ru-106	3.9140E-06	132.10	132.10	0.00E+00	5.17E-04	5.17E-04
Se-79	1.9184E-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	2.5126E+01	132.10	132.10	0.00E+00	3.32E+03	3.32E+03
Tc-99	6.7678E-03	132.10	132.10	0.00E+00	8.94E-01	8.94E-01
Th-229	1.2398E-08	132.10	132.10	0.00E+00	1.64E-04	1.64E-04
Th-230	4.1442E-08	132.10	132.10	0.00E+00	5.47E-04	5.47E-04
Th-232	6.0208E-07	132.10	132.10	0.00E+00	7.95E-05	7.95E-05
Tl-208	9.6478E-05	132.10	132.10	0.00E+00	1.27E-02	1.27E-02
U-232	2.6103E-04	132.10	132.10	0.00E+00	3.45E-02	3.45E-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	2.5126E+01	132.10	132.10	0.00E+00	3.32E+03	3.32E+03
Other Radionuclides					9.26E+03	9.26E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.212E+14
0.0250	4.383E+13
0.0375	3.911E+13
0.0575	5.338E+13
0.0850	2.308E+13
0.1250	2.007E+13
0.2250	1.961E+13
0.3750	8.264E+12
0.5750	1.318E+14
0.8500	7.943E+12
1.2500	1.031E+15
1.7500	2.498E+11
2.2500	5.427E+09
2.7500	4.648E+08
3.5000	4.752E+05
5.0000	2.022E+05
7.0000	2.321E+04
11.0000	2.660E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.95E+02	2.96E+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: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 25 years

Estimated Canister usage: 18"x15' = 0.07

II. Estimates	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.9648E-06	65.57	65.57	0.00E+00	1.29E-04	1.29E-04
Am-241	7.8064E+00	65.57	65.57	0.00E+00	5.12E+02	5.12E+02
Am-242m	1.7632E-02	65.57	65.57	0.00E+00	1.16E+00	1.16E+00
Am-243	1.6336E-02	65.57	65.57	0.00E+00	1.07E+00	1.07E+00
C-14	1.2101E-01	65.57	65.57	0.00E+00	7.94E+00	7.94E+00
Cl-36	2.2849E-03	65.57	65.57	0.00E+00	1.50E-01	1.50E-01
Cm-243	1.1046E-03	65.57	65.57	0.00E+00	7.24E-02	7.24E-02
Cm-244	2.4704E-01	65.57	65.57	0.00E+00	1.62E+01	1.62E+01
Co-60	1.0466E+02	65.57	65.57	0.00E+00	6.86E+03	6.86E+03
Cs-134	9.8289E-03	65.57	65.57	0.00E+00	6.45E-01	6.45E-01
Cs-135	4.3976E-04	65.57	65.57	0.00E+00	2.88E-02	2.88E-02
Cs-137	2.6526E+01	65.57	65.57	0.00E+00	1.74E+03	1.74E+03
Eu-154	2.7975E+00	65.57	65.57	0.00E+00	1.83E+02	1.83E+02
Eu-155	2.7881E-01	65.57	65.57	0.00E+00	1.83E+01	1.83E+01
Fe-55	4.2151E+00	65.57	65.57	0.00E+00	2.76E+02	2.76E+02
H-3	4.2599E-01	65.57	65.57	0.00E+00	2.79E+01	2.79E+01
I-129	1.0618E-05	65.57	65.57	0.00E+00	6.96E-04	6.96E-04
Kr-85	1.1426E+00	65.57	65.57	0.00E+00	7.49E+01	7.49E+01
Np-237	1.5647E-04	65.57	65.57	0.00E+00	1.03E-02	1.03E-02
Pa-231	2.8624E-06	65.57	65.57	0.00E+00	1.88E-04	1.88E-04
Pb-210	9.2770E-09	65.57	65.57	0.00E+00	6.08E-07	6.08E-07
Pm-147	2.3690E-01	65.57	65.57	0.00E+00	1.55E+01	1.55E+01
Pu-238	-6.1800E-01	65.57	0.00	1.77E+01	0.00E+00	1.77E+01
Pu-239	-4.8280E-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	-7.4000E+01	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	3.2167E-08	65.57	65.57	0.00E+00	2.11E-06	2.11E-06
Ra-228	5.9024E-07	65.57	65.57	0.00E+00	3.87E-05	3.87E-05
Ru-106	3.9140E-06	65.57	65.57	0.00E+00	2.57E-04	2.57E-04
Se-79	1.9184E-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	2.5126E+01	65.57	65.57	0.00E+00	1.65E+03	1.65E+03
Tc-99	6.7678E-03	65.57	65.57	0.00E+00	4.44E-01	4.44E-01
Th-229	1.2398E-06	65.57	65.57	0.00E+00	8.13E-05	8.13E-05
Th-230	4.1442E-06	65.57	65.57	0.00E+00	2.72E-04	2.72E-04
Th-232	6.0208E-07	65.57	65.57	0.00E+00	3.95E-05	3.95E-05
Tl-208	9.6478E-05	65.57	65.57	0.00E+00	6.33E-03	6.33E-03
U-232	2.6103E-04	65.57	65.57	0.00E+00	1.71E-02	1.71E-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	2.5126E+01	65.57	65.57	0.00E+00	1.65E+03	1.65E+03
Other Radionuclides					4.60E+03	4.60E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.098E+14
0.0250	2.176E+13
0.0375	1.941E+13
0.0575	2.650E+13
0.0850	1.146E+13
0.1250	9.965E+12
0.2250	9.733E+12
0.3750	4.102E+12
0.5750	6.544E+13
0.8500	3.943E+12
1.2500	5.117E+14
1.7500	1.240E+11
2.2500	2.694E+09
2.7500	2.307E+08
3.5000	2.359E+05
5.0000	1.004E+05
7.0000	1.152E+04
11.0000	1.320E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.46E+02	1.47E+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:		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: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 25 years

Estimated Canister usage: 18"x15' = 0.07

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.9648E-06	330.72	330.72	0.00E+00	6.50E-04	6.50E-04
Am-241	7.8064E+00	330.72	330.72	0.00E+00	2.58E+03	2.58E+03
Am-242m	1.7632E-02	330.72	330.72	0.00E+00	5.83E+00	5.83E+00
Am-243	1.6336E-02	330.72	330.72	0.00E+00	5.40E+00	5.40E+00
C-14	1.2101E-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	1.1046E-03	330.72	330.72	0.00E+00	3.65E-01	3.65E-01
Cm-244	2.4704E-01	330.72	330.72	0.00E+00	8.17E+01	8.17E+01
Co-60	1.0466E+02	330.72	330.72	0.00E+00	3.46E+04	3.46E+04
Cs-134	9.8289E-03	330.72	330.72	0.00E+00	3.25E+00	3.25E+00
Cs-135	4.3976E-04	330.72	330.72	0.00E+00	1.45E-01	1.45E-01
Cs-137	2.6526E+01	330.72	330.72	0.00E+00	8.77E+03	8.77E+03
Eu-154	2.7975E+00	330.72	330.72	0.00E+00	9.25E+02	9.25E+02
Eu-155	2.7881E-01	330.72	330.72	0.00E+00	9.22E+01	9.22E+01
Fe-55	4.2151E+00	330.72	330.72	0.00E+00	1.39E+03	1.39E+03
H-3	4.2599E-01	330.72	330.72	0.00E+00	1.41E+02	1.41E+02
I-129	1.0618E-05	330.72	330.72	0.00E+00	3.51E-03	3.51E-03
Kr-85	1.1426E+00	330.72	330.72	0.00E+00	3.78E+02	3.78E+02
Np-237	1.5647E-04	330.72	330.72	0.00E+00	5.17E-02	5.17E-02
Pa-231	2.8624E-06	330.72	330.72	0.00E+00	9.47E-04	9.47E-04
Pb-210	9.2770E-09	330.72	330.72	0.00E+00	3.07E-06	3.07E-06
Pm-147	2.3690E-01	330.72	330.72	0.00E+00	7.83E+01	7.83E+01
Pu-238	-6.1800E-01	330.72	0.00	8.94E+01	0.00E+00	8.94E+01
Pu-239	-4.8280E-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	-7.4000E+01	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	3.2167E-08	330.72	330.72	0.00E+00	1.06E-05	1.06E-05
Ra-228	5.9024E-07	330.72	330.72	0.00E+00	1.95E-04	1.95E-04
Ru-106	3.9140E-06	330.72	330.72	0.00E+00	1.29E-03	1.29E-03
Se-79	1.9184E-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	2.5126E+01	330.72	330.72	0.00E+00	8.31E+03	8.31E+03
Tc-99	6.7678E-03	330.72	330.72	0.00E+00	2.24E+00	2.24E+00
Th-229	1.2398E-06	330.72	330.72	0.00E+00	4.10E-04	4.10E-04
Th-230	4.1442E-06	330.72	330.72	0.00E+00	1.37E-03	1.37E-03
Th-232	6.0208E-07	330.72	330.72	0.00E+00	1.99E-04	1.99E-04
Tl-208	9.6478E-05	330.72	330.72	0.00E+00	3.19E-02	3.19E-02
U-232	2.6103E-04	330.72	330.72	0.00E+00	8.63E-02	8.63E-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	2.5126E+01	330.72	330.72	0.00E+00	8.31E+03	8.31E+03
Other Radionuclides					2.32E+04	2.32E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.538E+14
0.0250	1.097E+14
0.0375	9.791E+13
0.0575	1.336E+14
0.0850	5.779E+13
0.1250	5.026E+13
0.2250	4.909E+13
0.3750	2.069E+13
0.5750	3.300E+14
0.8500	1.989E+13
1.2500	2.581E+15
1.7500	6.253E+11
2.2500	1.359E+10
2.7500	1.164E+09
3.5000	1.190E+08
5.0000	5.061E+05
7.0000	5.811E+04
11.0000	6.659E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.38E+02	7.42E+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: 2010
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' = 0.44

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.3072E-06	61.01	61.01	0.00E+00	1.41E-04	1.41E-04
Am-241	8.4448E+00	61.01	61.01	0.00E+00	5.15E+02	5.15E+02
Am-242m	1.6848E-02	61.01	61.01	0.00E+00	1.03E+00	1.03E+00
Am-243	1.6320E-02	61.01	61.01	0.00E+00	9.96E-01	9.96E-01
C-14	1.2090E-01	61.01	61.01	0.00E+00	7.38E+00	7.38E+00
Cl-36	2.2849E-03	61.01	61.01	0.00E+00	1.39E-01	1.39E-01
Cm-243	8.6624E-04	61.01	61.01	0.00E+00	5.29E-02	5.29E-02
Cm-244	1.6848E-01	61.01	61.01	0.00E+00	1.03E+01	1.03E+01
Co-60	2.8086E+01	61.01	61.01	0.00E+00	1.71E+03	1.71E+03
Cs-134	3.4148E-04	61.01	61.01	0.00E+00	2.08E-02	2.08E-02
Cs-135	4.3976E-04	61.01	61.01	0.00E+00	2.68E-02	2.68E-02
Cs-137	2.1049E+01	61.01	61.01	0.00E+00	1.28E+03	1.28E+03
Eu-154	1.2500E+00	61.01	61.01	0.00E+00	7.63E+01	7.63E+01
Eu-155	6.8986E-02	61.01	61.01	0.00E+00	4.21E+00	4.21E+00
Fe-55	2.9308E-01	61.01	61.01	0.00E+00	1.79E+01	1.79E+01
H-3	2.4311E-01	61.01	61.01	0.00E+00	1.48E+01	1.48E+01
I-129	1.0618E-05	61.01	61.01	0.00E+00	6.48E-04	6.48E-04
Kr-85	5.9882E-01	61.01	61.01	0.00E+00	3.65E+01	3.65E+01
Np-237	1.5668E-04	61.01	61.01	0.00E+00	9.56E-03	9.56E-03
Pa-231	2.8656E-06	61.01	61.01	0.00E+00	1.75E-04	1.75E-04
Pb-210	2.3918E-08	61.01	61.01	0.00E+00	1.46E-06	1.46E-06
Pm-147	1.6900E-02	61.01	61.01	0.00E+00	1.03E+00	1.03E+00
Pu-238	-8.6120E-01	61.01	0.00	1.65E+01	0.00E+00	1.65E+01
Pu-239	-4.8440E-02	61.01	0.00	2.00E+00	0.00E+00	2.00E+00
Pu-240	-3.0095E-01	61.01	0.00	2.55E+00	0.00E+00	2.55E+00
Pu-241	-1.0411E+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	6.4400E-08	61.01	61.01	0.00E+00	3.93E-06	3.93E-06
Ra-228	5.9952E-07	61.01	61.01	0.00E+00	3.66E-05	3.66E-05
Ru-106	8.5526E-07	61.01	61.01	0.00E+00	5.22E-05	5.22E-05
Se-79	1.9181E-04	61.01	61.01	0.00E+00	1.17E-02	1.17E-02
Sn-126	1.6671E-04	61.01	61.01	0.00E+00	1.02E-02	1.02E-02
Sr-90	1.9799E+01	61.01	61.01	0.00E+00	1.21E+03	1.21E+03
Tc-99	6.7678E-03	61.01	61.01	0.00E+00	4.13E-01	4.13E-01
Th-229	1.7488E-06	61.01	61.01	0.00E+00	1.07E-04	1.07E-04
Th-230	5.8704E-06	61.01	61.01	0.00E+00	3.58E-04	3.58E-04
Th-232	6.0208E-07	61.01	61.01	0.00E+00	3.67E-05	3.67E-05
Tl-208	8.7573E-05	61.01	61.01	0.00E+00	5.34E-03	5.34E-03
U-232	2.3706E-04	61.01	61.01	0.00E+00	1.45E-02	1.45E-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	1.9804E+01	61.01	61.01	0.00E+00	1.21E+03	1.21E+03
Other Radionuclides					3.76E+03	3.76E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.477E+13
0.0250	1.488E+13
0.0375	1.300E+13
0.0575	2.045E+13
0.0850	7.982E+12
0.1250	6.256E+12
0.2250	6.915E+12
0.3750	2.958E+12
0.5750	4.809E+13
0.8500	1.838E+12
1.2500	1.285E+14
1.7500	5.683E+10
2.2500	6.737E+08
2.7500	1.899E+08
3.5000	1.519E+05
5.0000	6.453E+04
7.0000	7.390E+03
11.0000	8.455E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.01E+01	6.08E+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)
SNF ID #: 174
Fuel Units & Descr: 24 - CANISTER OF RODS
Heavy Metal Mass: BOL=254.671kg; EOL=252.202kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1978
Estimates as of: 2010
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: 25 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	6.6376E-10	2,348.47	2,546.71	0.00E+00	1.56E-06	1.69E-06
Am-241	1.3144E-01	2,348.47	2,546.71	0.00E+00	3.09E+02	3.35E+02
Am-242m	3.0039E-04	2,348.47	2,546.71	0.00E+00	7.05E-01	7.65E-01
Am-243	6.2629E-04	2,348.47	2,546.71	0.00E+00	1.47E+00	1.59E+00
C-14	4.7965E-05	2,348.47	2,546.71	0.00E+00	1.13E-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	3.1993E-04	2,348.47	2,546.71	0.00E+00	7.51E-01	8.15E-01
Cm-244	7.1851E-02	2,348.47	2,546.71	0.00E+00	1.69E+02	1.83E+02
Co-60	9.5220E-03	2,348.47	2,546.71	0.00E+00	2.24E+01	2.42E+01
Cs-134	1.1662E-03	2,348.47	2,546.71	0.00E+00	2.74E+00	2.97E+00
Cs-135	1.4433E-05	2,348.47	2,546.71	0.00E+00	3.39E-02	3.68E-02
Cs-137	1.7603E+00	2,348.47	2,546.71	0.00E+00	4.13E+03	4.48E+03
Eu-154	4.5203E-02	2,348.47	2,546.71	0.00E+00	1.06E+02	1.15E+02
Eu-155	7.1479E-03	2,348.47	2,546.71	0.00E+00	1.68E+01	1.82E+01
Fe-55	6.1919E-04	2,348.47	2,546.71	0.00E+00	1.45E+00	1.58E+00
H-3	3.6386E-02	2,348.47	2,546.71	0.00E+00	8.55E+01	9.27E+01
I-129	9.8288E-07	2,348.47	2,546.71	0.00E+00	2.31E-03	2.50E-03
Kr-85	5.3844E-02	2,348.47	2,546.71	0.00E+00	1.26E+02	1.37E+02
Np-237	1.0546E-05	2,348.47	2,546.71	0.00E+00	2.48E-02	2.69E-02
Pa-231	1.1370E-09	2,348.47	2,546.71	0.00E+00	2.67E-06	2.90E-06
Pb-210	3.3624E-11	2,348.47	2,546.71	0.00E+00	7.90E-08	8.56E-08
Pm-147	5.1211E-03	2,348.47	2,546.71	0.00E+00	1.20E+01	1.30E+01
Pu-238	8.0669E-02	2,348.47	2,546.71	0.00E+00	1.89E+02	2.05E+02
Pu-239	1.1626E-02	2,348.47	2,546.71	0.00E+00	2.73E+01	2.96E+01
Pu-240	1.5097E-02	2,348.47	2,546.71	0.00E+00	3.55E+01	3.84E+01
Pu-241	1.4567E+00	2,348.47	2,546.71	0.00E+00	3.42E+03	3.71E+03
Pu-242	6.4260E-05	2,348.47	2,546.71	0.00E+00	1.51E-01	1.64E-01
Ra-226	1.1392E-10	2,348.47	2,546.71	0.00E+00	2.68E-07	2.90E-07
Ra-228	5.1841E-12	2,348.47	2,546.71	0.00E+00	1.22E-08	1.32E-08
Ru-106	5.9012E-07	2,348.47	2,546.71	0.00E+00	1.39E-03	1.50E-03
Se-79	1.2379E-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	1.1630E+00	2,348.47	2,546.71	0.00E+00	2.73E+03	2.96E+03
Tc-99	3.9357E-04	2,348.47	2,546.71	0.00E+00	9.24E-01	1.00E+00
Th-229	8.5691E-11	2,348.47	2,546.71	0.00E+00	2.01E-07	2.18E-07
Th-230	1.4493E-08	2,348.47	2,546.71	0.00E+00	3.40E-05	3.69E-05
Th-232	5.2923E-12	2,348.47	2,546.71	0.00E+00	1.24E-08	1.35E-08
Tl-208	1.9202E-07	2,348.47	2,546.71	0.00E+00	4.51E-04	4.89E-04
U-232	5.2083E-07	2,348.47	2,546.71	0.00E+00	1.22E-03	1.33E-03
U-233	2.4386E-08	2,348.47	2,546.71	0.00E+00	5.73E-05	6.21E-05
U-234	4.7012E-05	2,348.47	2,546.71	0.00E+00	1.10E-01	1.20E-01
U-235	-1.4492E-08	2,348.47	0.00	3.30E-02	2.96E-02	3.30E-02
U-236	7.5759E-08	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	1.1631E+00	2,348.47	2,546.71	0.00E+00	2.73E+03	2.96E+03
Other Radionuclides					3.97E+03	4.30E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.732E+14
0.0250	3.508E+13
0.0375	3.395E+13
0.0575	3.703E+13
0.0850	1.962E+13
0.1250	1.433E+13
0.2250	1.685E+13
0.3750	7.228E+12
0.5750	1.661E+14
0.8500	3.278E+12
1.2500	4.428E+12
1.7500	9.702E+10
2.2500	1.792E+07
2.7500	2.014E+07
3.5000	2.640E+06
5.0000	1.128E+06
7.0000	1.301E+05
11.0000	1.494E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.44E+01	6.98E+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: 2010
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	x_n Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	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)
8.84E+01	1.13E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		920.05	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,840.09	Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PULSTAR-SUNY-BUFFALO (6% RODS)
SNF ID #: 176
Fuel Units & Descr: 996 - ROD
Heavy Metal Mass: BOL=537.541kg; EOL=499.992kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1965
Estimates as of: 2010
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' = 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	8.7758E-10	35,707.51	71,415.03	0.00E+00	3.13E-05	6.27E-05
Am-241	1.4352E-01	35,707.51	71,415.03	0.00E+00	5.12E+03	1.02E+04
Am-242m	2.8698E-04	35,707.51	71,415.03	0.00E+00	1.02E+01	2.05E+01
Am-243	6.2565E-04	35,707.51	71,415.03	0.00E+00	2.23E+01	4.47E+01
C-14	4.7901E-05	35,707.51	71,415.03	0.00E+00	1.71E+00	3.42E+00
Cl-36	8.0297E-07	35,707.51	71,415.03	0.00E+00	2.87E-02	5.73E-02
Cm-243	2.5081E-04	35,707.51	71,415.03	0.00E+00	8.96E+00	1.79E+01
Cm-244	4.9015E-02	35,707.51	71,415.03	0.00E+00	1.75E+03	3.50E+03
Co-60	2.5581E-03	35,707.51	71,415.03	0.00E+00	9.13E+01	1.83E+02
Cs-134	4.0536E-05	35,707.51	71,415.03	0.00E+00	1.45E+00	2.89E+00
Cs-135	1.4433E-05	35,707.51	71,415.03	0.00E+00	5.15E-01	1.03E+00
Cs-137	1.3979E+00	35,707.51	71,415.03	0.00E+00	4.99E+04	9.98E+04
Eu-154	2.0203E-02	35,707.51	71,415.03	0.00E+00	7.21E+02	1.44E+03
Eu-155	1.7684E-03	35,707.51	71,415.03	0.00E+00	6.31E+01	1.26E+02
Fe-55	4.3136E-05	35,707.51	71,415.03	0.00E+00	1.54E+00	3.08E+00
H-3	2.0769E-02	35,707.51	71,415.03	0.00E+00	7.42E+02	1.48E+03
I-129	9.8288E-07	35,707.51	71,415.03	0.00E+00	3.51E-02	7.02E-02
Kr-85	2.8214E-02	35,707.51	71,415.03	0.00E+00	1.01E+03	2.01E+03
Np-237	1.1218E-05	35,707.51	71,415.03	0.00E+00	4.01E-01	8.01E-01
Pa-231	1.3036E-09	35,707.51	71,415.03	0.00E+00	4.65E-05	9.31E-05
Pb-210	8.5078E-11	35,707.51	71,415.03	0.00E+00	3.04E-06	6.08E-06
Pm-147	3.6531E-04	35,707.51	71,415.03	0.00E+00	1.30E+01	2.61E+01
Pu-238	7.4564E-02	35,707.51	71,415.03	0.00E+00	2.66E+03	5.32E+03
Pu-239	1.1623E-02	35,707.51	71,415.03	0.00E+00	4.15E+02	8.30E+02
Pu-240	1.5132E-02	35,707.51	71,415.03	0.00E+00	5.40E+02	1.08E+03
Pu-241	9.0036E-01	35,707.51	71,415.03	0.00E+00	3.21E+04	6.43E+04
Pu-242	6.4260E-05	35,707.51	71,415.03	0.00E+00	2.29E+00	4.59E+00
Ra-226	2.2804E-10	35,707.51	71,415.03	0.00E+00	8.14E-06	1.63E-05
Ra-228	5.2713E-12	35,707.51	71,415.03	0.00E+00	1.88E-07	3.76E-07
Ru-106	6.1160E-10	35,707.51	71,415.03	0.00E+00	2.18E-05	4.37E-05
Se-79	1.2377E-05	35,707.51	71,415.03	0.00E+00	4.42E-01	8.84E-01
Sn-126	2.5210E-05	35,707.51	71,415.03	0.00E+00	9.00E-01	1.80E+00
Sr-90	9.1667E-01	35,707.51	71,415.03	0.00E+00	3.27E+04	6.55E+04
Tc-99	3.9357E-04	35,707.51	71,415.03	0.00E+00	1.41E+01	2.81E+01
Th-229	1.2057E-10	35,707.51	71,415.03	0.00E+00	4.31E-06	8.61E-06
Th-230	2.1043E-08	35,707.51	71,415.03	0.00E+00	7.51E-04	1.50E-03
Th-232	5.2972E-12	35,707.51	71,415.03	0.00E+00	1.89E-07	3.78E-07
Tl-208	1.7474E-07	35,707.51	71,415.03	0.00E+00	6.24E-03	1.25E-02
U-232	4.7368E-07	35,707.51	71,415.03	0.00E+00	1.69E-02	3.38E-02
U-233	2.5097E-08	35,707.51	71,415.03	0.00E+00	8.96E-04	1.79E-03
U-234	5.0000E-05	35,707.51	71,415.03	0.00E+00	1.79E+00	3.57E+00
U-235	-1.4489E-06	35,707.51	0.00	6.93E-02	1.76E-02	6.93E-02
U-236	7.5824E-06	35,707.51	71,415.03	0.00E+00	2.71E-01	5.41E-01
U-238	-2.6129E-07	35,707.51	0.00	1.70E-01	1.61E-01	1.70E-01
Y-90	9.1699E-01	35,707.51	71,415.03	0.00E+00	3.27E+04	6.55E+04
Other Radionuclides					4.79E+04	9.59E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.843E+15
0.0250	7.749E+14
0.0375	7.390E+14
0.0575	8.539E+14
0.0850	4.300E+14
0.1250	2.984E+14
0.2250	3.687E+14
0.3750	1.585E+14
0.5750	3.687E+15
0.8500	5.101E+13
1.2500	5.011E+13
1.7500	1.501E+12
2.2500	2.416E+08
2.7500	4.950E+08
3.5000	5.097E+07
5.0000	2.179E+07
7.0000	2.512E+06
11.0000	2.885E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.21E+02	1.64E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	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: 2010
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: 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	1.3562E-08	1,047.61	1,047.61	0.00E+00	1.42E-05	1.42E-05
Am-241	1.0168E-04	1,047.61	1,047.61	0.00E+00	1.07E-01	1.07E-01
Am-242m	8.9052E-09	1,047.61	1,047.61	0.00E+00	9.33E-06	9.33E-06
Am-243	9.8602E-10	1,047.61	1,047.61	0.00E+00	1.03E-06	1.03E-06
C-14	2.3045E-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	3.1730E-10	1,047.61	1,047.61	0.00E+00	3.32E-07	3.32E-07
Cm-244	3.3977E-09	1,047.61	1,047.61	0.00E+00	3.56E-06	3.56E-06
Co-60	2.6373E-01	1,047.61	1,047.61	0.00E+00	2.76E+02	2.76E+02
Cs-134	8.7072E-05	1,047.61	1,047.61	0.00E+00	9.12E-02	9.12E-02
Cs-135	3.0316E-05	1,047.61	1,047.61	0.00E+00	3.18E-02	3.18E-02
Cs-137	1.8286E+00	1,047.61	1,047.61	0.00E+00	1.92E+03	1.92E+03
Eu-154	1.4982E-03	1,047.61	1,047.61	0.00E+00	1.57E+00	1.57E+00
Eu-155	2.8236E-03	1,047.61	1,047.61	0.00E+00	2.96E+00	2.96E+00
Fe-55	1.7687E-02	1,047.61	1,047.61	0.00E+00	1.85E+01	1.85E+01
H-3	4.4043E-03	1,047.61	1,047.61	0.00E+00	4.61E+00	4.61E+00
I-129	7.3195E-07	1,047.61	1,047.61	0.00E+00	7.67E-04	7.67E-04
Kr-85	7.8769E-02	1,047.61	1,047.61	0.00E+00	8.25E+01	8.25E+01
Np-237	1.1484E-06	1,047.61	1,047.61	0.00E+00	1.20E-03	1.20E-03
Pa-231	3.2396E-08	1,047.61	1,047.61	0.00E+00	3.39E-05	3.39E-05
Pb-210	2.4409E-13	1,047.61	1,047.61	0.00E+00	2.56E-10	2.56E-10
Pm-147	1.6331E-02	1,047.61	1,047.61	0.00E+00	1.71E+01	1.71E+01
Pu-238	3.1947E-04	1,047.61	1,047.61	0.00E+00	3.35E-01	3.35E-01
Pu-239	6.6789E-04	1,047.61	1,047.61	0.00E+00	7.00E-01	7.00E-01
Pu-240	8.6922E-05	1,047.61	1,047.61	0.00E+00	9.11E-02	9.11E-02
Pu-241	1.1567E-03	1,047.61	1,047.61	0.00E+00	1.21E+00	1.21E+00
Pu-242	1.9717E-09	1,047.61	1,047.61	0.00E+00	2.07E-06	2.07E-06
Ra-226	8.6190E-13	1,047.61	1,047.61	0.00E+00	9.03E-10	9.03E-10
Ra-228	8.1498E-12	1,047.61	1,047.61	0.00E+00	8.54E-09	8.54E-09
Ru-106	1.7770E-07	1,047.61	1,047.61	0.00E+00	1.86E-04	1.86E-04
Se-79	1.3225E-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	1.7321E+00	1,047.61	1,047.61	0.00E+00	1.81E+03	1.81E+03
Tc-99	4.6656E-04	1,047.61	1,047.61	0.00E+00	4.89E-01	4.89E-01
Th-229	1.0110E-11	1,047.61	1,047.61	0.00E+00	1.06E-08	1.06E-08
Th-230	1.1466E-10	1,047.61	1,047.61	0.00E+00	1.20E-07	1.20E-07
Th-232	8.3245E-12	1,047.61	1,047.61	0.00E+00	8.72E-09	8.72E-09
Tl-208	2.3860E-06	1,047.61	1,047.61	0.00E+00	2.50E-05	2.50E-05
U-232	6.4576E-08	1,047.61	1,047.61	0.00E+00	6.77E-05	6.77E-05
U-233	3.1082E-09	1,047.61	1,047.61	0.00E+00	3.26E-06	3.26E-06
U-234	3.7587E-07	1,047.61	1,047.61	0.00E+00	3.94E-04	3.94E-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	1.7321E+00	1,047.61	1,047.61	0.00E+00	1.81E+03	1.81E+03
Other Radionuclides					2.13E+03	2.13E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.968E+13
0.0250	2.071E+13
0.0375	1.788E+13
0.0575	1.929E+13
0.0850	1.166E+13
0.1250	7.577E+12
0.2250	1.001E+13
0.3750	4.368E+12
0.5750	7.133E+13
0.8500	7.438E+11
1.2500	2.072E+13
1.7500	1.916E+10
2.2500	1.104E+08
2.7500	1.215E+06
3.5000	2.566E+02
5.0000	2.599E+01
7.0000	2.870E+00
11.0000	3.220E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.60E+01	2.60E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	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
RCD Storage Site: INEEL

[1]Fuel decay start date: 1972
Estimates as of: 2010
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated Canister usage: Bare Fuel Transfer

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	154,660.60	218,499.95	0.00E+00	1.36E-04	1.92E-04
Am-241	1.4352E-01	154,660.60	218,499.95	0.00E+00	2.22E+04	3.14E+04
Am-242m	2.8698E-04	154,660.60	218,499.95	0.00E+00	4.44E+01	6.27E+01
Am-243	6.2565E-04	154,660.60	218,499.95	0.00E+00	9.68E+01	1.37E+02
C-14	4.7901E-05	154,660.60	218,499.95	0.00E+00	7.41E+00	1.05E+01
Cl-36	8.0297E-07	154,660.60	218,499.95	0.00E+00	1.24E-01	1.75E-01
Cm-243	2.5081E-04	154,660.60	218,499.95	0.00E+00	3.88E+01	5.48E+01
Cm-244	4.9015E-02	154,660.60	218,499.95	0.00E+00	7.58E+03	1.07E+04
Co-60	2.5581E-03	154,660.60	218,499.95	0.00E+00	3.96E+02	5.59E+02
Cs-134	4.0536E-05	154,660.60	218,499.95	0.00E+00	6.27E+00	8.86E+00
Cs-135	1.4433E-05	154,660.60	218,499.95	0.00E+00	2.23E+00	3.15E+00
Cs-137	1.3979E+00	154,660.60	218,499.95	0.00E+00	2.16E+05	3.05E+05
Eu-154	2.0203E-02	154,660.60	218,499.95	0.00E+00	3.12E+03	4.41E+03
Eu-155	1.7684E-03	154,660.60	218,499.95	0.00E+00	2.74E+02	3.86E+02
Fe-55	4.3136E-05	154,660.60	218,499.95	0.00E+00	6.67E+00	9.43E+00
H-3	2.0769E-02	154,660.60	218,499.95	0.00E+00	3.21E+03	4.54E+03
I-129	9.8288E-07	154,660.60	218,499.95	0.00E+00	1.52E-01	2.15E-01
Kr-85	2.8214E-02	154,660.60	218,499.95	0.00E+00	4.36E+03	6.16E+03
Np-237	1.1218E-05	154,660.60	218,499.95	0.00E+00	1.73E+00	2.45E+00
Pa-231	1.3036E-09	154,660.60	218,499.95	0.00E+00	2.02E-04	2.85E-04
Pb-210	8.5078E-11	154,660.60	218,499.95	0.00E+00	1.32E-05	1.86E-05
Pm-147	3.6531E-04	154,660.60	218,499.95	0.00E+00	5.65E+01	7.98E+01
Pu-238	7.4564E-02	154,660.60	218,499.95	0.00E+00	1.15E+04	1.63E+04
Pu-239	1.1623E-02	154,660.60	218,499.95	0.00E+00	1.80E+03	2.54E+03
Pu-240	1.5132E-02	154,660.60	218,499.95	0.00E+00	2.34E+03	3.31E+03
Pu-241	9.0036E-01	154,660.60	218,499.95	0.00E+00	1.39E+05	1.97E+05
Pu-242	6.4260E-05	154,660.60	218,499.95	0.00E+00	9.94E+00	1.40E+01
Ra-226	2.2804E-10	154,660.60	218,499.95	0.00E+00	3.53E-05	4.98E-05
Ra-228	5.2713E-12	154,660.60	218,499.95	0.00E+00	8.15E-07	1.15E-06
Ru-106	6.1160E-10	154,660.60	218,499.95	0.00E+00	9.46E-05	1.34E-04
Se-79	1.2377E-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	9.1667E-01	154,660.60	218,499.95	0.00E+00	1.42E+05	2.00E+05
Tc-99	3.9357E-04	154,660.60	218,499.95	0.00E+00	6.09E+01	8.60E+01
Th-229	1.2057E-10	154,660.60	218,499.95	0.00E+00	1.86E-05	2.63E-05
Th-230	2.1043E-08	154,660.60	218,499.95	0.00E+00	3.25E-03	4.60E-03
Th-232	5.2972E-12	154,660.60	218,499.95	0.00E+00	8.19E-07	1.16E-06
Tl-208	1.7474E-07	154,660.60	218,499.95	0.00E+00	2.70E-02	3.82E-02
U-232	4.7368E-07	154,660.60	218,499.95	0.00E+00	7.33E-02	1.03E-01
U-233	2.5097E-08	154,660.60	218,499.95	0.00E+00	3.88E-03	5.48E-03
U-234	5.0000E-05	154,660.60	218,499.95	0.00E+00	7.73E+00	1.09E+01
U-235	-1.4489E-06	154,660.60	0.00	1.15E+00	9.26E-01	1.15E+00
U-236	7.5824E-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	9.1699E-01	154,660.60	218,499.95	0.00E+00	1.42E+05	2.00E+05
Other Radionuclides					2.08E+05	2.93E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.176E+16
0.0250	2.371E+15
0.0375	2.261E+15
0.0575	2.613E+15
0.0850	1.315E+15
0.1250	9.129E+14
0.2250	1.128E+15
0.3750	4.851E+14
0.5750	1.128E+16
0.8500	1.561E+14
1.2500	1.533E+14
1.7500	4.591E+12
2.2500	7.393E+08
2.7500	1.515E+09
3.5000	1.560E+08
5.0000	6.669E+07
7.0000	7.686E+06
11.0000	8.828E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.56E+03	5.03E+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: 2010
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

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.7456E-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)
8.85E+04	1.13E+05
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	GRAPHITE	(Worst Case)
Fuel Cladding:	NONE	SST/Inconel
BOL HM Constituents:	U	U, Th, & Pu
BOL Enrichment %:	93.02375258	0 to 100

Basis for Parameter Differences:
This fuel didn't closely match any existing templates, therefore the worst case template was used.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2,276.58
Bounding:		4,553.16

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

Checks

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

Estimated EOL HM/Given EOL HM: 13.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT LWBR BLKT I
SNF ID #: 374
Fuel Units & Descr: 3 - 443 ROD ARRAY
Heavy Metal Mass: BOL=3795.7kg; EOL=3755.2kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1982
Estimates as of: 2010
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: 25 years

Estimated Canister usage: 24"x15' = 3.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.3425E-05	50,103.24	88,060.24	0.00E+00	4.18E+00	7.35E+00	Avg. MeV	
Am-241	2.2387E-04	50,103.24	88,060.24	0.00E+00	1.12E+01	1.97E+01	0.0150	9.216E+15
Am-242m	1.5512E-06	50,103.24	88,060.24	0.00E+00	7.77E-02	1.37E-01	0.0250	1.902E+15
Am-243	3.1181E-07	50,103.24	88,060.24	0.00E+00	1.56E-02	2.75E-02	0.0375	1.629E+15
C-14	9.2539E-05	50,103.24	88,060.24	0.00E+00	4.64E+00	8.15E+00	0.0575	1.776E+15
Cl-36	1.8103E-06	50,103.24	88,060.24	0.00E+00	9.07E-02	1.59E-01	0.0850	1.127E+15
Cm-243	3.9020E-07	50,103.24	88,060.24	0.00E+00	1.96E-02	3.44E-02	0.1250	7.219E+14
Cm-244	2.0742E-05	50,103.24	88,060.24	0.00E+00	1.04E+00	1.83E+00	0.2250	1.006E+15
Co-60	3.2554E-03	50,103.24	88,060.24	0.00E+00	1.63E+02	2.87E+02	0.3750	4.084E+14
Cs-134	7.3823E-04	50,103.24	88,060.24	0.00E+00	3.70E+01	6.50E+01	0.5750	6.185E+15
Cs-135	2.8639E-05	50,103.24	88,060.24	0.00E+00	1.43E+00	2.52E+00	0.8500	1.224E+14
Cs-137	1.8609E+00	50,103.24	88,060.24	0.00E+00	9.32E+04	1.64E+05	1.2500	7.742E+13
Eu-154	1.9262E-02	50,103.24	88,060.24	0.00E+00	9.65E+02	1.70E+03	1.7500	7.381E+12
Eu-155	2.6721E-03	50,103.24	88,060.24	0.00E+00	1.34E+02	2.35E+02	2.2500	2.971E+08
Fe-55	3.3099E-05	50,103.24	88,060.24	0.00E+00	1.66E+00	2.91E+00	2.7500	4.757E+13
H-3	3.7296E-03	50,103.24	88,060.24	0.00E+00	1.87E+02	3.28E+02	3.5000	1.879E+05
I-129	1.5853E-06	50,103.24	88,060.24	0.00E+00	7.94E-02	1.40E-01	5.0000	5.851E+04
Kr-85	1.1958E-01	50,103.24	88,060.24	0.00E+00	5.99E+03	1.05E+04	7.0000	4.394E+03
Np-237	1.2513E-07	50,103.24	88,060.24	0.00E+00	6.27E-03	1.10E-02	11.0000	3.485E+02
Pa-231	1.2017E-04	50,103.24	88,060.24	0.00E+00	6.02E+00	1.06E+01		
Pb-210	1.1939E-06	50,103.24	88,060.24	0.00E+00	5.98E-04	1.05E-03		
Pm-147	3.6819E-03	50,103.24	88,060.24	0.00E+00	1.84E+02	3.24E+02		
Pu-238	4.5953E-04	50,103.24	88,060.24	0.00E+00	2.30E+01	4.05E+01		
Pu-239	2.7529E-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	2.3780E-03	50,103.24	88,060.24	0.00E+00	1.19E+02	2.09E+02		
Pu-242	4.0821E-06	50,103.24	88,060.24	0.00E+00	2.05E-03	3.59E-03		
Ra-226	1.4471E-06	50,103.24	88,060.24	0.00E+00	7.25E-04	1.27E-03		
Ra-228	4.5651E-06	50,103.24	88,060.24	0.00E+00	2.29E-01	4.02E-01		
Ru-106	3.8971E-08	50,103.24	88,060.24	0.00E+00	1.95E-03	3.43E-03		
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	1.8940E+00	50,103.24	88,060.24	0.00E+00	9.49E+04	1.67E+05		
Tc-99	3.2534E-04	50,103.24	88,060.24	0.00E+00	1.63E+01	2.86E+01		
Th-229	4.6839E-05	50,103.24	88,060.24	0.00E+00	2.35E+00	4.12E+00		
Th-230	1.0322E-06	50,103.24	88,060.24	0.00E+00	5.17E-02	9.09E-02		
Th-232	-9.0328E-08	50,103.24	0.00	4.01E-01	3.96E-01	4.01E-01		
Tl-208	1.5386E-02	50,103.24	88,060.24	0.00E+00	7.71E+02	1.35E+03		
U-232	4.1639E-02	50,103.24	88,060.24	0.00E+00	2.09E+03	3.67E+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-06	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	1.8940E+00	50,103.24	88,060.24	0.00E+00	9.49E+04	1.67E+05		
Other Radionuclides					1.03E+05	1.81E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.66E+03	2.89E+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 Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	50,103.24	39,413.10
Bounding:	88,060.24	78,826.19

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT LWBR BLKT II
SNF ID #: 375
Fuel Units & Descr: 3 - 261 ROD ARRAY
Heavy Metal Mass: BOL=4373.5kg; EOL=4331.7kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1962
Estimates as of: 2010
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: 25 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	8.3425E-05	64,290.45	110,212.20	0.00E+00	5.36E+00	9.19E+00
Am-241	2.2387E-04	64,290.45	110,212.20	0.00E+00	1.44E+01	2.47E+01
Am-242m	1.5512E-06	64,290.45	110,212.20	0.00E+00	9.97E-02	1.71E-01
Am-243	3.1181E-07	64,290.45	110,212.20	0.00E+00	2.00E-02	3.44E-02
C-14	9.2539E-05	64,290.45	110,212.20	0.00E+00	5.95E+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	3.9020E-07	64,290.45	110,212.20	0.00E+00	2.51E-02	4.30E-02
Cm-244	2.0742E-05	64,290.45	110,212.20	0.00E+00	1.33E+00	2.29E+00
Co-60	3.2554E-03	64,290.45	110,212.20	0.00E+00	2.09E+02	3.59E+02
Cs-134	7.3823E-04	64,290.45	110,212.20	0.00E+00	4.75E+01	8.14E+01
Cs-135	2.8639E-05	64,290.45	110,212.20	0.00E+00	1.84E+00	3.16E+00
Cs-137	1.8609E+00	64,290.45	110,212.20	0.00E+00	1.20E+05	2.05E+05
Eu-154	1.9262E-02	64,290.45	110,212.20	0.00E+00	1.24E+03	2.12E+03
Eu-155	2.6721E-03	64,290.45	110,212.20	0.00E+00	1.72E+02	2.94E+02
Fe-55	3.3099E-05	64,290.45	110,212.20	0.00E+00	2.13E+00	3.65E+00
H-3	3.7296E-03	64,290.45	110,212.20	0.00E+00	2.40E+02	4.11E+02
I-129	1.5853E-06	64,290.45	110,212.20	0.00E+00	1.02E-01	1.75E-01
Kr-85	1.1958E-01	64,290.45	110,212.20	0.00E+00	7.69E+03	1.32E+04
Np-237	1.2513E-07	64,290.45	110,212.20	0.00E+00	8.04E-03	1.38E-02
Pa-231	1.2017E-04	64,290.45	110,212.20	0.00E+00	7.73E+00	1.32E+01
Pb-210	1.1939E-08	64,290.45	110,212.20	0.00E+00	7.68E-04	1.32E-03
Pm-147	3.6819E-03	64,290.45	110,212.20	0.00E+00	2.37E+02	4.06E+02
Pu-238	4.5953E-04	64,290.45	110,212.20	0.00E+00	2.95E+01	5.06E+01
Pu-239	2.7529E-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	2.3780E-03	64,290.45	110,212.20	0.00E+00	1.53E+02	2.62E+02
Pu-242	4.0821E-08	64,290.45	110,212.20	0.00E+00	2.62E-03	4.50E-03
Ra-226	1.4471E-08	64,290.45	110,212.20	0.00E+00	9.30E-04	1.59E-03
Ra-228	4.5651E-06	64,290.45	110,212.20	0.00E+00	2.93E-01	5.03E-01
Ru-106	3.8971E-08	64,290.45	110,212.20	0.00E+00	2.51E-03	4.30E-03
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	1.8940E+00	64,290.45	110,212.20	0.00E+00	1.22E+05	2.09E+05
Tc-99	3.2534E-04	64,290.45	110,212.20	0.00E+00	2.09E+01	3.59E+01
Th-229	4.6839E-05	64,290.45	110,212.20	0.00E+00	3.01E+00	5.16E+00
Th-230	1.0322E-06	64,290.45	110,212.20	0.00E+00	6.64E-02	1.14E-01
Th-232	-9.0328E-08	64,290.45	0.00	4.62E-01	4.56E-01	4.62E-01
Tl-208	1.5386E-02	64,290.45	110,212.20	0.00E+00	9.89E+02	1.70E+03
U-232	4.1639E-02	64,290.45	110,212.20	0.00E+00	2.68E+03	4.59E+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	1.8940E+00	64,290.45	110,212.20	0.00E+00	1.22E+05	2.09E+05
Other Radionuclides					1.32E+05	2.27E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.153E+16
0.0250	2.381E+15
0.0375	2.039E+15
0.0575	2.223E+15
0.0850	1.411E+15
0.1250	9.035E+14
0.2250	1.259E+15
0.3750	5.112E+14
0.5750	7.741E+15
0.8500	1.532E+14
1.2500	9.690E+13
1.7500	9.238E+12
2.2500	3.718E+08
2.7500	5.954E+13
3.5000	2.343E+05
5.0000	7.297E+04
7.0000	5.482E+03
11.0000	4.351E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.12E+03	3.61E+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: 2010
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: 25 years

Estimated Canister usage: 24"x15' = 6.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.3425E-05	129,014.55	221,167.80	0.00E+00	1.08E+01	1.85E+01	Avg. MeV	
Am-241	2.2387E-04	129,014.55	221,167.80	0.00E+00	2.89E+01	4.95E+01	0.0150	2.314E+16
Am-242m	1.5512E-06	129,014.55	221,167.80	0.00E+00	2.00E-01	3.43E-01	0.0250	4.778E+15
Am-243	3.1181E-07	129,014.55	221,167.80	0.00E+00	4.02E-02	6.90E-02	0.0375	4.091E+15
C-14	9.2539E-05	129,014.55	221,167.80	0.00E+00	1.19E+01	2.05E+01	0.0575	4.462E+15
Cl-36	1.8103E-06	129,014.55	221,167.80	0.00E+00	2.34E-01	4.00E-01	0.0850	2.831E+15
Cm-243	3.9020E-07	129,014.55	221,167.80	0.00E+00	5.03E-02	8.63E-02	0.1250	1.813E+15
Cm-244	2.0742E-05	129,014.55	221,167.80	0.00E+00	2.68E+00	4.59E+00	0.2250	2.527E+15
Co-60	3.2554E-03	129,014.55	221,167.80	0.00E+00	4.20E+02	7.20E+02	0.3750	1.026E+15
Cs-134	7.3823E-04	129,014.55	221,167.80	0.00E+00	9.52E+01	1.63E+02	0.5750	1.553E+16
Cs-135	2.8639E-05	129,014.55	221,167.80	0.00E+00	3.69E+00	6.33E+00	0.8500	3.074E+14
Cs-137	1.8609E+00	129,014.55	221,167.80	0.00E+00	2.40E+05	4.12E+05	1.2500	1.944E+14
Eu-154	1.9262E-02	129,014.55	221,167.80	0.00E+00	2.49E+03	4.26E+03	1.7500	1.854E+13
Eu-155	2.6721E-03	129,014.55	221,167.80	0.00E+00	3.45E+02	5.91E+02	2.2500	7.462E+08
Fe-55	3.3099E-05	129,014.55	221,167.80	0.00E+00	4.27E+00	7.32E+00	2.7500	1.195E+14
H-3	3.7296E-03	129,014.55	221,167.80	0.00E+00	4.81E+02	8.25E+02	3.5000	4.701E+05
I-129	1.5853E-06	129,014.55	221,167.80	0.00E+00	2.05E-01	3.51E-01	5.0000	1.464E+05
Kr-85	1.1958E-01	129,014.55	221,167.80	0.00E+00	1.54E+04	2.64E+04	7.0000	1.100E+04
Np-237	1.2513E-07	129,014.55	221,167.80	0.00E+00	1.61E-02	2.77E-02	11.0000	8.732E+02
Pa-231	1.2017E-04	129,014.55	221,167.80	0.00E+00	1.55E+01	2.66E+01		
Pb-210	1.1939E-06	129,014.55	221,167.80	0.00E+00	1.54E-03	2.64E-03		
Pm-147	3.6819E-03	129,014.55	221,167.80	0.00E+00	4.75E+02	8.14E+02		
Pu-238	4.5953E-04	129,014.55	221,167.80	0.00E+00	5.93E+01	1.02E+02		
Pu-239	2.7529E-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	2.3780E-03	129,014.55	221,167.80	0.00E+00	3.07E+02	5.26E+02		
Pu-242	4.0821E-08	129,014.55	221,167.80	0.00E+00	5.27E-03	9.03E-03		
Ra-226	1.4471E-06	129,014.55	221,167.80	0.00E+00	1.87E-03	3.20E-03		
Ra-228	4.5651E-06	129,014.55	221,167.80	0.00E+00	5.89E-01	1.01E+00		
Ru-106	3.8971E-08	129,014.55	221,167.80	0.00E+00	5.03E-03	8.62E-03		
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	1.8940E+00	129,014.55	221,167.80	0.00E+00	2.44E+05	4.19E+05		
Tc-99	3.2534E-04	129,014.55	221,167.80	0.00E+00	4.20E+01	7.20E+01		
Th-229	4.6839E-05	129,014.55	221,167.80	0.00E+00	6.04E+00	1.04E+01		
Th-230	1.0322E-06	129,014.55	221,167.80	0.00E+00	1.33E-01	2.28E-01		
Th-232	-9.0328E-08	129,014.55	0.00	9.27E-01	9.15E-01	9.27E-01		
Tl-208	1.5386E-02	129,014.55	221,167.80	0.00E+00	1.99E+03	3.40E+03		
U-232	4.1639E-02	129,014.55	221,167.80	0.00E+00	5.37E+03	9.21E+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	1.8940E+00	129,014.55	221,167.80	0.00E+00	2.44E+05	4.19E+05		
Other Radionuclides					2.66E+05	4.56E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.25E+03	7.25E+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: 2010
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: 25 years

Estimated Canister usage: 24"x15' 9.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.3425E-05	25,281.52	51,712.20	0.00E+00	2.11E+00	4.31E+00
Am-241	2.2387E-04	25,281.52	51,712.20	0.00E+00	5.66E+00	1.16E+01
Am-242m	1.5512E-06	25,281.52	51,712.20	0.00E+00	3.92E-02	8.02E-02
Am-243	3.1181E-07	25,281.52	51,712.20	0.00E+00	7.88E-03	1.61E-02
C-14	9.2539E-05	25,281.52	51,712.20	0.00E+00	2.34E+00	4.79E+00
Cl-36	1.8103E-06	25,281.52	51,712.20	0.00E+00	4.58E-02	9.36E-02
Cm-243	3.9020E-07	25,281.52	51,712.20	0.00E+00	9.86E-03	2.02E-02
Cm-244	2.0742E-05	25,281.52	51,712.20	0.00E+00	5.24E-01	1.07E+00
Co-60	3.2554E-03	25,281.52	51,712.20	0.00E+00	8.23E+01	1.68E+02
Cs-134	7.3823E-04	25,281.52	51,712.20	0.00E+00	1.87E+01	3.82E+01
Cs-135	2.8639E-05	25,281.52	51,712.20	0.00E+00	7.24E-01	1.48E+00
Cs-137	1.8609E+00	25,281.52	51,712.20	0.00E+00	4.70E+04	9.62E+04
Eu-154	1.9262E-02	25,281.52	51,712.20	0.00E+00	4.87E+02	9.96E+02
Eu-155	2.6721E-03	25,281.52	51,712.20	0.00E+00	6.76E+01	1.38E+02
Fe-55	3.3099E-05	25,281.52	51,712.20	0.00E+00	8.37E-01	1.71E+00
H-3	3.7296E-03	25,281.52	51,712.20	0.00E+00	9.43E+01	1.93E+02
I-129	1.5853E-06	25,281.52	51,712.20	0.00E+00	4.01E-02	8.20E-02
Kr-85	1.1958E-01	25,281.52	51,712.20	0.00E+00	3.02E+03	6.18E+03
Np-237	1.2513E-07	25,281.52	51,712.20	0.00E+00	3.16E-03	6.47E-03
Pa-231	1.2017E-04	25,281.52	51,712.20	0.00E+00	3.04E+00	6.21E+00
Pb-210	1.1939E-08	25,281.52	51,712.20	0.00E+00	3.02E-04	6.17E-04
Pm-147	3.6819E-03	25,281.52	51,712.20	0.00E+00	9.31E+01	1.90E+02
Pu-238	4.5953E-04	25,281.52	51,712.20	0.00E+00	1.16E+01	2.38E+01
Pu-239	2.7529E-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	2.3780E-03	25,281.52	51,712.20	0.00E+00	6.01E+01	1.23E+02
Pu-242	4.0821E-08	25,281.52	51,712.20	0.00E+00	1.03E-03	2.11E-03
Ra-226	1.4471E-08	25,281.52	51,712.20	0.00E+00	3.66E-04	7.48E-04
Ra-228	4.5651E-06	25,281.52	51,712.20	0.00E+00	1.15E-01	2.36E-01
Ru-106	3.8971E-08	25,281.52	51,712.20	0.00E+00	9.85E-04	2.02E-03
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	1.8940E+00	25,281.52	51,712.20	0.00E+00	4.79E+04	9.79E+04
Tc-99	3.2534E-04	25,281.52	51,712.20	0.00E+00	8.23E+00	1.68E+01
Th-229	4.6839E-05	25,281.52	51,712.20	0.00E+00	1.18E+00	2.42E+00
Th-230	1.0322E-06	25,281.52	51,712.20	0.00E+00	2.61E-02	5.34E-02
Th-232	-9.0328E-08	25,281.52	0.00	1.21E+00	1.21E+00	1.21E+00
Tl-208	1.5386E-02	25,281.52	51,712.20	0.00E+00	3.89E+02	7.96E+02
U-232	4.1639E-02	25,281.52	51,712.20	0.00E+00	1.05E+03	2.15E+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-06	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	1.8940E+00	25,281.52	51,712.20	0.00E+00	4.79E+04	9.79E+04
Other Radionuclides					5.21E+04	1.07E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.422E+15
0.0250	1.117E+15
0.0375	9.567E+14
0.0575	1.043E+15
0.0850	6.620E+14
0.1250	4.240E+14
0.2250	5.910E+14
0.3750	2.399E+14
0.5750	3.632E+15
0.8500	7.187E+13
1.2500	4.546E+13
1.7500	4.334E+12
2.2500	1.745E+08
2.7500	2.794E+13
3.5000	1.318E+05
5.0000	4.077E+04
7.0000	2.997E+03
11.0000	2.311E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.34E+02	1.79E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.10	0.00
Bounding:	0.20	0.00

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT LWBR REFLCT. V
SNF ID #: 372
Fuel Units & Descr: 6 - 166 ROD ARRAY
Heavy Metal Mass: BOL=5850kg; EOL=5844.7kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1982
Estimates as of: 2010
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: 25 years

Estimated Canister usage: 24"x15' = 6.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.3425E-05	12,870.00	26,325.00	0.00E+00	1.07E+00	2.20E+00	Avg. MeV	
Am-241	2.2387E-04	12,870.00	26,325.00	0.00E+00	2.88E+00	5.89E+00	0.0150	2.760E+15
Am-242m	1.5512E-06	12,870.00	26,325.00	0.00E+00	2.00E-02	4.08E-02	0.0250	5.687E+14
Am-243	3.1181E-07	12,870.00	26,325.00	0.00E+00	4.01E-03	8.21E-03	0.0375	4.870E+14
C-14	9.2539E-05	12,870.00	26,325.00	0.00E+00	1.19E+00	2.44E+00	0.0575	5.311E+14
Cl-36	1.8103E-06	12,870.00	26,325.00	0.00E+00	2.33E-02	4.77E-02	0.0850	3.370E+14
Cm-243	3.9020E-07	12,870.00	26,325.00	0.00E+00	5.02E-03	1.03E-02	0.1250	2.158E+14
Cm-244	2.0742E-05	12,870.00	26,325.00	0.00E+00	2.67E-01	5.46E-01	0.2250	3.008E+14
Co-60	3.2554E-03	12,870.00	26,325.00	0.00E+00	4.19E+01	8.57E+01	0.3750	1.221E+14
Cs-134	7.3823E-04	12,870.00	26,325.00	0.00E+00	9.50E+00	1.94E+01	0.5750	1.849E+15
Cs-135	2.8639E-05	12,870.00	26,325.00	0.00E+00	3.69E-01	7.54E-01	0.8500	3.659E+13
Cs-137	1.8609E+00	12,870.00	26,325.00	0.00E+00	2.39E+04	4.90E+04	1.2500	2.314E+13
Eu-154	1.9262E-02	12,870.00	26,325.00	0.00E+00	2.48E+02	5.07E+02	1.7500	2.207E+12
Eu-155	2.6721E-03	12,870.00	26,325.00	0.00E+00	3.44E+01	7.03E+01	2.2500	8.885E+07
Fe-55	3.3099E-05	12,870.00	26,325.00	0.00E+00	4.26E-01	8.71E-01	2.7500	1.422E+13
H-3	3.7296E-03	12,870.00	26,325.00	0.00E+00	4.80E+01	9.82E+01	3.5000	6.708E+04
I-129	1.5853E-06	12,870.00	26,325.00	0.00E+00	2.04E-02	4.17E-02	5.0000	2.075E+04
Kr-85	1.1958E-01	12,870.00	26,325.00	0.00E+00	1.54E+03	3.15E+03	7.0000	1.526E+03
Np-237	1.2513E-07	12,870.00	26,325.00	0.00E+00	1.61E-03	3.29E-03	11.0000	1.176E+02
Pa-231	1.2017E-04	12,870.00	26,325.00	0.00E+00	1.55E+00	3.16E+00		
Pb-210	1.1939E-06	12,870.00	26,325.00	0.00E+00	1.54E-04	3.14E-04		
Pm-147	3.6819E-03	12,870.00	26,325.00	0.00E+00	4.74E+01	9.69E+01		
Pu-238	4.5953E-04	12,870.00	26,325.00	0.00E+00	5.91E+00	1.21E+01		
Pu-239	2.7529E-05	12,870.00	26,325.00	0.00E+00	3.54E-01	7.25E-01		
Pu-240	1.6184E-05	12,870.00	26,325.00	0.00E+00	2.08E-01	4.26E-01		
Pu-241	2.3780E-03	12,870.00	26,325.00	0.00E+00	3.06E+01	6.26E+01		
Pu-242	4.0821E-08	12,870.00	26,325.00	0.00E+00	5.25E-04	1.07E-03		
Ra-226	1.4471E-06	12,870.00	26,325.00	0.00E+00	1.86E-04	3.81E-04		
Ra-228	4.5651E-06	12,870.00	26,325.00	0.00E+00	5.88E-02	1.20E-01		
Ru-106	3.8971E-08	12,870.00	26,325.00	0.00E+00	5.02E-04	1.03E-03		
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	1.8940E+00	12,870.00	26,325.00	0.00E+00	2.44E+04	4.99E+04		
Tc-99	3.2534E-04	12,870.00	26,325.00	0.00E+00	4.19E+00	8.56E+00		
Th-229	4.6839E-05	12,870.00	26,325.00	0.00E+00	6.03E-01	1.23E+00		
Th-230	1.0322E-06	12,870.00	26,325.00	0.00E+00	1.33E-02	2.72E-02		
Th-232	-9.0328E-08	12,870.00	0.00	6.18E-01	6.17E-01	6.18E-01		
Tl-208	1.5386E-02	12,870.00	26,325.00	0.00E+00	1.98E+02	4.05E+02		
U-232	4.1639E-02	12,870.00	26,325.00	0.00E+00	5.36E+02	1.10E+03		
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	1.8940E+00	12,870.00	26,325.00	0.00E+00	2.44E+04	4.99E+04		
Other Radionuclides					2.65E+04	5.42E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.76E+02	9.12E+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:	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: 2010
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: 25 years

Estimated Canister usage: HIC = 7.00

II. Estimates

	m	x_a	x_b	b	y_a	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.3425E-05	10,315.62	166,981.81	0.00E+00	8.61E-01	1.39E+01
Am-241	2.2387E-04	10,315.62	166,981.81	0.00E+00	2.31E+00	3.74E+01
Am-242m	1.5512E-06	10,315.62	166,981.81	0.00E+00	1.60E-02	2.59E-01
Am-243	3.1181E-07	10,315.62	166,981.81	0.00E+00	3.22E-03	5.21E-02
C-14	9.2539E-05	10,315.62	166,981.81	0.00E+00	9.55E-01	1.55E+01
Cl-36	1.8103E-06	10,315.62	166,981.81	0.00E+00	1.87E-02	3.02E-01
Cm-243	3.9020E-07	10,315.62	166,981.81	0.00E+00	4.03E-03	6.52E-02
Cm-244	2.0742E-05	10,315.62	166,981.81	0.00E+00	2.14E-01	3.46E+00
Co-60	3.2554E-03	10,315.62	166,981.81	0.00E+00	3.36E+01	5.44E+02
Cs-134	7.3823E-04	10,315.62	166,981.81	0.00E+00	7.62E+00	1.23E+02
Cs-135	2.8639E-05	10,315.62	166,981.81	0.00E+00	2.95E-01	4.78E+00
Cs-137	1.8609E+00	10,315.62	166,981.81	0.00E+00	1.92E+04	3.11E+05
Eu-154	1.9262E-02	10,315.62	166,981.81	0.00E+00	1.99E+02	3.22E+03
Eu-155	2.6721E-03	10,315.62	166,981.81	0.00E+00	2.76E+01	4.46E+02
Fe-55	3.3099E-05	10,315.62	166,981.81	0.00E+00	3.41E-01	5.53E+00
H-3	3.7296E-03	10,315.62	166,981.81	0.00E+00	3.85E+01	6.23E+02
I-129	1.5853E-06	10,315.62	166,981.81	0.00E+00	1.64E-02	2.65E-01
Kr-85	1.1958E-01	10,315.62	166,981.81	0.00E+00	1.23E+03	2.00E+04
Np-237	1.2513E-07	10,315.62	166,981.81	0.00E+00	1.29E-03	2.09E-02
Pa-231	1.2017E-04	10,315.62	166,981.81	0.00E+00	1.24E+00	2.01E+01
Pb-210	1.1939E-08	10,315.62	166,981.81	0.00E+00	1.23E-04	1.99E-03
Pm-147	3.6819E-03	10,315.62	166,981.81	0.00E+00	3.80E+01	6.15E+02
Pu-238	4.5953E-04	10,315.62	166,981.81	0.00E+00	4.74E+00	7.67E+01
Pu-239	2.7529E-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	2.3780E-03	10,315.62	166,981.81	0.00E+00	2.45E+01	3.97E+02
Pu-242	4.0821E-06	10,315.62	166,981.81	0.00E+00	4.21E-04	6.82E-03
Ra-226	1.4471E-08	10,315.62	166,981.81	0.00E+00	1.49E-04	2.42E-03
Ra-228	4.5651E-06	10,315.62	166,981.81	0.00E+00	4.71E-02	7.62E-01
Ru-106	3.8971E-08	10,315.62	166,981.81	0.00E+00	4.02E-04	6.51E-03
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	1.8940E+00	10,315.62	166,981.81	0.00E+00	1.95E+04	3.16E+05
Tc-99	3.2534E-04	10,315.62	166,981.81	0.00E+00	3.36E+00	5.43E+01
Th-229	4.6839E-05	10,315.62	166,981.81	0.00E+00	4.83E-01	7.82E+00
Th-230	1.0322E-06	10,315.62	166,981.81	0.00E+00	1.06E-02	1.72E-01
Th-232	-9.0328E-08	10,315.62	0.00	3.30E-01	3.29E-01	3.30E-01
Tl-208	1.5386E-02	10,315.62	166,981.81	0.00E+00	1.59E+02	2.57E+03
U-232	4.1639E-02	10,315.62	166,981.81	0.00E+00	4.30E+02	6.95E+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	1.8940E+00	10,315.62	166,981.81	0.00E+00	1.95E+04	3.16E+05
Other Radionuclides					2.12E+04	3.44E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.747E+16
0.0250	3.607E+15
0.0375	3.089E+15
0.0575	3.368E+15
0.0850	2.137E+15
0.1250	1.369E+15
0.2250	1.908E+15
0.3750	7.744E+14
0.5750	1.173E+16
0.8500	2.321E+14
1.2500	1.468E+14
1.7500	1.400E+13
2.2500	5.634E+08
2.7500	9.021E+13
3.5000	3.469E+05
5.0000	1.081E+05
7.0000	8.149E+03
11.0000	6.493E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.65E+02	5.44E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		10,315.62
Bounding:	166,981.81	20,631.25

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.15	
Bounding:	2.39	0.12

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT LWBR SCRAP (LINER 15718)
SNF ID #: 379
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=244.6kg; EOL=242.9kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1982
Estimates as of: 2010
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: 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	8.3425E-05	1,654.38	13,061.64	0.00E+00	1.38E-01	1.09E+00
Am-241	2.2387E-04	1,654.38	13,061.64	0.00E+00	3.70E-01	2.92E+00
Am-242m	1.5512E-06	1,654.38	13,061.64	0.00E+00	2.57E-03	2.03E-02
Am-243	3.1181E-07	1,654.38	13,061.64	0.00E+00	5.16E-04	4.07E-03
C-14	9.2539E-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	3.9020E-07	1,654.38	13,061.64	0.00E+00	6.46E-04	5.10E-03
Cm-244	2.0742E-05	1,654.38	13,061.64	0.00E+00	3.43E-02	2.71E-01
Co-60	3.2554E-03	1,654.38	13,061.64	0.00E+00	5.39E+00	4.25E+01
Cs-134	7.3823E-04	1,654.38	13,061.64	0.00E+00	1.22E+00	9.64E+00
Cs-135	2.8639E-05	1,654.38	13,061.64	0.00E+00	4.74E-02	3.74E-01
Cs-137	1.8609E+00	1,654.38	13,061.64	0.00E+00	3.08E+03	2.43E+04
Eu-154	1.9262E-02	1,654.38	13,061.64	0.00E+00	3.19E+01	2.52E+02
Eu-155	2.6721E-03	1,654.38	13,061.64	0.00E+00	4.42E+00	3.49E+01
Fe-55	3.3099E-05	1,654.38	13,061.64	0.00E+00	5.48E-02	4.32E-01
H-3	3.7296E-03	1,654.38	13,061.64	0.00E+00	6.17E+00	4.87E+01
I-129	1.5853E-06	1,654.38	13,061.64	0.00E+00	2.62E-03	2.07E-02
Kr-85	1.1958E-01	1,654.38	13,061.64	0.00E+00	1.98E+02	1.56E+03
Np-237	1.2513E-07	1,654.38	13,061.64	0.00E+00	2.07E-04	1.63E-03
Pa-231	1.2017E-04	1,654.38	13,061.64	0.00E+00	1.99E-01	1.57E+00
Pb-210	1.1939E-06	1,654.38	13,061.64	0.00E+00	1.98E-05	1.56E-04
Pm-147	3.6819E-03	1,654.38	13,061.64	0.00E+00	6.09E+00	4.81E+01
Pu-238	4.5953E-04	1,654.38	13,061.64	0.00E+00	7.60E-01	6.00E+00
Pu-239	2.7529E-05	1,654.38	13,061.64	0.00E+00	4.55E-02	3.60E-01
Pu-240	1.6184E-05	1,654.38	13,061.64	0.00E+00	2.68E-02	2.11E-01
Pu-241	2.3780E-03	1,654.38	13,061.64	0.00E+00	3.93E+00	3.11E+01
Pu-242	4.0821E-08	1,654.38	13,061.64	0.00E+00	6.75E-05	5.33E-04
Ra-226	1.4471E-06	1,654.38	13,061.64	0.00E+00	2.39E-05	1.89E-04
Ra-228	4.5651E-06	1,654.38	13,061.64	0.00E+00	7.55E-03	5.96E-02
Ru-106	3.8971E-06	1,654.38	13,061.64	0.00E+00	6.45E-05	5.09E-04
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	1.8940E+00	1,654.38	13,061.64	0.00E+00	3.13E+03	2.47E+04
Tc-99	3.2534E-04	1,654.38	13,061.64	0.00E+00	5.38E-01	4.25E+00
Th-229	4.6839E-05	1,654.38	13,061.64	0.00E+00	7.75E-02	6.12E-01
Th-230	1.0322E-06	1,654.38	13,061.64	0.00E+00	1.71E-03	1.35E-02
Th-232	-9.0328E-08	1,654.38	0.00	2.58E-02	2.57E-02	2.58E-02
Tl-208	1.5386E-02	1,654.38	13,061.64	0.00E+00	2.55E+01	2.01E+02
U-232	4.1639E-02	1,654.38	13,061.64	0.00E+00	6.89E+01	5.44E+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	1.8940E+00	1,654.38	13,061.64	0.00E+00	3.13E+03	2.47E+04
Other Radionuclides					3.41E+03	2.69E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.367E+15
0.0250	2.821E+14
0.0375	2.416E+14
0.0575	2.635E+14
0.0850	1.672E+14
0.1250	1.071E+14
0.2250	1.493E+14
0.3750	6.058E+13
0.5750	9.174E+14
0.8500	1.815E+13
1.2500	1.148E+13
1.7500	1.095E+12
2.2500	4.407E+07
2.7500	7.056E+12
3.5000	2.713E+04
5.0000	8.459E+03
7.0000	6.374E+02
11.0000	5.079E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.59E+01	4.25E+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
Nominal:		1,654.38
Bounding:	13,061.64	3,308.75

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.30	
Bounding:	2.39	0.25

Estimated EOL HM/Given EOL HM = 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT LWBR SEED
SNF ID #: 380
Fuel Units & Descr: 12 - 619 ROD HEX ARRAY
Heavy Metal Mass: BOL=5218.3kg; EOL=5110.5kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1982
Estimates as of: 2010
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: 25 years

Estimated Canister usage:
18"x15'
12.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.3425E-05	155,505.33	278,657.20	0.00E+00	1.30E+01	2.32E+01
Am-241	2.2387E-04	155,505.33	278,657.20	0.00E+00	3.48E+01	6.24E+01
Am-242m	1.5512E-06	155,505.33	278,657.20	0.00E+00	2.41E-01	4.32E-01
Am-243	3.1181E-07	155,505.33	278,657.20	0.00E+00	4.85E-02	8.69E-02
C-14	9.2539E-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	3.9020E-07	155,505.33	278,657.20	0.00E+00	6.07E-02	1.09E-01
Cm-244	2.0742E-05	155,505.33	278,657.20	0.00E+00	3.23E+00	5.78E+00
Co-60	3.2554E-03	155,505.33	278,657.20	0.00E+00	5.06E+02	9.07E+02
Cs-134	7.3823E-04	155,505.33	278,657.20	0.00E+00	1.15E+02	2.06E+02
Cs-135	2.8639E-05	155,505.33	278,657.20	0.00E+00	4.45E+00	7.98E+00
Cs-137	1.8609E+00	155,505.33	278,657.20	0.00E+00	2.89E+05	5.19E+05
Eu-154	1.9262E-02	155,505.33	278,657.20	0.00E+00	3.00E+03	5.37E+03
Eu-155	2.6721E-03	155,505.33	278,657.20	0.00E+00	4.16E+02	7.45E+02
Fe-55	3.3099E-05	155,505.33	278,657.20	0.00E+00	5.15E+00	9.22E+00
H-3	3.7296E-03	155,505.33	278,657.20	0.00E+00	5.80E+02	1.04E+03
I-129	1.5853E-06	155,505.33	278,657.20	0.00E+00	2.47E-01	4.42E-01
Kr-85	1.1958E-01	155,505.33	278,657.20	0.00E+00	1.86E+04	3.33E+04
Np-237	1.2513E-07	155,505.33	278,657.20	0.00E+00	1.95E-02	3.49E-02
Pa-231	1.2017E-04	155,505.33	278,657.20	0.00E+00	1.87E+01	3.35E+01
Pb-210	1.1939E-08	155,505.33	278,657.20	0.00E+00	1.86E-03	3.33E-03
Pm-147	3.6819E-03	155,505.33	278,657.20	0.00E+00	5.73E+02	1.03E+03
Pu-238	4.5953E-04	155,505.33	278,657.20	0.00E+00	7.15E+01	1.28E+02
Pu-239	2.7529E-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	2.3780E-03	155,505.33	278,657.20	0.00E+00	3.70E+02	6.63E+02
Pu-242	4.0821E-06	155,505.33	278,657.20	0.00E+00	6.35E-03	1.14E-02
Ra-226	1.4471E-08	155,505.33	278,657.20	0.00E+00	2.25E-03	4.03E-03
Ra-228	4.5651E-06	155,505.33	278,657.20	0.00E+00	7.10E-01	1.27E+00
Ru-106	3.8971E-08	155,505.33	278,657.20	0.00E+00	6.06E-03	1.09E-02
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	1.8940E+00	155,505.33	278,657.20	0.00E+00	2.95E+05	5.28E+05
Tc-99	3.2534E-04	155,505.33	278,657.20	0.00E+00	5.06E+01	9.07E+01
Th-229	4.6839E-05	155,505.33	278,657.20	0.00E+00	7.28E+00	1.31E+01
Th-230	1.0322E-06	155,505.33	278,657.20	0.00E+00	1.61E-01	2.88E-01
Th-232	-9.0328E-08	155,505.33	0.00	5.51E-01	5.37E-01	5.51E-01
Tl-208	1.5386E-02	155,505.33	278,657.20	0.00E+00	2.39E+03	4.29E+03
U-232	4.1639E-02	155,505.33	278,657.20	0.00E+00	6.48E+03	1.16E+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	1.8940E+00	155,505.33	278,657.20	0.00E+00	2.95E+05	5.28E+05
Other Radionuclides					3.20E+05	5.74E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.915E+16
0.0250	6.019E+15
0.0375	5.154E+15
0.0575	5.621E+15
0.0850	3.567E+15
0.1250	2.284E+15
0.2250	3.184E+15
0.3750	1.292E+15
0.5750	1.957E+16
0.8500	3.873E+14
1.2500	2.450E+14
1.7500	2.336E+13
2.2500	9.401E+06
2.7500	1.505E+14
3.5000	5.788E+05
5.0000	1.805E+05
7.0000	1.360E+04
11.0000	1.083E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.07E+03	9.07E+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 %:	0.070617874	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: 2010
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"x18" 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	8.7758E-10	13,560.21	27,120.41	0.00E+00	1.19E-05	2.38E-05
Am-241	1.4352E-01	13,560.21	27,120.41	0.00E+00	1.95E+03	3.89E+03
Am-242m	2.8698E-04	13,560.21	27,120.41	0.00E+00	3.89E+00	7.78E+00
Am-243	6.2565E-04	13,560.21	27,120.41	0.00E+00	8.48E+00	1.70E+01
C-14	4.7901E-05	13,560.21	27,120.41	0.00E+00	6.50E-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	2.5081E-04	13,560.21	27,120.41	0.00E+00	3.40E+00	6.80E+00
Cm-244	4.9015E-02	13,560.21	27,120.41	0.00E+00	6.65E+02	1.33E+03
Co-60	2.5581E-03	13,560.21	27,120.41	0.00E+00	3.47E+01	6.94E+01
Cs-134	4.0536E-05	13,560.21	27,120.41	0.00E+00	5.50E-01	1.10E+00
Cs-135	1.4433E-05	13,560.21	27,120.41	0.00E+00	1.96E-01	3.91E-01
Cs-137	1.3979E+00	13,560.21	27,120.41	0.00E+00	1.90E+04	3.79E+04
Eu-154	2.0203E-02	13,560.21	27,120.41	0.00E+00	2.74E+02	5.48E+02
Eu-155	1.7684E-03	13,560.21	27,120.41	0.00E+00	2.40E+01	4.80E+01
Fe-55	4.3136E-05	13,560.21	27,120.41	0.00E+00	5.85E-01	1.17E+00
H-3	2.0769E-02	13,560.21	27,120.41	0.00E+00	2.82E+02	5.63E+02
I-129	9.8288E-07	13,560.21	27,120.41	0.00E+00	1.33E-02	2.67E-02
Kr-85	2.8214E-02	13,560.21	27,120.41	0.00E+00	3.83E+02	7.65E+02
Np-237	1.1218E-05	13,560.21	27,120.41	0.00E+00	1.52E-01	3.04E-01
Pa-231	1.3036E-09	13,560.21	27,120.41	0.00E+00	1.77E-05	3.54E-05
Pb-210	8.5078E-11	13,560.21	27,120.41	0.00E+00	1.15E-06	2.31E-06
Pm-147	3.6531E-04	13,560.21	27,120.41	0.00E+00	4.95E+00	9.91E+00
Pu-238	7.4564E-02	13,560.21	27,120.41	0.00E+00	1.01E+03	2.02E+03
Pu-239	1.1623E-02	13,560.21	27,120.41	0.00E+00	1.58E+02	3.15E+02
Pu-240	1.5132E-02	13,560.21	27,120.41	0.00E+00	2.05E+02	4.10E+02
Pu-241	9.0036E-01	13,560.21	27,120.41	0.00E+00	1.22E+04	2.44E+04
Pu-242	6.4260E-05	13,560.21	27,120.41	0.00E+00	8.71E-01	1.74E+00
Ra-226	2.2804E-10	13,560.21	27,120.41	0.00E+00	3.09E-06	6.18E-06
Ra-228	5.2713E-12	13,560.21	27,120.41	0.00E+00	7.15E-08	1.43E-07
Ru-106	6.1160E-10	13,560.21	27,120.41	0.00E+00	8.29E-06	1.66E-05
Se-79	1.2377E-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	9.1667E-01	13,560.21	27,120.41	0.00E+00	1.24E+04	2.49E+04
Tc-99	3.9357E-04	13,560.21	27,120.41	0.00E+00	5.34E+00	1.07E+01
Th-229	1.2057E-10	13,560.21	27,120.41	0.00E+00	1.64E-06	3.27E-06
Th-230	2.1043E-08	13,560.21	27,120.41	0.00E+00	2.85E-04	5.71E-04
Th-232	5.2972E-12	13,560.21	27,120.41	0.00E+00	7.18E-08	1.44E-07
Tl-208	1.7474E-07	13,560.21	27,120.41	0.00E+00	2.37E-03	4.74E-03
U-232	4.7368E-07	13,560.21	27,120.41	0.00E+00	6.42E-03	1.28E-02
U-233	2.5097E-08	13,560.21	27,120.41	0.00E+00	3.40E-04	6.81E-04
U-234	5.0000E-05	13,560.21	27,120.41	0.00E+00	6.78E-01	1.36E+00
U-235	-1.4489E-06	13,560.21	0.00	1.24E-02	0.00E+00	1.24E-02
U-236	7.5824E-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	9.1699E-01	13,560.21	27,120.41	0.00E+00	1.24E+04	2.49E+04
Other Radionuclides					1.82E+04	3.64E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.459E+15
0.0250	2.943E+14
0.0375	2.806E+14
0.0575	3.243E+14
0.0850	1.633E+14
0.1250	1.133E+14
0.2250	1.400E+14
0.3750	6.021E+13
0.5750	1.400E+15
0.8500	1.937E+13
1.2500	1.903E+13
1.7500	5.698E+11
2.2500	9.176E+07
2.7500	1.880E+08
3.5000	1.936E+07
5.0000	8.276E+06
7.0000	9.539E+05
11.0000	1.096E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.12E+02	6.24E+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 %:	0.96643828	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	6,481.51	13,560.21	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		27,120.41	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.66	2.09
Bounding:	1.33	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT PWR C2 BLKT
SNF ID #: 192
Fuel Units & Descr: 17 - 17 FLAT PLATES
Heavy Metal Mass: BOL=1323.635kg; EOL=1038.999kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1974
Estimates as of: 2010
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' 17.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (CI)	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	270,675.47	541,350.94	0.00E+00	2.38E-04	4.75E-04	Avg. MeV	
Am-241	1.4352E-01	270,675.47	541,350.94	0.00E+00	3.88E+04	7.77E+04	0.0150	2.913E+16
Am-242m	2.8698E-04	270,675.47	541,350.94	0.00E+00	7.77E+01	1.55E+02	0.0250	5.874E+15
Am-243	6.2565E-04	270,675.47	541,350.94	0.00E+00	1.69E+02	3.39E+02	0.0375	5.602E+15
C-14	4.7901E-05	270,675.47	541,350.94	0.00E+00	1.30E+01	2.59E+01	0.0575	6.473E+15
Cl-36	8.0297E-07	270,675.47	541,350.94	0.00E+00	2.17E-01	4.35E-01	0.0850	3.259E+15
Cm-243	2.5081E-04	270,675.47	541,350.94	0.00E+00	6.79E+01	1.36E+02	0.1250	2.262E+15
Cm-244	4.9015E-02	270,675.47	541,350.94	0.00E+00	1.33E+04	2.65E+04	0.2250	2.795E+15
Co-60	2.5581E-03	270,675.47	541,350.94	0.00E+00	6.92E+02	1.38E+03	0.3750	1.202E+15
Cs-134	4.0536E-05	270,675.47	541,350.94	0.00E+00	1.10E+01	2.19E+01	0.5750	2.795E+16
Cs-135	1.4433E-05	270,675.47	541,350.94	0.00E+00	3.91E+00	7.81E+00	0.8500	3.867E+14
Cs-137	1.3979E+00	270,675.47	541,350.94	0.00E+00	3.78E+05	7.57E+05	1.2500	3.798E+14
Eu-154	2.0203E-02	270,675.47	541,350.94	0.00E+00	5.47E+03	1.09E+04	1.7500	1.137E+13
Eu-155	1.7684E-03	270,675.47	541,350.94	0.00E+00	4.79E+02	9.57E+02	2.2500	1.832E+09
Fe-55	4.3136E-05	270,675.47	541,350.94	0.00E+00	1.17E+01	2.34E+01	2.7500	3.752E+09
H-3	2.0769E-02	270,675.47	541,350.94	0.00E+00	5.62E+03	1.12E+04	3.5000	3.864E+08
I-129	9.8288E-07	270,675.47	541,350.94	0.00E+00	2.66E-01	5.32E-01	5.0000	1.852E+08
Kr-85	2.8214E-02	270,675.47	541,350.94	0.00E+00	7.64E+03	1.53E+04	7.0000	1.904E+07
Np-237	1.1218E-05	270,675.47	541,350.94	0.00E+00	3.04E+00	6.07E+00	11.0000	2.187E+06
Pa-231	1.3036E-09	270,675.47	541,350.94	0.00E+00	3.53E-04	7.06E-04		
Pb-210	8.5078E-11	270,675.47	541,350.94	0.00E+00	2.30E-05	4.61E-05		
Pm-147	3.6531E-04	270,675.47	541,350.94	0.00E+00	9.89E+01	1.98E+02		
Pu-238	7.4564E-02	270,675.47	541,350.94	0.00E+00	2.02E+04	4.04E+04		
Pu-239	1.1623E-02	270,675.47	541,350.94	0.00E+00	3.15E+03	6.29E+03		
Pu-240	1.5132E-02	270,675.47	541,350.94	0.00E+00	4.10E+03	8.19E+03		
Pu-241	9.0036E-01	270,675.47	541,350.94	0.00E+00	2.44E+05	4.87E+05		
Pu-242	6.4260E-05	270,675.47	541,350.94	0.00E+00	1.74E+01	3.48E+01		
Ra-226	2.2804E-10	270,675.47	541,350.94	0.00E+00	6.17E-05	1.23E-04		
Ra-228	5.2713E-12	270,675.47	541,350.94	0.00E+00	1.43E-06	2.85E-06		
Ru-106	6.1160E-10	270,675.47	541,350.94	0.00E+00	1.66E-04	3.31E-04		
Se-79	1.2377E-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	9.1667E-01	270,675.47	541,350.94	0.00E+00	2.48E+05	4.96E+05		
Tc-99	3.9357E-04	270,675.47	541,350.94	0.00E+00	1.07E+02	2.13E+02		
Th-229	1.2057E-10	270,675.47	541,350.94	0.00E+00	3.26E-05	6.53E-05		
Th-230	2.1043E-08	270,675.47	541,350.94	0.00E+00	5.70E-03	1.14E-02		
Th-232	5.2972E-12	270,675.47	541,350.94	0.00E+00	1.43E-06	2.87E-06		
Tl-208	1.7474E-07	270,675.47	541,350.94	0.00E+00	4.73E-02	9.46E-02		
U-232	4.7368E-07	270,675.47	541,350.94	0.00E+00	1.28E-01	2.56E-01		
U-233	2.5097E-08	270,675.47	541,350.94	0.00E+00	6.79E-03	1.36E-02		
U-234	5.0000E-05	270,675.47	541,350.94	0.00E+00	1.35E+01	2.71E+01		
U-235	-1.4489E-06	270,675.47	0.00	2.03E-02	0.00E+00	2.03E-02		
U-236	7.5824E-06	270,675.47	541,350.94	0.00E+00	2.05E+00	4.10E+00		
U-238	-2.6129E-07	270,675.47	0.00	4.42E-01	3.71E-01	4.42E-01		
Y-90	9.1699E-01	270,675.47	541,350.94	0.00E+00	2.48E+05	4.96E+05		
Other Radionuclides					3.63E+05	7.27E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.23E+03	1.25E+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
Nominal:	18,892.25	270,675.47
Bounding:		541,350.94

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.17

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1964
Estimates as of: 2010
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

	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	2.3344E-08	908.00	1,815.99	0.00E+00	2.12E-05	4.24E-05
Am-241	1.1135E-04	908.00	1,815.99	0.00E+00	1.01E-01	2.02E-01
Am-242m	8.5075E-09	908.00	1,815.99	0.00E+00	7.72E-06	1.54E-05
Am-243	9.8519E-10	908.00	1,815.99	0.00E+00	8.95E-07	1.79E-06
C-14	2.3012E-04	908.00	1,815.99	0.00E+00	2.09E-01	4.18E-01
Cl-36	1.2261E-06	908.00	1,815.99	0.00E+00	1.11E-03	2.23E-03
Cm-243	2.4875E-10	908.00	1,815.99	0.00E+00	2.26E-07	4.52E-07
Cm-244	2.3178E-09	908.00	1,815.99	0.00E+00	2.10E-06	4.21E-06
Co-60	7.0849E-02	908.00	1,815.99	0.00E+00	6.43E+01	1.29E+02
Cs-134	3.0266E-06	908.00	1,815.99	0.00E+00	2.75E-03	5.50E-03
Cs-135	3.0316E-05	908.00	1,815.99	0.00E+00	2.75E-02	5.51E-02
Cs-137	1.4511E+00	908.00	1,815.99	0.00E+00	1.32E+03	2.64E+03
Eu-154	6.6955E-04	908.00	1,815.99	0.00E+00	6.08E-01	1.22E+00
Eu-155	6.9850E-04	908.00	1,815.99	0.00E+00	6.34E-01	1.27E+00
Fe-55	1.2318E-03	908.00	1,815.99	0.00E+00	1.12E+00	2.24E+00
H-3	2.5141E-03	908.00	1,815.99	0.00E+00	2.28E+00	4.57E+00
I-129	7.3195E-07	908.00	1,815.99	0.00E+00	6.65E-04	1.33E-03
Kr-85	4.1281E-02	908.00	1,815.99	0.00E+00	3.75E+01	7.50E+01
Np-237	1.1489E-06	908.00	1,815.99	0.00E+00	1.04E-03	2.09E-03
Pa-231	4.5241E-08	908.00	1,815.99	0.00E+00	4.11E-05	8.22E-05
Pb-210	6.4476E-13	908.00	1,815.99	0.00E+00	5.85E-10	1.17E-09
Pm-147	1.1651E-03	908.00	1,815.99	0.00E+00	1.06E+00	2.12E+00
Pu-238	2.9517E-04	908.00	1,815.99	0.00E+00	2.68E-01	5.36E-01
Pu-239	6.6772E-04	908.00	1,815.99	0.00E+00	6.06E-01	1.21E+00
Pu-240	8.6839E-05	908.00	1,815.99	0.00E+00	7.88E-02	1.58E-01
Pu-241	7.1514E-04	908.00	1,815.99	0.00E+00	6.49E-01	1.30E+00
Pu-242	1.9717E-09	908.00	1,815.99	0.00E+00	1.79E-06	3.58E-06
Ra-226	1.7654E-12	908.00	1,815.99	0.00E+00	1.60E-09	3.21E-09
Ra-228	8.2928E-12	908.00	1,815.99	0.00E+00	7.53E-09	1.51E-08
Ru-106	1.8419E-10	908.00	1,815.99	0.00E+00	1.67E-07	3.34E-07
Se-79	1.3223E-05	908.00	1,815.99	0.00E+00	1.20E-02	2.40E-02
Sn-126	1.1493E-05	908.00	1,815.99	0.00E+00	1.04E-02	2.09E-02
Sr-90	1.3649E+00	908.00	1,815.99	0.00E+00	1.24E+03	2.48E+03
Tc-99	4.6656E-04	908.00	1,815.99	0.00E+00	4.24E-01	8.47E-01
Th-229	1.4547E-11	908.00	1,815.99	0.00E+00	1.32E-08	2.64E-08
Th-230	1.6617E-10	908.00	1,815.99	0.00E+00	1.51E-07	3.02E-07
Th-232	8.3361E-12	908.00	1,815.99	0.00E+00	7.57E-09	1.51E-08
Tl-208	2.1664E-06	908.00	1,815.99	0.00E+00	1.97E-05	3.93E-05
U-232	5.8669E-06	908.00	1,815.99	0.00E+00	5.33E-05	1.07E-04
U-233	3.1847E-09	908.00	1,815.99	0.00E+00	2.89E-06	5.78E-06
U-234	3.8769E-07	908.00	1,815.99	0.00E+00	3.52E-04	7.04E-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	1.3652E+00	908.00	1,815.99	0.00E+00	1.24E+03	2.48E+03
Other Radionuclides					1.50E+03	3.00E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.355E+14
0.0250	2.817E+13
0.0375	2.436E+13
0.0575	2.626E+13
0.0850	1.587E+13
0.1250	1.030E+13
0.2250	1.366E+13
0.3750	5.957E+12
0.5750	9.813E+13
0.8500	9.933E+11
1.2500	9.873E+12
1.7500	2.562E+10
2.2500	5.319E+07
2.7500	1.538E+06
3.5000	1.083E+02
5.0000	4.454E+01
7.0000	4.918E+00
11.0000	5.518E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.59E+01	3.17E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	92.9998016	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches Pathfinder Template on all but one parameter (cladding, but substituting Stainless Steel is a good conservative assumption).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		908.00
Bounding:		1,815.99

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	6.44	
Bounding:	12.87	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT PWR-C2-S1
SNF ID #: 195
Fuel Units & Descr: 19 - 19 FLAT PLATES
Heavy Metal Mass: BOL=343.226kg; EOL=220.031kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1969
Estimates as of: 2010
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' 19.00

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	116,375.01	232,750.02	0.00E+00	2.72E-03	5.43E-03
Am-241	1.1135E-04	116,375.01	232,750.02	0.00E+00	1.30E+01	2.59E+01
Am-242m	8.5075E-09	116,375.01	232,750.02	0.00E+00	9.90E-04	1.98E-03
Am-243	9.8519E-10	116,375.01	232,750.02	0.00E+00	1.15E-04	2.29E-04
C-14	2.3012E-04	116,375.01	232,750.02	0.00E+00	2.68E+01	5.36E+01
Cl-36	1.2261E-06	116,375.01	232,750.02	0.00E+00	1.43E-01	2.85E-01
Cm-243	2.4875E-10	116,375.01	232,750.02	0.00E+00	2.89E-05	5.79E-05
Cm-244	2.3178E-09	116,375.01	232,750.02	0.00E+00	2.70E-04	5.39E-04
Co-60	7.0849E-02	116,375.01	232,750.02	0.00E+00	8.25E+03	1.65E+04
Cs-134	3.0266E-06	116,375.01	232,750.02	0.00E+00	3.52E-01	7.04E-01
Cs-135	3.0316E-05	116,375.01	232,750.02	0.00E+00	3.53E+00	7.06E+00
Cs-137	1.4511E+00	116,375.01	232,750.02	0.00E+00	1.69E+05	3.38E+05
Eu-154	6.6955E-04	116,375.01	232,750.02	0.00E+00	7.79E+01	1.56E+02
Eu-155	6.9850E-04	116,375.01	232,750.02	0.00E+00	8.13E+01	1.63E+02
Fe-55	1.2318E-03	116,375.01	232,750.02	0.00E+00	1.43E+02	2.87E+02
H-3	2.5141E-03	116,375.01	232,750.02	0.00E+00	2.93E+02	5.85E+02
I-129	7.3195E-07	116,375.01	232,750.02	0.00E+00	8.52E-02	1.70E-01
Kr-85	4.1281E-02	116,375.01	232,750.02	0.00E+00	4.80E+03	9.61E+03
Np-237	1.1489E-06	116,375.01	232,750.02	0.00E+00	1.34E-01	2.67E-01
Pa-231	4.5241E-08	116,375.01	232,750.02	0.00E+00	5.26E-03	1.05E-02
Pb-210	6.4476E-13	116,375.01	232,750.02	0.00E+00	7.50E-08	1.50E-07
Pm-147	1.1651E-03	116,375.01	232,750.02	0.00E+00	1.36E+02	2.71E+02
Pu-238	2.9517E-04	116,375.01	232,750.02	0.00E+00	3.44E+01	6.87E+01
Pu-239	6.6772E-04	116,375.01	232,750.02	0.00E+00	7.77E+01	1.55E+02
Pu-240	8.6839E-05	116,375.01	232,750.02	0.00E+00	1.01E+01	2.02E+01
Pu-241	7.1514E-04	116,375.01	232,750.02	0.00E+00	8.32E+01	1.66E+02
Pu-242	1.9717E-09	116,375.01	232,750.02	0.00E+00	2.29E-04	4.59E-04
Ra-226	1.7654E-12	116,375.01	232,750.02	0.00E+00	2.05E-07	4.11E-07
Ra-228	8.2928E-12	116,375.01	232,750.02	0.00E+00	9.65E-07	1.93E-06
Ru-106	1.8419E-10	116,375.01	232,750.02	0.00E+00	2.14E-05	4.29E-05
Se-79	1.3223E-05	116,375.01	232,750.02	0.00E+00	1.54E+00	3.08E+00
Sn-126	1.1493E-05	116,375.01	232,750.02	0.00E+00	1.34E+00	2.67E+00
Sr-90	1.3649E+00	116,375.01	232,750.02	0.00E+00	1.59E+05	3.18E+05
Tc-99	4.6656E-04	116,375.01	232,750.02	0.00E+00	5.43E+01	1.09E+02
Th-229	1.4547E-11	116,375.01	232,750.02	0.00E+00	1.69E-06	3.39E-06
Th-230	1.6617E-10	116,375.01	232,750.02	0.00E+00	1.93E-05	3.87E-05
Th-232	8.3361E-12	116,375.01	232,750.02	0.00E+00	9.70E-07	1.94E-06
Tl-208	2.1664E-08	116,375.01	232,750.02	0.00E+00	2.52E-03	5.04E-03
U-232	5.8669E-08	116,375.01	232,750.02	0.00E+00	6.83E-03	1.37E-02
U-233	3.1847E-09	116,375.01	232,750.02	0.00E+00	3.71E-04	7.41E-04
U-234	3.8769E-07	116,375.01	232,750.02	0.00E+00	4.51E-02	9.02E-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	1.3652E+00	116,375.01	232,750.02	0.00E+00	1.59E+05	3.18E+05
Other Radionuclides					1.92E+05	3.84E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.737E+16
0.0250	3.610E+15
0.0375	3.122E+15
0.0575	3.366E+15
0.0850	2.034E+15
0.1250	1.320E+15
0.2250	1.750E+15
0.3750	7.635E+14
0.5750	1.258E+16
0.8500	1.273E+14
1.2500	1.265E+15
1.7500	3.284E+12
2.2500	6.818E+09
2.7500	1.971E+08
3.5000	1.387E+04
5.0000	5.705E+03
7.0000	6.299E+02
11.0000	7.068E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.03E+03	4.06E+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: 2010
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"x18" 20.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3344E-08	111,247.37	222,494.74	0.00E+00	2.60E-03	5.19E-03	Avg. MeV	
Am-241	1.1135E-04	111,247.37	222,494.74	0.00E+00	1.24E+01	2.48E+01	0.0150	1.661E+16
Am-242m	8.5075E-09	111,247.37	222,494.74	0.00E+00	9.46E-04	1.89E-03	0.0250	3.451E+15
Am-243	9.8519E-10	111,247.37	222,494.74	0.00E+00	1.10E-04	2.19E-04	0.0375	2.985E+15
C-14	2.3012E-04	111,247.37	222,494.74	0.00E+00	2.56E+01	5.12E+01	0.0575	3.217E+15
Cl-36	1.2261E-06	111,247.37	222,494.74	0.00E+00	1.36E-01	2.73E-01	0.0850	1.944E+15
Cm-243	2.4875E-10	111,247.37	222,494.74	0.00E+00	2.77E-05	5.53E-05	0.1250	1.262E+15
Cm-244	2.3178E-09	111,247.37	222,494.74	0.00E+00	2.58E-04	5.16E-04	0.2250	1.673E+15
Co-60	7.0849E-02	111,247.37	222,494.74	0.00E+00	7.88E+03	1.58E+04	0.3750	7.299E+14
Cs-134	3.0266E-06	111,247.37	222,494.74	0.00E+00	3.37E-01	6.73E-01	0.5750	1.202E+16
Cs-135	3.0316E-05	111,247.37	222,494.74	0.00E+00	3.37E+00	6.75E+00	0.8500	1.217E+14
Cs-137	1.4511E+00	111,247.37	222,494.74	0.00E+00	1.61E+05	3.23E+05	1.2500	1.210E+15
Eu-154	6.6955E-04	111,247.37	222,494.74	0.00E+00	7.45E+01	1.49E+02	1.7500	3.139E+12
Eu-155	6.9850E-04	111,247.37	222,494.74	0.00E+00	7.77E+01	1.55E+02	2.2500	6.517E+09
Fe-55	1.2318E-03	111,247.37	222,494.74	0.00E+00	1.37E+02	2.74E+02	2.7500	1.884E+08
H-3	2.5141E-03	111,247.37	222,494.74	0.00E+00	2.80E+02	5.59E+02	3.5000	1.328E+04
I-129	7.3195E-07	111,247.37	222,494.74	0.00E+00	8.14E-02	1.63E-01	5.0000	5.461E+03
Kr-85	4.1281E-02	111,247.37	222,494.74	0.00E+00	4.59E+03	9.18E+03	7.0000	6.030E+02
Np-237	1.1489E-06	111,247.37	222,494.74	0.00E+00	1.28E-01	2.56E-01	11.0000	6.766E+01
Pa-231	4.5241E-08	111,247.37	222,494.74	0.00E+00	5.03E-03	1.01E-02		
Pb-210	6.4476E-13	111,247.37	222,494.74	0.00E+00	7.17E-08	1.43E-07		
Pm-147	1.1651E-03	111,247.37	222,494.74	0.00E+00	1.30E+02	2.59E+02		
Pu-238	2.9517E-04	111,247.37	222,494.74	0.00E+00	3.28E+01	6.57E+01		
Pu-239	6.6772E-04	111,247.37	222,494.74	0.00E+00	7.43E+01	1.49E+02		
Pu-240	8.6839E-05	111,247.37	222,494.74	0.00E+00	9.66E+00	1.93E+01		
Pu-241	7.1514E-04	111,247.37	222,494.74	0.00E+00	7.96E+01	1.59E+02		
Pu-242	1.9717E-09	111,247.37	222,494.74	0.00E+00	2.19E-04	4.39E-04		
Ra-226	1.7654E-12	111,247.37	222,494.74	0.00E+00	1.96E-07	3.93E-07		
Ra-228	8.2928E-12	111,247.37	222,494.74	0.00E+00	9.23E-07	1.85E-06		
Ru-106	1.8419E-10	111,247.37	222,494.74	0.00E+00	2.05E-05	4.10E-05		
Se-79	1.3223E-05	111,247.37	222,494.74	0.00E+00	1.47E+00	2.94E+00		
Sn-126	1.1493E-05	111,247.37	222,494.74	0.00E+00	1.28E+00	2.56E+00		
Sr-90	1.3649E+00	111,247.37	222,494.74	0.00E+00	1.52E+05	3.04E+05		
Tc-99	4.6656E-04	111,247.37	222,494.74	0.00E+00	5.19E+01	1.04E+02		
Th-229	1.4547E-11	111,247.37	222,494.74	0.00E+00	1.62E-06	3.24E-06		
Th-230	1.6617E-10	111,247.37	222,494.74	0.00E+00	1.85E-05	3.70E-05		
Th-232	8.3361E-12	111,247.37	222,494.74	0.00E+00	9.27E-07	1.85E-06		
Tl-208	2.1664E-06	111,247.37	222,494.74	0.00E+00	2.41E-03	4.82E-03		
U-232	5.8669E-06	111,247.37	222,494.74	0.00E+00	6.53E-03	1.31E-02		
U-233	3.1847E-09	111,247.37	222,494.74	0.00E+00	3.54E-04	7.09E-04		
U-234	3.8769E-07	111,247.37	222,494.74	0.00E+00	4.31E-02	8.63E-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	1.3652E+00	111,247.37	222,494.74	0.00E+00	1.52E+05	3.04E+05		
Other Radionuclides					1.84E+05	3.67E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.94E+03	3.88E+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	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: 2010
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012682
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 5.81

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3344E-08	13,248.12	26,496.23	0.00E+00	3.09E-04	6.19E-04	Avg. MeV	
Am-241	1.1135E-04	13,248.12	26,496.23	0.00E+00	1.48E+00	2.95E+00	0.0150	1.978E+15
Am-242m	8.5075E-09	13,248.12	26,496.23	0.00E+00	1.13E-04	2.25E-04	0.0250	4.110E+14
Am-243	9.8519E-10	13,248.12	26,496.23	0.00E+00	1.31E-05	2.61E-05	0.0375	3.555E+14
C-14	2.3012E-04	13,248.12	26,496.23	0.00E+00	3.05E+00	6.10E+00	0.0575	3.832E+14
Cl-36	1.2261E-06	13,248.12	26,496.23	0.00E+00	1.62E-02	3.25E-02	0.0850	2.315E+14
Cm-243	2.4875E-10	13,248.12	26,496.23	0.00E+00	3.30E-06	6.59E-06	0.1250	1.503E+14
Cm-244	2.3178E-09	13,248.12	26,496.23	0.00E+00	3.07E-05	6.14E-05	0.2250	1.993E+14
Co-60	7.0849E-02	13,248.12	26,496.23	0.00E+00	9.39E+02	1.88E+03	0.3750	8.692E+13
Cs-134	3.0266E-06	13,248.12	26,496.23	0.00E+00	4.01E-02	8.02E-02	0.5750	1.432E+15
Cs-135	3.0316E-05	13,248.12	26,496.23	0.00E+00	4.02E-01	8.03E-01	0.8500	1.449E+13
Cs-137	1.4511E+00	13,248.12	26,496.23	0.00E+00	1.92E+04	3.84E+04	1.2500	1.441E+14
Eu-154	6.6955E-04	13,248.12	26,496.23	0.00E+00	8.87E+00	1.77E+01	1.7500	3.738E+11
Eu-155	6.9850E-04	13,248.12	26,496.23	0.00E+00	9.25E+00	1.85E+01	2.2500	7.761E+08
Fe-55	1.2318E-03	13,248.12	26,496.23	0.00E+00	1.63E+01	3.26E+01	2.7500	2.244E+07
H-3	2.5141E-03	13,248.12	26,496.23	0.00E+00	3.33E+01	6.66E+01	3.5000	1.587E+03
I-129	7.3195E-07	13,248.12	26,496.23	0.00E+00	9.70E-03	1.94E-02	5.0000	6.528E+02
Kr-85	4.1281E-02	13,248.12	26,496.23	0.00E+00	5.47E+02	1.09E+03	7.0000	7.206E+01
Np-237	1.1489E-06	13,248.12	26,496.23	0.00E+00	1.52E-02	3.04E-02	11.0000	8.089E+00
Pa-231	4.5241E-06	13,248.12	26,496.23	0.00E+00	5.99E-04	1.20E-03		
Pb-210	6.4476E-13	13,248.12	26,496.23	0.00E+00	8.54E-09	1.71E-08		
Pm-147	1.1651E-03	13,248.12	26,496.23	0.00E+00	1.54E+01	3.09E+01		
Pu-238	2.9517E-04	13,248.12	26,496.23	0.00E+00	3.91E+00	7.82E+00		
Pu-239	6.6772E-04	13,248.12	26,496.23	0.00E+00	8.85E+00	1.77E+01		
Pu-240	8.6839E-05	13,248.12	26,496.23	0.00E+00	1.15E+00	2.30E+00		
Pu-241	7.1514E-04	13,248.12	26,496.23	0.00E+00	9.47E+00	1.89E+01		
Pu-242	1.9717E-09	13,248.12	26,496.23	0.00E+00	2.61E-05	5.22E-05		
Ra-226	1.7654E-12	13,248.12	26,496.23	0.00E+00	2.34E-08	4.68E-08		
Ra-228	8.2928E-12	13,248.12	26,496.23	0.00E+00	1.10E-07	2.20E-07		
Ru-106	1.8419E-10	13,248.12	26,496.23	0.00E+00	2.44E-06	4.88E-06		
Se-79	1.3223E-05	13,248.12	26,496.23	0.00E+00	1.75E-01	3.50E-01		
Sn-126	1.1493E-05	13,248.12	26,496.23	0.00E+00	1.52E-01	3.05E-01		
Sr-90	1.3649E+00	13,248.12	26,496.23	0.00E+00	1.81E+04	3.62E+04		
Tc-99	4.6656E-04	13,248.12	26,496.23	0.00E+00	6.18E+00	1.24E+01		
Th-229	1.4547E-11	13,248.12	26,496.23	0.00E+00	1.93E-07	3.85E-07		
Th-230	1.6617E-10	13,248.12	26,496.23	0.00E+00	2.20E-06	4.40E-06		
Th-232	8.3361E-12	13,248.12	26,496.23	0.00E+00	1.10E-07	2.21E-07		
Tl-208	2.1664E-06	13,248.12	26,496.23	0.00E+00	2.87E-04	5.74E-04		
U-232	5.8669E-08	13,248.12	26,496.23	0.00E+00	7.77E-04	1.55E-03		
U-233	3.1847E-09	13,248.12	26,496.23	0.00E+00	4.22E-05	8.44E-05		
U-234	3.8769E-07	13,248.12	26,496.23	0.00E+00	5.14E-03	1.03E-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	1.3652E+00	13,248.12	26,496.23	0.00E+00	1.81E+04	3.62E+04		
Other Radionuclides					2.19E+04	4.37E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.31E+02	4.63E+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	Estimated EOL HM/Given EOL HM
Nominal:	3.56	32.41	1.01
Bounding:	7.12		

[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: 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: 2010
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: 50 years

Estimated Canister usage: HIC: 6.15

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9.4992E-09	28,414.84	28,414.84	0.00E+00	2.70E-04	2.70E-04	Avg. MeV	
Am-241	4.0120E-03	28,414.84	28,414.84	0.00E+00	1.14E+02	1.14E+02	0.0150	1.387E+15
Am-242m	1.1510E-06	28,414.84	28,414.84	0.00E+00	3.27E-02	3.27E-02	0.0250	2.881E+14
Am-243	1.4713E-07	28,414.84	28,414.84	0.00E+00	4.18E-03	4.18E-03	0.0375	2.508E+14
C-14	1.2800E-04	28,414.84	28,414.84	0.00E+00	3.64E+00	3.64E+00	0.0575	2.702E+14
Cl-36	2.8120E-06	28,414.84	28,414.84	0.00E+00	7.99E-02	7.99E-02	0.0850	1.622E+14
Cm-243	6.0120E-08	28,414.84	28,414.84	0.00E+00	1.71E-03	1.71E-03	0.1250	1.063E+14
Cm-244	3.0331E-07	28,414.84	28,414.84	0.00E+00	8.62E-03	8.62E-03	0.2250	1.398E+14
Co-60	3.4647E-03	28,414.84	28,414.84	0.00E+00	9.84E+01	9.84E+01	0.3750	6.097E+13
Cs-134	2.4632E-06	28,414.84	28,414.84	0.00E+00	7.00E-04	7.00E-04	0.5750	1.031E+15
Cs-135	3.2195E-05	28,414.84	28,414.84	0.00E+00	9.15E-01	9.15E-01	0.8500	1.014E+13
Cs-137	9.7519E-01	28,414.84	28,414.84	0.00E+00	2.77E+04	2.77E+04	1.2500	1.085E+13
Eu-154	4.0947E-04	28,414.84	28,414.84	0.00E+00	1.16E+01	1.16E+01	1.7500	2.617E+11
Eu-155	5.4586E-05	28,414.84	28,414.84	0.00E+00	1.55E+00	1.55E+00	2.2500	6.867E+07
Fe-55	4.7955E-06	28,414.84	28,414.84	0.00E+00	1.36E-01	1.36E-01	2.7500	1.202E+07
H-3	8.9038E-04	28,414.84	28,414.84	0.00E+00	2.53E+01	2.53E+01	3.5000	3.476E+04
I-129	7.3684E-07	28,414.84	28,414.84	0.00E+00	2.09E-02	2.09E-02	5.0000	1.463E+04
Kr-85	1.3791E-02	28,414.84	28,414.84	0.00E+00	3.92E+02	3.92E+02	7.0000	1.650E+03
Np-237	1.3038E-06	28,414.84	28,414.84	0.00E+00	3.70E-02	3.70E-02	11.0000	1.876E+02
Pa-231	1.5534E-06	28,414.84	28,414.84	0.00E+00	4.41E-04	4.41E-04		
Pb-210	7.1759E-13	28,414.84	28,414.84	0.00E+00	2.04E-08	2.04E-08		
Pm-147	1.4547E-05	28,414.84	28,414.84	0.00E+00	4.13E-01	4.13E-01		
Pu-238	7.2827E-04	28,414.84	28,414.84	0.00E+00	2.07E+01	2.07E+01		
Pu-239	5.5218E-03	28,414.84	28,414.84	0.00E+00	1.57E+02	1.57E+02		
Pu-240	2.1173E-03	28,414.84	28,414.84	0.00E+00	6.02E+01	6.02E+01		
Pu-241	1.1702E-02	28,414.84	28,414.84	0.00E+00	3.33E+02	3.33E+02		
Pu-242	2.3128E-07	28,414.84	28,414.84	0.00E+00	6.57E-03	6.57E-03		
Ra-226	1.6827E-12	28,414.84	28,414.84	0.00E+00	4.78E-08	4.78E-08		
Ra-228	2.5263E-10	28,414.84	28,414.84	0.00E+00	7.18E-06	7.18E-06		
Ru-106	3.4090E-15	28,414.84	28,414.84	0.00E+00	9.69E-11	9.69E-11		
Se-79	1.3012E-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	8.9323E-01	28,414.84	28,414.84	0.00E+00	2.54E+04	2.54E+04		
Tc-99	4.4241E-04	28,414.84	28,414.84	0.00E+00	1.26E+01	1.26E+01		
Th-229	7.6902E-10	28,414.84	28,414.84	0.00E+00	2.19E-05	2.19E-05		
Th-230	1.3059E-10	28,414.84	28,414.84	0.00E+00	3.71E-06	3.71E-06		
Th-232	2.5278E-10	28,414.84	28,414.84	0.00E+00	7.18E-06	7.18E-06		
Tl-208	1.1892E-08	28,414.84	28,414.84	0.00E+00	3.38E-04	3.38E-04		
U-232	3.1970E-06	28,414.84	28,414.84	0.00E+00	9.08E-04	9.08E-04		
U-233	1.2232E-07	28,414.84	28,414.84	0.00E+00	3.48E-03	3.48E-03		
U-234	2.8662E-07	28,414.84	28,414.84	0.00E+00	8.14E-03	8.14E-03		
U-235	-2.6194E-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-06	28,414.84	0.00	1.60E-02	1.50E-02	1.60E-02		
Y-90	8.9338E-01	28,414.84	28,414.84	0.00E+00	2.54E+04	2.54E+04		
Other Radionuclides					2.80E+04	2.80E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.18E+02	3.18E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	NONE	SST
BOL HM Constituents:	U	U
BOL Enrichment %:		10 to 20.1

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		28,414.84
Bounding:		28,414.84

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	14.00	
Bounding:	14.00	

Estimated EOL HM/Given EOL HM: 1.78

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1981
Estimates as of: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 25 years

Estimated Canister usage: 18"x10' = 0.42

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.9648E-06	220.48	440.96	0.00E+00	4.33E-04	8.66E-04
Am-241	7.8064E+00	220.48	440.96	0.00E+00	1.72E+03	3.44E+03
Am-242m	1.7632E-02	220.48	440.96	0.00E+00	3.89E+00	7.78E+00
Am-243	1.6336E-02	220.48	440.96	0.00E+00	3.60E+00	7.20E+00
C-14	1.2101E-01	220.48	440.96	0.00E+00	2.67E+01	5.34E+01
Cl-36	2.2849E-03	220.48	440.96	0.00E+00	5.04E-01	1.01E+00
Cm-243	1.1046E-03	220.48	440.96	0.00E+00	2.44E-01	4.87E-01
Cm-244	2.4704E-01	220.48	440.96	0.00E+00	5.45E+01	1.09E+02
Co-60	1.0466E+02	220.48	440.96	0.00E+00	2.31E+04	4.62E+04
Cs-134	9.8289E-03	220.48	440.96	0.00E+00	2.17E+00	4.33E+00
Cs-135	4.3976E-04	220.48	440.96	0.00E+00	9.70E-02	1.94E-01
Cs-137	2.6526E+01	220.48	440.96	0.00E+00	5.85E+03	1.17E+04
Eu-154	2.7975E+00	220.48	440.96	0.00E+00	6.17E+02	1.23E+03
Eu-155	2.7881E-01	220.48	440.96	0.00E+00	6.15E+01	1.23E+02
Fe-55	4.2151E+00	220.48	440.96	0.00E+00	9.29E+02	1.86E+03
H-3	4.2599E-01	220.48	440.96	0.00E+00	9.39E+01	1.88E+02
I-129	1.0618E-05	220.48	440.96	0.00E+00	2.34E-03	4.68E-03
Kr-85	1.1426E+00	220.48	440.96	0.00E+00	2.52E+02	5.04E+02
Np-237	1.5647E-04	220.48	440.96	0.00E+00	3.45E-02	6.90E-02
Pa-231	2.8624E-06	220.48	440.96	0.00E+00	6.31E-04	1.26E-03
Pb-210	9.2770E-09	220.48	440.96	0.00E+00	2.05E-06	4.09E-06
Pm-147	2.3690E-01	220.48	440.96	0.00E+00	5.22E+01	1.04E+02
Pu-238	-6.1800E-01	220.48	0.00	5.40E+02	4.03E+02	5.40E+02
Pu-239	-4.8260E-02	220.48	0.00	6.53E+01	5.47E+01	6.53E+01
Pu-240	-3.0095E-01	220.48	0.00	8.34E+01	1.70E+01	8.34E+01
Pu-241	-7.4000E+01	220.48	0.00	2.15E+04	5.15E+03	2.15E+04
Pu-242	-1.1381E-04	220.48	0.00	3.61E-01	3.36E-01	3.61E-01
Ra-226	3.2167E-08	220.48	440.96	0.00E+00	7.09E-06	1.42E-05
Ra-228	5.9024E-07	220.48	440.96	0.00E+00	1.30E-04	2.60E-04
Ru-106	3.9140E-06	220.48	440.96	0.00E+00	8.63E-04	1.73E-03
Se-79	1.9184E-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	2.5126E+01	220.48	440.96	0.00E+00	5.54E+03	1.11E+04
Tc-99	6.7678E-03	220.48	440.96	0.00E+00	1.49E+00	2.98E+00
Th-229	1.2398E-06	220.48	440.96	0.00E+00	2.73E-04	5.47E-04
Th-230	4.1442E-06	220.48	440.96	0.00E+00	9.14E-04	1.83E-03
Th-232	6.0208E-07	220.48	440.96	0.00E+00	1.33E-04	2.65E-04
Tl-208	9.6478E-05	220.48	440.96	0.00E+00	2.13E-02	4.25E-02
U-232	2.6103E-04	220.48	440.96	0.00E+00	5.76E-02	1.15E-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	2.5126E+01	220.48	440.96	0.00E+00	5.54E+03	1.11E+04
Other Radionuclides					1.55E+04	3.09E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.418E+14
0.0250	1.463E+14
0.0375	1.305E+14
0.0575	1.782E+14
0.0850	7.705E+13
0.1250	6.701E+13
0.2250	6.545E+13
0.3750	2.759E+13
0.5750	4.401E+14
0.8500	2.652E+13
1.2500	3.441E+15
1.7500	8.337E+11
2.2500	1.812E+10
2.7500	1.552E+09
3.5000	1.648E+08
5.0000	7.009E+05
7.0000	8.043E+04
11.0000	9.215E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.08E+02	1.01E+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:	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: 35.21

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 25 years

Estimated Canister usage: 18"x10' = 0.25

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.9648E-06	62.56	125.11	0.00E+00	1.23E-04	2.46E-04	Avg. MeV	
Am-241	7.8064E+00	62.56	125.11	0.00E+00	4.88E+02	9.77E+02	0.0150	2.157E+14
Am-242m	1.7632E-02	62.56	125.11	0.00E+00	1.10E+00	2.21E+00	0.0250	4.152E+13
Am-243	1.6336E-02	62.56	125.11	0.00E+00	1.02E+00	2.04E+00	0.0375	3.705E+13
C-14	1.2101E-01	62.56	125.11	0.00E+00	7.57E+00	1.51E+01	0.0575	5.055E+13
Cl-36	2.2849E-03	62.56	125.11	0.00E+00	1.43E-01	2.86E-01	0.0850	2.186E+13
Cm-243	1.1046E-03	62.56	125.11	0.00E+00	6.91E-02	1.38E-01	0.1250	1.901E+13
Cm-244	2.4704E-01	62.56	125.11	0.00E+00	1.55E+01	3.09E+01	0.2250	1.857E+13
Co-60	1.0466E+02	62.56	125.11	0.00E+00	6.55E+03	1.31E+04	0.3750	7.828E+12
Cs-134	9.8289E-03	62.56	125.11	0.00E+00	6.15E-01	1.23E+00	0.5750	1.249E+14
Cs-135	4.3976E-04	62.56	125.11	0.00E+00	2.75E-02	5.50E-02	0.8500	7.523E+12
Cs-137	2.6526E+01	62.56	125.11	0.00E+00	1.66E+03	3.32E+03	1.2500	9.763E+14
Eu-154	2.7975E+00	62.56	125.11	0.00E+00	1.75E+02	3.50E+02	1.7500	2.366E+11
Eu-155	2.7881E-01	62.56	125.11	0.00E+00	1.74E+01	3.49E+01	2.2500	5.140E+09
Fe-55	4.2151E+00	62.56	125.11	0.00E+00	2.64E+02	5.27E+02	2.7500	4.404E+08
H-3	4.2599E-01	62.56	125.11	0.00E+00	2.66E+01	5.33E+01	3.5000	5.634E+05
I-129	1.0618E-05	62.56	125.11	0.00E+00	6.64E-04	1.33E-03	5.0000	2.393E+05
Kr-85	1.1426E+00	62.56	125.11	0.00E+00	7.15E+01	1.43E+02	7.0000	2.739E+04
Np-237	1.5647E-04	62.56	125.11	0.00E+00	9.79E-03	1.96E-02	11.0000	3.135E+03
Pa-231	2.8624E-06	62.56	125.11	0.00E+00	1.79E-04	3.58E-04		
Pb-210	9.2770E-09	62.56	125.11	0.00E+00	5.80E-07	1.16E-06		
Pm-147	2.3690E-01	62.56	125.11	0.00E+00	1.48E+01	2.96E+01		
Pu-238	-6.1800E-01	62.56	0.00	8.04E+02	7.65E+02	8.04E+02		
Pu-239	-4.8280E-02	62.56	0.00	9.73E+01	9.43E+01	9.73E+01		
Pu-240	-3.0095E-01	62.56	0.00	1.24E+02	1.05E+02	1.24E+02		
Pu-241	-7.4000E+01	62.56	0.00	3.20E+04	2.73E+04	3.20E+04		
Pu-242	-1.1381E-04	62.56	0.00	5.38E-01	5.31E-01	5.38E-01		
Ra-226	3.2167E-06	62.56	125.11	0.00E+00	2.01E-06	4.02E-06		
Ra-228	5.9024E-07	62.56	125.11	0.00E+00	3.69E-05	7.38E-05		
Ru-106	3.9140E-06	62.56	125.11	0.00E+00	2.45E-04	4.90E-04		
Se-79	1.9184E-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	2.5126E+01	62.56	125.11	0.00E+00	1.57E+03	3.14E+03		
Tc-99	6.7678E-03	62.56	125.11	0.00E+00	4.23E-01	8.47E-01		
Th-229	1.2398E-06	62.56	125.11	0.00E+00	7.76E-05	1.55E-04		
Th-230	4.1442E-06	62.56	125.11	0.00E+00	2.59E-04	5.18E-04		
Th-232	6.0208E-07	62.56	125.11	0.00E+00	3.77E-05	7.53E-05		
Tl-208	9.6478E-05	62.56	125.11	0.00E+00	6.04E-03	1.21E-02		
U-232	2.6103E-04	62.56	125.11	0.00E+00	1.63E-02	3.27E-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	2.5126E+01	62.56	125.11	0.00E+00	1.57E+03	3.14E+03		
Other Radionuclides					4.39E+03	8.77E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.72E+02	3.14E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	62.56	-1,022.96
Bounding:		125.11

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.30	-16.35
Bounding:	0.60	

Estimated EOL HM/Given EOL HM: 5.94

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SPEC (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: 2010
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: 50 years

Estimated Canister usage: HIC = 1.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	3.9527E-09	45.43	90.86	0.00E+00	1.80E-07	3.59E-07
Am-241	2.9407E-02	45.43	90.86	0.00E+00	1.34E+00	2.67E+00
Am-242m	7.7733E-06	45.43	90.86	0.00E+00	3.53E-04	7.06E-04
Am-243	6.3827E-06	45.43	90.86	0.00E+00	2.90E-04	5.80E-04
C-14	2.9513E-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	1.0647E-06	45.43	90.86	0.00E+00	4.84E-05	9.67E-05
Cm-244	3.4907E-05	45.43	90.86	0.00E+00	1.59E-03	3.17E-03
Co-60	3.1593E-07	45.43	90.86	0.00E+00	1.44E-05	2.87E-05
Cs-134	8.9067E-08	45.43	90.86	0.00E+00	4.05E-06	8.09E-06
Cs-135	4.8607E-06	45.43	90.86	0.00E+00	2.21E-04	4.42E-04
Cs-137	1.0113E+00	45.43	90.86	0.00E+00	4.59E+01	9.19E+01
Eu-154	1.8607E-03	45.43	90.86	0.00E+00	8.45E-02	1.69E-01
Eu-155	6.1700E-05	45.43	90.86	0.00E+00	2.80E-03	5.61E-03
Fe-55	4.7627E-07	45.43	90.86	0.00E+00	2.16E-05	4.33E-05
H-3	8.6600E-04	45.43	90.86	0.00E+00	3.93E-02	7.87E-02
I-129	7.1600E-07	45.43	90.86	0.00E+00	3.25E-05	6.51E-05
Kr-85	1.4713E-02	45.43	90.86	0.00E+00	6.68E-01	1.34E+00
Np-237	4.0773E-06	45.43	90.86	0.00E+00	1.85E-04	3.70E-04
Pa-231	6.7867E-09	45.43	90.86	0.00E+00	3.08E-07	6.17E-07
Pb-210	1.2127E-12	45.43	90.86	0.00E+00	5.51E-11	1.10E-10
Pm-147	1.6720E-05	45.43	90.86	0.00E+00	7.60E-04	1.52E-03
Pu-238	4.3627E-03	45.43	90.86	0.00E+00	1.98E-01	3.96E-01
Pu-239	1.0307E-02	45.43	90.86	0.00E+00	4.68E-01	9.37E-01
Pu-240	5.4007E-03	45.43	90.86	0.00E+00	2.45E-01	4.91E-01
Pu-241	8.8667E-02	45.43	90.86	0.00E+00	4.03E+00	8.06E+00
Pu-242	3.0713E-06	45.43	90.86	0.00E+00	1.40E-04	2.79E-04
Ra-226	3.2767E-12	45.43	90.86	0.00E+00	1.49E-10	2.98E-10
Ra-228	3.5827E-14	45.43	90.86	0.00E+00	1.63E-12	3.26E-12
Ru-106	9.3133E-15	45.43	90.86	0.00E+00	4.23E-13	8.46E-13
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	9.0067E-01	45.43	90.86	0.00E+00	4.09E+01	8.18E+01
Tc-99	4.3533E-04	45.43	90.86	0.00E+00	1.98E-02	3.96E-02
Th-229	3.5147E-12	45.43	90.86	0.00E+00	1.60E-10	3.19E-10
Th-230	3.2487E-10	45.43	90.86	0.00E+00	1.48E-08	2.95E-08
Th-232	4.2020E-14	45.43	90.86	0.00E+00	1.91E-12	3.82E-12
Tl-208	5.7620E-09	45.43	90.86	0.00E+00	2.62E-07	5.24E-07
U-232	1.5613E-08	45.43	90.86	0.00E+00	7.09E-07	1.42E-06
U-233	1.1207E-09	45.43	90.86	0.00E+00	5.09E-08	1.02E-07
U-234	9.8267E-07	45.43	90.86	0.00E+00	4.46E-05	8.93E-05
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	9.0133E-01	45.43	90.86	0.00E+00	4.09E+01	8.19E+01
Other Radionuclides					4.37E+01	8.74E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.507E+12
0.0250	9.334E+11
0.0375	8.169E+11
0.0575	9.049E+11
0.0850	5.242E+11
0.1250	3.421E+11
0.2250	4.517E+11
0.3750	1.967E+11
0.5750	3.416E+12
0.8500	3.482E+10
1.2500	1.382E+10
1.7500	9.201E+08
2.2500	9.103E+04
2.7500	1.879E+04
3.5000	3.590E+02
5.0000	1.503E+02
7.0000	1.687E+01
11.0000	1.911E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.71E-01	1.14E+00
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: 0.96

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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: 2010
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' 0.08

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.4276E-08	1.89	3.78	0.00E+00	6.48E-08	1.30E-07	Avg. MeV	
Am-241	1.1458E-04	1.89	3.78	0.00E+00	2.16E-04	4.33E-04	0.0150	1.971E+11
Am-242m	7.9468E-09	1.89	3.78	0.00E+00	1.50E-08	3.00E-08	0.0250	4.095E+10
Am-243	9.8386E-10	1.89	3.78	0.00E+00	1.86E-09	3.72E-09	0.0375	3.550E+10
C-14	2.2978E-04	1.89	3.78	0.00E+00	4.34E-04	8.68E-04	0.0575	3.818E+10
Cl-36	1.2261E-06	1.89	3.78	0.00E+00	2.32E-06	4.63E-06	0.0850	2.307E+10
Cm-243	1.7271E-10	1.89	3.78	0.00E+00	3.26E-10	6.53E-10	0.1250	1.497E+10
Cm-244	1.3058E-09	1.89	3.78	0.00E+00	2.47E-09	4.93E-09	0.2250	1.990E+10
Co-60	9.8636E-03	1.89	3.78	0.00E+00	1.86E-02	3.73E-02	0.3750	8.670E+09
Cs-134	1.9617E-08	1.89	3.78	0.00E+00	3.71E-08	7.41E-08	0.5750	1.444E+11
Cs-135	3.0316E-05	1.89	3.78	0.00E+00	5.73E-05	1.15E-04	0.8500	1.425E+09
Cs-137	1.0263E+00	1.89	3.78	0.00E+00	1.94E+00	3.88E+00	1.2500	3.246E+09
Eu-154	2.0017E-04	1.89	3.78	0.00E+00	3.78E-04	7.56E-04	1.7500	3.670E+07
Eu-155	8.5967E-05	1.89	3.78	0.00E+00	1.62E-04	3.25E-04	2.2500	1.860E+04
Fe-55	2.2646E-05	1.89	3.78	0.00E+00	4.28E-05	8.56E-05	2.7500	2.534E+03
H-3	1.0835E-03	1.89	3.78	0.00E+00	2.05E-03	4.09E-03	3.5000	3.334E-01
I-129	7.3195E-07	1.89	3.78	0.00E+00	1.38E-06	2.77E-06	5.0000	1.385E-01
Kr-85	1.5661E-02	1.89	3.78	0.00E+00	2.96E-02	5.92E-02	7.0000	1.541E-02
Np-237	1.1494E-06	1.89	3.78	0.00E+00	2.17E-06	4.34E-06	11.0000	1.736E-03
Pa-231	5.8070E-08	1.89	3.78	0.00E+00	1.10E-07	2.19E-07		
Pb-210	1.2985E-12	1.89	3.78	0.00E+00	2.45E-12	4.91E-12		
Pm-147	2.2196E-05	1.89	3.78	0.00E+00	4.19E-05	8.39E-05		
Pu-238	2.6223E-04	1.89	3.78	0.00E+00	4.95E-04	9.91E-04		
Pu-239	6.6739E-04	1.89	3.78	0.00E+00	1.26E-03	2.52E-03		
Pu-240	8.6705E-05	1.89	3.78	0.00E+00	1.64E-04	3.28E-04		
Pu-241	3.4759E-04	1.89	3.78	0.00E+00	6.57E-04	1.31E-03		
Pu-242	1.9717E-09	1.89	3.78	0.00E+00	3.73E-09	7.45E-09		
Ra-226	3.0000E-12	1.89	3.78	0.00E+00	5.67E-12	1.13E-11		
Ra-228	8.3328E-12	1.89	3.78	0.00E+00	1.57E-11	3.15E-11		
Ru-106	6.1464E-15	1.89	3.78	0.00E+00	1.16E-14	2.32E-14		
Se-79	1.3221E-05	1.89	3.78	0.00E+00	2.50E-05	5.00E-05		
Sn-126	1.1491E-05	1.89	3.78	0.00E+00	2.17E-05	4.34E-05		
Sr-90	9.5541E-01	1.89	3.78	0.00E+00	1.81E+00	3.61E+00		
Tc-99	4.6656E-04	1.89	3.78	0.00E+00	8.81E-04	1.76E-03		
Th-229	1.9085E-11	1.89	3.78	0.00E+00	3.61E-11	7.21E-11		
Th-230	2.1913E-10	1.89	3.78	0.00E+00	4.14E-10	8.28E-10		
Th-232	8.3478E-12	1.89	3.78	0.00E+00	1.58E-11	3.15E-11		
Tl-208	1.8752E-08	1.89	3.78	0.00E+00	3.54E-08	7.09E-08		
U-232	5.0782E-08	1.89	3.78	0.00E+00	9.59E-08	1.92E-07		
U-233	3.2596E-09	1.89	3.78	0.00E+00	6.16E-09	1.23E-08		
U-234	3.9817E-07	1.89	3.78	0.00E+00	7.52E-07	1.50E-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	9.5557E-01	1.89	3.78	0.00E+00	1.81E+00	3.61E+00		
Other Radionuclides					2.30E+00	4.61E+00		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.21E-02	4.41E-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
Nominal:		1.89
Bounding:		3.78

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.07	
Bounding:	0.14	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TMI-2
SNF ID #: 228
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=0.032kg; EOL=0.032kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1979
Estimates as of: 2010
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: 25 years

Estimated Canister usage: 18"x10' 0.06

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6376E-10	0.19	0.38	0.00E+00	1.26E-10	2.52E-10
Am-241	1.3144E-01	0.19	0.38	0.00E+00	2.50E-02	5.00E-02
Am-242m	3.0039E-04	0.19	0.38	0.00E+00	5.71E-05	1.14E-04
Am-243	6.2629E-04	0.19	0.38	0.00E+00	1.19E-04	2.38E-04
C-14	4.7965E-05	0.19	0.38	0.00E+00	9.12E-06	1.82E-05
Cl-36	8.0297E-07	0.19	0.38	0.00E+00	1.53E-07	3.05E-07
Cm-243	3.1993E-04	0.19	0.38	0.00E+00	6.08E-05	1.22E-04
Cm-244	7.1851E-02	0.19	0.38	0.00E+00	1.37E-02	2.73E-02
Co-60	9.5220E-03	0.19	0.38	0.00E+00	1.81E-03	3.62E-03
Cs-134	1.1662E-03	0.19	0.38	0.00E+00	2.22E-04	4.44E-04
Cs-135	1.4433E-05	0.19	0.38	0.00E+00	2.75E-06	5.49E-06
Cs-137	1.7603E+00	0.19	0.38	0.00E+00	3.35E-01	6.70E-01
Eu-154	4.5203E-02	0.19	0.38	0.00E+00	8.60E-03	1.72E-02
Eu-155	7.1479E-03	0.19	0.38	0.00E+00	1.36E-03	2.72E-03
Fe-55	6.1919E-04	0.19	0.38	0.00E+00	1.18E-04	2.36E-04
H-3	3.6386E-02	0.19	0.38	0.00E+00	6.92E-03	1.38E-02
I-129	9.8288E-07	0.19	0.38	0.00E+00	1.87E-07	3.74E-07
Kr-85	5.3844E-02	0.19	0.38	0.00E+00	1.02E-02	2.05E-02
Np-237	1.0546E-05	0.19	0.38	0.00E+00	2.01E-06	4.01E-06
Pa-231	1.1370E-09	0.19	0.38	0.00E+00	2.16E-10	4.32E-10
Pb-210	3.3624E-11	0.19	0.38	0.00E+00	6.39E-12	1.28E-11
Pm-147	5.1211E-03	0.19	0.38	0.00E+00	9.74E-04	1.95E-03
Pu-238	8.0669E-02	0.19	0.38	0.00E+00	1.53E-02	3.07E-02
Pu-239	1.1626E-02	0.19	0.38	0.00E+00	2.21E-03	4.42E-03
Pu-240	1.5097E-02	0.19	0.38	0.00E+00	2.87E-03	5.74E-03
Pu-241	1.4567E+00	0.19	0.38	0.00E+00	2.77E-01	5.54E-01
Pu-242	6.4260E-05	0.19	0.38	0.00E+00	1.22E-05	2.44E-05
Ra-226	1.1392E-10	0.19	0.38	0.00E+00	2.17E-11	4.33E-11
Ra-228	5.1841E-12	0.19	0.38	0.00E+00	9.86E-13	1.97E-12
Ru-106	5.9012E-07	0.19	0.38	0.00E+00	1.12E-07	2.24E-07
Se-79	1.2379E-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	1.1630E+00	0.19	0.38	0.00E+00	2.21E-01	4.42E-01
Tc-99	3.9357E-04	0.19	0.38	0.00E+00	7.49E-05	1.50E-04
Th-229	8.5691E-11	0.19	0.38	0.00E+00	1.63E-11	3.26E-11
Th-230	1.4493E-08	0.19	0.38	0.00E+00	2.76E-09	5.51E-09
Th-232	5.2923E-12	0.19	0.38	0.00E+00	1.01E-12	2.01E-12
Tl-208	1.9202E-07	0.19	0.38	0.00E+00	3.65E-08	7.30E-08
U-232	5.2083E-07	0.19	0.38	0.00E+00	9.91E-08	1.98E-07
U-233	2.4386E-08	0.19	0.38	0.00E+00	4.64E-09	9.28E-09
U-234	4.7012E-05	0.19	0.38	0.00E+00	8.94E-06	1.79E-05
U-235	-1.4492E-06	0.19	0.00	2.50E-06	2.22E-06	2.50E-06
U-236	7.5759E-06	0.19	0.38	0.00E+00	1.44E-06	2.88E-06
U-238	-2.6129E-07	0.19	0.00	1.04E-05	1.04E-05	1.04E-05
Y-90	1.1631E+00	0.19	0.38	0.00E+00	2.21E-01	4.42E-01
Other Radionuclides					3.21E-01	6.43E-01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.587E+10
0.0250	5.239E+09
0.0375	5.070E+09
0.0575	5.531E+09
0.0850	2.931E+09
0.1250	2.141E+09
0.2250	2.516E+09
0.3750	1.060E+09
0.5750	2.481E+10
0.8500	4.897E+08
1.2500	6.614E+08
1.7500	1.449E+07
2.2500	2.677E+03
2.7500	3.009E+03
3.5000	3.942E+02
5.0000	1.685E+02
7.0000	1.943E+01
11.0000	2.231E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.21E-03	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 %:	3.588	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		0.19
Bounding:		0.38

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.17	
Bounding:	0.34	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 1979
Estimates as of: 2010
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: 25 years

Estimated Canister usage: 18"x15' 341.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6376E-10	274,985.09	549,970.18	0.00E+00	1.83E-04	3.65E-04
Am-241	1.3144E-01	274,985.09	549,970.18	0.00E+00	3.61E+04	7.23E+04
Am-242m	3.0039E-04	274,985.09	549,970.18	0.00E+00	8.26E+01	1.65E+02
Am-243	6.2629E-04	274,985.09	549,970.18	0.00E+00	1.72E+02	3.44E+02
C-14	4.7965E-05	274,985.09	549,970.18	0.00E+00	1.32E+01	2.64E+01
Cl-36	8.0297E-07	274,985.09	549,970.18	0.00E+00	2.21E-01	4.42E-01
Cm-243	3.1993E-04	274,985.09	549,970.18	0.00E+00	8.80E+01	1.76E+02
Cm-244	7.1851E-02	274,985.09	549,970.18	0.00E+00	1.98E+04	3.95E+04
Co-60	9.5220E-03	274,985.09	549,970.18	0.00E+00	2.62E+03	5.24E+03
Cs-134	1.1662E-03	274,985.09	549,970.18	0.00E+00	3.21E+02	6.41E+02
Cs-135	1.4433E-05	274,985.09	549,970.18	0.00E+00	3.97E+00	7.94E+00
Cs-137	1.7603E+00	274,985.09	549,970.18	0.00E+00	4.84E+05	9.68E+05
Eu-154	4.5203E-02	274,985.09	549,970.18	0.00E+00	1.24E+04	2.49E+04
Eu-155	7.1479E-03	274,985.09	549,970.18	0.00E+00	1.97E+03	3.93E+03
Fe-55	6.1919E-04	274,985.09	549,970.18	0.00E+00	1.70E+02	3.41E+02
H-3	3.6386E-02	274,985.09	549,970.18	0.00E+00	1.00E+04	2.00E+04
I-129	9.8288E-07	274,985.09	549,970.18	0.00E+00	2.70E-01	5.41E-01
Kr-85	5.3844E-02	274,985.09	549,970.18	0.00E+00	1.48E+04	2.96E+04
Np-237	1.0546E-05	274,985.09	549,970.18	0.00E+00	2.90E+00	5.80E+00
Pa-231	1.1370E-09	274,985.09	549,970.18	0.00E+00	3.13E-04	6.25E-04
Pb-210	3.3624E-11	274,985.09	549,970.18	0.00E+00	9.25E-06	1.85E-05
Pm-147	5.1211E-03	274,985.09	549,970.18	0.00E+00	1.41E+03	2.82E+03
Pu-238	8.0669E-02	274,985.09	549,970.18	0.00E+00	2.22E+04	4.44E+04
Pu-239	1.1626E-02	274,985.09	549,970.18	0.00E+00	3.20E+03	6.39E+03
Pu-240	1.5097E-02	274,985.09	549,970.18	0.00E+00	4.15E+03	8.30E+03
Pu-241	1.4567E+00	274,985.09	549,970.18	0.00E+00	4.01E+05	8.01E+05
Pu-242	6.4260E-05	274,985.09	549,970.18	0.00E+00	1.77E+01	3.53E+01
Ra-226	1.1392E-10	274,985.09	549,970.18	0.00E+00	3.13E-05	6.27E-05
Ra-228	5.1841E-12	274,985.09	549,970.18	0.00E+00	1.43E-06	2.85E-06
Ru-106	5.9012E-07	274,985.09	549,970.18	0.00E+00	1.62E-01	3.25E-01
Se-79	1.2379E-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	1.1630E+00	274,985.09	549,970.18	0.00E+00	3.20E+05	6.40E+05
Tc-99	3.9357E-04	274,985.09	549,970.18	0.00E+00	1.08E+02	2.16E+02
Th-229	8.5691E-11	274,985.09	549,970.18	0.00E+00	2.36E-05	4.71E-05
Th-230	1.4493E-08	274,985.09	549,970.18	0.00E+00	3.99E-03	7.97E-03
Th-232	5.2923E-12	274,985.09	549,970.18	0.00E+00	1.46E-06	2.91E-06
Tl-208	1.9202E-07	274,985.09	549,970.18	0.00E+00	5.28E-02	1.06E-01
U-232	5.2083E-07	274,985.09	549,970.18	0.00E+00	1.43E-01	2.86E-01
U-233	2.4386E-08	274,985.09	549,970.18	0.00E+00	6.71E-03	1.34E-02
U-234	4.7012E-05	274,985.09	549,970.18	0.00E+00	1.29E+01	2.59E+01
U-235	-1.4492E-06	274,985.09	0.00	4.50E+00	4.10E+00	4.50E+00
U-236	7.5759E-06	274,985.09	549,970.18	0.00E+00	2.08E+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	1.1631E+00	274,985.09	549,970.18	0.00E+00	3.20E+05	6.40E+05
Other Radionuclides					4.65E+05	9.29E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.740E+16
0.0250	7.575E+15
0.0375	7.331E+15
0.0575	7.997E+15
0.0850	4.238E+15
0.1250	3.096E+15
0.2250	3.638E+15
0.3750	1.561E+15
0.5750	3.587E+16
0.8500	7.080E+14
1.2500	9.563E+14
1.7500	2.095E+13
2.2500	3.870E+09
2.7500	4.350E+09
3.5000	5.701E+08
5.0000	2.437E+08
7.0000	2.809E+07
11.0000	3.226E+06

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.54E+03	1.51E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.539514873	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.10	1.06
Bounding:	0.19	1.12

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TMI-2 CORE DEBRIS (D-153 & 388)
SNF ID #: 229
Fuel Units & Descr: 2 - DEBRIS
Heavy Metal Mass: BOL=19.06kg; EOL=19.01kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1979
Estimates as of: 2010
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: 25 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	6.6376E-10	66.57	133.13	0.00E+00	4.42E-08	8.84E-08
Am-241	1.3144E-01	66.57	133.13	0.00E+00	8.75E+00	1.75E+01
Am-242m	3.0039E-04	66.57	133.13	0.00E+00	2.00E-02	4.00E-02
Am-243	6.2629E-04	66.57	133.13	0.00E+00	4.17E-02	8.34E-02
C-14	4.7965E-05	66.57	133.13	0.00E+00	3.19E-03	6.39E-03
Cl-36	8.0297E-07	66.57	133.13	0.00E+00	5.35E-05	1.07E-04
Cm-243	3.1993E-04	66.57	133.13	0.00E+00	2.13E-02	4.26E-02
Cm-244	7.1851E-02	66.57	133.13	0.00E+00	4.78E+00	9.57E+00
Co-60	9.5220E-03	66.57	133.13	0.00E+00	6.34E-01	1.27E+00
Cs-134	1.1662E-03	66.57	133.13	0.00E+00	7.76E-02	1.55E-01
Cs-135	1.4433E-05	66.57	133.13	0.00E+00	9.61E-04	1.92E-03
Cs-137	1.7603E+00	66.57	133.13	0.00E+00	1.17E+02	2.34E+02
Eu-154	4.5203E-02	66.57	133.13	0.00E+00	3.01E+00	6.02E+00
Eu-155	7.1479E-03	66.57	133.13	0.00E+00	4.76E-01	9.52E-01
Fe-55	6.1919E-04	66.57	133.13	0.00E+00	4.12E-02	8.24E-02
H-3	3.6386E-02	66.57	133.13	0.00E+00	2.42E+00	4.84E+00
I-129	9.8288E-07	66.57	133.13	0.00E+00	6.54E-05	1.31E-04
Kr-85	5.3844E-02	66.57	133.13	0.00E+00	3.58E+00	7.17E+00
Np-237	1.0546E-05	66.57	133.13	0.00E+00	7.02E-04	1.40E-03
Pa-231	1.1370E-09	66.57	133.13	0.00E+00	7.57E-08	1.51E-07
Pb-210	3.3624E-11	66.57	133.13	0.00E+00	2.24E-09	4.48E-09
Pm-147	5.1211E-03	66.57	133.13	0.00E+00	3.41E-01	6.82E-01
Pu-238	8.0669E-02	66.57	133.13	0.00E+00	5.37E+00	1.07E+01
Pu-239	1.1626E-02	66.57	133.13	0.00E+00	7.74E-01	1.55E+00
Pu-240	1.5097E-02	66.57	133.13	0.00E+00	1.00E+00	2.01E+00
Pu-241	1.4567E+00	66.57	133.13	0.00E+00	9.70E+01	1.94E+02
Pu-242	6.4260E-05	66.57	133.13	0.00E+00	4.28E-03	8.56E-03
Ra-226	1.1392E-10	66.57	133.13	0.00E+00	7.58E-09	1.52E-08
Ra-228	5.1841E-12	66.57	133.13	0.00E+00	3.45E-10	6.90E-10
Ru-106	5.9012E-07	66.57	133.13	0.00E+00	3.93E-05	7.86E-05
Se-79	1.2379E-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	1.1630E+00	66.57	133.13	0.00E+00	7.74E+01	1.55E+02
Tc-99	3.9357E-04	66.57	133.13	0.00E+00	2.62E-02	5.24E-02
Th-229	8.5691E-11	66.57	133.13	0.00E+00	5.70E-09	1.14E-08
Th-230	1.4493E-08	66.57	133.13	0.00E+00	9.65E-07	1.93E-06
Th-232	5.2923E-12	66.57	133.13	0.00E+00	3.52E-10	7.05E-10
Tl-208	1.9202E-07	66.57	133.13	0.00E+00	1.28E-05	2.56E-05
U-232	5.2083E-07	66.57	133.13	0.00E+00	3.47E-05	6.93E-05
U-233	2.4386E-08	66.57	133.13	0.00E+00	1.62E-06	3.25E-06
U-234	4.7012E-05	66.57	133.13	0.00E+00	3.13E-03	6.26E-03
U-235	-1.4492E-06	66.57	0.00	1.29E-03	1.19E-03	1.29E-03
U-236	7.5759E-06	66.57	133.13	0.00E+00	5.04E-04	1.01E-03
U-238	-2.6129E-07	66.57	0.00	6.21E-03	6.19E-03	6.21E-03
Y-90	1.1631E+00	66.57	133.13	0.00E+00	7.74E+01	1.55E+02
Other Radionuclides					1.12E+02	2.25E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.053E+12
0.0250	1.834E+12
0.0375	1.775E+12
0.0575	1.936E+12
0.0850	1.026E+12
0.1250	7.494E+11
0.2250	8.807E+11
0.3750	3.779E+11
0.5750	8.683E+12
0.8500	1.714E+11
1.2500	2.315E+11
1.7500	5.072E+09
2.2500	9.369E+05
2.7500	1.053E+06
3.5000	1.380E+05
5.0000	5.898E+04
7.0000	6.800E+03
11.0000	7.810E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.83E+00	3.85E+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
Nominal:	60.58	66.57
Bounding:	113.81	133.13

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.10	1.10
Bounding:	0.20	1.17

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TORY-IIA
SNF ID #: 230
Fuel Units & Descr: 146 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=48.647kg; EOL=48.647kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1962
Estimates as of: 2010
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]Template Burnup(MWd): 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 35 years

Estimated Canister usage: HIC: 3.65

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9.5869E-10	896.18	1,792.36	0.00E+00	8.59E-07	1.72E-06	Avg. MeV	
Am-241	1.0109E-02	896.18	1,792.36	0.00E+00	9.06E+00	1.81E+01	0.0150	1.324E+14
Am-242m	1.2789E-06	896.18	1,792.36	0.00E+00	1.15E-03	2.29E-03	0.0250	2.720E+13
Am-243	3.7047E-05	896.18	1,792.36	0.00E+00	3.32E-02	6.64E-02	0.0375	2.384E+13
C-14	2.6416E-08	896.18	1,792.36	0.00E+00	2.37E-05	4.73E-05	0.0575	2.565E+13
Cl-36	4.4441E-31	896.18	1,792.36	0.00E+00	3.98E-28	7.97E-28	0.0850	1.535E+13
Cm-243	3.9605E-06	896.18	1,792.36	0.00E+00	3.55E-03	7.10E-03	0.1250	1.035E+13
Cm-244	2.6227E-03	896.18	1,792.36	0.00E+00	2.35E+00	4.70E+00	0.2250	1.327E+13
Co-60	6.7740E-06	896.18	1,792.36	0.00E+00	6.07E-03	1.21E-02	0.3750	5.757E+12
Cs-134	6.8894E-05	896.18	1,792.36	0.00E+00	6.17E-02	1.23E-01	0.5750	9.616E+13
Cs-135	4.2564E-06	896.18	1,792.36	0.00E+00	3.81E-03	7.63E-03	0.8500	1.424E+12
Cs-137	1.4399E+00	896.18	1,792.36	0.00E+00	1.29E+03	2.58E+03	1.2500	8.509E+11
Eu-154	1.5522E-02	896.18	1,792.36	0.00E+00	1.39E+01	2.78E+01	1.7500	4.025E+10
Eu-155	1.7588E-03	896.18	1,792.36	0.00E+00	1.58E+00	3.15E+00	2.2500	2.787E+08
Fe-55	2.4933E-05	896.18	1,792.36	0.00E+00	2.23E-02	4.47E-02	2.7500	2.801E+08
H-3	1.9945E-03	896.18	1,792.36	0.00E+00	1.79E+00	3.57E+00	3.5000	7.448E+04
I-129	6.6403E-07	896.18	1,792.36	0.00E+00	5.95E-04	1.19E-03	5.0000	3.165E+04
Kr-85	4.1002E-02	896.18	1,792.36	0.00E+00	3.67E+01	7.35E+01	7.0000	3.624E+03
Np-237	3.1610E-05	896.18	1,792.36	0.00E+00	2.83E-02	5.67E-02	11.0000	4.147E+02
Pa-231	1.8876E-09	896.18	1,792.36	0.00E+00	1.69E-06	3.38E-06		
Pb-210	8.3840E-11	896.18	1,792.36	0.00E+00	7.51E-08	1.50E-07		
Pm-147	4.6501E-04	896.18	1,792.36	0.00E+00	4.17E-01	8.33E-01		
Pu-238	1.3645E-01	896.18	1,792.36	0.00E+00	1.22E+02	2.45E+02		
Pu-239	6.9502E-04	896.18	1,792.36	0.00E+00	6.23E-01	1.25E+00		
Pu-240	3.8183E-04	896.18	1,792.36	0.00E+00	3.42E-01	6.84E-01		
Pu-241	6.5310E-02	896.18	1,792.36	0.00E+00	5.85E+01	1.17E+02		
Pu-242	3.0911E-06	896.18	1,792.36	0.00E+00	2.77E-03	5.54E-03		
Ra-226	2.3512E-10	896.18	1,792.36	0.00E+00	2.11E-07	4.21E-07		
Ra-228	3.3366E-14	896.18	1,792.36	0.00E+00	2.99E-11	5.98E-11		
Ru-106	2.4490E-10	896.18	1,792.36	0.00E+00	2.19E-07	4.39E-07		
Se-79	1.2333E-05	896.18	1,792.36	0.00E+00	1.11E-02	2.21E-02		
Sn-126	1.0194E-05	896.18	1,792.36	0.00E+00	9.14E-03	1.83E-02		
Sr-90	1.3348E+00	896.18	1,792.36	0.00E+00	1.20E+03	2.39E+03		
Tc-99	3.8056E-04	896.18	1,792.36	0.00E+00	3.41E-01	6.82E-01		
Th-229	1.7868E-11	896.18	1,792.36	0.00E+00	1.60E-08	3.20E-08		
Th-230	2.3348E-08	896.18	1,792.36	0.00E+00	2.09E-05	4.18E-05		
Th-232	4.1288E-14	896.18	1,792.36	0.00E+00	3.70E-11	7.40E-11		
Tl-208	4.3190E-08	896.18	1,792.36	0.00E+00	3.87E-05	7.74E-05		
U-232	1.1707E-07	896.18	1,792.36	0.00E+00	1.05E-04	2.10E-04		
U-233	7.2175E-09	896.18	1,792.36	0.00E+00	6.47E-06	1.29E-05		
U-234	6.1543E-05	896.18	1,792.36	0.00E+00	5.52E-02	1.10E-01		
U-235	-2.8681E-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	1.3348E+00	896.18	1,792.36	0.00E+00	1.20E+03	2.39E+03		
Other Radionuclides					1.24E+03	2.47E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.89E+01	3.78E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	BERYLLIUM	HEAVY WATER
Fuel Cladding:	NONE	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.175	40 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except cladding (none) and moderator (Heavy Water is conservative)

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		896.18
Bounding:		1,792.36

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.04	
Bounding:	0.08	

Estimated EOL HM/Given EOL HM: 0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TORY-IIC
SNF ID #: 231
Fuel Units & Descr: 655 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=59.081kg; EOL=59.081kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2010
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]Template Burnup(MWd): 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 13.10

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	9.5869E-10	1,088.39	2,176.79	0.00E+00	1.04E-06	2.09E-06
Am-241	1.0109E-02	1,088.39	2,176.79	0.00E+00	1.10E+01	2.20E+01
Am-242m	1.2789E-06	1,088.39	2,176.79	0.00E+00	1.39E-03	2.78E-03
Am-243	3.7047E-05	1,088.39	2,176.79	0.00E+00	4.03E-02	8.06E-02
C-14	2.6416E-06	1,088.39	2,176.79	0.00E+00	2.88E-05	5.75E-05
Cl-36	4.4441E-31	1,088.39	2,176.79	0.00E+00	4.84E-28	9.67E-28
Cm-243	3.9605E-06	1,088.39	2,176.79	0.00E+00	4.31E-03	8.62E-03
Cm-244	2.6227E-03	1,088.39	2,176.79	0.00E+00	2.85E+00	5.71E+00
Co-60	6.7740E-06	1,088.39	2,176.79	0.00E+00	7.37E-03	1.47E-02
Cs-134	6.8894E-05	1,088.39	2,176.79	0.00E+00	7.50E-02	1.50E-01
Cs-135	4.2564E-06	1,088.39	2,176.79	0.00E+00	4.63E-03	9.27E-03
Cs-137	1.4399E+00	1,088.39	2,176.79	0.00E+00	1.57E+03	3.13E+03
Eu-154	1.5522E-02	1,088.39	2,176.79	0.00E+00	1.69E+01	3.38E+01
Eu-155	1.7588E-03	1,088.39	2,176.79	0.00E+00	1.91E+00	3.83E+00
Fe-55	2.4933E-05	1,088.39	2,176.79	0.00E+00	2.71E-02	5.43E-02
H-3	1.9945E-03	1,088.39	2,176.79	0.00E+00	2.17E+00	4.34E+00
I-129	6.6403E-07	1,088.39	2,176.79	0.00E+00	7.23E-04	1.45E-03
Kr-85	4.1002E-02	1,088.39	2,176.79	0.00E+00	4.46E+01	8.93E+01
Np-237	3.1610E-05	1,088.39	2,176.79	0.00E+00	3.44E-02	6.88E-02
Pa-231	1.8876E-09	1,088.39	2,176.79	0.00E+00	2.05E-06	4.11E-06
Pb-210	8.3840E-11	1,088.39	2,176.79	0.00E+00	9.13E-08	1.83E-07
Pm-147	4.6501E-04	1,088.39	2,176.79	0.00E+00	5.06E-01	1.01E+00
Pu-238	1.3645E-01	1,088.39	2,176.79	0.00E+00	1.49E+02	2.97E+02
Pu-239	6.9502E-04	1,088.39	2,176.79	0.00E+00	7.56E-01	1.51E+00
Pu-240	3.8183E-04	1,088.39	2,176.79	0.00E+00	4.16E-01	8.31E-01
Pu-241	6.5310E-02	1,088.39	2,176.79	0.00E+00	7.11E+01	1.42E+02
Pu-242	3.0911E-06	1,088.39	2,176.79	0.00E+00	3.36E-03	6.73E-03
Ra-226	2.3512E-10	1,088.39	2,176.79	0.00E+00	2.56E-07	5.12E-07
Ra-228	3.3366E-14	1,088.39	2,176.79	0.00E+00	3.63E-11	7.26E-11
Ru-106	2.4490E-10	1,088.39	2,176.79	0.00E+00	2.67E-07	5.33E-07
Se-79	1.2333E-05	1,088.39	2,176.79	0.00E+00	1.34E-02	2.68E-02
Sn-126	1.0194E-05	1,088.39	2,176.79	0.00E+00	1.11E-02	2.22E-02
Sr-90	1.3348E+00	1,088.39	2,176.79	0.00E+00	1.45E+03	2.91E+03
Tc-99	3.8056E-04	1,088.39	2,176.79	0.00E+00	4.14E-01	8.28E-01
Th-229	1.7868E-11	1,088.39	2,176.79	0.00E+00	1.94E-08	3.89E-08
Th-230	2.3348E-08	1,088.39	2,176.79	0.00E+00	2.54E-05	5.08E-05
Th-232	4.1288E-14	1,088.39	2,176.79	0.00E+00	4.49E-11	8.99E-11
Tl-208	4.3190E-08	1,088.39	2,176.79	0.00E+00	4.70E-05	9.40E-05
U-232	1.1707E-07	1,088.39	2,176.79	0.00E+00	1.27E-04	2.55E-04
U-233	7.2175E-09	1,088.39	2,176.79	0.00E+00	7.86E-06	1.57E-05
U-234	6.1543E-05	1,088.39	2,176.79	0.00E+00	6.70E-02	1.34E-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	1.3348E+00	1,088.39	2,176.79	0.00E+00	1.45E+03	2.91E+03
Other Radionuclides					1.50E+03	3.00E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.608E+14
0.0250	3.304E+13
0.0375	2.895E+13
0.0575	3.115E+13
0.0850	1.864E+13
0.1250	1.257E+13
0.2250	1.611E+13
0.3750	6.991E+12
0.5750	1.168E+14
0.8500	1.730E+12
1.2500	1.033E+12
1.7500	4.889E+10
2.2500	3.384E+06
2.7500	3.402E+06
3.5000	9.045E+04
5.0000	3.844E+04
7.0000	4.401E+03
11.0000	5.036E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.30E+01	4.59E+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:	0.06	

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: 2010
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: 15 years

Estimated Canister usage: 18"x15' 14.48

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	0.0000E+00	783.73	1,567.46	0.00E+00	0.00E+00	0.00E+00	Avg. MeV	
Am-241	7.2313E-02	783.73	1,567.46	0.00E+00	5.67E+01	1.13E+02	0.0150	1.030E+14
Am-242m	6.2011E-05	783.73	1,567.46	0.00E+00	4.86E-02	9.72E-02	0.0250	2.113E+13
Am-243	4.6336E-05	783.73	1,567.46	0.00E+00	3.63E-02	7.26E-02	0.0375	1.970E+13
C-14	9.2170E-05	783.73	1,567.46	0.00E+00	7.22E-02	1.44E-01	0.0575	2.115E+13
Cl-36	0.0000E+00	783.73	1,567.46	0.00E+00	0.00E+00	0.00E+00	0.0850	1.180E+13
Cm-243	0.0000E+00	783.73	1,567.46	0.00E+00	0.00E+00	0.00E+00	0.1250	8.058E+12
Cm-244	7.4511E-04	783.73	1,567.46	0.00E+00	5.84E-01	1.17E+00	0.2250	1.014E+13
Co-60	3.4842E-04	783.73	1,567.46	0.00E+00	2.73E-01	5.46E-01	0.3750	4.374E+12
Cs-134	1.0795E-03	783.73	1,567.46	0.00E+00	8.46E-01	1.69E+00	0.5750	9.345E+13
Cs-135	1.0066E-05	783.73	1,567.46	0.00E+00	7.89E-03	1.58E-02	0.8500	1.282E+12
Cs-137	1.6092E+00	783.73	1,567.46	0.00E+00	1.26E+03	2.52E+03	1.2500	8.559E+11
Eu-154	1.8822E-02	783.73	1,567.46	0.00E+00	1.48E+01	2.95E+01	1.7500	3.542E+10
Eu-155	1.7672E-03	783.73	1,567.46	0.00E+00	1.39E+00	2.77E+00	2.2500	2.707E+06
Fe-55	9.0172E-05	783.73	1,567.46	0.00E+00	7.07E-02	1.41E-01	2.7500	9.736E+04
H-3	4.3506E-03	783.73	1,567.46	0.00E+00	3.41E+00	6.82E+00	3.5000	4.567E+04
I-129	8.6006E-07	783.73	1,567.46	0.00E+00	6.74E-04	1.35E-03	5.0000	1.641E+04
Kr-85	6.1652E-02	783.73	1,567.46	0.00E+00	4.83E+01	9.66E+01	7.0000	1.868E+03
Np-237	7.7672E-06	783.73	1,567.46	0.00E+00	6.09E-03	1.22E-02	11.0000	2.133E+02
Pa-231	0.0000E+00	783.73	1,567.46	0.00E+00	0.00E+00	0.00E+00		
Pb-210	0.0000E+00	783.73	1,567.46	0.00E+00	0.00E+00	0.00E+00		
Pm-147	1.8175E-02	783.73	1,567.46	0.00E+00	1.42E+01	2.85E+01		
Pu-238	2.2170E-02	783.73	1,567.46	0.00E+00	1.74E+01	3.47E+01		
Pu-239	2.8836E-02	783.73	1,567.46	0.00E+00	2.26E+01	4.52E+01		
Pu-240	2.2830E-02	783.73	1,567.46	0.00E+00	1.79E+01	3.58E+01		
Pu-241	1.1362E+00	783.73	1,567.46	0.00E+00	8.90E+02	1.78E+03		
Pu-242	1.4526E-05	783.73	1,567.46	0.00E+00	1.14E-02	2.28E-02		
Ra-226	0.0000E+00	783.73	1,567.46	0.00E+00	0.00E+00	0.00E+00		
Ra-228	0.0000E+00	783.73	1,567.46	0.00E+00	0.00E+00	0.00E+00		
Ru-106	4.2672E-06	783.73	1,567.46	0.00E+00	3.34E-03	6.69E-03		
Se-79	1.0901E-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	1.1546E+00	783.73	1,567.46	0.00E+00	9.05E+02	1.81E+03		
Tc-99	3.6494E-04	783.73	1,567.46	0.00E+00	2.86E-01	5.72E-01		
Th-229	0.0000E+00	783.73	1,567.46	0.00E+00	0.00E+00	0.00E+00		
Th-230	0.0000E+00	783.73	1,567.46	0.00E+00	0.00E+00	0.00E+00		
Th-232	0.0000E+00	783.73	1,567.46	0.00E+00	0.00E+00	0.00E+00		
Tl-208	0.0000E+00	783.73	1,567.46	0.00E+00	0.00E+00	0.00E+00		
U-232	0.0000E+00	783.73	1,567.46	0.00E+00	0.00E+00	0.00E+00		
U-233	0.0000E+00	783.73	1,567.46	0.00E+00	0.00E+00	0.00E+00		
U-234	6.3994E-05	783.73	1,567.46	0.00E+00	5.02E-02	1.00E-01		
U-235	-1.2944E-06	783.73	0.00	3.13E-02	3.02E-02	3.13E-02		
U-238	1.1932E-05	783.73	1,567.46	0.00E+00	9.35E-03	1.87E-02		
U-238	-3.0619E-07	783.73	0.00	3.94E-04	1.54E-04	3.94E-04		
Y-90	1.1550E+00	783.73	1,567.46	0.00E+00	9.05E+02	1.81E+03		
Other Radionuclides					1.21E+03	2.42E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.81E+01	3.23E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	GRAPHITE	GRAPHITE
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	92.5	0 to 5

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	30.19	783.73
Bounding:		1,567.46

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	8.35	25.96
Bounding:	16.70	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR OSU
SNF ID #: 1039
Fuel Units & Descr: 3 - ELEMENT
Heavy Metal Mass: BOL=0.48kg; EOL=0.472kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2025
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.04

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	7.73	15.46	0.00E+00	6.59E-09	1.32E-08
Am-241	1.8331E-03	7.73	15.46	0.00E+00	1.42E-02	2.83E-02
Am-242m	1.4129E-06	7.73	15.46	0.00E+00	1.09E-05	2.19E-05
Am-243	1.4774E-07	7.73	15.46	0.00E+00	1.14E-06	2.28E-06
C-14	1.2871E-04	7.73	15.46	0.00E+00	9.95E-04	1.99E-03
Cl-36	2.8120E-06	7.73	15.46	0.00E+00	2.17E-05	4.35E-05
Cm-243	1.7940E-07	7.73	15.46	0.00E+00	1.39E-06	2.77E-06
Cm-244	1.6962E-06	7.73	15.46	0.00E+00	1.31E-05	2.62E-05
Co-60	1.2839E+00	7.73	15.46	0.00E+00	9.93E+00	1.99E+01
Cs-134	9.0541E-02	7.73	15.46	0.00E+00	7.00E-01	1.40E+00
Cs-135	3.2195E-05	7.73	15.46	0.00E+00	2.49E-04	4.98E-04
Cs-137	2.7564E+00	7.73	15.46	0.00E+00	2.13E+01	4.26E+01
Eu-154	1.5368E-02	7.73	15.46	0.00E+00	1.19E-01	2.38E-01
Eu-155	2.9293E-02	7.73	15.46	0.00E+00	2.27E-01	4.53E-01
Fe-55	7.7158E-01	7.73	15.46	0.00E+00	5.97E+00	1.19E+01
H-3	1.1111E-02	7.73	15.46	0.00E+00	8.59E-02	1.72E-01
I-129	7.3684E-07	7.73	15.46	0.00E+00	5.70E-06	1.14E-05
Kr-85	2.5263E-01	7.73	15.46	0.00E+00	1.95E+00	3.91E+00
Np-237	1.2427E-06	7.73	15.46	0.00E+00	9.61E-06	1.92E-05
Pa-231	3.8511E-09	7.73	15.46	0.00E+00	2.98E-08	5.96E-08
Pb-210	7.3880E-15	7.73	15.46	0.00E+00	5.71E-14	1.14E-13
Pm-147	2.1023E+00	7.73	15.46	0.00E+00	1.63E+01	3.25E+01
Pu-238	1.0383E-03	7.73	15.46	0.00E+00	8.03E-03	1.61E-02
Pu-239	5.5293E-03	7.73	15.46	0.00E+00	4.28E-02	8.55E-02
Pu-240	2.1278E-03	7.73	15.46	0.00E+00	1.65E-02	3.29E-02
Pu-241	1.0195E-01	7.73	15.46	0.00E+00	7.88E-01	1.58E+00
Pu-242	2.3128E-07	7.73	15.46	0.00E+00	1.79E-06	3.58E-06
Ra-226	5.2782E-14	7.73	15.46	0.00E+00	4.08E-13	8.16E-13
Ra-228	1.9338E-10	7.73	15.46	0.00E+00	1.50E-09	2.99E-09
Ru-106	9.1684E-02	7.73	15.46	0.00E+00	7.09E-01	1.42E+00
Se-79	1.3018E-05	7.73	15.46	0.00E+00	1.01E-04	2.01E-04
Sn-126	1.2167E-05	7.73	15.46	0.00E+00	9.41E-05	1.88E-04
Sr-90	2.6045E+00	7.73	15.46	0.00E+00	2.01E+01	4.03E+01
Tc-99	4.4241E-04	7.73	15.46	0.00E+00	3.42E-03	6.84E-03
Th-229	1.3713E-10	7.73	15.46	0.00E+00	1.06E-09	2.12E-09
Th-230	1.8090E-11	7.73	15.46	0.00E+00	1.40E-10	2.80E-10
Th-232	2.5278E-10	7.73	15.46	0.00E+00	1.95E-09	3.91E-09
Tl-208	1.6947E-08	7.73	15.46	0.00E+00	1.31E-07	2.62E-07
U-232	4.8737E-08	7.73	15.46	0.00E+00	3.77E-07	7.54E-07
U-233	1.2203E-07	7.73	15.46	0.00E+00	9.44E-07	1.89E-06
U-234	1.5925E-07	7.73	15.46	0.00E+00	1.23E-06	2.46E-06
U-235	-2.6194E-06	7.73	0.00	2.06E-04	1.86E-04	2.06E-04
U-236	1.2693E-05	7.73	15.46	0.00E+00	9.81E-05	1.96E-04
U-238	-3.6331E-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)
4.80E-01	9.00E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	4.68	7.73
Bounding:		15.46

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.47	1.65
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: 2010
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-06	3.73	0.00	1.03E-04	1.03E-04	1.03E-04
Y-90	2.6060E+00	3.73	7.47	0.00E+00	9.73E+00	1.95E+01
Other Radionuclides					1.35E+01	2.69E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.207E+12
0.0250	2.656E+11
0.0375	2.262E+11
0.0575	2.322E+11
0.0850	1.438E+11
0.1250	1.045E+11
0.2250	1.220E+11
0.3750	6.193E+10
0.5750	8.233E+11
0.8500	3.533E+10
1.2500	7.175E+11
1.7500	4.783E+08
2.2500	7.710E+08
2.7500	6.118E+08
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: 2010
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:
[1]Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (ACPR 12/20) JAPAN
SNF ID #: 480
Fuel Units & Descr: 182 - ELEMENT
Heavy Metal Mass: BOL=48.357kg; EOL=48.23kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 1.64

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	455.87	911.73	0.00E+00	3.88E-07	7.77E-07
Am-241	1.8331E-03	455.87	911.73	0.00E+00	8.36E-01	1.67E+00
Am-242m	1.4129E-06	455.87	911.73	0.00E+00	6.44E-04	1.29E-03
Am-243	1.4774E-07	455.87	911.73	0.00E+00	6.74E-05	1.35E-04
C-14	1.2871E-04	455.87	911.73	0.00E+00	5.87E-02	1.17E-01
Cl-36	2.8120E-06	455.87	911.73	0.00E+00	1.28E-03	2.56E-03
Cm-243	1.7940E-07	455.87	911.73	0.00E+00	8.18E-05	1.64E-04
Cm-244	1.6962E-06	455.87	911.73	0.00E+00	7.73E-04	1.55E-03
Co-60	1.2839E+00	455.87	911.73	0.00E+00	5.85E+02	1.17E+03
Cs-134	9.0541E-02	455.87	911.73	0.00E+00	4.13E+01	8.25E+01
Cs-135	3.2195E-05	455.87	911.73	0.00E+00	1.47E-02	2.94E-02
Cs-137	2.7564E+00	455.87	911.73	0.00E+00	1.26E+03	2.51E+03
Eu-154	1.5368E-02	455.87	911.73	0.00E+00	7.01E+00	1.40E+01
Eu-155	2.9293E-02	455.87	911.73	0.00E+00	1.34E+01	2.67E+01
Fe-55	7.7158E-01	455.87	911.73	0.00E+00	3.52E+02	7.03E+02
H-3	1.1111E-02	455.87	911.73	0.00E+00	5.07E+00	1.01E+01
I-129	7.3684E-07	455.87	911.73	0.00E+00	3.36E-04	6.72E-04
Kr-85	2.5263E-01	455.87	911.73	0.00E+00	1.15E+02	2.30E+02
Np-237	1.2427E-06	455.87	911.73	0.00E+00	5.67E-04	1.13E-03
Pa-231	3.8511E-09	455.87	911.73	0.00E+00	1.76E-06	3.51E-06
Pb-210	7.3880E-15	455.87	911.73	0.00E+00	3.37E-12	6.74E-12
Pm-147	2.1023E+00	455.87	911.73	0.00E+00	9.58E+02	1.92E+03
Pu-238	1.0383E-03	455.87	911.73	0.00E+00	4.73E-01	9.47E-01
Pu-239	5.5293E-03	455.87	911.73	0.00E+00	2.52E+00	5.04E+00
Pu-240	2.1278E-03	455.87	911.73	0.00E+00	9.70E-01	1.94E+00
Pu-241	1.0195E-01	455.87	911.73	0.00E+00	4.65E+01	9.30E+01
Pu-242	2.3128E-07	455.87	911.73	0.00E+00	1.05E-04	2.11E-04
Ra-226	5.2782E-14	455.87	911.73	0.00E+00	2.41E-11	4.81E-11
Ra-228	1.9338E-10	455.87	911.73	0.00E+00	8.82E-08	1.76E-07
Ru-106	9.1684E-02	455.87	911.73	0.00E+00	4.18E+01	8.36E+01
Se-79	1.3018E-05	455.87	911.73	0.00E+00	5.93E-03	1.19E-02
Sn-126	1.2167E-05	455.87	911.73	0.00E+00	5.55E-03	1.11E-02
Sr-90	2.6045E+00	455.87	911.73	0.00E+00	1.19E+03	2.37E+03
Tc-99	4.4241E-04	455.87	911.73	0.00E+00	2.02E-01	4.03E-01
Th-229	1.3713E-10	455.87	911.73	0.00E+00	6.25E-08	1.25E-07
Th-230	1.8090E-11	455.87	911.73	0.00E+00	8.25E-09	1.65E-08
Th-232	2.5278E-10	455.87	911.73	0.00E+00	1.15E-07	2.30E-07
Tl-208	1.6947E-06	455.87	911.73	0.00E+00	7.73E-06	1.55E-05
U-232	4.8737E-08	455.87	911.73	0.00E+00	2.22E-05	4.44E-05
U-233	1.2203E-07	455.87	911.73	0.00E+00	5.56E-05	1.11E-04
U-234	1.5925E-07	455.87	911.73	0.00E+00	7.26E-05	1.45E-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-06	455.87	0.00	1.30E-02	1.30E-02	1.30E-02
Y-90	2.6060E+00	455.87	911.73	0.00E+00	1.19E+03	2.38E+03
Other Radionuclides					1.64E+03	3.29E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.474E+14
0.0250	3.242E+13
0.0375	2.761E+13
0.0575	2.834E+13
0.0850	1.756E+13
0.1250	1.275E+13
0.2250	1.490E+13
0.3750	7.559E+12
0.5750	1.005E+14
0.8500	4.313E+12
1.2500	8.759E+13
1.7500	5.838E+10
2.2500	9.411E+10
2.7500	7.468E+08
3.5000	8.691E+07
5.0000	5.079E+02
7.0000	5.754E+01
11.0000	6.557E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.65E+01	5.31E+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
Nominal:	455.87	121.62
Bounding:		911.73

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.28	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
ROO Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
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

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	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	4.567E+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: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 10 years

Estimated Canister usage: 18"x10' 0.01

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	1.3731E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-241	2.3865E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-242m	1.3812E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-243	1.4767E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
C-14	1.2863E-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	1.5895E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-244	1.4008E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Co-60	6.6541E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-134	1.6887E-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	2.4556E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-154	1.0268E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-155	1.4570E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Fe-55	2.0361E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
H-3	8.3940E-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	1.8286E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.2462E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pa-231	4.9143E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pb-210	1.7173E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pm-147	5.6165E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-238	9.9820E-04	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	2.1263E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-241	8.0165E-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	9.9774E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ra-228	2.1729E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ru-106	2.9519E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Se-79	1.3017E-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	2.3128E+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	1.9459E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-230	2.5564E-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	4.6812E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-233	1.2206E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-234	1.7323E-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-238	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	7.42E-05	7.42E-05	7.42E-05
Y-90	2.3128E+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
SNF ID #: 1077
Fuel Units & Descr: 75 - ELEMENT
Heavy Metal Mass: BOL=14.7kg; EOL=14.445kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1999
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 10 years

Estimated Canister usage: 18"x10' 0.68

II. Estimates

Radionuclide	m CMWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.3731E-09	243.42	486.85	0.00E+00	3.34E-07	6.68E-07
Am-241	2.3865E-03	243.42	486.85	0.00E+00	5.81E-01	1.16E+00
Am-242m	1.3812E-06	243.42	486.85	0.00E+00	3.36E-04	6.72E-04
Am-243	1.4767E-07	243.42	486.85	0.00E+00	3.59E-05	7.19E-05
C-14	1.2863E-04	243.42	486.85	0.00E+00	3.13E-02	6.26E-02
Cl-36	2.8120E-06	243.42	486.85	0.00E+00	6.85E-04	1.37E-03
Cm-243	1.5895E-07	243.42	486.85	0.00E+00	3.87E-05	7.74E-05
Cm-244	1.4008E-06	243.42	486.85	0.00E+00	3.41E-04	6.82E-04
Co-60	6.6541E-01	243.42	486.85	0.00E+00	1.62E+02	3.24E+02
Cs-134	1.6887E-02	243.42	486.85	0.00E+00	4.11E+00	8.22E+00
Cs-135	3.2195E-05	243.42	486.85	0.00E+00	7.84E-03	1.57E-02
Cs-137	2.4556E+00	243.42	486.85	0.00E+00	5.98E+02	1.20E+03
Eu-154	1.0268E-02	243.42	486.85	0.00E+00	2.50E+00	5.00E+00
Eu-155	1.4570E-02	243.42	486.85	0.00E+00	3.55E+00	7.09E+00
Fe-55	2.0361E-01	243.42	486.85	0.00E+00	4.96E+01	9.91E+01
H-3	8.3940E-03	243.42	486.85	0.00E+00	2.04E+00	4.09E+00
I-129	7.3684E-07	243.42	486.85	0.00E+00	1.79E-04	3.59E-04
Kr-85	1.8286E-01	243.42	486.85	0.00E+00	4.45E+01	8.90E+01
Np-237	1.2462E-06	243.42	486.85	0.00E+00	3.03E-04	6.07E-04
Pa-231	4.9143E-09	243.42	486.85	0.00E+00	1.20E-06	2.39E-06
Pb-210	1.7173E-14	243.42	486.85	0.00E+00	4.18E-12	8.36E-12
Pm-147	5.6165E-01	243.42	486.85	0.00E+00	1.37E+02	2.73E+02
Pu-238	9.9820E-04	243.42	486.85	0.00E+00	2.43E-01	4.86E-01
Pu-239	5.5293E-03	243.42	486.85	0.00E+00	1.35E+00	2.69E+00
Pu-240	2.1263E-03	243.42	486.85	0.00E+00	5.18E-01	1.04E+00
Pu-241	8.0165E-02	243.42	486.85	0.00E+00	1.95E+01	3.90E+01
Pu-242	2.3128E-07	243.42	486.85	0.00E+00	5.63E-05	1.13E-04
Ra-226	9.9774E-14	243.42	486.85	0.00E+00	2.43E-11	4.86E-11
Ra-228	2.1729E-10	243.42	486.85	0.00E+00	5.29E-08	1.06E-07
Ru-106	2.9519E-03	243.42	486.85	0.00E+00	7.19E-01	1.44E+00
Se-79	1.3017E-05	243.42	486.85	0.00E+00	3.17E-03	6.34E-03
Sn-126	1.2167E-05	243.42	486.85	0.00E+00	2.96E-03	5.92E-03
Sr-90	2.3128E+00	243.42	486.85	0.00E+00	5.63E+02	1.13E+03
Tc-99	4.4241E-04	243.42	486.85	0.00E+00	1.08E-01	2.15E-01
Th-229	1.9459E-10	243.42	486.85	0.00E+00	4.74E-08	9.47E-08
Th-230	2.5564E-11	243.42	486.85	0.00E+00	6.22E-09	1.24E-08
Th-232	2.5278E-10	243.42	486.85	0.00E+00	6.15E-08	1.23E-07
Tl-208	1.6947E-08	243.42	486.85	0.00E+00	4.13E-06	8.25E-06
U-232	4.6812E-08	243.42	486.85	0.00E+00	1.14E-05	2.28E-05
U-233	1.2206E-07	243.42	486.85	0.00E+00	2.97E-05	5.94E-05
U-234	1.7323E-07	243.42	486.85	0.00E+00	4.22E-05	8.43E-05
U-235	-2.6194E-06	243.42	0.00	6.32E-03	5.68E-03	6.32E-03
U-236	1.2693E-05	243.42	486.85	0.00E+00	3.09E-03	6.18E-03
U-238	-3.6331E-08	243.42	0.00	3.96E-03	3.95E-03	3.96E-03
Y-90	2.3128E+00	243.42	486.85	0.00E+00	5.63E+02	1.13E+03
Other Radionuclides					5.97E+02	1.19E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.290E+13
0.0250	1.332E+13
0.0375	1.138E+13
0.0575	1.213E+13
0.0850	7.359E+12
0.1250	4.838E+12
0.2250	6.277E+12
0.3750	2.883E+12
0.5750	4.517E+13
0.8500	8.063E+11
1.2500	2.424E+13
1.7500	1.459E+10
2.2500	7.620E+08
2.7500	1.261E+07
3.5000	1.495E+06
5.0000	2.632E+02
7.0000	2.978E+01
11.0000	3.391E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.53E+00	1.91E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	0.00	243.42	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		486.85	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.49	
Bounding:	0.97	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (DEMOUNTABLE) U OF AZ
SNF ID #: 971
Fuel Units & Descr: 1 - ELEMENT
Heavy Metal Mass: BOL=0.195kg; EOL=0.181kg
RCD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
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-238	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
SNF ID #: 619
Fuel Units & Descr: 4 - ELEMENT
Heavy Metal Mass: BOL=0.583kg; EOL=0.556kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1996
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 10 years

Estimated Canister usage: 18"x10' 0.04

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.3731E-09	25.58	51.17	0.00E+00	3.51E-08	7.03E-08
Am-241	2.3865E-03	25.58	51.17	0.00E+00	6.11E-02	1.22E-01
Am-242m	1.3812E-06	25.58	51.17	0.00E+00	3.53E-05	7.07E-05
Am-243	1.4767E-07	25.58	51.17	0.00E+00	3.78E-06	7.56E-06
C-14	1.2863E-04	25.58	51.17	0.00E+00	3.29E-03	6.58E-03
Cl-36	2.8120E-06	25.58	51.17	0.00E+00	7.19E-05	1.44E-04
Cm-243	1.5895E-07	25.58	51.17	0.00E+00	4.07E-06	8.13E-06
Cm-244	1.4008E-06	25.58	51.17	0.00E+00	3.58E-05	7.17E-05
Co-60	6.6541E-01	25.58	51.17	0.00E+00	1.70E+01	3.40E+01
Cs-134	1.6887E-02	25.58	51.17	0.00E+00	4.32E-01	8.64E-01
Cs-135	3.2195E-05	25.58	51.17	0.00E+00	8.24E-04	1.65E-03
Cs-137	2.4556E+00	25.58	51.17	0.00E+00	6.28E+01	1.26E+02
Eu-154	1.0268E-02	25.58	51.17	0.00E+00	2.63E-01	5.25E-01
Eu-155	1.4570E-02	25.58	51.17	0.00E+00	3.73E-01	7.45E-01
Fe-55	2.0361E-01	25.58	51.17	0.00E+00	5.21E+00	1.04E+01
H-3	8.3940E-03	25.58	51.17	0.00E+00	2.15E-01	4.29E-01
I-129	7.3684E-07	25.58	51.17	0.00E+00	1.89E-05	3.77E-05
Kr-85	1.8286E-01	25.58	51.17	0.00E+00	4.68E+00	9.36E+00
Np-237	1.2462E-06	25.58	51.17	0.00E+00	3.19E-05	6.38E-05
Pa-231	4.9143E-09	25.58	51.17	0.00E+00	1.26E-07	2.51E-07
Pb-210	1.7173E-14	25.58	51.17	0.00E+00	4.39E-13	8.79E-13
Pm-147	5.6165E-01	25.58	51.17	0.00E+00	1.44E+01	2.87E+01
Pu-238	9.9820E-04	25.58	51.17	0.00E+00	2.55E-02	5.11E-02
Pu-239	5.5293E-03	25.58	51.17	0.00E+00	1.41E-01	2.83E-01
Pu-240	2.1263E-03	25.58	51.17	0.00E+00	5.44E-02	1.09E-01
Pu-241	8.0165E-02	25.58	51.17	0.00E+00	2.05E+00	4.10E+00
Pu-242	2.3128E-07	25.58	51.17	0.00E+00	5.92E-06	1.18E-05
Ra-226	9.9774E-14	25.58	51.17	0.00E+00	2.55E-12	5.11E-12
Ra-228	2.1729E-10	25.58	51.17	0.00E+00	5.56E-09	1.11E-08
Ru-106	2.9519E-03	25.58	51.17	0.00E+00	7.55E-02	1.51E-01
Se-79	1.3017E-05	25.58	51.17	0.00E+00	3.33E-04	6.66E-04
Sn-126	1.2167E-05	25.58	51.17	0.00E+00	3.11E-04	6.23E-04
Sr-90	2.3128E+00	25.58	51.17	0.00E+00	5.92E+01	1.18E+02
Tc-99	4.4241E-04	25.58	51.17	0.00E+00	1.13E-02	2.26E-02
Th-229	1.9459E-10	25.58	51.17	0.00E+00	4.98E-09	9.96E-09
Th-230	2.5564E-11	25.58	51.17	0.00E+00	6.54E-10	1.31E-09
Th-232	2.5278E-10	25.58	51.17	0.00E+00	6.47E-09	1.29E-08
Tl-206	1.6947E-08	25.58	51.17	0.00E+00	4.34E-07	8.67E-07
U-232	4.6812E-08	25.58	51.17	0.00E+00	1.20E-06	2.40E-06
U-233	1.2206E-07	25.58	51.17	0.00E+00	3.12E-06	6.25E-06
U-234	1.7323E-07	25.58	51.17	0.00E+00	4.43E-06	8.86E-06
U-235	-2.6194E-06	25.58	0.00	5.81E-04	5.14E-04	5.81E-04
U-236	1.2693E-05	25.58	51.17	0.00E+00	3.25E-04	6.49E-04
U-238	-3.6331E-08	25.58	0.00	1.06E-04	1.05E-04	1.06E-04
Y-90	2.3128E+00	25.58	51.17	0.00E+00	5.92E+01	1.18E+02
Other Radionuclides					6.27E+01	1.25E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.610E+12
0.0250	1.400E+12
0.0375	1.196E+12
0.0575	1.275E+12
0.0850	7.734E+11
0.1250	5.084E+11
0.2250	6.596E+11
0.3750	3.030E+11
0.5750	4.747E+12
0.8500	8.474E+10
1.2500	2.548E+12
1.7500	1.533E+09
2.2500	8.009E+07
2.7500	1.326E+06
3.5000	1.571E+05
5.0000	2.695E+01
7.0000	3.048E+00
11.0000	3.470E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.60E+00	2.00E+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 %:	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: 2010
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' 0.85

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	807.60	1,615.20	0.00E+00	6.88E-07	1.38E-06	Avg. MeV	
Am-241	1.8331E-03	807.60	1,615.20	0.00E+00	1.48E+00	2.96E+00	0.0150	2.611E+14
Am-242m	1.4129E-06	807.60	1,615.20	0.00E+00	1.14E-03	2.28E-03	0.0250	5.744E+13
Am-243	1.4774E-07	807.60	1,615.20	0.00E+00	1.19E-04	2.39E-04	0.0375	4.892E+13
C-14	1.2871E-04	807.60	1,615.20	0.00E+00	1.04E-01	2.08E-01	0.0575	5.021E+13
Cl-36	2.8120E-06	807.60	1,615.20	0.00E+00	2.27E-03	4.54E-03	0.0850	3.111E+13
Cm-243	1.7940E-07	807.60	1,615.20	0.00E+00	1.45E-04	2.90E-04	0.1250	2.259E+13
Cm-244	1.6962E-06	807.60	1,615.20	0.00E+00	1.37E-03	2.74E-03	0.2250	2.639E+13
Co-60	1.2839E+00	807.60	1,615.20	0.00E+00	1.04E+03	2.07E+03	0.3750	1.339E+13
Cs-134	9.0541E-02	807.60	1,615.20	0.00E+00	7.31E+01	1.46E+02	0.5750	1.780E+14
Cs-135	3.2195E-05	807.60	1,615.20	0.00E+00	2.60E-02	5.20E-02	0.8500	7.641E+12
Cs-137	2.7564E+00	807.60	1,615.20	0.00E+00	2.23E+03	4.45E+03	1.2500	1.552E+14
Eu-154	1.5368E-02	807.60	1,615.20	0.00E+00	1.24E+01	2.48E+01	1.7500	1.034E+11
Eu-155	2.9293E-02	807.60	1,615.20	0.00E+00	2.37E+01	4.73E+01	2.2500	1.667E+11
Fe-55	7.7158E-01	807.60	1,615.20	0.00E+00	6.23E+02	1.25E+03	2.7500	1.323E+08
H-3	1.1111E-02	807.60	1,615.20	0.00E+00	8.97E+00	1.79E+01	3.5000	1.540E+08
I-129	7.3684E-07	807.60	1,615.20	0.00E+00	5.95E-04	1.19E-03	5.0000	8.759E+02
Kr-85	2.5263E-01	807.60	1,615.20	0.00E+00	2.04E+02	4.08E+02	7.0000	9.919E+01
Np-237	1.2427E-06	807.60	1,615.20	0.00E+00	1.00E-03	2.01E-03	11.0000	1.130E+01
Pa-231	3.8511E-09	807.60	1,615.20	0.00E+00	3.11E-06	6.22E-06		
Pb-210	7.3880E-15	807.60	1,615.20	0.00E+00	5.97E-12	1.19E-11		
Pm-147	2.1023E+00	807.60	1,615.20	0.00E+00	1.70E+03	3.40E+03		
Pu-238	1.0383E-03	807.60	1,615.20	0.00E+00	8.39E-01	1.68E+00		
Pu-239	5.5293E-03	807.60	1,615.20	0.00E+00	4.47E+00	8.93E+00		
Pu-240	2.1278E-03	807.60	1,615.20	0.00E+00	1.72E+00	3.44E+00		
Pu-241	1.0195E-01	807.60	1,615.20	0.00E+00	8.23E+01	1.65E+02		
Pu-242	2.3128E-07	807.60	1,615.20	0.00E+00	1.87E-04	3.74E-04		
Ra-226	5.2782E-14	807.60	1,615.20	0.00E+00	4.26E-11	8.53E-11		
Ra-228	1.9338E-10	807.60	1,615.20	0.00E+00	1.56E-07	3.12E-07		
Ru-106	9.1684E-02	807.60	1,615.20	0.00E+00	7.40E+01	1.48E+02		
Se-79	1.3018E-05	807.60	1,615.20	0.00E+00	1.05E-02	2.10E-02		
Sn-126	1.2167E-05	807.60	1,615.20	0.00E+00	9.83E-03	1.97E-02		
Sr-90	2.6045E+00	807.60	1,615.20	0.00E+00	2.10E+03	4.21E+03		
Tc-99	4.4241E-04	807.60	1,615.20	0.00E+00	3.57E-01	7.15E-01		
Th-229	1.3713E-10	807.60	1,615.20	0.00E+00	1.11E-07	2.21E-07		
Th-230	1.8090E-11	807.60	1,615.20	0.00E+00	1.46E-08	2.92E-08		
Th-232	2.5278E-10	807.60	1,615.20	0.00E+00	2.04E-07	4.08E-07		
Tl-208	1.6947E-08	807.60	1,615.20	0.00E+00	1.37E-05	2.74E-05		
U-232	4.8737E-08	807.60	1,615.20	0.00E+00	3.94E-05	7.87E-05	Thermal Power	
U-233	1.2203E-07	807.60	1,615.20	0.00E+00	9.86E-05	1.97E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.5925E-07	807.60	1,615.20	0.00E+00	1.29E-04	2.57E-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	4.70E+01	9.40E+01
U-238	-3.6331E-08	807.60	0.00	1.27E-02	1.27E-02	1.27E-02	Total	Total
Y-90	2.6060E+00	807.60	1,615.20	0.00E+00	2.10E+03	4.21E+03		
Other Radionuclides					2.91E+03	5.82E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[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	Estimated EOL HM/Given EOL HM
Nominal:	0.50	1.81	1.00
Bounding:	1.00		

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

[2]Total burnup for all fuel associated with this worksheet must be divided 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: 2010
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' = 0.32

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	8.5173E-10	2,381.55	4,763.11	0.00E+00	2.03E-06	4.06E-06
Am-241	1.8331E-03	2,381.55	4,763.11	0.00E+00	4.37E+00	8.73E+00
Am-242m	1.4129E-06	2,381.55	4,763.11	0.00E+00	3.36E-03	6.73E-03
Am-243	1.4774E-07	2,381.55	4,763.11	0.00E+00	3.52E-04	7.04E-04
C-14	1.2871E-04	2,381.55	4,763.11	0.00E+00	3.07E-01	6.13E-01
Cl-36	2.8120E-06	2,381.55	4,763.11	0.00E+00	6.70E-03	1.34E-02
Cm-243	1.7940E-07	2,381.55	4,763.11	0.00E+00	4.27E-04	8.54E-04
Cm-244	1.6962E-06	2,381.55	4,763.11	0.00E+00	4.04E-03	8.08E-03
Co-60	1.2839E+00	2,381.55	4,763.11	0.00E+00	3.06E+03	6.12E+03
Cs-134	9.0541E-02	2,381.55	4,763.11	0.00E+00	2.16E+02	4.31E+02
Cs-135	3.2195E-05	2,381.55	4,763.11	0.00E+00	7.67E-02	1.53E-01
Cs-137	2.7564E+00	2,381.55	4,763.11	0.00E+00	6.56E+03	1.31E+04
Eu-154	1.5368E-02	2,381.55	4,763.11	0.00E+00	3.66E+01	7.32E+01
Eu-155	2.9293E-02	2,381.55	4,763.11	0.00E+00	6.98E+01	1.40E+02
Fe-55	7.7158E-01	2,381.55	4,763.11	0.00E+00	1.84E+03	3.68E+03
H-3	1.1111E-02	2,381.55	4,763.11	0.00E+00	2.65E+01	5.29E+01
I-129	7.3684E-07	2,381.55	4,763.11	0.00E+00	1.75E-03	3.51E-03
Kr-85	2.5263E-01	2,381.55	4,763.11	0.00E+00	6.02E+02	1.20E+03
Np-237	1.2427E-06	2,381.55	4,763.11	0.00E+00	2.96E-03	5.92E-03
Pa-231	3.8511E-09	2,381.55	4,763.11	0.00E+00	9.17E-06	1.83E-05
Pb-210	7.3880E-15	2,381.55	4,763.11	0.00E+00	1.76E-11	3.52E-11
Pm-147	2.1023E+00	2,381.55	4,763.11	0.00E+00	5.01E+03	1.00E+04
Pu-238	1.0383E-03	2,381.55	4,763.11	0.00E+00	2.47E+00	4.95E+00
Pu-239	5.5293E-03	2,381.55	4,763.11	0.00E+00	1.32E+01	2.63E+01
Pu-240	2.1278E-03	2,381.55	4,763.11	0.00E+00	5.07E+00	1.01E+01
Pu-241	1.0195E-01	2,381.55	4,763.11	0.00E+00	2.43E+02	4.86E+02
Pu-242	2.3128E-07	2,381.55	4,763.11	0.00E+00	5.51E-04	1.10E-03
Ra-226	5.2782E-14	2,381.55	4,763.11	0.00E+00	1.26E-10	2.51E-10
Ra-228	1.9338E-10	2,381.55	4,763.11	0.00E+00	4.61E-07	9.21E-07
Ru-106	9.1684E-02	2,381.55	4,763.11	0.00E+00	2.18E+02	4.37E+02
Se-79	1.3018E-05	2,381.55	4,763.11	0.00E+00	3.10E-02	6.20E-02
Sn-126	1.2167E-05	2,381.55	4,763.11	0.00E+00	2.90E-02	5.80E-02
Sr-90	2.6045E+00	2,381.55	4,763.11	0.00E+00	6.20E+03	1.24E+04
Tc-99	4.4241E-04	2,381.55	4,763.11	0.00E+00	1.05E+00	2.11E+00
Th-229	1.3713E-10	2,381.55	4,763.11	0.00E+00	3.27E-07	6.53E-07
Th-230	1.8090E-11	2,381.55	4,763.11	0.00E+00	4.31E-08	8.62E-08
Th-232	2.5278E-10	2,381.55	4,763.11	0.00E+00	6.02E-07	1.20E-06
Tl-208	1.6947E-08	2,381.55	4,763.11	0.00E+00	4.04E-05	8.07E-05
U-232	4.8737E-08	2,381.55	4,763.11	0.00E+00	1.16E-04	2.32E-04
U-233	1.2203E-07	2,381.55	4,763.11	0.00E+00	2.91E-04	5.81E-04
U-234	1.5925E-07	2,381.55	4,763.11	0.00E+00	3.79E-04	7.59E-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	2.6060E+00	2,381.55	4,763.11	0.00E+00	6.21E+03	1.24E+04
Other Radionuclides					8.59E+03	1.72E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.698E+14
0.0250	1.694E+14
0.0375	1.443E+14
0.0575	1.481E+14
0.0850	9.173E+13
0.1250	6.661E+13
0.2250	7.781E+13
0.3750	3.949E+13
0.5750	5.250E+14
0.8500	2.253E+13
1.2500	4.576E+14
1.7500	3.050E+11
2.2500	4.916E+11
2.7500	3.901E+09
3.5000	4.540E+08
5.0000	2.507E+03
7.0000	2.838E+02
11.0000	3.233E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.39E+02	2.77E+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	Estimated EOL HM/Given EOL HM
Nominal:	3.85	2.78	1.00
Bounding:	7.70		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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: 2010
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' 0.90

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	4,143.00	8,285.99	0.00E+00	3.53E-06	7.06E-06
Am-241	1.8331E-03	4,143.00	8,285.99	0.00E+00	7.59E+00	1.52E+01
Am-242m	1.4129E-06	4,143.00	8,285.99	0.00E+00	5.85E-03	1.17E-02
Am-243	1.4774E-07	4,143.00	8,285.99	0.00E+00	6.12E-04	1.22E-03
C-14	1.2871E-04	4,143.00	8,285.99	0.00E+00	5.33E-01	1.07E+00
Cl-36	2.8120E-06	4,143.00	8,285.99	0.00E+00	1.17E-02	2.33E-02
Cm-243	1.7940E-07	4,143.00	8,285.99	0.00E+00	7.43E-04	1.49E-03
Cm-244	1.6962E-06	4,143.00	8,285.99	0.00E+00	7.03E-03	1.41E-02
Co-60	1.2839E+00	4,143.00	8,285.99	0.00E+00	5.32E+03	1.06E+04
Cs-134	9.0541E-02	4,143.00	8,285.99	0.00E+00	3.75E+02	7.50E+02
Cs-135	3.2195E-05	4,143.00	8,285.99	0.00E+00	1.33E-01	2.67E-01
Cs-137	2.7564E+00	4,143.00	8,285.99	0.00E+00	1.14E+04	2.28E+04
Eu-154	1.5368E-02	4,143.00	8,285.99	0.00E+00	6.37E+01	1.27E+02
Eu-155	2.9293E-02	4,143.00	8,285.99	0.00E+00	1.21E+02	2.43E+02
Fe-55	7.7158E-01	4,143.00	8,285.99	0.00E+00	3.20E+03	6.39E+03
H-3	1.1111E-02	4,143.00	8,285.99	0.00E+00	4.60E+01	9.21E+01
I-129	7.3684E-07	4,143.00	8,285.99	0.00E+00	3.05E-03	6.11E-03
Kr-85	2.5263E-01	4,143.00	8,285.99	0.00E+00	1.05E+03	2.09E+03
Np-237	1.2427E-06	4,143.00	8,285.99	0.00E+00	5.15E-03	1.03E-02
Pa-231	3.8511E-09	4,143.00	8,285.99	0.00E+00	1.60E-05	3.19E-05
Pb-210	7.3880E-15	4,143.00	8,285.99	0.00E+00	3.06E-11	6.12E-11
Pm-147	2.1023E+00	4,143.00	8,285.99	0.00E+00	8.71E+03	1.74E+04
Pu-238	1.0383E-03	4,143.00	8,285.99	0.00E+00	4.30E+00	8.60E+00
Pu-239	5.5293E-03	4,143.00	8,285.99	0.00E+00	2.29E+01	4.58E+01
Pu-240	2.1278E-03	4,143.00	8,285.99	0.00E+00	8.82E+00	1.76E+01
Pu-241	1.0195E-01	4,143.00	8,285.99	0.00E+00	4.22E+02	8.45E+02
Pu-242	2.3128E-07	4,143.00	8,285.99	0.00E+00	9.58E-04	1.92E-03
Ra-226	5.2782E-14	4,143.00	8,285.99	0.00E+00	2.19E-10	4.37E-10
Ra-228	1.9338E-10	4,143.00	8,285.99	0.00E+00	8.01E-07	1.60E-06
Ru-106	9.1684E-02	4,143.00	8,285.99	0.00E+00	3.80E+02	7.60E+02
Se-79	1.3018E-05	4,143.00	8,285.99	0.00E+00	5.39E-02	1.08E-01
Sn-126	1.2167E-05	4,143.00	8,285.99	0.00E+00	5.04E-02	1.01E-01
Sr-90	2.6045E+00	4,143.00	8,285.99	0.00E+00	1.08E+04	2.16E+04
Tc-99	4.4241E-04	4,143.00	8,285.99	0.00E+00	1.83E+00	3.67E+00
Th-229	1.3713E-10	4,143.00	8,285.99	0.00E+00	5.68E-07	1.14E-06
Th-230	1.8090E-11	4,143.00	8,285.99	0.00E+00	7.49E-08	1.50E-07
Th-232	2.5278E-10	4,143.00	8,285.99	0.00E+00	1.05E-06	2.09E-06
Tl-208	1.6947E-08	4,143.00	8,285.99	0.00E+00	7.02E-05	1.40E-04
U-232	4.8737E-06	4,143.00	8,285.99	0.00E+00	2.02E-04	4.04E-04
U-233	1.2203E-07	4,143.00	8,285.99	0.00E+00	5.06E-04	1.01E-03
U-234	1.5925E-07	4,143.00	8,285.99	0.00E+00	6.60E-04	1.32E-03
U-235	-2.6194E-06	4,143.00	0.00	2.18E-02	1.10E-02	2.18E-02
U-236	1.2693E-05	4,143.00	8,285.99	0.00E+00	5.26E-02	1.05E-01
U-238	-3.6331E-06	4,143.00	0.00	1.35E-02	1.34E-02	1.35E-02
Y-90	2.6060E+00	4,143.00	8,285.99	0.00E+00	1.08E+04	2.16E+04
Other Radionuclides					1.49E+04	2.99E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.339E+15
0.0250	2.947E+14
0.0375	2.509E+14
0.0575	2.576E+14
0.0850	1.596E+14
0.1250	1.159E+14
0.2250	1.354E+14
0.3750	6.870E+13
0.5750	9.133E+14
0.8500	3.920E+13
1.2500	7.960E+14
1.7500	5.306E+11
2.2500	8.553E+11
2.7500	6.787E+09
3.5000	7.899E+08
5.0000	4.374E+03
7.0000	4.951E+02
11.0000	5.639E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.41E+02	4.82E+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	Estimated EOL HM/Given EOL HM
Nominal:	2.41	8.72	1.00
Bounding:	4.82		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.15

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	994.28	1,988.57	0.00E+00	8.47E-07	1.69E-06
Am-241	1.8331E-03	994.28	1,988.57	0.00E+00	1.82E+00	3.65E+00
Am-242m	1.4129E-06	994.28	1,988.57	0.00E+00	1.40E-03	2.81E-03
Am-243	1.4774E-07	994.28	1,988.57	0.00E+00	1.47E-04	2.94E-04
C-14	1.2871E-04	994.28	1,988.57	0.00E+00	1.28E-01	2.56E-01
Cl-36	2.8120E-06	994.28	1,988.57	0.00E+00	2.80E-03	5.59E-03
Cm-243	1.7940E-07	994.28	1,988.57	0.00E+00	1.78E-04	3.57E-04
Cm-244	1.6962E-06	994.28	1,988.57	0.00E+00	1.69E-03	3.37E-03
Co-60	1.2839E+00	994.28	1,988.57	0.00E+00	1.28E+03	2.55E+03
Cs-134	9.0541E-02	994.28	1,988.57	0.00E+00	9.00E+01	1.80E+02
Cs-135	3.2195E-05	994.28	1,988.57	0.00E+00	3.20E-02	6.40E-02
Cs-137	2.7564E+00	994.28	1,988.57	0.00E+00	2.74E+03	5.48E+03
Eu-154	1.5368E-02	994.28	1,988.57	0.00E+00	1.53E+01	3.06E+01
Eu-155	2.9293E-02	994.28	1,988.57	0.00E+00	2.91E+01	5.83E+01
Fe-55	7.7158E-01	994.28	1,988.57	0.00E+00	7.67E+02	1.53E+03
H-3	1.1111E-02	994.28	1,988.57	0.00E+00	1.10E+01	2.21E+01
I-129	7.3684E-07	994.28	1,988.57	0.00E+00	7.33E-04	1.47E-03
Kr-85	2.5263E-01	994.28	1,988.57	0.00E+00	2.51E+02	5.02E+02
Np-237	1.2427E-06	994.28	1,988.57	0.00E+00	1.24E-03	2.47E-03
Pa-231	3.8511E-09	994.28	1,988.57	0.00E+00	3.83E-06	7.66E-06
Pb-210	7.3880E-15	994.28	1,988.57	0.00E+00	7.35E-12	1.47E-11
Pm-147	2.1023E+00	994.28	1,988.57	0.00E+00	2.09E+03	4.18E+03
Pu-238	1.0383E-03	994.28	1,988.57	0.00E+00	1.03E+00	2.06E+00
Pu-239	5.5293E-03	994.28	1,988.57	0.00E+00	5.50E+00	1.10E+01
Pu-240	2.1278E-03	994.28	1,988.57	0.00E+00	2.12E+00	4.23E+00
Pu-241	1.0195E-01	994.28	1,988.57	0.00E+00	1.01E+02	2.03E+02
Pu-242	2.3128E-07	994.28	1,988.57	0.00E+00	2.30E-04	4.60E-04
Ra-226	5.2782E-14	994.28	1,988.57	0.00E+00	5.25E-11	1.05E-10
Ra-228	1.9338E-10	994.28	1,988.57	0.00E+00	1.92E-07	3.85E-07
Ru-106	9.1684E-02	994.28	1,988.57	0.00E+00	9.12E+01	1.82E+02
Se-79	1.3018E-05	994.28	1,988.57	0.00E+00	1.29E-02	2.59E-02
Sn-126	1.2167E-05	994.28	1,988.57	0.00E+00	1.21E-02	2.42E-02
Sr-90	2.6045E+00	994.28	1,988.57	0.00E+00	2.59E+03	5.18E+03
Tc-99	4.4241E-04	994.28	1,988.57	0.00E+00	4.40E-01	8.80E-01
Th-229	1.3713E-10	994.28	1,988.57	0.00E+00	1.36E-07	2.73E-07
Th-230	1.8090E-11	994.28	1,988.57	0.00E+00	1.80E-08	3.60E-08
Th-232	2.5278E-10	994.28	1,988.57	0.00E+00	2.51E-07	5.03E-07
Tl-208	1.6947E-08	994.28	1,988.57	0.00E+00	1.69E-05	3.37E-05
U-232	4.8737E-08	994.28	1,988.57	0.00E+00	4.85E-05	9.69E-05
U-233	1.2203E-07	994.28	1,988.57	0.00E+00	1.21E-04	2.43E-04
U-234	1.5925E-07	994.28	1,988.57	0.00E+00	1.58E-04	3.17E-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	2.6060E+00	994.28	1,988.57	0.00E+00	2.59E+03	5.18E+03
Other Radionuclides					3.58E+03	7.17E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.214E+14
0.0250	7.072E+13
0.0375	6.023E+13
0.0575	6.182E+13
0.0850	3.830E+13
0.1250	2.781E+13
0.2250	3.249E+13
0.3750	1.649E+13
0.5750	2.192E+14
0.8500	9.407E+12
1.2500	1.910E+14
1.7500	1.273E+11
2.2500	2.053E+11
2.7500	1.629E+09
3.5000	1.896E+08
5.0000	1.106E+03
7.0000	1.255E+02
11.0000	1.430E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.79E+01	1.16E+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 %:	20.02427184	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	994.28	122.19
Bounding:		1,988.57

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.28	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: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.30

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	8.5173E-10	1,118.57	2,237.14	0.00E+00	9.53E-07	1.91E-06
Am-241	1.8331E-03	1,118.57	2,237.14	0.00E+00	2.05E+00	4.10E+00
Am-242m	1.4129E-06	1,118.57	2,237.14	0.00E+00	1.58E-03	3.16E-03
Am-243	1.4774E-07	1,118.57	2,237.14	0.00E+00	1.65E-04	3.31E-04
C-14	1.2871E-04	1,118.57	2,237.14	0.00E+00	1.44E-01	2.88E-01
Cl-36	2.8120E-06	1,118.57	2,237.14	0.00E+00	3.15E-03	6.29E-03
Cm-243	1.7940E-07	1,118.57	2,237.14	0.00E+00	2.01E-04	4.01E-04
Cm-244	1.6962E-06	1,118.57	2,237.14	0.00E+00	1.90E-03	3.79E-03
Co-60	1.2839E+00	1,118.57	2,237.14	0.00E+00	1.44E+03	2.87E+03
Cs-134	9.0541E-02	1,118.57	2,237.14	0.00E+00	1.01E+02	2.03E+02
Cs-135	3.2195E-05	1,118.57	2,237.14	0.00E+00	3.60E-02	7.20E-02
Cs-137	2.7564E+00	1,118.57	2,237.14	0.00E+00	3.08E+03	6.17E+03
Eu-154	1.5368E-02	1,118.57	2,237.14	0.00E+00	1.72E+01	3.44E+01
Eu-155	2.9293E-02	1,118.57	2,237.14	0.00E+00	3.28E+01	6.55E+01
Fe-55	7.7158E-01	1,118.57	2,237.14	0.00E+00	8.63E+02	1.73E+03
H-3	1.1111E-02	1,118.57	2,237.14	0.00E+00	1.24E+01	2.49E+01
I-129	7.3684E-07	1,118.57	2,237.14	0.00E+00	8.24E-04	1.65E-03
Kr-85	2.5263E-01	1,118.57	2,237.14	0.00E+00	2.83E+02	5.65E+02
Np-237	1.2427E-06	1,118.57	2,237.14	0.00E+00	1.39E-03	2.78E-03
Pa-231	3.8511E-09	1,118.57	2,237.14	0.00E+00	4.31E-06	8.62E-06
Pb-210	7.3880E-15	1,118.57	2,237.14	0.00E+00	8.26E-12	1.65E-11
Pm-147	2.1023E+00	1,118.57	2,237.14	0.00E+00	2.35E+03	4.70E+03
Pu-238	1.0383E-03	1,118.57	2,237.14	0.00E+00	1.16E+00	2.32E+00
Pu-239	5.5293E-03	1,118.57	2,237.14	0.00E+00	6.18E+00	1.24E+01
Pu-240	2.1278E-03	1,118.57	2,237.14	0.00E+00	2.38E+00	4.76E+00
Pu-241	1.0195E-01	1,118.57	2,237.14	0.00E+00	1.14E+02	2.28E+02
Pu-242	2.3128E-07	1,118.57	2,237.14	0.00E+00	2.59E-04	5.17E-04
Ra-226	5.2782E-14	1,118.57	2,237.14	0.00E+00	5.90E-11	1.18E-10
Ra-228	1.9338E-10	1,118.57	2,237.14	0.00E+00	2.16E-07	4.33E-07
Ru-106	9.1684E-02	1,118.57	2,237.14	0.00E+00	1.03E+02	2.05E+02
Se-79	1.3018E-05	1,118.57	2,237.14	0.00E+00	1.46E-02	2.91E-02
Sn-126	1.2167E-05	1,118.57	2,237.14	0.00E+00	1.36E-02	2.72E-02
Sr-90	2.6045E+00	1,118.57	2,237.14	0.00E+00	2.91E+03	5.83E+03
Tc-99	4.4241E-04	1,118.57	2,237.14	0.00E+00	4.95E-01	9.90E-01
Th-229	1.3713E-10	1,118.57	2,237.14	0.00E+00	1.53E-07	3.07E-07
Th-230	1.8090E-11	1,118.57	2,237.14	0.00E+00	2.02E-08	4.05E-08
Th-232	2.5278E-10	1,118.57	2,237.14	0.00E+00	2.83E-07	5.66E-07
Tl-208	1.6947E-08	1,118.57	2,237.14	0.00E+00	1.90E-05	3.79E-05
U-232	4.8737E-08	1,118.57	2,237.14	0.00E+00	5.45E-05	1.09E-04
U-233	1.2203E-07	1,118.57	2,237.14	0.00E+00	1.36E-04	2.73E-04
U-234	1.5925E-07	1,118.57	2,237.14	0.00E+00	1.78E-04	3.56E-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	2.6060E+00	1,118.57	2,237.14	0.00E+00	2.92E+03	5.83E+03
Other Radionuclides					4.03E+03	8.07E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.616E+14
0.0250	7.956E+13
0.0375	6.775E+13
0.0575	6.954E+13
0.0850	4.308E+13
0.1250	3.129E+13
0.2250	3.655E+13
0.3750	1.855E+13
0.5750	2.466E+14
0.8500	1.058E+13
1.2500	2.149E+14
1.7500	1.433E+11
2.2500	2.309E+11
2.7500	1.832E+09
3.5000	2.133E+08
5.0000	1.246E+03
7.0000	1.412E+02
11.0000	1.609E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.51E+01	1.30E+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 %:	20.024	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: 2010
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

	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	2.8488E-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: 2010
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: 15 years

Estimated Canister usage:	
18"x10'	0.05

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	5.6765E-10	84.97	169.94	0.00E+00	4.82E-08	9.65E-08
Am-241	1.1720E-02	84.97	169.94	0.00E+00	9.96E-01	1.99E+00
Am-242m	2.3361E-05	84.97	169.94	0.00E+00	1.98E-03	3.97E-03
Am-243	3.0953E-05	84.97	169.94	0.00E+00	2.63E-03	5.26E-03
C-14	1.2574E-04	84.97	169.94	0.00E+00	1.07E-02	2.14E-02
Cl-36	2.6624E-06	84.97	169.94	0.00E+00	2.26E-04	4.52E-04
Cm-243	2.9991E-05	84.97	169.94	0.00E+00	2.55E-03	5.10E-03
Cm-244	2.7977E-03	84.97	169.94	0.00E+00	2.38E-01	4.75E-01
Co-60	3.3343E-01	84.97	169.94	0.00E+00	2.83E+01	5.67E+01
Cs-134	2.2760E-02	84.97	169.94	0.00E+00	1.93E+00	3.87E+00
Cs-135	1.9753E-05	84.97	169.94	0.00E+00	1.68E-03	3.36E-03
Cs-137	2.1723E+00	84.97	169.94	0.00E+00	1.85E+02	3.69E+02
Eu-154	5.5066E-02	84.97	169.94	0.00E+00	4.68E+00	9.36E+00
Eu-155	1.3119E-02	84.97	169.94	0.00E+00	1.11E+00	2.23E+00
Fe-55	5.5412E-02	84.97	169.94	0.00E+00	4.71E+00	9.42E+00
H-3	6.0102E-03	84.97	169.94	0.00E+00	5.11E-01	1.02E+00
I-129	7.1287E-07	84.97	169.94	0.00E+00	6.06E-05	1.21E-04
Kr-85	1.3077E-01	84.97	169.94	0.00E+00	1.11E+01	2.22E+01
Np-237	1.2153E-05	84.97	169.94	0.00E+00	1.03E-03	2.07E-03
Pa-231	1.5021E-09	84.97	169.94	0.00E+00	1.28E-07	2.55E-07
Pb-210	2.2760E-13	84.97	169.94	0.00E+00	1.93E-11	3.87E-11
Pm-147	8.0622E-02	84.97	169.94	0.00E+00	6.85E+00	1.37E+01
Pu-238	5.0676E-02	84.97	169.94	0.00E+00	4.31E+00	8.61E+00
Pu-239	1.4051E-03	84.97	169.94	0.00E+00	1.19E-01	2.39E-01
Pu-240	1.1553E-03	84.97	169.94	0.00E+00	9.82E-02	1.96E-01
Pu-241	2.6578E-01	84.97	169.94	0.00E+00	2.26E+01	4.52E+01
Pu-242	4.9910E-06	84.97	169.94	0.00E+00	4.24E-04	8.48E-04
Ra-226	1.2541E-12	84.97	169.94	0.00E+00	1.07E-10	2.13E-10
Ra-228	2.1843E-11	84.97	169.94	0.00E+00	1.86E-09	3.71E-09
Ru-106	1.0722E-04	84.97	169.94	0.00E+00	9.11E-03	1.82E-02
Se-79	1.2831E-05	84.97	169.94	0.00E+00	1.09E-03	2.18E-03
Sn-126	1.2090E-05	84.97	169.94	0.00E+00	1.03E-03	2.05E-03
Sr-90	2.0204E+00	84.97	169.94	0.00E+00	1.72E+02	3.43E+02
Tc-99	4.0319E-04	84.97	169.94	0.00E+00	3.43E-02	6.85E-02
Th-229	1.4217E-10	84.97	169.94	0.00E+00	1.21E-08	2.42E-08
Th-230	3.6906E-10	84.97	169.94	0.00E+00	3.14E-08	6.27E-08
Th-232	2.3857E-11	84.97	169.94	0.00E+00	2.03E-09	4.05E-09
Tl-208	1.4857E-07	84.97	169.94	0.00E+00	1.26E-05	2.52E-05
U-232	4.1251E-07	84.97	169.94	0.00E+00	3.50E-05	7.01E-05
U-233	6.9017E-08	84.97	169.94	0.00E+00	5.86E-06	1.17E-05
U-234	3.4546E-06	84.97	169.94	0.00E+00	2.94E-04	5.87E-04
U-235	-2.6572E-06	84.97	0.00	1.62E-03	1.39E-03	1.62E-03
U-236	1.3575E-05	84.97	169.94	0.00E+00	1.15E-03	2.31E-03
U-238	-2.2698E-06	84.97	0.00	1.07E-04	1.05E-04	1.07E-04
Y-90	2.0219E+00	84.97	169.94	0.00E+00	1.72E+02	3.44E+02
Other Radionuclides					1.81E+02	3.62E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.910E+13
0.0250	3.978E+12
0.0375	3.514E+12
0.0575	3.718E+12
0.0850	2.239E+12
0.1250	1.585E+12
0.2250	1.928E+12
0.3750	8.464E+11
0.5750	1.398E+13
0.8500	4.252E+11
1.2500	4.428E+12
1.7500	8.922E+09
2.2500	2.580E+07
2.7500	1.110E+06
3.5000	2.606E+04
5.0000	3.036E+03
7.0000	3.490E+02
11.0000	4.003E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.76E+00	5.52E+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:	77.67	84.97	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	43.79	169.94	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.23	1.09
Bounding:	0.47	3.88

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) ANL-W (NRAD)
SNF ID #: 884
Fuel Units & Descr: 61 - ELEMENT
Heavy Metal Mass: BOL=10.858kg; EOL=10.602kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1994
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 0.55

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	5.6765E-10	263.21	445.18	0.00E+00	1.49E-07	2.53E-07
Am-241	1.1720E-02	263.21	445.18	0.00E+00	3.08E+00	5.22E+00
Am-242m	2.3361E-05	263.21	445.18	0.00E+00	6.15E-03	1.04E-02
Am-243	3.0953E-05	263.21	445.18	0.00E+00	8.15E-03	1.38E-02
C-14	1.2574E-04	263.21	445.18	0.00E+00	3.31E-02	5.60E-02
Cl-36	2.6624E-06	263.21	445.18	0.00E+00	7.01E-04	1.19E-03
Cm-243	2.9991E-05	263.21	445.18	0.00E+00	7.89E-03	1.34E-02
Cm-244	2.7977E-03	263.21	445.18	0.00E+00	7.36E-01	1.25E+00
Co-60	3.3343E-01	263.21	445.18	0.00E+00	8.78E+01	1.48E+02
Cs-134	2.2760E-02	263.21	445.18	0.00E+00	5.99E+00	1.01E+01
Cs-135	1.9753E-05	263.21	445.18	0.00E+00	5.20E-03	8.79E-03
Cs-137	2.1723E+00	263.21	445.18	0.00E+00	5.72E+02	9.67E+02
Eu-154	5.5066E-02	263.21	445.18	0.00E+00	1.45E+01	2.45E+01
Eu-155	1.3119E-02	263.21	445.18	0.00E+00	3.45E+00	5.84E+00
Fe-55	5.5412E-02	263.21	445.18	0.00E+00	1.46E+01	2.47E+01
H-3	6.0102E-03	263.21	445.18	0.00E+00	1.58E+00	2.68E+00
I-129	7.1287E-07	263.21	445.18	0.00E+00	1.88E-04	3.17E-04
Kr-85	1.3077E-01	263.21	445.18	0.00E+00	3.44E+01	5.82E+01
Np-237	1.2153E-05	263.21	445.18	0.00E+00	3.20E-03	5.41E-03
Pa-231	1.5021E-09	263.21	445.18	0.00E+00	3.95E-07	6.69E-07
Pb-210	2.2760E-13	263.21	445.18	0.00E+00	5.99E-11	1.01E-10
Pm-147	8.0622E-02	263.21	445.18	0.00E+00	2.12E+01	3.59E+01
Pu-238	5.0676E-02	263.21	445.18	0.00E+00	1.33E+01	2.26E+01
Pu-239	1.4061E-03	263.21	445.18	0.00E+00	3.70E-01	6.26E-01
Pu-240	1.1553E-03	263.21	445.18	0.00E+00	3.04E-01	5.14E-01
Pu-241	2.6578E-01	263.21	445.18	0.00E+00	7.00E+01	1.18E+02
Pu-242	4.9910E-06	263.21	445.18	0.00E+00	1.31E-03	2.22E-03
Ra-226	1.2541E-12	263.21	445.18	0.00E+00	3.30E-10	5.58E-10
Ra-228	2.1843E-11	263.21	445.18	0.00E+00	5.75E-09	9.72E-09
Ru-106	1.0722E-04	263.21	445.18	0.00E+00	2.82E-02	4.77E-02
Se-79	1.2831E-05	263.21	445.18	0.00E+00	3.38E-03	5.71E-03
Sn-126	1.2090E-05	263.21	445.18	0.00E+00	3.18E-03	5.38E-03
Sr-90	2.0204E+00	263.21	445.18	0.00E+00	5.32E+02	8.99E+02
Tc-99	4.0319E-04	263.21	445.18	0.00E+00	1.06E-01	1.79E-01
Th-229	1.4217E-10	263.21	445.18	0.00E+00	3.74E-08	6.33E-08
Th-230	3.6906E-10	263.21	445.18	0.00E+00	9.71E-08	1.64E-07
Th-232	2.3857E-11	263.21	445.18	0.00E+00	6.28E-09	1.06E-08
Tl-208	1.4857E-07	263.21	445.18	0.00E+00	3.91E-05	6.61E-05
U-232	4.1251E-07	263.21	445.18	0.00E+00	1.09E-04	1.84E-04
U-233	6.9017E-08	263.21	445.18	0.00E+00	1.82E-05	3.07E-05
U-234	3.4546E-06	263.21	445.18	0.00E+00	9.09E-04	1.54E-03
U-235	-2.6572E-06	263.21	0.00	1.65E-02	1.58E-02	1.65E-02
U-236	1.3575E-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	2.0219E+00	263.21	445.18	0.00E+00	5.32E+02	9.00E+02
Other Radionuclides					5.61E+02	9.49E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.003E+13
0.0250	1.042E+13
0.0375	9.204E+12
0.0575	9.741E+12
0.0850	5.866E+12
0.1250	4.152E+12
0.2250	5.052E+12
0.3750	2.217E+12
0.5750	3.662E+13
0.8500	1.114E+12
1.2500	1.160E+13
1.7500	2.337E+10
2.2500	6.759E+07
2.7500	2.908E+06
3.5000	6.827E+04
5.0000	7.955E+03
7.0000	9.145E+02
11.0000	1.049E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.86E+00	1.45E+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 %:	70.2247191	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	Estimated EOL HM/Given EOL HM
Nominal:	0.07	0.93	1.00
Bounding:	0.12	1.09	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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: 2010
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' 0.09

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-10	47.51	95.02	0.00E+00	1.35E-08	2.71E-08	Avg. MeV	
Am-241	7.5767E-03	47.51	95.02	0.00E+00	3.60E-01	7.20E-01	0.0150	1.533E+13
Am-242m	2.4459E-05	47.51	95.02	0.00E+00	1.16E-03	2.32E-03	0.0250	3.364E+12
Am-243	3.0983E-05	47.51	95.02	0.00E+00	1.47E-03	2.94E-03	0.0375	2.976E+12
C-14	1.2590E-04	47.51	95.02	0.00E+00	5.98E-03	1.20E-02	0.0575	2.970E+12
Cl-36	2.6624E-06	47.51	95.02	0.00E+00	1.26E-04	2.53E-04	0.0850	1.848E+12
Cm-243	3.8244E-05	47.51	95.02	0.00E+00	1.82E-03	3.63E-03	0.1250	1.484E+12
Cm-244	4.1010E-03	47.51	95.02	0.00E+00	1.95E-01	3.90E-01	0.2250	1.571E+12
Co-60	1.2410E+00	47.51	95.02	0.00E+00	5.90E+01	1.18E+02	0.3750	7.838E+11
Cs-134	6.5454E-01	47.51	95.02	0.00E+00	3.11E+01	6.22E+01	0.5750	1.297E+13
Cs-135	1.9753E-05	47.51	95.02	0.00E+00	9.39E-04	1.88E-03	0.8500	2.380E+12
Cs-137	2.7375E+00	47.51	95.02	0.00E+00	1.30E+02	2.60E+02	1.2500	9.141E+12
Eu-154	1.2324E-01	47.51	95.02	0.00E+00	5.86E+00	1.17E+01	1.7500	1.223E+10
Eu-155	5.3037E-02	47.51	95.02	0.00E+00	2.52E+00	5.04E+00	2.2500	9.583E+09
Fe-55	7.9555E-01	47.51	95.02	0.00E+00	3.78E+01	7.56E+01	2.7500	8.688E+07
H-3	1.0531E-02	47.51	95.02	0.00E+00	5.00E-01	1.00E+00	3.5000	1.022E+07
I-129	7.1287E-07	47.51	95.02	0.00E+00	3.39E-05	6.77E-05	5.0000	2.450E+03
Kr-85	2.4955E-01	47.51	95.02	0.00E+00	1.19E+01	2.37E+01	7.0000	2.819E+02
Np-237	1.2121E-05	47.51	95.02	0.00E+00	5.76E-04	1.15E-03	11.0000	3.235E+01
Pa-231	1.1230E-09	47.51	95.02	0.00E+00	5.34E-08	1.07E-07		
Pb-210	6.1636E-14	47.51	95.02	0.00E+00	2.93E-12	5.86E-12		
Pm-147	1.1302E+00	47.51	95.02	0.00E+00	5.37E+01	1.07E+02		
Pu-238	5.4826E-02	47.51	95.02	0.00E+00	2.60E+00	5.21E+00		
Pu-239	1.4056E-03	47.51	95.02	0.00E+00	6.68E-02	1.34E-01		
Pu-240	1.1536E-03	47.51	95.02	0.00E+00	5.48E-02	1.10E-01		
Pu-241	4.2995E-01	47.51	95.02	0.00E+00	2.04E+01	4.09E+01		
Pu-242	4.9910E-06	47.51	95.02	0.00E+00	2.37E-04	4.74E-04		
Ra-226	2.4008E-13	47.51	95.02	0.00E+00	1.14E-11	2.28E-11		
Ra-228	1.8220E-11	47.51	95.02	0.00E+00	8.66E-10	1.73E-09		
Ru-106	1.0343E-01	47.51	95.02	0.00E+00	4.91E+00	9.83E+00		
Se-79	1.2832E-05	47.51	95.02	0.00E+00	6.10E-04	1.22E-03		
Sn-126	1.2090E-05	47.51	95.02	0.00E+00	5.74E-04	1.15E-03		
Sr-90	2.5646E+00	47.51	95.02	0.00E+00	1.22E+02	2.44E+02		
Tc-99	4.0319E-04	47.51	95.02	0.00E+00	1.92E-02	3.83E-02		
Th-229	7.7375E-11	47.51	95.02	0.00E+00	3.68E-09	7.35E-09		
Th-230	1.2211E-10	47.51	95.02	0.00E+00	5.80E-09	1.16E-08		
Th-232	2.3842E-11	47.51	95.02	0.00E+00	1.13E-09	2.27E-09		
Tl-208	1.4313E-07	47.51	95.02	0.00E+00	6.80E-06	1.36E-05		
U-232	4.1927E-07	47.51	95.02	0.00E+00	1.99E-05	3.98E-05		
U-233	6.8491E-08	47.51	95.02	0.00E+00	3.25E-06	6.51E-06		
U-234	2.0189E-06	47.51	95.02	0.00E+00	9.59E-05	1.92E-04		
U-235	-2.6572E-06	47.51	0.00	2.96E-03	2.83E-03	2.96E-03		
U-236	1.3575E-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	2.5646E+00	47.51	95.02	0.00E+00	1.22E+02	2.44E+02		
Other Radionuclides					1.69E+02	3.38E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.12E+00	6.23E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	69.89795918	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	47.51	9.50
Bounding:		95.02

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:	0.07	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: 2010
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

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-10	339.87	679.74	0.00E+00	9.68E-08	1.94E-07	Avg. MeV	
Am-241	7.5767E-03	339.87	679.74	0.00E+00	2.58E+00	5.15E+00	0.0150	1.097E+14
Am-242m	2.4459E-05	339.87	679.74	0.00E+00	8.31E-03	1.66E-02	0.0250	2.407E+13
Am-243	3.0983E-05	339.87	679.74	0.00E+00	1.05E-02	2.11E-02	0.0375	2.129E+13
C-14	1.2590E-04	339.87	679.74	0.00E+00	4.28E-02	8.56E-02	0.0575	2.125E+13
Cl-36	2.6624E-06	339.87	679.74	0.00E+00	9.05E-04	1.81E-03	0.0850	1.322E+13
Cm-243	3.8244E-05	339.87	679.74	0.00E+00	1.30E-02	2.60E-02	0.1250	1.062E+13
Cm-244	4.1010E-03	339.87	679.74	0.00E+00	1.39E+00	2.79E+00	0.2250	1.124E+13
Co-60	1.2410E+00	339.87	679.74	0.00E+00	4.22E+02	8.44E+02	0.3750	5.606E+12
Cs-134	6.5454E-01	339.87	679.74	0.00E+00	2.22E+02	4.45E+02	0.5750	9.279E+13
Cs-135	1.9753E-05	339.87	679.74	0.00E+00	6.71E-03	1.34E-02	0.8500	1.702E+13
Cs-137	2.7375E+00	339.87	679.74	0.00E+00	9.30E+02	1.86E+03	1.2500	6.538E+13
Eu-154	1.2324E-01	339.87	679.74	0.00E+00	4.19E+01	8.38E+01	1.7500	8.745E+10
Eu-155	5.3037E-02	339.87	679.74	0.00E+00	1.80E+01	3.61E+01	2.2500	6.855E+10
Fe-55	7.9555E-01	339.87	679.74	0.00E+00	2.70E+02	5.41E+02	2.7500	6.215E+08
H-3	1.0531E-02	339.87	679.74	0.00E+00	3.58E+00	7.16E+00	3.5000	7.314E+07
I-129	7.1287E-07	339.87	679.74	0.00E+00	2.42E-04	4.85E-04	5.0000	1.752E+04
Kr-85	2.4955E-01	339.87	679.74	0.00E+00	8.48E+01	1.70E+02	7.0000	2.016E+03
Np-237	1.2121E-05	339.87	679.74	0.00E+00	4.12E-03	8.24E-03	11.0000	2.314E+02
Pa-231	1.1230E-09	339.87	679.74	0.00E+00	3.82E-07	7.63E-07		
Pb-210	6.1636E-14	339.87	679.74	0.00E+00	2.09E-11	4.19E-11		
Pm-147	1.1302E+00	339.87	679.74	0.00E+00	3.84E+02	7.68E+02		
Pu-238	5.4826E-02	339.87	679.74	0.00E+00	1.86E+01	3.73E+01		
Pu-239	1.4056E-03	339.87	679.74	0.00E+00	4.78E-01	9.55E-01		
Pu-240	1.1536E-03	339.87	679.74	0.00E+00	3.92E-01	7.84E-01		
Pu-241	4.2995E-01	339.87	679.74	0.00E+00	1.46E+02	2.92E+02		
Pu-242	4.9910E-06	339.87	679.74	0.00E+00	1.70E-03	3.39E-03		
Ra-226	2.4008E-13	339.87	679.74	0.00E+00	8.16E-11	1.63E-10		
Ra-228	1.8220E-11	339.87	679.74	0.00E+00	6.19E-09	1.24E-08		
Ru-106	1.0343E-01	339.87	679.74	0.00E+00	3.52E+01	7.03E+01		
Se-79	1.2832E-05	339.87	679.74	0.00E+00	4.36E-03	8.72E-03		
Sn-126	1.2090E-05	339.87	679.74	0.00E+00	4.11E-03	8.22E-03		
Sr-90	2.5646E+00	339.87	679.74	0.00E+00	8.72E+02	1.74E+03		
Tc-99	4.0319E-04	339.87	679.74	0.00E+00	1.37E-01	2.74E-01		
Th-229	7.7375E-11	339.87	679.74	0.00E+00	2.63E-08	5.26E-08		
Th-230	1.2211E-10	339.87	679.74	0.00E+00	4.15E-08	8.30E-08		
Th-232	2.3842E-11	339.87	679.74	0.00E+00	8.10E-09	1.62E-08		
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		

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
Nominal:	327.42	339.87
Bounding:		679.74

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.04	1.04
Bounding:	2.08	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 2025
Estimates as of: 2010
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

	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	2.8488E-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-06	21.67	0.00	6.47E-05	6.43E-05	6.47E-05
Y-90	2.5646E+00	21.67	43.34	0.00E+00	5.56E+01	1.11E+02
Other Radionuclides					7.72E+01	1.54E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.993E+12
0.0250	1.534E+12
0.0375	1.357E+12
0.0575	1.355E+12
0.0850	8.430E+11
0.1250	6.769E+11
0.2250	7.164E+11
0.3750	3.575E+11
0.5750	5.916E+12
0.8500	1.085E+12
1.2500	4.169E+12
1.7500	5.576E+09
2.2500	4.371E+09
2.7500	3.962E+07
3.5000	4.663E+06
5.0000	1.117E+03
7.0000	1.286E+02
11.0000	1.475E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.42E+00	2.84E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	69.9	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	6.03	21.67
Bounding:		43.34

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.10	3.59
Bounding:	0.20	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) FFCR SO. KOREA
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: 2010
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: 10 years

Estimated Canister usage: 18"x10' 0.05

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.2243E-10	73.37	146.74	0.00E+00	3.10E-08	6.20E-08
Am-241	9.9143E-03	73.37	146.74	0.00E+00	7.27E-01	1.45E+00
Am-242m	2.3903E-05	73.37	146.74	0.00E+00	1.75E-03	3.51E-03
Am-243	3.0968E-05	73.37	146.74	0.00E+00	2.27E-03	4.54E-03
C-14	1.2581E-04	73.37	146.74	0.00E+00	9.23E-03	1.85E-02
Cl-36	2.6624E-06	73.37	146.74	0.00E+00	1.95E-04	3.91E-04
Cm-243	3.3870E-05	73.37	146.74	0.00E+00	2.49E-03	4.97E-03
Cm-244	3.3870E-03	73.37	146.74	0.00E+00	2.49E-01	4.97E-01
Co-60	6.4311E-01	73.37	146.74	0.00E+00	4.72E+01	9.44E+01
Cs-134	1.2201E-01	73.37	146.74	0.00E+00	8.95E+00	1.79E+01
Cs-135	1.9753E-05	73.37	146.74	0.00E+00	1.45E-03	2.90E-03
Cs-137	2.4384E+00	73.37	146.74	0.00E+00	1.79E+02	3.58E+02
Eu-154	8.2396E-02	73.37	146.74	0.00E+00	6.05E+00	1.21E+01
Eu-155	2.6383E-02	73.37	146.74	0.00E+00	1.94E+00	3.87E+00
Fe-55	2.1001E-01	73.37	146.74	0.00E+00	1.54E+01	3.08E+01
H-3	7.9555E-03	73.37	146.74	0.00E+00	5.84E-01	1.17E+00
I-129	7.1287E-07	73.37	146.74	0.00E+00	5.23E-05	1.05E-04
Kr-85	1.8070E-01	73.37	146.74	0.00E+00	1.33E+01	2.65E+01
Np-237	1.2135E-05	73.37	146.74	0.00E+00	8.90E-04	1.78E-03
Pa-231	1.3125E-09	73.37	146.74	0.00E+00	9.63E-08	1.93E-07
Pb-210	1.1201E-13	73.37	146.74	0.00E+00	8.22E-12	1.64E-11
Pm-147	3.0186E-01	73.37	146.74	0.00E+00	2.21E+01	4.43E+01
Pu-238	5.2706E-02	73.37	146.74	0.00E+00	3.87E+00	7.73E+00
Pu-239	1.4054E-03	73.37	146.74	0.00E+00	1.03E-01	2.06E-01
Pu-240	1.1545E-03	73.37	146.74	0.00E+00	8.47E-02	1.69E-01
Pu-241	3.3809E-01	73.37	146.74	0.00E+00	2.48E+01	4.96E+01
Pu-242	4.9910E-06	73.37	146.74	0.00E+00	3.66E-04	7.32E-04
Ra-226	6.1395E-13	73.37	146.74	0.00E+00	4.50E-11	9.01E-11
Ra-228	2.0490E-11	73.37	146.74	0.00E+00	1.50E-09	3.01E-09
Ru-106	3.3298E-03	73.37	146.74	0.00E+00	2.44E-01	4.89E-01
Se-79	1.2831E-05	73.37	146.74	0.00E+00	9.41E-04	1.88E-03
Sn-126	1.2090E-05	73.37	146.74	0.00E+00	8.87E-04	1.77E-03
Sr-90	2.2760E+00	73.37	146.74	0.00E+00	1.67E+02	3.34E+02
Tc-99	4.0319E-04	73.37	146.74	0.00E+00	2.96E-02	5.92E-02
Th-229	1.0973E-10	73.37	146.74	0.00E+00	8.05E-09	1.61E-08
Th-230	2.2940E-10	73.37	146.74	0.00E+00	1.68E-08	3.37E-08
Th-232	2.3842E-11	73.37	146.74	0.00E+00	1.75E-09	3.50E-09
Tl-208	1.4857E-07	73.37	146.74	0.00E+00	1.09E-05	2.18E-05
U-232	4.1927E-07	73.37	146.74	0.00E+00	3.08E-05	6.15E-05
U-233	6.8746E-08	73.37	146.74	0.00E+00	5.04E-06	1.01E-05
U-234	2.7511E-06	73.37	146.74	0.00E+00	2.02E-04	4.04E-04
U-235	-2.6572E-06	73.37	0.00	9.65E-04	7.70E-04	9.65E-04
U-236	1.3575E-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	2.2775E+00	73.37	146.74	0.00E+00	1.67E+02	3.34E+02
Other Radionuclides					1.78E+02	3.55E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.882E+13
0.0250	3.972E+12
0.0375	3.501E+12
0.0575	3.651E+12
0.0850	2.214E+12
0.1250	1.608E+12
0.2250	1.898E+12
0.3750	8.605E+11
0.5750	1.428E+13
0.8500	9.292E+11
1.2500	7.302E+12
1.7500	1.053E+10
2.2500	2.263E+06
2.7500	4.921E+06
3.5000	5.154E+05
5.0000	3.145E+03
7.0000	3.618E+02
11.0000	4.151E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.09E+00	6.17E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	69.98432602	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	30.07	73.37	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		146.74	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.34	2.44	1.00
Bounding:	0.68		

[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: 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: 2010
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'
0.32

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-10	64.67	129.34	0.00E+00	1.84E-08	3.68E-08	Avg. MeV	
Am-241	7.5767E-03	64.67	129.34	0.00E+00	4.90E-01	9.80E-01	0.0150	2.067E+13
Am-242m	2.4459E-05	64.67	129.34	0.00E+00	1.58E-03	3.16E-03	0.0250	4.579E+12
Am-243	3.0983E-05	64.67	129.34	0.00E+00	2.00E-03	4.01E-03	0.0375	4.051E+12
C-14	1.2590E-04	64.67	129.34	0.00E+00	8.14E-03	1.63E-02	0.0575	4.043E+12
Cl-36	2.6624E-06	64.67	129.34	0.00E+00	1.72E-04	3.44E-04	0.0850	2.516E+12
Cm-243	3.8244E-05	64.67	129.34	0.00E+00	2.47E-03	4.95E-03	0.1250	2.020E+12
Cm-244	4.1010E-03	64.67	129.34	0.00E+00	2.65E-01	5.30E-01	0.2250	2.138E+12
Co-60	1.2410E+00	64.67	129.34	0.00E+00	8.03E+01	1.61E+02	0.3750	1.067E+12
Cs-134	6.5454E-01	64.67	129.34	0.00E+00	4.23E+01	8.47E+01	0.5750	1.766E+13
Cs-135	1.9753E-05	64.67	129.34	0.00E+00	1.28E-03	2.55E-03	0.8500	3.239E+12
Cs-137	2.7375E+00	64.67	129.34	0.00E+00	1.77E+02	3.54E+02	1.2500	1.244E+13
Eu-154	1.2324E-01	64.67	129.34	0.00E+00	7.97E+00	1.59E+01	1.7500	1.664E+10
Eu-155	5.3037E-02	64.67	129.34	0.00E+00	3.43E+00	6.86E+00	2.2500	1.304E+10
Fe-55	7.9555E-01	64.67	129.34	0.00E+00	5.14E+01	1.03E+02	2.7500	1.182E+08
H-3	1.0531E-02	64.67	129.34	0.00E+00	6.81E-01	1.36E+00	3.5000	1.392E+07
I-129	7.1287E-07	64.67	129.34	0.00E+00	4.61E-05	9.22E-05	5.0000	3.336E+03
Kr-85	2.4955E-01	64.67	129.34	0.00E+00	1.61E+01	3.23E+01	7.0000	3.839E+02
Np-237	1.2121E-05	64.67	129.34	0.00E+00	7.84E-04	1.57E-03	11.0000	4.405E+01
Pa-231	1.1230E-09	64.67	129.34	0.00E+00	7.26E-08	1.45E-07		
Pb-210	6.1636E-14	64.67	129.34	0.00E+00	3.99E-12	7.97E-12		
Pm-147	1.1302E+00	64.67	129.34	0.00E+00	7.31E+01	1.46E+02		
Pu-238	5.4826E-02	64.67	129.34	0.00E+00	3.55E+00	7.09E+00		
Pu-239	1.4056E-03	64.67	129.34	0.00E+00	9.09E-02	1.82E-01		
Pu-240	1.1536E-03	64.67	129.34	0.00E+00	7.46E-02	1.49E-01		
Pu-241	4.2995E-01	64.67	129.34	0.00E+00	2.78E+01	5.56E+01		
Pu-242	4.9910E-06	64.67	129.34	0.00E+00	3.23E-04	6.46E-04		
Ra-226	2.4008E-13	64.67	129.34	0.00E+00	1.55E-11	3.11E-11		
Ra-228	1.8220E-11	64.67	129.34	0.00E+00	1.18E-09	2.36E-09		
Ru-106	1.0343E-01	64.67	129.34	0.00E+00	6.69E+00	1.34E+01		
Se-79	1.2832E-05	64.67	129.34	0.00E+00	8.30E-04	1.66E-03		
Sn-126	1.2090E-05	64.67	129.34	0.00E+00	7.82E-04	1.56E-03		
Sr-90	2.5646E+00	64.67	129.34	0.00E+00	1.66E+02	3.32E+02		
Tc-99	4.0319E-04	64.67	129.34	0.00E+00	2.61E-02	5.21E-02		
Th-229	7.7375E-11	64.67	129.34	0.00E+00	5.00E-09	1.00E-08		
Th-230	1.2211E-10	64.67	129.34	0.00E+00	7.90E-09	1.58E-08		
Th-232	2.3842E-11	64.67	129.34	0.00E+00	1.54E-09	3.08E-09		
Tl-208	1.4313E-07	64.67	129.34	0.00E+00	9.26E-06	1.85E-05		
U-232	4.1927E-07	64.67	129.34	0.00E+00	2.71E-05	5.42E-05		
U-233	6.8491E-08	64.67	129.34	0.00E+00	4.43E-06	8.86E-06		
U-234	2.0189E-06	64.67	129.34	0.00E+00	1.31E-04	2.61E-04		
U-235	-2.6572E-06	64.67	0.00	1.04E-02	1.02E-02	1.04E-02		
U-236	1.3575E-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	2.5646E+00	64.67	129.34	0.00E+00	1.66E+02	3.32E+02		
Other Radionuclides					2.30E+02	4.61E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.24E+00	8.48E+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	Estimated EOL HM/Given EOL HM
Nominal:	0.03	0.51	1.00
Bounding:	0.06		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (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: 2010
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	Estimated EOL HM/Given EOL HM
Nominal:	0.23	2.81	1.00
Bounding:	0.47		

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

[2]Total burnup for all fuel associated with this worksheet must be divided 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: 2010
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: 10 years

Estimated Canister usage: 18"x10'
0.23

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.2243E-10	281.70	563.41	0.00E+00	1.19E-07	2.38E-07	Avg. MeV	
Am-241	9.9143E-03	281.70	563.41	0.00E+00	2.79E+00	5.59E+00	0.0150	7.224E+13
Am-242m	2.3903E-05	281.70	563.41	0.00E+00	6.73E-03	1.35E-02	0.0250	1.525E+13
Am-243	3.0968E-05	281.70	563.41	0.00E+00	8.72E-03	1.74E-02	0.0375	1.344E+13
C-14	1.2581E-04	281.70	563.41	0.00E+00	3.54E-02	7.09E-02	0.0575	1.402E+13
Cl-36	2.6624E-06	281.70	563.41	0.00E+00	7.50E-04	1.50E-03	0.0850	8.500E+12
Cm-243	3.3870E-05	281.70	563.41	0.00E+00	9.54E-03	1.91E-02	0.1250	6.174E+12
Cm-244	3.3870E-03	281.70	563.41	0.00E+00	9.54E-01	1.91E+00	0.2250	7.288E+12
Co-60	6.4311E-01	281.70	563.41	0.00E+00	1.81E+02	3.62E+02	0.3750	3.304E+12
Cs-134	1.2201E-01	281.70	563.41	0.00E+00	3.44E+01	6.87E+01	0.5750	5.483E+13
Cs-135	1.9753E-05	281.70	563.41	0.00E+00	5.56E-03	1.11E-02	0.8500	3.568E+12
Cs-137	2.4384E+00	281.70	563.41	0.00E+00	6.87E+02	1.37E+03	1.2500	2.804E+13
Eu-154	8.2396E-02	281.70	563.41	0.00E+00	2.32E+01	4.64E+01	1.7500	4.043E+10
Eu-155	2.6383E-02	281.70	563.41	0.00E+00	7.43E+00	1.49E+01	2.2500	8.688E+08
Fe-55	2.1001E-01	281.70	563.41	0.00E+00	5.92E+01	1.18E+02	2.7500	1.889E+07
H-3	7.9555E-03	281.70	563.41	0.00E+00	2.24E+00	4.48E+00	3.5000	1.979E+06
I-129	7.1287E-07	281.70	563.41	0.00E+00	2.01E-04	4.02E-04	5.0000	1.208E+04
Kr-85	1.8070E-01	281.70	563.41	0.00E+00	5.09E+01	1.02E+02	7.0000	1.389E+03
Np-237	1.2135E-05	281.70	563.41	0.00E+00	3.42E-03	6.84E-03	11.0000	1.594E+02
Pa-231	1.3125E-09	281.70	563.41	0.00E+00	3.70E-07	7.39E-07		
Pb-210	1.1201E-13	281.70	563.41	0.00E+00	3.16E-11	6.31E-11		
Pm-147	3.0186E-01	281.70	563.41	0.00E+00	8.50E+01	1.70E+02		
Pu-238	5.2706E-02	281.70	563.41	0.00E+00	1.48E+01	2.97E+01		
Pu-239	1.4054E-03	281.70	563.41	0.00E+00	3.96E-01	7.92E-01		
Pu-240	1.1545E-03	281.70	563.41	0.00E+00	3.25E-01	6.50E-01		
Pu-241	3.3809E-01	281.70	563.41	0.00E+00	9.52E+01	1.90E+02		
Pu-242	4.9910E-06	281.70	563.41	0.00E+00	1.41E-03	2.81E-03		
Ra-226	6.1395E-13	281.70	563.41	0.00E+00	1.73E-10	3.46E-10		
Ra-228	2.0490E-11	281.70	563.41	0.00E+00	5.77E-09	1.15E-08		
Ru-106	3.3298E-03	281.70	563.41	0.00E+00	9.38E-01	1.88E+00		
Se-79	1.2831E-05	281.70	563.41	0.00E+00	3.61E-03	7.23E-03		
Sn-126	1.2090E-05	281.70	563.41	0.00E+00	3.41E-03	6.81E-03		
Sr-90	2.2760E+00	281.70	563.41	0.00E+00	6.41E+02	1.28E+03		
Tc-99	4.0319E-04	281.70	563.41	0.00E+00	1.14E-01	2.27E-01		
Th-229	1.0973E-10	281.70	563.41	0.00E+00	3.09E-08	6.18E-08		
Th-230	2.2940E-10	281.70	563.41	0.00E+00	6.46E-08	1.29E-07		
Th-232	2.3842E-11	281.70	563.41	0.00E+00	6.72E-09	1.34E-08		
Tl-208	1.4857E-07	281.70	563.41	0.00E+00	4.19E-05	8.37E-05		
U-232	4.1927E-07	281.70	563.41	0.00E+00	1.18E-04	2.36E-04		
U-233	6.8746E-08	281.70	563.41	0.00E+00	1.94E-05	3.87E-05		
U-234	2.7511E-06	281.70	563.41	0.00E+00	7.75E-04	1.55E-03		
U-235	-2.6572E-06	281.70	0.00	7.54E-03	6.79E-03	7.54E-03		
U-236	1.3575E-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	2.2775E+00	281.70	563.41	0.00E+00	6.42E+02	1.28E+03		
Other Radionuclides					6.82E+02	1.36E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.19E+01	2.37E+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	Estimated EOL HM/Given EOL HM
Nominal:	0.17	3.00	1.00
Bounding:	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: 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: 2010
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: 10 years

Estimated Canister usage: 18"x10' = 1.03

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.2243E-10	2,426.99	4,853.99	0.00E+00	1.03E-06	2.05E-06
Am-241	9.9143E-03	2,426.99	4,853.99	0.00E+00	2.41E+01	4.81E+01
Am-242m	2.3903E-05	2,426.99	4,853.99	0.00E+00	5.80E-02	1.16E-01
Am-243	3.0968E-05	2,426.99	4,853.99	0.00E+00	7.52E-02	1.50E-01
C-14	1.2581E-04	2,426.99	4,853.99	0.00E+00	3.05E-01	6.11E-01
Cl-36	2.6624E-06	2,426.99	4,853.99	0.00E+00	6.46E-03	1.29E-02
Cm-243	3.3870E-05	2,426.99	4,853.99	0.00E+00	8.22E-02	1.64E-01
Cm-244	3.3870E-03	2,426.99	4,853.99	0.00E+00	8.22E+00	1.64E+01
Co-60	6.4311E-01	2,426.99	4,853.99	0.00E+00	1.56E+03	3.12E+03
Cs-134	1.2201E-01	2,426.99	4,853.99	0.00E+00	2.96E+02	5.92E+02
Cs-135	1.9753E-05	2,426.99	4,853.99	0.00E+00	4.79E-02	9.59E-02
Cs-137	2.4384E+00	2,426.99	4,853.99	0.00E+00	5.92E+03	1.18E+04
Eu-154	8.2396E-02	2,426.99	4,853.99	0.00E+00	2.00E+02	4.00E+02
Eu-155	2.6383E-02	2,426.99	4,853.99	0.00E+00	6.40E+01	1.28E+02
Fe-55	2.1001E-01	2,426.99	4,853.99	0.00E+00	5.10E+02	1.02E+03
H-3	7.9555E-03	2,426.99	4,853.99	0.00E+00	1.93E+01	3.86E+01
I-129	7.1287E-07	2,426.99	4,853.99	0.00E+00	1.73E-03	3.46E-03
Kr-85	1.8070E-01	2,426.99	4,853.99	0.00E+00	4.39E+02	8.77E+02
Np-237	1.2135E-05	2,426.99	4,853.99	0.00E+00	2.95E-02	5.89E-02
Pa-231	1.3125E-09	2,426.99	4,853.99	0.00E+00	3.19E-06	6.37E-06
Pb-210	1.1201E-13	2,426.99	4,853.99	0.00E+00	2.72E-10	5.44E-10
Pm-147	3.0186E-01	2,426.99	4,853.99	0.00E+00	7.33E+02	1.47E+03
Pu-238	5.2706E-02	2,426.99	4,853.99	0.00E+00	1.28E+02	2.56E+02
Pu-239	1.4054E-03	2,426.99	4,853.99	0.00E+00	3.41E+00	6.82E+00
Pu-240	1.1545E-03	2,426.99	4,853.99	0.00E+00	2.80E+00	5.60E+00
Pu-241	3.3809E-01	2,426.99	4,853.99	0.00E+00	8.21E+02	1.64E+03
Pu-242	4.9910E-06	2,426.99	4,853.99	0.00E+00	1.21E-02	2.42E-02
Ra-226	6.1395E-13	2,426.99	4,853.99	0.00E+00	1.49E-09	2.98E-09
Ra-228	2.0490E-11	2,426.99	4,853.99	0.00E+00	4.97E-08	9.95E-08
Ru-106	3.3298E-03	2,426.99	4,853.99	0.00E+00	8.08E+00	1.62E+01
Se-79	1.2831E-05	2,426.99	4,853.99	0.00E+00	3.11E-02	6.23E-02
Sn-126	1.2090E-05	2,426.99	4,853.99	0.00E+00	2.93E-02	5.87E-02
Sr-90	2.2760E+00	2,426.99	4,853.99	0.00E+00	5.52E+03	1.10E+04
Tc-99	4.0319E-04	2,426.99	4,853.99	0.00E+00	9.79E-01	1.96E+00
Th-229	1.0973E-10	2,426.99	4,853.99	0.00E+00	2.66E-07	5.33E-07
Th-230	2.2940E-10	2,426.99	4,853.99	0.00E+00	5.57E-07	1.11E-06
Th-232	2.3842E-11	2,426.99	4,853.99	0.00E+00	5.79E-08	1.16E-07
Tl-208	1.4857E-07	2,426.99	4,853.99	0.00E+00	3.61E-04	7.21E-04
U-232	4.1927E-07	2,426.99	4,853.99	0.00E+00	1.02E-03	2.04E-03
U-233	6.8746E-08	2,426.99	4,853.99	0.00E+00	1.67E-04	3.34E-04
U-234	2.7511E-06	2,426.99	4,853.99	0.00E+00	6.68E-03	1.34E-02
U-235	-2.6572E-06	2,426.99	0.00	3.28E-02	2.63E-02	3.28E-02
U-236	1.3575E-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	2.2775E+00	2,426.99	4,853.99	0.00E+00	5.53E+03	1.11E+04
Other Radionuclides					5.87E+03	1.17E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.224E+14
0.0250	1.314E+14
0.0375	1.158E+14
0.0575	1.208E+14
0.0850	7.323E+13
0.1250	5.319E+13
0.2250	6.279E+13
0.3750	2.846E+13
0.5750	4.724E+14
0.8500	3.074E+13
1.2500	2.415E+14
1.7500	3.483E+11
2.2500	7.485E+09
2.7500	1.628E+08
3.5000	1.705E+07
5.0000	1.040E+05
7.0000	1.197E+04
11.0000	1.373E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.02E+02	2.04E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	70	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	816.76	2,426.99
Bounding:		4,853.99

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.33	2.97
Bounding:	0.66	

Estimated EOL HM/Given EOL HM: 1.00

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

[2]Total burnup for all fuel associated with this worksheet must be divided 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: 2010
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" 0.06

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.0386E-09	180.29	360.59	0.00E+00	1.87E-07	3.75E-07	Avg. MeV	
Am-241	1.4973E-02	180.29	360.59	0.00E+00	2.70E+00	5.40E+00	0.0150	3.170E+13
Am-242m	2.2324E-05	180.29	360.59	0.00E+00	4.02E-03	8.05E-03	0.0250	6.562E+12
Am-243	3.0923E-05	180.29	360.59	0.00E+00	5.58E-03	1.12E-02	0.0375	5.787E+12
C-14	1.2559E-04	180.29	360.59	0.00E+00	2.26E-02	4.53E-02	0.0575	6.196E+12
Cl-36	2.6624E-06	180.29	360.59	0.00E+00	4.80E-04	9.60E-04	0.0850	3.699E+12
Cm-243	2.3527E-05	180.29	360.59	0.00E+00	4.24E-03	8.48E-03	0.1250	2.526E+12
Cm-244	1.9092E-03	180.29	360.59	0.00E+00	3.44E-01	6.88E-01	0.2250	3.196E+12
Co-60	8.9552E-02	180.29	360.59	0.00E+00	1.61E+01	3.23E+01	0.3750	1.387E+12
Cs-134	7.9074E-04	180.29	360.59	0.00E+00	1.43E-01	2.85E-01	0.5750	2.319E+13
Cs-135	1.9753E-05	180.29	360.59	0.00E+00	3.56E-03	7.12E-03	0.8500	3.897E+11
Cs-137	1.7243E+00	180.29	360.59	0.00E+00	3.11E+02	6.22E+02	1.2500	2.638E+12
Eu-154	2.4609E-02	180.29	360.59	0.00E+00	4.44E+00	8.87E+00	1.7500	1.095E+10
Eu-155	3.2456E-03	180.29	360.59	0.00E+00	5.85E-01	1.17E+00	2.2500	1.332E+07
Fe-55	3.8605E-03	180.29	360.59	0.00E+00	6.96E-01	1.39E+00	2.7500	1.822E+08
H-3	3.4305E-03	180.29	360.59	0.00E+00	6.19E-01	1.24E+00	3.5000	1.060E+04
I-129	7.1287E-07	180.29	360.59	0.00E+00	1.29E-04	2.57E-04	5.0000	4.497E+03
Kr-85	6.8536E-02	180.29	360.59	0.00E+00	1.24E+01	2.47E+01	7.0000	5.163E+02
Np-237	1.2219E-05	180.29	360.59	0.00E+00	2.20E-03	4.41E-03	11.0000	5.918E+01
Pa-231	2.0701E-09	180.29	360.59	0.00E+00	3.73E-07	7.46E-07		
Pb-210	1.3279E-12	180.29	360.59	0.00E+00	2.39E-10	4.79E-10		
Pm-147	5.7517E-03	180.29	360.59	0.00E+00	1.04E+00	2.07E+00		
Pu-238	4.6828E-02	180.29	360.59	0.00E+00	8.44E+00	1.69E+01		
Pu-239	1.4048E-03	180.29	360.59	0.00E+00	2.53E-01	5.07E-01		
Pu-240	1.1563E-03	180.29	360.59	0.00E+00	2.08E-01	4.17E-01		
Pu-241	1.6431E-01	180.29	360.59	0.00E+00	2.96E+01	5.92E+01		
Pu-242	4.9910E-06	180.29	360.59	0.00E+00	9.00E-04	1.80E-03		
Ra-226	5.4390E-12	180.29	360.59	0.00E+00	9.81E-10	1.96E-09		
Ra-228	2.3437E-11	180.29	360.59	0.00E+00	4.23E-09	8.45E-09		
Ru-106	1.1115E-07	180.29	360.59	0.00E+00	2.00E-05	4.01E-05		
Se-79	1.2829E-05	180.29	360.59	0.00E+00	2.31E-03	4.63E-03		
Sn-126	1.2088E-05	180.29	360.59	0.00E+00	2.18E-03	4.36E-03		
Sr-90	1.5935E+00	180.29	360.59	0.00E+00	2.87E+02	5.75E+02		
Tc-99	4.0319E-04	180.29	360.59	0.00E+00	7.27E-02	1.45E-01		
Th-229	2.4023E-10	180.29	360.59	0.00E+00	4.33E-08	8.66E-08		
Th-230	9.6948E-10	180.29	360.59	0.00E+00	1.75E-07	3.50E-07		
Th-232	2.3857E-11	180.29	360.59	0.00E+00	4.30E-09	8.60E-09		
Tl-208	1.3982E-07	180.29	360.59	0.00E+00	2.52E-05	5.04E-05		
U-232	3.7943E-07	180.29	360.59	0.00E+00	6.84E-05	1.37E-04		
U-233	6.9814E-06	180.29	360.59	0.00E+00	1.26E-05	2.52E-05		
U-234	5.4059E-06	180.29	360.59	0.00E+00	9.75E-04	1.95E-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-06	180.29	0.00	1.39E-04	1.35E-04	1.39E-04		
Y-90	1.5935E+00	180.29	360.59	0.00E+00	2.87E+02	5.75E+02		
Other Radionuclides					3.05E+02	6.11E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.14E+00	8.27E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	69.89795918	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	38.80	180.29
Bounding:		360.59

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.39	4.65
Bounding:	0.77	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) TEXAS A&M
SNF ID #: 241
Fuel Units & Descr: 96 - ELEMENT
Heavy Metal Mass: BOL=16.819kg; EOL=14.63kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 66.52
Template BOL Heavy Metal Mass (MT): 0.000196
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.86

II. Estimates

	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	2.8488E-10	2,080.28	4,160.56	0.00E+00	5.93E-07	1.19E-06
Am-241	7.5767E-03	2,080.28	4,160.56	0.00E+00	1.58E+01	3.15E+01
Am-242m	2.4459E-05	2,080.28	4,160.56	0.00E+00	5.09E-02	1.02E-01
Am-243	3.0983E-05	2,080.28	4,160.56	0.00E+00	6.45E-02	1.29E-01
C-14	1.2590E-04	2,080.28	4,160.56	0.00E+00	2.62E-01	5.24E-01
Cl-36	2.6624E-06	2,080.28	4,160.56	0.00E+00	5.54E-03	1.11E-02
Cm-243	3.8244E-05	2,080.28	4,160.56	0.00E+00	7.96E-02	1.59E-01
Cm-244	4.1010E-03	2,080.28	4,160.56	0.00E+00	8.53E+00	1.71E+01
Co-60	1.2410E+00	2,080.28	4,160.56	0.00E+00	2.58E+03	5.16E+03
Cs-134	6.5454E-01	2,080.28	4,160.56	0.00E+00	1.36E+03	2.72E+03
Cs-135	1.9753E-05	2,080.28	4,160.56	0.00E+00	4.11E-02	8.22E-02
Cs-137	2.7375E+00	2,080.28	4,160.56	0.00E+00	5.69E+03	1.14E+04
Eu-154	1.2324E-01	2,080.28	4,160.56	0.00E+00	2.56E+02	5.13E+02
Eu-155	5.3037E-02	2,080.28	4,160.56	0.00E+00	1.10E+02	2.21E+02
Fe-55	7.9555E-01	2,080.28	4,160.56	0.00E+00	1.65E+03	3.31E+03
H-3	1.0531E-02	2,080.28	4,160.56	0.00E+00	2.19E+01	4.38E+01
I-129	7.1287E-07	2,080.28	4,160.56	0.00E+00	1.48E-03	2.97E-03
Kr-85	2.4955E-01	2,080.28	4,160.56	0.00E+00	5.19E+02	1.04E+03
Np-237	1.2121E-05	2,080.28	4,160.56	0.00E+00	2.52E-02	5.04E-02
Pa-231	1.1230E-09	2,080.28	4,160.56	0.00E+00	2.34E-06	4.67E-06
Pb-210	6.1636E-14	2,080.28	4,160.56	0.00E+00	1.28E-10	2.56E-10
Pm-147	1.1302E+00	2,080.28	4,160.56	0.00E+00	2.35E+03	4.70E+03
Pu-238	5.4826E-02	2,080.28	4,160.56	0.00E+00	1.14E+02	2.28E+02
Pu-239	1.4056E-03	2,080.28	4,160.56	0.00E+00	2.92E+00	5.85E+00
Pu-240	1.1536E-03	2,080.28	4,160.56	0.00E+00	2.40E+00	4.80E+00
Pu-241	4.2995E-01	2,080.28	4,160.56	0.00E+00	8.94E+02	1.79E+03
Pu-242	4.9910E-06	2,080.28	4,160.56	0.00E+00	1.04E-02	2.08E-02
Ra-226	2.4008E-13	2,080.28	4,160.56	0.00E+00	4.99E-10	9.99E-10
Ra-228	1.8220E-11	2,080.28	4,160.56	0.00E+00	3.79E-08	7.58E-08
Ru-106	1.0343E-01	2,080.28	4,160.56	0.00E+00	2.15E+02	4.30E+02
Se-79	1.2832E-05	2,080.28	4,160.56	0.00E+00	2.67E-02	5.34E-02
Sn-126	1.2090E-05	2,080.28	4,160.56	0.00E+00	2.51E-02	5.03E-02
Sr-90	2.5646E+00	2,080.28	4,160.56	0.00E+00	5.34E+03	1.07E+04
Tc-99	4.0319E-04	2,080.28	4,160.56	0.00E+00	8.39E-01	1.68E+00
Th-229	7.7375E-11	2,080.28	4,160.56	0.00E+00	1.61E-07	3.22E-07
Th-230	1.2211E-10	2,080.28	4,160.56	0.00E+00	2.54E-07	5.08E-07
Th-232	2.3842E-11	2,080.28	4,160.56	0.00E+00	4.96E-08	9.92E-08
Tl-208	1.4313E-07	2,080.28	4,160.56	0.00E+00	2.98E-04	5.96E-04
U-232	4.1927E-07	2,080.28	4,160.56	0.00E+00	8.72E-04	1.74E-03
U-233	6.8491E-08	2,080.28	4,160.56	0.00E+00	1.42E-04	2.85E-04
U-234	2.0189E-06	2,080.28	4,160.56	0.00E+00	4.20E-03	8.40E-03
U-235	-2.6572E-06	2,080.28	0.00	2.54E-02	1.99E-02	2.54E-02
U-236	1.3575E-05	2,080.28	4,160.56	0.00E+00	2.82E-02	5.65E-02
U-238	-2.2698E-08	2,080.28	0.00	1.70E-03	1.65E-03	1.70E-03
Y-90	2.5646E+00	2,080.28	4,160.56	0.00E+00	5.34E+03	1.07E+04
Other Radionuclides					7.41E+03	1.48E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.713E+14
0.0250	1.473E+14
0.0375	1.303E+14
0.0575	1.301E+14
0.0850	8.093E+13
0.1250	6.498E+13
0.2250	6.877E+13
0.3750	3.432E+13
0.5750	5.680E+14
0.8500	1.042E+14
1.2500	4.002E+14
1.7500	5.353E+11
2.2500	4.196E+11
2.7500	3.804E+09
3.5000	4.477E+08
5.0000	1.072E+05
7.0000	1.234E+04
11.0000	1.416E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.36E+02	2.73E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	70.00179205	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	792.76	2,080.28
Bounding:		4,160.56

Basis for burnup used in estimate:
Nominal 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	2.62
Bounding:	0.73	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

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

[1]Fuel decay start date: 2035
Estimates as of: 2010
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

	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	2.8488E-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-06	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-06	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	Estimated EOL HM/Given EOL HM
Nominal:	0.21	2.56	1.00
Bounding:	0.43		

[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: TRIGA (FLIP) U OF WI
SNF ID #: 1035
Fuel Units & Descr: 9 - ELEMENT
Heavy Metal Mass: BOL=1.573kg; EOL=1.573kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
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

	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	2.8488E-10	59.32	118.64	0.00E+00	1.69E-08	3.38E-08
Am-241	7.5767E-03	59.32	118.64	0.00E+00	4.49E-01	8.99E-01
Am-242m	2.4459E-05	59.32	118.64	0.00E+00	1.45E-03	2.90E-03
Am-243	3.0983E-05	59.32	118.64	0.00E+00	1.84E-03	3.68E-03
C-14	1.2590E-04	59.32	118.64	0.00E+00	7.47E-03	1.49E-02
Cl-36	2.6624E-06	59.32	118.64	0.00E+00	1.58E-04	3.16E-04
Cm-243	3.8244E-05	59.32	118.64	0.00E+00	2.27E-03	4.54E-03
Cm-244	4.1010E-03	59.32	118.64	0.00E+00	2.43E-01	4.87E-01
Co-60	1.2410E+00	59.32	118.64	0.00E+00	7.36E+01	1.47E+02
Cs-134	6.5454E-01	59.32	118.64	0.00E+00	3.88E+01	7.77E+01
Cs-135	1.9753E-05	59.32	118.64	0.00E+00	1.17E-03	2.34E-03
Cs-137	2.7375E+00	59.32	118.64	0.00E+00	1.62E+02	3.25E+02
Eu-154	1.2324E-01	59.32	118.64	0.00E+00	7.31E+00	1.46E+01
Eu-155	5.3037E-02	59.32	118.64	0.00E+00	3.15E+00	6.29E+00
Fe-55	7.9555E-01	59.32	118.64	0.00E+00	4.72E+01	9.44E+01
H-3	1.0531E-02	59.32	118.64	0.00E+00	6.25E-01	1.25E+00
I-129	7.1287E-07	59.32	118.64	0.00E+00	4.23E-05	8.46E-05
Kr-85	2.4955E-01	59.32	118.64	0.00E+00	1.48E+01	2.96E+01
Np-237	1.2121E-05	59.32	118.64	0.00E+00	7.19E-04	1.44E-03
Pa-231	1.1230E-09	59.32	118.64	0.00E+00	6.66E-08	1.33E-07
Pb-210	6.1636E-14	59.32	118.64	0.00E+00	3.66E-12	7.31E-12
Pm-147	1.1302E+00	59.32	118.64	0.00E+00	6.70E+01	1.34E+02
Pu-238	5.4826E-02	59.32	118.64	0.00E+00	3.25E+00	6.50E+00
Pu-239	1.4056E-03	59.32	118.64	0.00E+00	8.34E-02	1.67E-01
Pu-240	1.1536E-03	59.32	118.64	0.00E+00	6.84E-02	1.37E-01
Pu-241	4.2995E-01	59.32	118.64	0.00E+00	2.55E+01	5.10E+01
Pu-242	4.9910E-06	59.32	118.64	0.00E+00	2.96E-04	5.92E-04
Ra-226	2.4008E-13	59.32	118.64	0.00E+00	1.42E-11	2.85E-11
Ra-228	1.8220E-11	59.32	118.64	0.00E+00	1.08E-09	2.16E-09
Ru-106	1.0343E-01	59.32	118.64	0.00E+00	6.14E+00	1.23E+01
Se-79	1.2832E-05	59.32	118.64	0.00E+00	7.61E-04	1.52E-03
Sn-126	1.2090E-05	59.32	118.64	0.00E+00	7.17E-04	1.43E-03
Sr-90	2.5646E+00	59.32	118.64	0.00E+00	1.52E+02	3.04E+02
Tc-99	4.0319E-04	59.32	118.64	0.00E+00	2.39E-02	4.78E-02
Th-229	7.7375E-11	59.32	118.64	0.00E+00	4.59E-09	9.18E-09
Th-230	1.2211E-10	59.32	118.64	0.00E+00	7.24E-09	1.45E-08
Th-232	2.3842E-11	59.32	118.64	0.00E+00	1.41E-09	2.83E-09
Tl-208	1.4313E-07	59.32	118.64	0.00E+00	8.49E-06	1.70E-05
U-232	4.1927E-07	59.32	118.64	0.00E+00	2.49E-05	4.97E-05
U-233	6.8491E-08	59.32	118.64	0.00E+00	4.06E-06	8.13E-06
U-234	2.0189E-06	59.32	118.64	0.00E+00	1.20E-04	2.40E-04
U-235	-2.6572E-06	59.32	0.00	2.38E-03	2.22E-03	2.38E-03
U-236	1.3575E-05	59.32	118.64	0.00E+00	8.05E-04	1.61E-03
U-238	-2.2698E-08	59.32	0.00	1.59E-04	1.58E-04	1.59E-04
Y-90	2.5646E+00	59.32	118.64	0.00E+00	1.52E+02	3.04E+02
Other Radionuclides					2.11E+02	4.23E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.914E+13
0.0250	4.201E+12
0.0375	3.716E+12
0.0575	3.709E+12
0.0850	2.308E+12
0.1250	1.853E+12
0.2250	1.961E+12
0.3750	9.786E+11
0.5750	1.620E+13
0.8500	2.971E+12
1.2500	1.141E+13
1.7500	1.526E+10
2.2500	1.196E+10
2.7500	1.085E+08
3.5000	1.277E+07
5.0000	3.059E+03
7.0000	3.520E+02
11.0000	4.039E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.89E+00	7.78E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	69.93004832	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	59.32	
Bounding:		118.64

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.11	0.00
Bounding:	0.22	

Estimated EOL HM/Given EOL HM: 0.96

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) UNIV OF WISCONSIN
SNF ID #: 242
Fuel Units & Descr: 92 - ELEMENT
Heavy Metal Mass: BOL=18.032kg; EOL=15.53kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 66.52
Template BOL Heavy Metal Mass (MT): 0.000196
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.83

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8488E-10	2,378.33	4,756.66	0.00E+00	6.78E-07	1.36E-06	Avg. MeV	
Am-241	7.5767E-03	2,378.33	4,756.66	0.00E+00	1.80E+01	3.60E+01	0.0150	7.675E+14
Am-242m	2.4459E-05	2,378.33	4,756.66	0.00E+00	5.82E-02	1.16E-01	0.0250	1.684E+14
Am-243	3.0983E-05	2,378.33	4,756.66	0.00E+00	7.37E-02	1.47E-01	0.0375	1.490E+14
C-14	1.2590E-04	2,378.33	4,756.66	0.00E+00	2.99E-01	5.99E-01	0.0575	1.487E+14
Cl-36	2.6624E-06	2,378.33	4,756.66	0.00E+00	6.33E-03	1.27E-02	0.0850	9.252E+13
Cm-243	3.8244E-05	2,378.33	4,756.66	0.00E+00	9.10E-02	1.82E-01	0.1250	7.429E+13
Cm-244	4.1010E-03	2,378.33	4,756.66	0.00E+00	9.75E+00	1.95E+01	0.2250	7.863E+13
Co-60	1.2410E+00	2,378.33	4,756.66	0.00E+00	2.95E+03	5.90E+03	0.3750	3.923E+13
Cs-134	6.5454E-01	2,378.33	4,756.66	0.00E+00	1.56E+03	3.11E+03	0.5750	6.493E+14
Cs-135	1.9753E-05	2,378.33	4,756.66	0.00E+00	4.70E-02	9.40E-02	0.8500	1.191E+14
Cs-137	2.7375E+00	2,378.33	4,756.66	0.00E+00	6.51E+03	1.30E+04	1.2500	4.575E+14
Eu-154	1.2324E-01	2,378.33	4,756.66	0.00E+00	2.93E+02	5.86E+02	1.7500	6.120E+11
Eu-155	5.3037E-02	2,378.33	4,756.66	0.00E+00	1.26E+02	2.52E+02	2.2500	4.797E+11
Fe-55	7.9555E-01	2,378.33	4,756.66	0.00E+00	1.89E+03	3.78E+03	2.7500	4.349E+09
H-3	1.0531E-02	2,378.33	4,756.66	0.00E+00	2.50E+01	5.01E+01	3.5000	5.118E+08
I-129	7.1287E-07	2,378.33	4,756.66	0.00E+00	1.70E-03	3.39E-03	5.0000	1.226E+05
Kr-85	2.4955E-01	2,378.33	4,756.66	0.00E+00	5.94E+02	1.19E+03	7.0000	1.411E+04
Np-237	1.2121E-05	2,378.33	4,756.66	0.00E+00	2.88E-02	5.77E-02	11.0000	1.619E+03
Pa-231	1.1230E-09	2,378.33	4,756.66	0.00E+00	2.67E-06	5.34E-06		
Pb-210	6.1636E-14	2,378.33	4,756.66	0.00E+00	1.47E-10	2.93E-10		
Pm-147	1.1302E+00	2,378.33	4,756.66	0.00E+00	2.69E+03	5.38E+03		
Pu-238	5.4826E-02	2,378.33	4,756.66	0.00E+00	1.30E+02	2.61E+02		
Pu-239	1.4056E-03	2,378.33	4,756.66	0.00E+00	3.34E+00	6.69E+00		
Pu-240	1.1536E-03	2,378.33	4,756.66	0.00E+00	2.74E+00	5.49E+00		
Pu-241	4.2995E-01	2,378.33	4,756.66	0.00E+00	1.02E+03	2.05E+03		
Pu-242	4.9910E-06	2,378.33	4,756.66	0.00E+00	1.19E-02	2.37E-02		
Ra-226	2.4008E-13	2,378.33	4,756.66	0.00E+00	5.71E-10	1.14E-09		
Ra-228	1.8220E-11	2,378.33	4,756.66	0.00E+00	4.33E-08	8.67E-08		
Ru-106	1.0343E-01	2,378.33	4,756.66	0.00E+00	2.46E+02	4.92E+02		
Se-79	1.2832E-05	2,378.33	4,756.66	0.00E+00	3.05E-02	6.10E-02		
Sn-126	1.2090E-05	2,378.33	4,756.66	0.00E+00	2.88E-02	5.75E-02		
Sr-90	2.5646E+00	2,378.33	4,756.66	0.00E+00	6.10E+03	1.22E+04		
Tc-99	4.0319E-04	2,378.33	4,756.66	0.00E+00	9.59E-01	1.92E+00		
Th-229	7.7375E-11	2,378.33	4,756.66	0.00E+00	1.84E-07	3.68E-07		
Th-230	1.2211E-10	2,378.33	4,756.66	0.00E+00	2.90E-07	5.81E-07		
Th-232	2.3842E-11	2,378.33	4,756.66	0.00E+00	5.67E-08	1.13E-07		
Tl-208	1.4313E-07	2,378.33	4,756.66	0.00E+00	3.40E-04	6.81E-04		
U-232	4.1927E-07	2,378.33	4,756.66	0.00E+00	9.97E-04	1.99E-03		
U-233	6.8491E-08	2,378.33	4,756.66	0.00E+00	1.63E-04	3.26E-04		
U-234	2.0189E-06	2,378.33	4,756.66	0.00E+00	4.80E-03	9.60E-03		
U-235	-2.6572E-08	2,378.33	0.00	2.72E-02	2.09E-02	2.72E-02		
U-236	1.3575E-05	2,378.33	4,756.66	0.00E+00	3.23E-02	6.46E-02		
U-238	-2.2698E-08	2,378.33	0.00	1.82E-03	1.77E-03	1.82E-03		
Y-90	2.5646E+00	2,378.33	4,756.66	0.00E+00	6.10E+03	1.22E+04		
Other Radionuclides					6.47E+03	1.69E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.56E+02	3.12E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	69.89795918	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	509.96	2,378.33	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,756.66	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.39	4.66
Bounding:	0.78	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (FLIP) WSU
SNF ID #: 243
Fuel Units & Descr: 78 - ELEMENT
Heavy Metal Mass: BOL=15.288kg; EOL=13.291kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-FLIP (LW/U-Zrx, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 66.52
Template BOL Heavy Metal Mass (MT): 0.000196
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.70

II. Estimates

	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	2.8488E-10	1,897.80	3,795.60	0.00E+00	5.41E-07	1.08E-06
Am-241	7.5767E-03	1,897.80	3,795.60	0.00E+00	1.44E+01	2.88E+01
Am-242m	2.4459E-05	1,897.80	3,795.60	0.00E+00	4.64E-02	9.28E-02
Am-243	3.0983E-05	1,897.80	3,795.60	0.00E+00	5.88E-02	1.18E-01
C-14	1.2590E-04	1,897.80	3,795.60	0.00E+00	2.39E-01	4.78E-01
Cl-36	2.6624E-06	1,897.80	3,795.60	0.00E+00	5.05E-03	1.01E-02
Cm-243	3.8244E-05	1,897.80	3,795.60	0.00E+00	7.26E-02	1.45E-01
Cm-244	4.1010E-03	1,897.80	3,795.60	0.00E+00	7.78E+00	1.56E+01
Co-60	1.2410E+00	1,897.80	3,795.60	0.00E+00	2.36E+03	4.71E+03
Cs-134	6.5454E-01	1,897.80	3,795.60	0.00E+00	1.24E+03	2.48E+03
Cs-135	1.9753E-05	1,897.80	3,795.60	0.00E+00	3.75E-02	7.50E-02
Cs-137	2.7375E+00	1,897.80	3,795.60	0.00E+00	5.20E+03	1.04E+04
Eu-154	1.2324E-01	1,897.80	3,795.60	0.00E+00	2.34E+02	4.68E+02
Eu-155	5.3037E-02	1,897.80	3,795.60	0.00E+00	1.01E+02	2.01E+02
Fe-55	7.9555E-01	1,897.80	3,795.60	0.00E+00	1.51E+03	3.02E+03
H-3	1.0531E-02	1,897.80	3,795.60	0.00E+00	2.00E+01	4.00E+01
I-129	7.1287E-07	1,897.80	3,795.60	0.00E+00	1.35E-03	2.71E-03
Kr-85	2.4955E-01	1,897.80	3,795.60	0.00E+00	4.74E+02	9.47E+02
Np-237	1.2121E-05	1,897.80	3,795.60	0.00E+00	2.30E-02	4.60E-02
Pa-231	1.1230E-09	1,897.80	3,795.60	0.00E+00	2.13E-06	4.26E-06
Pb-210	6.1636E-14	1,897.80	3,795.60	0.00E+00	1.17E-10	2.34E-10
Pm-147	1.1302E+00	1,897.80	3,795.60	0.00E+00	2.14E+03	4.29E+03
Pu-238	5.4826E-02	1,897.80	3,795.60	0.00E+00	1.04E+02	2.08E+02
Pu-239	1.4056E-03	1,897.80	3,795.60	0.00E+00	2.67E+00	5.34E+00
Pu-240	1.1536E-03	1,897.80	3,795.60	0.00E+00	2.19E+00	4.38E+00
Pu-241	4.2996E-01	1,897.80	3,795.60	0.00E+00	8.16E+02	1.63E+03
Pu-242	4.9910E-06	1,897.80	3,795.60	0.00E+00	9.47E-03	1.89E-02
Ra-226	2.4008E-13	1,897.80	3,795.60	0.00E+00	4.56E-10	9.11E-10
Ra-228	1.8220E-11	1,897.80	3,795.60	0.00E+00	3.46E-08	6.92E-08
Ru-106	1.0343E-01	1,897.80	3,795.60	0.00E+00	1.96E+02	3.93E+02
Se-79	1.2832E-05	1,897.80	3,795.60	0.00E+00	2.44E-02	4.87E-02
Sn-126	1.2090E-05	1,897.80	3,795.60	0.00E+00	2.29E-02	4.59E-02
Sr-90	2.5646E+00	1,897.80	3,795.60	0.00E+00	4.87E+03	9.73E+03
Tc-99	4.0319E-04	1,897.80	3,795.60	0.00E+00	7.65E-01	1.53E+00
Th-229	7.7375E-11	1,897.80	3,795.60	0.00E+00	1.47E-07	2.94E-07
Th-230	1.2211E-10	1,897.80	3,795.60	0.00E+00	2.32E-07	4.63E-07
Th-232	2.3842E-11	1,897.80	3,795.60	0.00E+00	4.52E-08	9.05E-08
Tl-208	1.4313E-07	1,897.80	3,795.60	0.00E+00	2.72E-04	5.43E-04
U-232	4.1927E-07	1,897.80	3,795.60	0.00E+00	7.96E-04	1.59E-03
U-233	6.8491E-08	1,897.80	3,795.60	0.00E+00	1.30E-04	2.60E-04
U-234	2.0189E-06	1,897.80	3,795.60	0.00E+00	3.83E-03	7.66E-03
U-235	-2.6572E-06	1,897.80	0.00	2.31E-02	1.81E-02	2.31E-02
U-236	1.3575E-05	1,897.80	3,795.60	0.00E+00	2.58E-02	5.15E-02
U-238	-2.2698E-08	1,897.80	0.00	1.54E-03	1.50E-03	1.54E-03
Y-90	2.5646E+00	1,897.80	3,795.60	0.00E+00	4.87E+03	9.73E+03
Other Radionuclides					6.76E+03	1.35E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.124E+14
0.0250	1.344E+14
0.0375	1.189E+14
0.0575	1.186E+14
0.0850	7.383E+13
0.1250	5.928E+13
0.2250	6.274E+13
0.3750	3.131E+13
0.5750	5.181E+14
0.8500	9.505E+13
1.2500	3.651E+14
1.7500	4.883E+11
2.2500	3.828E+11
2.7500	3.470E+09
3.5000	4.084E+08
5.0000	9.784E+04
7.0000	1.126E+04
11.0000	1.292E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.24E+02	2.49E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	70	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	432.36	1,897.80
Bounding:		3,795.60

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.37	4.39
Bounding:	0.73	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (HIGH POWER) (HEU)
SNF ID #: 998
Fuel Units & Descr: 4 - ELEMENT
Heavy Metal Mass: BOL=0.117kg; EOL=0.117kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1970
Estimates as of: 2010
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

	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	1.5469E-09	2.22	4.44	0.00E+00	3.43E-09	6.87E-09
Am-241	1.6326E-02	2.22	4.44	0.00E+00	3.62E-02	7.25E-02
Am-242m	2.1332E-05	2.22	4.44	0.00E+00	4.74E-05	9.47E-05
Am-243	3.0893E-05	2.22	4.44	0.00E+00	6.86E-05	1.37E-04
C-14	1.2544E-04	2.22	4.44	0.00E+00	2.78E-04	5.57E-04
Cl-36	2.6624E-06	2.22	4.44	0.00E+00	5.91E-06	1.18E-05
Cm-243	1.8446E-05	2.22	4.44	0.00E+00	4.10E-05	8.19E-05
Cm-244	1.3020E-03	2.22	4.44	0.00E+00	2.89E-03	5.78E-03
Co-60	2.4053E-02	2.22	4.44	0.00E+00	5.34E-02	1.07E-01
Cs-134	2.7480E-05	2.22	4.44	0.00E+00	6.10E-05	1.22E-04
Cs-135	1.9738E-05	2.22	4.44	0.00E+00	4.38E-05	8.76E-05
Cs-137	1.3692E+00	2.22	4.44	0.00E+00	3.04E+00	6.08E+00
Eu-154	1.1001E-02	2.22	4.44	0.00E+00	2.44E-02	4.88E-02
Eu-155	8.0292E-04	2.22	4.44	0.00E+00	1.78E-03	3.57E-03
Fe-55	2.6894E-04	2.22	4.44	0.00E+00	5.97E-04	1.19E-03
H-3	1.9573E-03	2.22	4.44	0.00E+00	4.35E-03	8.69E-03
I-129	7.1287E-07	2.22	4.44	0.00E+00	1.58E-06	3.17E-06
Kr-85	3.5914E-02	2.22	4.44	0.00E+00	7.97E-02	1.59E-01
Np-237	1.2294E-05	2.22	4.44	0.00E+00	2.73E-05	5.46E-05
Pa-231	2.6383E-09	2.22	4.44	0.00E+00	5.86E-09	1.17E-08
Pb-210	4.4648E-12	2.22	4.44	0.00E+00	9.91E-12	1.98E-11
Pm-147	4.1025E-04	2.22	4.44	0.00E+00	9.11E-04	1.82E-03
Pu-238	4.3265E-02	2.22	4.44	0.00E+00	9.61E-02	1.92E-01
Pu-239	1.4044E-03	2.22	4.44	0.00E+00	3.12E-03	6.24E-03
Pu-240	1.1563E-03	2.22	4.44	0.00E+00	2.57E-03	5.13E-03
Pu-241	1.0156E-01	2.22	4.44	0.00E+00	2.25E-01	4.51E-01
Pu-242	4.9910E-06	2.22	4.44	0.00E+00	1.11E-05	2.22E-05
Ra-226	1.4301E-11	2.22	4.44	0.00E+00	3.18E-11	6.35E-11
Ra-228	2.3767E-11	2.22	4.44	0.00E+00	5.28E-11	1.06E-10
Ru-106	1.1521E-10	2.22	4.44	0.00E+00	2.56E-10	5.12E-10
Se-79	1.2828E-05	2.22	4.44	0.00E+00	2.85E-05	5.70E-05
Sn-126	1.2088E-05	2.22	4.44	0.00E+00	2.68E-05	5.37E-05
Sr-90	1.2560E+00	2.22	4.44	0.00E+00	2.79E+00	5.58E+00
Tc-99	4.0319E-04	2.22	4.44	0.00E+00	8.95E-04	1.79E-03
Th-229	3.3915E-10	2.22	4.44	0.00E+00	7.53E-10	1.51E-09
Th-230	1.8175E-09	2.22	4.44	0.00E+00	4.04E-09	8.07E-09
Th-232	2.3873E-11	2.22	4.44	0.00E+00	5.30E-11	1.06E-10
Tl-208	1.2736E-07	2.22	4.44	0.00E+00	2.83E-07	5.66E-07
U-232	3.4501E-07	2.22	4.44	0.00E+00	7.66E-07	1.53E-06
U-233	7.0610E-08	2.22	4.44	0.00E+00	1.57E-07	3.14E-07
U-234	7.1407E-06	2.22	4.44	0.00E+00	1.59E-05	3.17E-05
U-235	-2.6572E-06	2.22	0.00	2.35E-04	2.29E-04	2.35E-04
U-236	1.3576E-05	2.22	4.44	0.00E+00	3.01E-05	6.03E-05
U-238	-2.2698E-08	2.22	0.00	2.69E-06	2.64E-06	2.69E-06
Y-90	1.2563E+00	2.22	4.44	0.00E+00	2.79E+00	5.58E+00
Other Radionuclides					3.00E+00	6.01E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.071E+11
0.0250	6.351E+10
0.0375	5.560E+10
0.0575	6.022E+10
0.0850	3.576E+10
0.1250	2.389E+10
0.2250	3.089E+10
0.3750	1.342E+10
0.5750	2.264E+11
0.8500	3.039E+09
1.2500	9.577E+09
1.7500	8.452E+07
2.2500	4.822E+04
2.7500	2.009E+04
3.5000	9.161E+01
5.0000	3.897E+01
7.0000	4.467E+00
11.0000	5.115E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.93E-02	7.85E-02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	INCOLOY	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.152	60 to 100

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2.22
Bounding:		4.44

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.11	

Estimated EOL HM/Given EOL HM: 0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (HIGH POWER) ROMANIA
SNF ID #: 302
Fuel Units & Descr: 611 - ELEMENT
Heavy Metal Mass: BOL=27.067kg; EOL=13.992kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1978
Estimates as of: 2010
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' 5.50

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.0386E-09	12,427.12	24,854.25	0.00E+00	1.29E-05	2.58E-05
Am-241	1.4973E-02	12,427.12	24,854.25	0.00E+00	1.86E+02	3.72E+02
Am-242m	2.2324E-05	12,427.12	24,854.25	0.00E+00	2.77E-01	5.55E-01
Am-243	3.0923E-05	12,427.12	24,854.25	0.00E+00	3.84E-01	7.69E-01
C-14	1.2559E-04	12,427.12	24,854.25	0.00E+00	1.56E+00	3.12E+00
Cl-36	2.6624E-06	12,427.12	24,854.25	0.00E+00	3.31E-02	6.62E-02
Cm-243	2.3527E-05	12,427.12	24,854.25	0.00E+00	2.92E-01	5.85E-01
Cm-244	1.9092E-03	12,427.12	24,854.25	0.00E+00	2.37E+01	4.75E+01
Co-60	8.9552E-02	12,427.12	24,854.25	0.00E+00	1.11E+03	2.23E+03
Cs-134	7.9074E-04	12,427.12	24,854.25	0.00E+00	9.83E+00	1.97E+01
Cs-135	1.9753E-05	12,427.12	24,854.25	0.00E+00	2.45E-01	4.91E-01
Cs-137	1.7243E+00	12,427.12	24,854.25	0.00E+00	2.14E+04	4.29E+04
Eu-154	2.4609E-02	12,427.12	24,854.25	0.00E+00	3.06E+02	6.12E+02
Eu-155	3.2456E-03	12,427.12	24,854.25	0.00E+00	4.03E+01	8.07E+01
Fe-55	3.8605E-03	12,427.12	24,854.25	0.00E+00	4.80E+01	9.59E+01
H-3	3.4305E-03	12,427.12	24,854.25	0.00E+00	4.26E+01	8.53E+01
I-129	7.1287E-07	12,427.12	24,854.25	0.00E+00	8.86E-03	1.77E-02
Kr-85	6.8536E-02	12,427.12	24,854.25	0.00E+00	8.52E+02	1.70E+03
Np-237	1.2219E-05	12,427.12	24,854.25	0.00E+00	1.52E-01	3.04E-01
Pa-231	2.0701E-09	12,427.12	24,854.25	0.00E+00	2.57E-05	5.14E-05
Pb-210	1.3279E-12	12,427.12	24,854.25	0.00E+00	1.65E-08	3.30E-08
Pm-147	5.7517E-03	12,427.12	24,854.25	0.00E+00	7.15E+01	1.43E+02
Pu-238	4.6828E-02	12,427.12	24,854.25	0.00E+00	5.82E+02	1.16E+03
Pu-239	1.4048E-03	12,427.12	24,854.25	0.00E+00	1.75E+01	3.49E+01
Pu-240	1.1563E-03	12,427.12	24,854.25	0.00E+00	1.44E+01	2.87E+01
Pu-241	1.6431E-01	12,427.12	24,854.25	0.00E+00	2.04E+03	4.08E+03
Pu-242	4.9910E-06	12,427.12	24,854.25	0.00E+00	6.20E-02	1.24E-01
Ra-226	5.4390E-12	12,427.12	24,854.25	0.00E+00	6.76E-08	1.35E-07
Ra-228	2.3437E-11	12,427.12	24,854.25	0.00E+00	2.91E-07	5.82E-07
Ru-106	1.1115E-07	12,427.12	24,854.25	0.00E+00	1.38E-03	2.76E-03
Se-79	1.2829E-05	12,427.12	24,854.25	0.00E+00	1.59E-01	3.19E-01
Sn-126	1.2088E-05	12,427.12	24,854.25	0.00E+00	1.50E-01	3.00E-01
Sr-90	1.5935E+00	12,427.12	24,854.25	0.00E+00	1.98E+04	3.96E+04
Tc-99	4.0319E-04	12,427.12	24,854.25	0.00E+00	5.01E+00	1.00E+01
Th-229	2.4023E-10	12,427.12	24,854.25	0.00E+00	2.99E-06	5.97E-06
Th-230	9.6948E-10	12,427.12	24,854.25	0.00E+00	1.20E-05	2.41E-05
Th-232	2.3857E-11	12,427.12	24,854.25	0.00E+00	2.96E-07	5.93E-07
Tl-208	1.3982E-07	12,427.12	24,854.25	0.00E+00	1.74E-03	3.48E-03
U-232	3.7943E-07	12,427.12	24,854.25	0.00E+00	4.72E-03	9.43E-03
U-233	6.9814E-08	12,427.12	24,854.25	0.00E+00	8.68E-04	1.74E-03
U-234	5.4059E-06	12,427.12	24,854.25	0.00E+00	6.72E-02	1.34E-01
U-235	-2.6572E-06	12,427.12	0.00	5.45E-02	2.15E-02	5.45E-02
U-236	1.3576E-05	12,427.12	24,854.25	0.00E+00	1.69E-01	3.37E-01
U-238	-2.2698E-06	12,427.12	0.00	6.24E-04	3.42E-04	6.24E-04
Y-90	1.5935E+00	12,427.12	24,854.25	0.00E+00	1.98E+04	3.96E+04
Other Radionuclides					2.11E+04	4.21E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.185E+15
0.0250	4.523E+14
0.0375	3.975E+14
0.0575	4.271E+14
0.0850	2.550E+14
0.1250	1.741E+14
0.2250	2.203E+14
0.3750	9.561E+13
0.5750	1.598E+15
0.8500	2.686E+13
1.2500	1.818E+14
1.7500	7.549E+11
2.2500	9.182E+08
2.7500	1.256E+08
3.5000	7.303E+05
5.0000	3.100E+05
7.0000	3.559E+04
11.0000	4.079E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.85E+02	5.70E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	INCOLOY	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.14	60 to 100

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		12,427.12
Bounding:		24,854.25

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.35	
Bounding:	2.71	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA (HIGH POWER) ROMANIA
SNF ID #: 930
Fuel Units & Descr: 267 - ELEMENT
Heavy Metal Mass: BOL=11.828kg; EOL=5.58kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1999
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' 2.41

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[3]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.2243E-10	5,938.04	11,241.67	0.00E+00	2.51E-06	4.75E-06
Am-241	9.9143E-03	5,938.04	11,241.67	0.00E+00	5.89E+01	1.11E+02
Am-242m	2.3903E-05	5,938.04	11,241.67	0.00E+00	1.42E-01	2.69E-01
Am-243	3.0968E-05	5,938.04	11,241.67	0.00E+00	1.84E-01	3.48E-01
C-14	1.2581E-04	5,938.04	11,241.67	0.00E+00	7.47E-01	1.41E+00
Cl-36	2.6624E-06	5,938.04	11,241.67	0.00E+00	1.58E-02	2.99E-02
Cm-243	3.3870E-05	5,938.04	11,241.67	0.00E+00	2.01E-01	3.81E-01
Cm-244	3.3870E-03	5,938.04	11,241.67	0.00E+00	2.01E+01	3.81E+01
Co-60	6.4311E-01	5,938.04	11,241.67	0.00E+00	3.82E+03	7.23E+03
Cs-134	1.2201E-01	5,938.04	11,241.67	0.00E+00	7.24E+02	1.37E+03
Cs-135	1.9753E-05	5,938.04	11,241.67	0.00E+00	1.17E-01	2.22E-01
Cs-137	2.4384E+00	5,938.04	11,241.67	0.00E+00	1.45E+04	2.74E+04
Eu-154	8.2396E-02	5,938.04	11,241.67	0.00E+00	4.89E+02	9.26E+02
Eu-155	2.6383E-02	5,938.04	11,241.67	0.00E+00	1.57E+02	2.97E+02
Fe-55	2.1001E-01	5,938.04	11,241.67	0.00E+00	1.25E+03	2.36E+03
H-3	7.9555E-03	5,938.04	11,241.67	0.00E+00	4.72E+01	8.94E+01
I-129	7.1287E-07	5,938.04	11,241.67	0.00E+00	4.23E-03	8.01E-03
Kr-85	1.8070E-01	5,938.04	11,241.67	0.00E+00	1.07E+03	2.03E+03
Np-237	1.2135E-05	5,938.04	11,241.67	0.00E+00	7.21E-02	1.36E-01
Pa-231	1.3125E-09	5,938.04	11,241.67	0.00E+00	7.79E-06	1.48E-05
Pb-210	1.1201E-13	5,938.04	11,241.67	0.00E+00	6.65E-10	1.26E-09
Pm-147	3.0186E-01	5,938.04	11,241.67	0.00E+00	1.79E+03	3.39E+03
Pu-238	5.2706E-02	5,938.04	11,241.67	0.00E+00	3.13E+02	5.93E+02
Pu-239	1.4054E-03	5,938.04	11,241.67	0.00E+00	8.35E+00	1.58E+01
Pu-240	1.1545E-03	5,938.04	11,241.67	0.00E+00	6.86E+00	1.30E+01
Pu-241	3.3809E-01	5,938.04	11,241.67	0.00E+00	2.01E+03	3.80E+03
Pu-242	4.9910E-06	5,938.04	11,241.67	0.00E+00	2.96E-02	5.61E-02
Ra-226	6.1395E-13	5,938.04	11,241.67	0.00E+00	3.65E-09	6.90E-09
Ra-228	2.0490E-11	5,938.04	11,241.67	0.00E+00	1.22E-07	2.30E-07
Ru-106	3.3298E-03	5,938.04	11,241.67	0.00E+00	1.98E+01	3.74E+01
Se-79	1.2831E-05	5,938.04	11,241.67	0.00E+00	7.62E-02	1.44E-01
Sn-126	1.2090E-05	5,938.04	11,241.67	0.00E+00	7.18E-02	1.36E-01
Sr-90	2.2760E+00	5,938.04	11,241.67	0.00E+00	1.35E+04	2.56E+04
Tc-99	4.0319E-04	5,938.04	11,241.67	0.00E+00	2.39E+00	4.53E+00
Th-229	1.0973E-10	5,938.04	11,241.67	0.00E+00	6.52E-07	1.23E-06
Th-230	2.2940E-10	5,938.04	11,241.67	0.00E+00	1.36E-06	2.58E-06
Th-232	2.3842E-11	5,938.04	11,241.67	0.00E+00	1.42E-07	2.68E-07
Tl-208	1.4857E-07	5,938.04	11,241.67	0.00E+00	8.82E-04	1.67E-03
U-232	4.1927E-07	5,938.04	11,241.67	0.00E+00	2.49E-03	4.71E-03
U-233	6.8746E-08	5,938.04	11,241.67	0.00E+00	4.08E-04	7.73E-04
U-234	2.7511E-06	5,938.04	11,241.67	0.00E+00	1.63E-02	3.09E-02
U-235	-2.6572E-06	5,938.04	0.00	2.38E-02	8.03E-03	2.38E-02
U-236	1.3575E-05	5,938.04	11,241.67	0.00E+00	8.06E-02	1.53E-01
U-238	-2.2698E-08	5,938.04	0.00	2.72E-04	1.38E-04	2.72E-04
Y-90	2.2775E+00	5,938.04	11,241.67	0.00E+00	1.35E+04	2.56E+04
Other Radionuclides					1.44E+04	2.72E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.441E+15
0.0250	3.043E+14
0.0375	2.682E+14
0.0575	2.797E+14
0.0850	1.696E+14
0.1250	1.232E+14
0.2250	1.454E+14
0.3750	6.592E+13
0.5750	1.094E+15
0.8500	7.118E+13
1.2500	5.594E+14
1.7500	8.067E+11
2.2500	1.733E+10
2.7500	3.770E+08
3.5000	3.948E+07
5.0000	2.409E+05
7.0000	2.772E+04
11.0000	3.180E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.50E+02	4.73E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	INCOLOY	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.14636964	60 to 100

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

Burnup Summary (MWd)[3]

	From SFD	Estimated
Nominal:		5,938.04
Bounding:		11,241.67

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.48	
Bounding:	2.80	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 20/20 FFCR MNRC
SNF ID #: 737
Fuel Units & Descr: 6 - ELEMENT
Heavy Metal Mass: BOL=2.462kg; EOL=2.462kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
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' 0.08

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	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.2427E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pa-231	3.8511E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pb-210	7.3880E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pm-147	2.1023E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-238	1.0383E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-239	5.5293E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-240	2.1278E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-241	1.0195E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-242	2.3128E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ra-226	5.2782E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ra-228	1.9338E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ru-106	9.1684E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Se-79	1.3018E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Sn-126	1.2167E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Sr-90	2.6045E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Tc-99	4.4241E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-229	1.3713E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-230	1.8090E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-232	2.5278E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Tl-208	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-232	4.8737E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-233	1.2203E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-234	1.5925E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-235	-2.6194E-06	0.00	0.00	1.05E-03	1.05E-03	1.05E-03
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-238	-3.6331E-08	0.00	0.00	6.64E-04	6.64E-04	6.64E-04
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Other Radionuclides					0.00E+00	0.00E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.607E+07
0.0250	0.000E+00
0.0375	3.553E+04
0.0575	2.174E+04
0.0850	3.036E+06
0.1250	5.994E+06
0.2250	2.121E+07
0.3750	5.293E+04
0.5750	2.604E+03
0.8500	4.065E+02
1.2500	2.427E+01
1.7500	1.188E+01
2.2500	6.879E+00
2.7500	3.997E+00
3.5000	3.573E+00
5.0000	1.535E+00
7.0000	1.767E-01
11.0000	2.032E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.44E-05	4.44E-05
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.76779631	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.00	
Bounding:		

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 30/20 FFCR MNRC
SNF ID #: 1055
Fuel Units & Descr: 1 - ELEMENT
Heavy Metal Mass: BOL=0.675kg; EOL=0.675kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 0.01

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.2427E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pa-231	3.8511E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pb-210	7.3880E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pm-147	2.1023E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-238	1.0383E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-239	5.5293E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-240	2.1278E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-241	1.0195E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-242	2.3128E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ra-226	5.2782E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ra-228	1.9338E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ru-106	9.1684E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Se-79	1.3018E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Sn-126	1.2167E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Sr-90	2.6045E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Tc-99	4.4241E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-229	1.3713E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-230	1.8090E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-232	2.5278E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Tl-208	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-232	4.8737E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-233	1.2203E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-234	1.5925E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-235	-2.6194E-06	0.00	0.00	2.88E-04	2.88E-04	2.88E-04
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-238	-3.6331E-08	0.00	0.00	1.82E-04	1.82E-04	1.82E-04
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Other Radionuclides					0.00E+00	0.00E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.138E+08
0.0250	0.000E+00
0.0375	9.726E+03
0.0575	5.957E+03
0.0850	8.309E+05
0.1250	1.641E+06
0.2250	5.806E+06
0.3750	1.449E+04
0.5750	7.127E+02
0.8500	1.113E+02
1.2500	6.652E+00
1.7500	3.255E+00
2.2500	1.885E+00
2.7500	1.095E+00
3.5000	9.793E-01
5.0000	4.207E-01
7.0000	4.843E-02
11.0000	5.568E-03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.22E-06	1.22E-06
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.74748006	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.00	
Bounding:		

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR
SNF ID #: 1003
Fuel Units & Descr: 10 - ELEMENT
Heavy Metal Mass: BOL=1.604kg; EOL=1.541kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.14

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	60.14	120.28	0.00E+00	5.12E-08	1.02E-07
Am-241	1.8331E-03	60.14	120.28	0.00E+00	1.10E-01	2.20E-01
Am-242m	1.4129E-06	60.14	120.28	0.00E+00	8.50E-05	1.70E-04
Am-243	1.4774E-07	60.14	120.28	0.00E+00	8.89E-06	1.78E-05
C-14	1.2871E-04	60.14	120.28	0.00E+00	7.74E-03	1.55E-02
Cl-36	2.8120E-06	60.14	120.28	0.00E+00	1.69E-04	3.38E-04
Cm-243	1.7940E-07	60.14	120.28	0.00E+00	1.08E-05	2.16E-05
Cm-244	1.6962E-06	60.14	120.28	0.00E+00	1.02E-04	2.04E-04
Co-60	1.2839E+00	60.14	120.28	0.00E+00	7.72E+01	1.54E+02
Cs-134	9.0541E-02	60.14	120.28	0.00E+00	5.45E+00	1.09E+01
Cs-135	3.2195E-05	60.14	120.28	0.00E+00	1.94E-03	3.87E-03
Cs-137	2.7564E+00	60.14	120.28	0.00E+00	1.66E+02	3.32E+02
Eu-154	1.5368E-02	60.14	120.28	0.00E+00	9.24E-01	1.85E+00
Eu-155	2.9293E-02	60.14	120.28	0.00E+00	1.76E+00	3.52E+00
Fe-55	7.7158E-01	60.14	120.28	0.00E+00	4.64E+01	9.28E+01
H-3	1.1111E-02	60.14	120.28	0.00E+00	6.68E-01	1.34E+00
I-129	7.3684E-07	60.14	120.28	0.00E+00	4.43E-05	8.86E-05
Kr-85	2.5263E-01	60.14	120.28	0.00E+00	1.52E+01	3.04E+01
Np-237	1.2427E-06	60.14	120.28	0.00E+00	7.47E-05	1.49E-04
Pa-231	3.8511E-09	60.14	120.28	0.00E+00	2.32E-07	4.63E-07
Pb-210	7.3880E-15	60.14	120.28	0.00E+00	4.44E-13	8.89E-13
Pm-147	2.1023E+00	60.14	120.28	0.00E+00	1.26E+02	2.53E+02
Pu-238	1.0383E-03	60.14	120.28	0.00E+00	6.24E-02	1.25E-01
Pu-239	5.5293E-03	60.14	120.28	0.00E+00	3.33E-01	6.65E-01
Pu-240	2.1278E-03	60.14	120.28	0.00E+00	1.28E-01	2.56E-01
Pu-241	1.0195E-01	60.14	120.28	0.00E+00	6.13E+00	1.23E+01
Pu-242	2.3128E-07	60.14	120.28	0.00E+00	1.39E-05	2.78E-05
Ra-226	5.2782E-14	60.14	120.28	0.00E+00	3.17E-12	6.35E-12
Ra-228	1.9338E-10	60.14	120.28	0.00E+00	1.16E-08	2.33E-08
Ru-106	9.1684E-02	60.14	120.28	0.00E+00	5.51E+00	1.10E+01
Se-79	1.3018E-05	60.14	120.28	0.00E+00	7.83E-04	1.57E-03
Sn-126	1.2167E-05	60.14	120.28	0.00E+00	7.32E-04	1.46E-03
Sr-90	2.6045E+00	60.14	120.28	0.00E+00	1.57E+02	3.13E+02
Tc-99	4.4241E-04	60.14	120.28	0.00E+00	2.66E-02	5.32E-02
Th-229	1.3713E-10	60.14	120.28	0.00E+00	8.25E-09	1.65E-08
Th-230	1.8090E-11	60.14	120.28	0.00E+00	1.09E-09	2.18E-09
Th-232	2.5278E-10	60.14	120.28	0.00E+00	1.52E-08	3.04E-08
Tl-208	1.6947E-08	60.14	120.28	0.00E+00	1.02E-06	2.04E-06
U-232	4.8737E-08	60.14	120.28	0.00E+00	2.93E-06	5.86E-06
U-233	1.2203E-07	60.14	120.28	0.00E+00	7.34E-06	1.47E-05
U-234	1.5925E-07	60.14	120.28	0.00E+00	9.58E-06	1.92E-05
U-235	-2.6194E-06	60.14	0.00	6.68E-04	5.10E-04	6.68E-04
U-236	1.2693E-05	60.14	120.28	0.00E+00	7.63E-04	1.53E-03
U-238	-3.6331E-08	60.14	0.00	4.35E-04	4.33E-04	4.35E-04
Y-90	2.6060E+00	60.14	120.28	0.00E+00	1.57E+02	3.13E+02
Other Radionuclides					2.17E+02	4.34E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.944E+13
0.0250	4.278E+12
0.0375	3.643E+12
0.0575	3.739E+12
0.0850	2.316E+12
0.1250	1.682E+12
0.2250	1.965E+12
0.3750	9.972E+11
0.5750	1.326E+13
0.8500	5.690E+11
1.2500	1.155E+13
1.7500	7.702E+09
2.2500	1.241E+10
2.7500	9.852E+07
3.5000	1.147E+07
5.0000	6.404E+01
7.0000	7.250E+00
11.0000	8.259E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.80E+00	7.00E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.26433915	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	54.71	60.14
Bounding:		120.28

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.10	1.10
Bounding:	2.20	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR AFRRI
SNF ID #: 969
Fuel Units & Descr: 3 - ELEMENT
Heavy Metal Mass: BOL= ; EOL=0.26kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2019
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10" 0.04

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	9.20	18.40	0.00E+00	7.84E-09	1.57E-08
Am-241	1.8331E-03	9.20	18.40	0.00E+00	1.69E-02	3.37E-02
Am-242m	1.4129E-06	9.20	18.40	0.00E+00	1.30E-05	2.60E-05
Am-243	1.4774E-07	9.20	18.40	0.00E+00	1.36E-06	2.72E-06
C-14	1.2871E-04	9.20	18.40	0.00E+00	1.18E-03	2.37E-03
Cl-36	2.8120E-06	9.20	18.40	0.00E+00	2.59E-05	5.17E-05
Cm-243	1.7940E-07	9.20	18.40	0.00E+00	1.65E-06	3.30E-06
Cm-244	1.6962E-06	9.20	18.40	0.00E+00	1.56E-05	3.12E-05
Co-60	1.2839E+00	9.20	18.40	0.00E+00	1.18E+01	2.36E+01
Cs-134	9.0541E-02	9.20	18.40	0.00E+00	8.33E-01	1.67E+00
Cs-135	3.2195E-05	9.20	18.40	0.00E+00	2.96E-04	5.92E-04
Cs-137	2.7564E+00	9.20	18.40	0.00E+00	2.54E+01	5.07E+01
Eu-154	1.5368E-02	9.20	18.40	0.00E+00	1.41E-01	2.83E-01
Eu-155	2.9293E-02	9.20	18.40	0.00E+00	2.70E-01	5.39E-01
Fe-55	7.7158E-01	9.20	18.40	0.00E+00	7.10E+00	1.42E+01
H-3	1.1111E-02	9.20	18.40	0.00E+00	1.02E-01	2.04E-01
I-129	7.3684E-07	9.20	18.40	0.00E+00	6.78E-06	1.36E-05
Kr-85	2.5263E-01	9.20	18.40	0.00E+00	2.32E+00	4.65E+00
Np-237	1.2427E-06	9.20	18.40	0.00E+00	1.14E-05	2.29E-05
Pa-231	3.8511E-09	9.20	18.40	0.00E+00	3.54E-08	7.09E-08
Pb-210	7.3880E-15	9.20	18.40	0.00E+00	6.80E-14	1.36E-13
Pm-147	2.1023E+00	9.20	18.40	0.00E+00	1.93E+01	3.87E+01
Pu-238	1.0383E-03	9.20	18.40	0.00E+00	9.55E-03	1.91E-02
Pu-239	5.5293E-03	9.20	18.40	0.00E+00	5.09E-02	1.02E-01
Pu-240	2.1278E-03	9.20	18.40	0.00E+00	1.96E-02	3.92E-02
Pu-241	1.0195E-01	9.20	18.40	0.00E+00	9.38E-01	1.88E+00
Pu-242	2.3128E-07	9.20	18.40	0.00E+00	2.13E-06	4.26E-06
Ra-226	5.2782E-14	9.20	18.40	0.00E+00	4.86E-13	9.71E-13
Ra-228	1.9338E-10	9.20	18.40	0.00E+00	1.78E-09	3.56E-09
Ru-106	9.1684E-02	9.20	18.40	0.00E+00	8.44E-01	1.69E+00
Se-79	1.3018E-05	9.20	18.40	0.00E+00	1.20E-04	2.40E-04
Sn-126	1.2167E-05	9.20	18.40	0.00E+00	1.12E-04	2.24E-04
Sr-90	2.6045E+00	9.20	18.40	0.00E+00	2.40E+01	4.79E+01
Tc-99	4.4241E-04	9.20	18.40	0.00E+00	4.07E-03	8.14E-03
Th-229	1.3713E-10	9.20	18.40	0.00E+00	1.26E-09	2.52E-09
Th-230	1.8090E-11	9.20	18.40	0.00E+00	1.66E-10	3.33E-10
Th-232	2.5278E-10	9.20	18.40	0.00E+00	2.33E-09	4.65E-09
Tl-208	1.6947E-06	9.20	18.40	0.00E+00	1.56E-07	3.12E-07
U-232	4.8737E-06	9.20	18.40	0.00E+00	4.48E-07	8.97E-07
U-233	1.2203E-07	9.20	18.40	0.00E+00	1.12E-06	2.25E-06
U-234	1.5925E-07	9.20	18.40	0.00E+00	1.47E-06	2.93E-06
U-235	-2.6194E-06	9.20	0.00	1.17E-04	9.25E-05	1.17E-04
U-236	1.2693E-05	9.20	18.40	0.00E+00	1.17E-04	2.34E-04
U-238	-3.6331E-08	9.20	0.00	7.25E-05	7.22E-05	7.25E-05
Y-90	2.6060E+00	9.20	18.40	0.00E+00	2.40E+01	4.80E+01
Other Radionuclides					3.32E+01	6.63E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.974E+12
0.0250	6.544E+11
0.0375	5.573E+11
0.0575	5.721E+11
0.0850	3.544E+11
0.1250	2.574E+11
0.2250	3.006E+11
0.3750	1.526E+11
0.5750	2.028E+12
0.8500	8.705E+10
1.2500	1.768E+12
1.7500	1.178E+09
2.2500	1.899E+09
2.7500	1.507E+07
3.5000	1.754E+06
5.0000	9.812E+00
7.0000	1.111E+00
11.0000	1.265E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.35E-01	1.07E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		9.20
Bounding:		18.40

Basis for burnup used in estimate:
Nominal burnup taken from SFD and converted to MWd using BOL=0.27kg
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.00	
Bounding:	2.00	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR ENGLAND
SNF ID #: 987
Fuel Units & Descr: 4 - ELEMENT
Heavy Metal Mass: BOL=0.641kg; EOL=0.624kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 0.04

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	18.75	37.49	0.00E+00	1.60E-08	3.19E-08
Am-241	1.8331E-03	18.75	37.49	0.00E+00	3.44E-02	6.87E-02
Am-242m	1.4129E-06	18.75	37.49	0.00E+00	2.65E-05	5.30E-05
Am-243	1.4774E-07	18.75	37.49	0.00E+00	2.77E-06	5.54E-06
C-14	1.2871E-04	18.75	37.49	0.00E+00	2.41E-03	4.83E-03
Cl-36	2.8120E-06	18.75	37.49	0.00E+00	5.27E-05	1.05E-04
Cm-243	1.7940E-07	18.75	37.49	0.00E+00	3.36E-06	6.73E-06
Cm-244	1.6962E-06	18.75	37.49	0.00E+00	3.18E-05	6.36E-05
Co-60	1.2839E+00	18.75	37.49	0.00E+00	2.41E+01	4.81E+01
Cs-134	9.0541E-02	18.75	37.49	0.00E+00	1.70E+00	3.39E+00
Cs-135	3.2195E-05	18.75	37.49	0.00E+00	6.04E-04	1.21E-03
Cs-137	2.7564E+00	18.75	37.49	0.00E+00	5.17E+01	1.03E+02
Eu-154	1.5368E-02	18.75	37.49	0.00E+00	2.88E-01	5.76E-01
Eu-155	2.9293E-02	18.75	37.49	0.00E+00	5.49E-01	1.10E+00
Fe-55	7.7158E-01	18.75	37.49	0.00E+00	1.45E+01	2.89E+01
H-3	1.1111E-02	18.75	37.49	0.00E+00	2.08E-01	4.17E-01
I-129	7.3684E-07	18.75	37.49	0.00E+00	1.38E-05	2.76E-05
Kr-85	2.5263E-01	18.75	37.49	0.00E+00	4.74E+00	9.47E+00
Np-237	1.2427E-06	18.75	37.49	0.00E+00	2.33E-05	4.66E-05
Pa-231	3.8511E-09	18.75	37.49	0.00E+00	7.22E-08	1.44E-07
Pb-210	7.3880E-15	18.75	37.49	0.00E+00	1.39E-13	2.77E-13
Pm-147	2.1023E+00	18.75	37.49	0.00E+00	3.94E+01	7.88E+01
Pu-238	1.0383E-03	18.75	37.49	0.00E+00	1.95E-02	3.89E-02
Pu-239	5.5293E-03	18.75	37.49	0.00E+00	1.04E-01	2.07E-01
Pu-240	2.1278E-03	18.75	37.49	0.00E+00	3.99E-02	7.98E-02
Pu-241	1.0195E-01	18.75	37.49	0.00E+00	1.91E+00	3.82E+00
Pu-242	2.3128E-07	18.75	37.49	0.00E+00	4.34E-06	8.67E-06
Ra-226	5.2782E-14	18.75	37.49	0.00E+00	9.90E-13	1.98E-12
Ra-228	1.9338E-10	18.75	37.49	0.00E+00	3.63E-09	7.25E-09
Ru-106	9.1684E-02	18.75	37.49	0.00E+00	1.72E+00	3.44E+00
Se-79	1.3018E-05	18.75	37.49	0.00E+00	2.44E-04	4.88E-04
Sn-126	1.2167E-05	18.75	37.49	0.00E+00	2.28E-04	4.56E-04
Sr-90	2.6045E+00	18.75	37.49	0.00E+00	4.88E+01	9.77E+01
Tc-99	4.4241E-04	18.75	37.49	0.00E+00	8.29E-03	1.66E-02
Th-229	1.3713E-10	18.75	37.49	0.00E+00	2.57E-09	5.14E-09
Th-230	1.8090E-11	18.75	37.49	0.00E+00	3.39E-10	6.78E-10
Th-232	2.5278E-10	18.75	37.49	0.00E+00	4.74E-09	9.48E-09
Tl-208	1.6947E-08	18.75	37.49	0.00E+00	3.18E-07	6.35E-07
U-232	4.8737E-08	18.75	37.49	0.00E+00	9.14E-07	1.83E-06
U-233	1.2203E-07	18.75	37.49	0.00E+00	2.29E-06	4.58E-06
U-234	1.5925E-07	18.75	37.49	0.00E+00	2.99E-06	5.97E-06
U-235	-2.6194E-06	18.75	0.00	2.77E-04	2.28E-04	2.77E-04
U-236	1.2693E-05	18.75	37.49	0.00E+00	2.38E-04	4.76E-04
U-238	-3.6331E-08	18.75	0.00	1.72E-04	1.72E-04	1.72E-04
Y-90	2.6060E+00	18.75	37.49	0.00E+00	4.89E+01	9.77E+01
Other Radionuclides					6.76E+01	1.35E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.060E+12
0.0250	1.333E+12
0.0375	1.136E+12
0.0575	1.166E+12
0.0850	7.221E+11
0.1250	5.244E+11
0.2250	6.126E+11
0.3750	3.109E+11
0.5750	4.133E+12
0.8500	1.774E+11
1.2500	3.602E+12
1.7500	2.401E+09
2.2500	3.870E+09
2.7500	3.071E+07
3.5000	3.574E+06
5.0000	2.005E+01
7.0000	2.270E+00
11.0000	2.586E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.89E+00	2.18E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.96879875	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	18.75	16.80
Bounding:		37.49

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.86	0.90
Bounding:	1.71	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR HEIDELBERG
SNF ID #: 1045
Fuel Units & Descr: 5 - ELEMENT
Heavy Metal Mass: BOL=0.801kg; EOL=0.79kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.05

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	15.61	31.23	0.00E+00	1.33E-08	2.66E-08
Am-241	1.8331E-03	15.61	31.23	0.00E+00	2.86E-02	5.72E-02
Am-242m	1.4129E-06	15.61	31.23	0.00E+00	2.21E-05	4.41E-05
Am-243	1.4774E-07	15.61	31.23	0.00E+00	2.31E-06	4.61E-06
C-14	1.2871E-04	15.61	31.23	0.00E+00	2.01E-03	4.02E-03
Cl-36	2.8120E-06	15.61	31.23	0.00E+00	4.39E-05	8.78E-05
Cm-243	1.7940E-07	15.61	31.23	0.00E+00	2.80E-06	5.60E-06
Cm-244	1.6962E-06	15.61	31.23	0.00E+00	2.65E-05	5.30E-05
Co-60	1.2839E+00	15.61	31.23	0.00E+00	2.00E+01	4.01E+01
Cs-134	9.0541E-02	15.61	31.23	0.00E+00	1.41E+00	2.83E+00
Cs-135	3.2195E-05	15.61	31.23	0.00E+00	5.03E-04	1.01E-03
Cs-137	2.7564E+00	15.61	31.23	0.00E+00	4.30E+01	8.61E+01
Eu-154	1.5368E-02	15.61	31.23	0.00E+00	2.40E-01	4.80E-01
Eu-155	2.9293E-02	15.61	31.23	0.00E+00	4.57E-01	9.15E-01
Fe-55	7.7158E-01	15.61	31.23	0.00E+00	1.20E+01	2.41E+01
H-3	1.1111E-02	15.61	31.23	0.00E+00	1.73E-01	3.47E-01
I-129	7.3684E-07	15.61	31.23	0.00E+00	1.15E-05	2.30E-05
Kr-85	2.5263E-01	15.61	31.23	0.00E+00	3.94E+00	7.89E+00
Np-237	1.2427E-06	15.61	31.23	0.00E+00	1.94E-05	3.88E-05
Pa-231	3.8511E-09	15.61	31.23	0.00E+00	6.01E-08	1.20E-07
Pb-210	7.3880E-15	15.61	31.23	0.00E+00	1.15E-13	2.31E-13
Pm-147	2.1023E+00	15.61	31.23	0.00E+00	3.28E+01	6.56E+01
Pu-238	1.0383E-03	15.61	31.23	0.00E+00	1.62E-02	3.24E-02
Pu-239	5.5293E-03	15.61	31.23	0.00E+00	8.63E-02	1.73E-01
Pu-240	2.1278E-03	15.61	31.23	0.00E+00	3.32E-02	6.64E-02
Pu-241	1.0195E-01	15.61	31.23	0.00E+00	1.59E+00	3.18E+00
Pu-242	2.3128E-07	15.61	31.23	0.00E+00	3.61E-06	7.22E-06
Ra-226	5.2782E-14	15.61	31.23	0.00E+00	8.24E-13	1.65E-12
Ra-228	1.9338E-10	15.61	31.23	0.00E+00	3.02E-09	6.04E-09
Ru-106	9.1684E-02	15.61	31.23	0.00E+00	1.43E+00	2.86E+00
Se-79	1.3018E-05	15.61	31.23	0.00E+00	2.03E-04	4.07E-04
Sn-126	1.2167E-05	15.61	31.23	0.00E+00	1.90E-04	3.80E-04
Sr-90	2.6045E+00	15.61	31.23	0.00E+00	4.07E+01	8.13E+01
Tc-99	4.4241E-04	15.61	31.23	0.00E+00	6.91E-03	1.38E-02
Th-229	1.3713E-10	15.61	31.23	0.00E+00	2.14E-09	4.28E-09
Th-230	1.8090E-11	15.61	31.23	0.00E+00	2.82E-10	5.65E-10
Th-232	2.5278E-10	15.61	31.23	0.00E+00	3.95E-09	7.89E-09
Tl-208	1.6947E-08	15.61	31.23	0.00E+00	2.65E-07	5.29E-07
U-232	4.8737E-08	15.61	31.23	0.00E+00	7.61E-07	1.52E-06
U-233	1.2203E-07	15.61	31.23	0.00E+00	1.91E-06	3.81E-06
U-234	1.5925E-07	15.61	31.23	0.00E+00	2.49E-06	4.97E-06
U-235	-2.6194E-06	15.61	0.00	3.44E-04	3.03E-04	3.44E-04
U-236	1.2693E-05	15.61	31.23	0.00E+00	1.98E-04	3.96E-04
U-238	-3.6331E-08	15.61	0.00	2.16E-04	2.15E-04	2.16E-04
Y-90	2.6060E+00	15.61	31.23	0.00E+00	4.07E+01	8.14E+01
Other Radionuclides					5.63E+01	1.13E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.047E+12
0.0250	1.111E+12
0.0375	9.457E+11
0.0575	9.707E+11
0.0850	6.014E+11
0.1250	4.367E+11
0.2250	5.101E+11
0.3750	2.589E+11
0.5750	3.442E+12
0.8500	1.477E+11
1.2500	3.000E+12
1.7500	2.000E+09
2.2500	3.223E+09
2.7500	2.558E+07
3.5000	2.977E+06
5.0000	1.686E+01
7.0000	1.909E+00
11.0000	2.178E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.09E-01	1.82E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.85018727	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	15.61	10.02	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		31.23	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.57	0.64	0.99
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: TRIGA 8.5/20 FFCR ITALY
SNF ID #: 730
Fuel Units & Descr: 3 - ELEMENT
Heavy Metal Mass: BOL=0.484kg; EOL=0.458kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1959
Estimates as of: 2010
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: 50 years

Estimated Canister usage: 18"x10' 0.04

II. Estimates	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	9.4992E-09	24.34	48.68	0.00E+00	2.31E-07	4.62E-07
Am-241	4.0120E-03	24.34	48.68	0.00E+00	9.77E-02	1.95E-01
Am-242m	1.1510E-06	24.34	48.68	0.00E+00	2.80E-05	5.60E-05
Am-243	1.4713E-07	24.34	48.68	0.00E+00	3.58E-06	7.16E-06
C-14	1.2800E-04	24.34	48.68	0.00E+00	3.12E-03	6.23E-03
Cl-36	2.8120E-06	24.34	48.68	0.00E+00	6.85E-05	1.37E-04
Cm-243	6.0120E-08	24.34	48.68	0.00E+00	1.46E-06	2.93E-06
Cm-244	3.0331E-07	24.34	48.68	0.00E+00	7.38E-06	1.48E-05
Co-60	3.4647E-03	24.34	48.68	0.00E+00	8.43E-02	1.69E-01
Cs-134	2.4632E-08	24.34	48.68	0.00E+00	6.00E-07	1.20E-06
Cs-135	3.2195E-05	24.34	48.68	0.00E+00	7.84E-04	1.57E-03
Cs-137	9.7519E-01	24.34	48.68	0.00E+00	2.37E+01	4.75E+01
Eu-154	4.0947E-04	24.34	48.68	0.00E+00	9.97E-03	1.99E-02
Eu-155	5.4586E-05	24.34	48.68	0.00E+00	1.33E-03	2.66E-03
Fe-55	4.7955E-06	24.34	48.68	0.00E+00	1.17E-04	2.33E-04
H-3	8.9038E-04	24.34	48.68	0.00E+00	2.17E-02	4.33E-02
I-129	7.3684E-07	24.34	48.68	0.00E+00	1.79E-05	3.59E-05
Kr-85	1.3791E-02	24.34	48.68	0.00E+00	3.36E-01	6.71E-01
Np-237	1.3038E-06	24.34	48.68	0.00E+00	3.17E-05	6.35E-05
Pa-231	1.5534E-08	24.34	48.68	0.00E+00	3.78E-07	7.56E-07
Pb-210	7.1759E-13	24.34	48.68	0.00E+00	1.75E-11	3.49E-11
Pm-147	1.4547E-05	24.34	48.68	0.00E+00	3.54E-04	7.08E-04
Pu-238	7.2827E-04	24.34	48.68	0.00E+00	1.77E-02	3.55E-02
Pu-239	5.5218E-03	24.34	48.68	0.00E+00	1.34E-01	2.69E-01
Pu-240	2.1173E-03	24.34	48.68	0.00E+00	5.15E-02	1.03E-01
Pu-241	1.1702E-02	24.34	48.68	0.00E+00	2.85E-01	5.70E-01
Pu-242	2.3128E-07	24.34	48.68	0.00E+00	5.63E-06	1.13E-05
Ra-226	1.6827E-12	24.34	48.68	0.00E+00	4.10E-11	8.19E-11
Ra-228	2.5263E-10	24.34	48.68	0.00E+00	6.15E-09	1.23E-08
Ru-106	3.4090E-15	24.34	48.68	0.00E+00	8.30E-14	1.66E-13
Se-79	1.3012E-05	24.34	48.68	0.00E+00	3.17E-04	6.33E-04
Sn-126	1.2162E-05	24.34	48.68	0.00E+00	2.96E-04	5.92E-04
Sr-90	8.9323E-01	24.34	48.68	0.00E+00	2.17E+01	4.35E+01
Tc-99	4.4241E-04	24.34	48.68	0.00E+00	1.08E-02	2.15E-02
Th-229	7.6902E-10	24.34	48.68	0.00E+00	1.87E-08	3.74E-08
Th-230	1.3059E-10	24.34	48.68	0.00E+00	3.18E-09	6.36E-09
Th-232	2.5278E-10	24.34	48.68	0.00E+00	6.15E-09	1.23E-08
Tl-208	1.1892E-08	24.34	48.68	0.00E+00	2.89E-07	5.79E-07
U-232	3.1970E-08	24.34	48.68	0.00E+00	7.78E-07	1.56E-06
U-233	1.2232E-07	24.34	48.68	0.00E+00	2.98E-06	5.95E-06
U-234	2.8662E-07	24.34	48.68	0.00E+00	6.98E-06	1.40E-05
U-235	-2.6194E-06	24.34	0.00	2.10E-04	1.46E-04	2.10E-04
U-236	1.2696E-05	24.34	48.68	0.00E+00	3.09E-04	6.18E-04
U-238	-3.6331E-08	24.34	0.00	1.30E-04	1.29E-04	1.30E-04
Y-90	8.9338E-01	24.34	48.68	0.00E+00	2.17E+01	4.35E+01
Other Radionuclides					2.40E+01	4.80E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.377E+12
0.0250	4.937E+11
0.0375	4.297E+11
0.0575	4.629E+11
0.0850	2.780E+11
0.1250	1.805E+11
0.2250	2.395E+11
0.3750	1.045E+11
0.5750	1.766E+12
0.8500	1.738E+10
1.2500	1.859E+10
1.7500	4.485E+08
2.2500	1.142E+05
2.7500	2.060E+04
3.5000	6.010E+01
5.0000	2.530E+01
7.0000	2.854E+00
11.0000	3.245E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.72E-01	5.45E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.04130579	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	16.51	24.34
Bounding:		48.68

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.48	1.47
Bounding:	2.95	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR MNRC
SNF ID #: 703
Fuel Units & Descr: 5 - ELEMENT
Heavy Metal Mass: BOL=0.801kg; EOL=0.761kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10" 0.07

II. Estimates	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	39.14	78.28	0.00E+00	3.33E-08	6.67E-08	Avg. MeV	
Am-241	1.8331E-03	39.14	78.28	0.00E+00	7.17E-02	1.43E-01	0.0150	1.265E+13
Am-242m	1.4129E-06	39.14	78.28	0.00E+00	5.53E-05	1.11E-04	0.0250	2.784E+12
Am-243	1.4774E-07	39.14	78.28	0.00E+00	5.78E-06	1.16E-05	0.0375	2.371E+12
C-14	1.2871E-04	39.14	78.28	0.00E+00	5.04E-03	1.01E-02	0.0575	2.433E+12
Cl-36	2.8120E-06	39.14	78.28	0.00E+00	1.10E-04	2.20E-04	0.0850	1.508E+12
Cm-243	1.7940E-07	39.14	78.28	0.00E+00	7.02E-06	1.40E-05	0.1250	1.095E+12
Cm-244	1.6962E-06	39.14	78.28	0.00E+00	6.64E-05	1.33E-04	0.2250	1.279E+12
Co-60	1.2839E+00	39.14	78.28	0.00E+00	5.03E+01	1.01E+02	0.3750	6.490E+11
Cs-134	9.0541E-02	39.14	78.28	0.00E+00	3.54E+00	7.09E+00	0.5750	8.628E+12
Cs-135	3.2195E-05	39.14	78.28	0.00E+00	1.26E-03	2.52E-03	0.8500	3.703E+11
Cs-137	2.7564E+00	39.14	78.28	0.00E+00	1.08E+02	2.16E+02	1.2500	7.520E+12
Eu-154	1.5368E-02	39.14	78.28	0.00E+00	6.02E-01	1.20E+00	1.7500	5.013E+09
Eu-155	2.9293E-02	39.14	78.28	0.00E+00	1.15E+00	2.29E+00	2.2500	8.080E+09
Fe-55	7.7158E-01	39.14	78.28	0.00E+00	3.02E+01	6.04E+01	2.7500	6.412E+07
H-3	1.1111E-02	39.14	78.28	0.00E+00	4.35E-01	8.70E-01	3.5000	7.462E+06
I-129	7.3684E-07	39.14	78.28	0.00E+00	2.88E-05	5.77E-05	5.0000	4.153E+01
Kr-85	2.5263E-01	39.14	78.28	0.00E+00	9.89E+00	1.98E+01	7.0000	4.701E+00
Np-237	1.2427E-06	39.14	78.28	0.00E+00	4.86E-05	9.73E-05	11.0000	5.355E-01
Pa-231	3.8511E-09	39.14	78.28	0.00E+00	1.51E-07	3.01E-07		
Pb-210	7.3880E-15	39.14	78.28	0.00E+00	2.89E-13	5.78E-13		
Pm-147	2.1023E+00	39.14	78.28	0.00E+00	8.23E+01	1.65E+02		
Pu-238	1.0383E-03	39.14	78.28	0.00E+00	4.06E-02	8.13E-02		
Pu-239	5.5293E-03	39.14	78.28	0.00E+00	2.16E-01	4.33E-01		
Pu-240	2.1278E-03	39.14	78.28	0.00E+00	8.33E-02	1.67E-01		
Pu-241	1.0195E-01	39.14	78.28	0.00E+00	3.99E+00	7.98E+00		
Pu-242	2.3128E-07	39.14	78.28	0.00E+00	9.05E-06	1.81E-05		
Ra-226	5.2782E-14	39.14	78.28	0.00E+00	2.07E-12	4.13E-12		
Ra-228	1.9338E-10	39.14	78.28	0.00E+00	7.57E-09	1.51E-08		
Ru-106	9.1684E-02	39.14	78.28	0.00E+00	3.59E+00	7.18E+00		
Se-79	1.3018E-05	39.14	78.28	0.00E+00	5.10E-04	1.02E-03		
Sn-126	1.2167E-05	39.14	78.28	0.00E+00	4.76E-04	9.52E-04		
Sr-90	2.6045E+00	39.14	78.28	0.00E+00	1.02E+02	2.04E+02		
Tc-99	4.4241E-04	39.14	78.28	0.00E+00	1.73E-02	3.46E-02		
Th-229	1.3713E-10	39.14	78.28	0.00E+00	5.37E-09	1.07E-08		
Th-230	1.8090E-11	39.14	78.28	0.00E+00	7.08E-10	1.42E-09		
Th-232	2.5278E-10	39.14	78.28	0.00E+00	9.89E-09	1.98E-08		
Tl-208	1.6947E-08	39.14	78.28	0.00E+00	6.63E-07	1.33E-06		
U-232	4.8737E-08	39.14	78.28	0.00E+00	1.91E-06	3.82E-06	Thermal Power	
U-233	1.2203E-07	39.14	78.28	0.00E+00	4.78E-06	9.55E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.5925E-07	39.14	78.28	0.00E+00	6.23E-06	1.25E-05		
U-235	-2.6194E-06	39.14	0.00	3.35E-04	2.32E-04	3.35E-04		
U-236	1.2693E-05	39.14	78.28	0.00E+00	4.97E-04	9.94E-04	2.28E+00	4.56E+00
U-238	-3.6331E-08	39.14	0.00	2.17E-04	2.16E-04	2.17E-04	Total	Total
Y-90	2.6060E+00	39.14	78.28	0.00E+00	1.02E+02	2.04E+02		
Other Radionuclides					1.41E+02	2.82E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.34235977	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	27.34	39.14
Bounding:		78.28

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:	1.43	1.43
Bounding:	2.86	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR OSU
SNF ID #: 1041
Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass: BOL=0.392kg; EOL=0.37kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2025
Estimates as of: 2010
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' 0.02

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.8488E-10	20.91	41.82	0.00E+00	5.96E-09	1.19E-08
Am-241	7.5767E-03	20.91	41.82	0.00E+00	1.58E-01	3.17E-01
Am-242m	2.4459E-05	20.91	41.82	0.00E+00	5.11E-04	1.02E-03
Am-243	3.0983E-05	20.91	41.82	0.00E+00	6.48E-04	1.30E-03
C-14	1.2590E-04	20.91	41.82	0.00E+00	2.63E-03	5.27E-03
Cl-36	2.6624E-06	20.91	41.82	0.00E+00	5.57E-05	1.11E-04
Cm-243	3.8244E-05	20.91	41.82	0.00E+00	8.00E-04	1.60E-03
Cm-244	4.1010E-03	20.91	41.82	0.00E+00	8.57E-02	1.71E-01
Co-60	1.2410E+00	20.91	41.82	0.00E+00	2.59E+01	5.19E+01
Cs-134	6.5454E-01	20.91	41.82	0.00E+00	1.37E+01	2.74E+01
Cs-135	1.9753E-05	20.91	41.82	0.00E+00	4.13E-04	8.26E-04
Cs-137	2.7375E+00	20.91	41.82	0.00E+00	5.72E+01	1.14E+02
Eu-154	1.2324E-01	20.91	41.82	0.00E+00	2.58E+00	5.15E+00
Eu-155	5.3037E-02	20.91	41.82	0.00E+00	1.11E+00	2.22E+00
Fe-55	7.9555E-01	20.91	41.82	0.00E+00	1.66E+01	3.33E+01
H-3	1.0531E-02	20.91	41.82	0.00E+00	2.20E-01	4.40E-01
I-129	7.1287E-07	20.91	41.82	0.00E+00	1.49E-05	2.98E-05
Kr-85	2.4955E-01	20.91	41.82	0.00E+00	5.22E+00	1.04E+01
Np-237	1.2121E-05	20.91	41.82	0.00E+00	2.53E-04	5.07E-04
Pa-231	1.1230E-09	20.91	41.82	0.00E+00	2.35E-08	4.70E-08
Pb-210	6.1636E-14	20.91	41.82	0.00E+00	1.29E-12	2.58E-12
Pm-147	1.1302E+00	20.91	41.82	0.00E+00	2.36E+01	4.73E+01
Pu-238	5.4826E-02	20.91	41.82	0.00E+00	1.15E+00	2.29E+00
Pu-239	1.4056E-03	20.91	41.82	0.00E+00	2.94E-02	5.88E-02
Pu-240	1.1536E-03	20.91	41.82	0.00E+00	2.41E-02	4.82E-02
Pu-241	4.2995E-01	20.91	41.82	0.00E+00	8.99E+00	1.80E+01
Pu-242	4.9910E-06	20.91	41.82	0.00E+00	1.04E-04	2.09E-04
Ra-226	2.4008E-13	20.91	41.82	0.00E+00	5.02E-12	1.00E-11
Ra-228	1.8220E-11	20.91	41.82	0.00E+00	3.81E-10	7.62E-10
Ru-106	1.0343E-01	20.91	41.82	0.00E+00	2.16E+00	4.33E+00
Se-79	1.2832E-05	20.91	41.82	0.00E+00	2.68E-04	5.37E-04
Sn-126	1.2090E-05	20.91	41.82	0.00E+00	2.53E-04	5.06E-04
Sr-90	2.5646E+00	20.91	41.82	0.00E+00	5.36E+01	1.07E+02
Tc-99	4.0319E-04	20.91	41.82	0.00E+00	8.43E-03	1.69E-02
Th-229	7.7375E-11	20.91	41.82	0.00E+00	1.62E-09	3.24E-09
Th-230	1.2211E-10	20.91	41.82	0.00E+00	2.55E-09	5.11E-09
Th-232	2.3842E-11	20.91	41.82	0.00E+00	4.99E-10	9.97E-10
Tl-208	1.4313E-07	20.91	41.82	0.00E+00	2.99E-06	5.99E-06
U-232	4.1927E-07	20.91	41.82	0.00E+00	8.77E-06	1.75E-05
U-233	6.8491E-08	20.91	41.82	0.00E+00	1.43E-06	2.86E-06
U-234	2.0189E-06	20.91	41.82	0.00E+00	4.22E-05	8.44E-05
U-235	-2.6572E-06	20.91	0.00	5.92E-04	5.37E-04	5.92E-04
U-236	1.3575E-05	20.91	41.82	0.00E+00	2.84E-04	5.68E-04
U-238	-2.2698E-08	20.91	0.00	3.97E-05	3.92E-05	3.97E-05
Y-90	2.5646E+00	20.91	41.82	0.00E+00	5.36E+01	1.07E+02
Other Radionuclides					7.45E+01	1.49E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.747E+12
0.0250	1.481E+12
0.0375	1.310E+12
0.0575	1.307E+12
0.0850	8.134E+11
0.1250	6.531E+11
0.2250	6.913E+11
0.3750	3.449E+11
0.5750	5.709E+12
0.8500	1.047E+12
1.2500	4.023E+12
1.7500	5.380E+09
2.2500	4.217E+09
2.7500	3.823E+07
3.5000	4.499E+06
5.0000	1.078E+03
7.0000	1.241E+02
11.0000	1.424E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.37E+00	2.74E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	69.89795918	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	5.73	20.91
Bounding:		41.82

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.16	3.65
Bounding:	0.31	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR PENN. STATE UNIV.
SNF ID #: 815
Fuel Units & Descr: 7 - ELEMENT
Heavy Metal Mass: BOL=1.379kg; EOL=1.316kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10" 0.09

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	60.14	120.28	0.00E+00	5.12E-08	1.02E-07
Am-241	1.8331E-03	60.14	120.28	0.00E+00	1.10E-01	2.20E-01
Am-242m	1.4129E-06	60.14	120.28	0.00E+00	8.50E-05	1.70E-04
Am-243	1.4774E-07	60.14	120.28	0.00E+00	8.89E-06	1.78E-05
C-14	1.2871E-04	60.14	120.28	0.00E+00	7.74E-03	1.55E-02
Cl-36	2.8120E-06	60.14	120.28	0.00E+00	1.69E-04	3.38E-04
Cm-243	1.7940E-07	60.14	120.28	0.00E+00	1.08E-05	2.16E-05
Cm-244	1.6962E-06	60.14	120.28	0.00E+00	1.02E-04	2.04E-04
Co-60	1.2839E+00	60.14	120.28	0.00E+00	7.72E+01	1.54E+02
Cs-134	9.0541E-02	60.14	120.28	0.00E+00	5.45E+00	1.09E+01
Cs-135	3.2195E-05	60.14	120.28	0.00E+00	1.94E-03	3.87E-03
Cs-137	2.7564E+00	60.14	120.28	0.00E+00	1.66E+02	3.32E+02
Eu-154	1.5368E-02	60.14	120.28	0.00E+00	9.24E-01	1.85E+00
Eu-155	2.9293E-02	60.14	120.28	0.00E+00	1.76E+00	3.52E+00
Fe-55	7.7158E-01	60.14	120.28	0.00E+00	4.64E+01	9.28E+01
H-3	1.1111E-02	60.14	120.28	0.00E+00	6.68E-01	1.34E+00
I-129	7.3684E-07	60.14	120.28	0.00E+00	4.43E-05	8.86E-05
Kr-85	2.5263E-01	60.14	120.28	0.00E+00	1.52E+01	3.04E+01
Np-237	1.2427E-06	60.14	120.28	0.00E+00	7.47E-05	1.49E-04
Pa-231	3.8511E-09	60.14	120.28	0.00E+00	2.32E-07	4.63E-07
Pb-210	7.3880E-15	60.14	120.28	0.00E+00	4.44E-13	8.89E-13
Pm-147	2.1023E+00	60.14	120.28	0.00E+00	1.26E+02	2.53E+02
Pu-238	1.0383E-03	60.14	120.28	0.00E+00	6.24E-02	1.25E-01
Pu-239	5.5293E-03	60.14	120.28	0.00E+00	3.33E-01	6.65E-01
Pu-240	2.1278E-03	60.14	120.28	0.00E+00	1.28E-01	2.56E-01
Pu-241	1.0195E-01	60.14	120.28	0.00E+00	6.13E+00	1.23E+01
Pu-242	2.3128E-07	60.14	120.28	0.00E+00	1.39E-05	2.78E-05
Ra-226	5.2782E-14	60.14	120.28	0.00E+00	3.17E-12	6.35E-12
Ra-228	1.9338E-10	60.14	120.28	0.00E+00	1.16E-08	2.33E-08
Ru-106	9.1684E-02	60.14	120.28	0.00E+00	5.51E+00	1.10E+01
Se-79	1.3018E-05	60.14	120.28	0.00E+00	7.83E-04	1.57E-03
Sn-126	1.2167E-05	60.14	120.28	0.00E+00	7.32E-04	1.46E-03
Sr-90	2.6045E+00	60.14	120.28	0.00E+00	1.57E+02	3.13E+02
Tc-99	4.4241E-04	60.14	120.28	0.00E+00	2.66E-02	5.32E-02
Th-229	1.3713E-10	60.14	120.28	0.00E+00	8.25E-09	1.65E-08
Th-230	1.8090E-11	60.14	120.28	0.00E+00	1.09E-09	2.18E-09
Th-232	2.5278E-10	60.14	120.28	0.00E+00	1.52E-08	3.04E-08
Tl-208	1.6947E-08	60.14	120.28	0.00E+00	1.02E-06	2.04E-06
U-232	4.8737E-08	60.14	120.28	0.00E+00	2.93E-06	5.86E-06
U-233	1.2203E-07	60.14	120.28	0.00E+00	7.34E-06	1.47E-05
U-234	1.5925E-07	60.14	120.28	0.00E+00	9.58E-06	1.92E-05
U-235	-2.6194E-06	60.14	0.00	5.90E-04	4.32E-04	5.90E-04
U-236	1.2693E-05	60.14	120.28	0.00E+00	7.63E-04	1.53E-03
U-238	-3.6331E-08	60.14	0.00	3.72E-04	3.70E-04	3.72E-04
Y-90	2.6060E+00	60.14	120.28	0.00E+00	1.57E+02	3.13E+02
Other Radionuclides					2.17E+02	4.34E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.944E+13
0.0250	4.278E+12
0.0375	3.643E+12
0.0575	3.739E+12
0.0850	2.316E+12
0.1250	1.682E+12
0.2250	1.965E+12
0.3750	9.972E+11
0.5750	1.329E+13
0.8500	5.690E+11
1.2500	1.155E+13
1.7500	7.702E+09
2.2500	1.241E+10
2.7500	9.852E+07
3.5000	1.147E+07
5.0000	6.389E+01
7.0000	7.233E+00
11.0000	8.239E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.50E+00	7.00E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.79695431	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	40.32	60.14
Bounding:		120.28

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.28	1.49
Bounding:	2.56	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR SLOVENIA
SNF ID #: 941
Fuel Units & Descr: 3 - ELEMENT
Heavy Metal Mass: BOL=0.473kg; EOL=0.457kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1959
Estimates as of: 2010
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: 50 years

Estimated Canister usage: 18"x10' 0.04

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9.4992E-09	16.14	32.28	0.00E+00	1.53E-07	3.07E-07	Avg. MeV	
Am-241	4.0120E-03	16.14	32.28	0.00E+00	6.47E-02	1.29E-01	0.0150	1.576E+12
Am-242m	1.1510E-06	16.14	32.28	0.00E+00	1.86E-05	3.71E-05	0.0250	3.273E+11
Am-243	1.4713E-07	16.14	32.28	0.00E+00	2.37E-06	4.75E-06	0.0375	2.849E+11
C-14	1.2800E-04	16.14	32.28	0.00E+00	2.07E-03	4.13E-03	0.0575	3.069E+11
Cl-36	2.8120E-06	16.14	32.28	0.00E+00	4.54E-05	9.08E-05	0.0850	1.843E+11
Cm-243	6.0120E-08	16.14	32.28	0.00E+00	9.70E-07	1.94E-06	0.1250	1.197E+11
Cm-244	3.0331E-07	16.14	32.28	0.00E+00	4.89E-06	9.79E-06	0.2250	1.588E+11
Co-60	3.4647E-03	16.14	32.28	0.00E+00	5.59E-02	1.12E-01	0.3750	6.926E+10
Cs-134	2.4632E-08	16.14	32.28	0.00E+00	3.98E-07	7.95E-07	0.5750	1.171E+12
Cs-135	3.2195E-05	16.14	32.28	0.00E+00	5.20E-04	1.04E-03	0.8500	1.152E+10
Cs-137	9.7519E-01	16.14	32.28	0.00E+00	1.57E+01	3.15E+01	1.2500	1.232E+10
Eu-154	4.0947E-04	16.14	32.28	0.00E+00	6.61E-03	1.32E-02	1.7500	2.973E+08
Eu-155	5.4586E-05	16.14	32.28	0.00E+00	8.81E-04	1.76E-03	2.2500	7.573E+04
Fe-55	4.7955E-06	16.14	32.28	0.00E+00	7.74E-05	1.55E-04	2.7500	1.366E+04
H-3	8.9038E-04	16.14	32.28	0.00E+00	1.44E-02	2.87E-02	3.5000	4.007E+01
I-129	7.3684E-07	16.14	32.28	0.00E+00	1.19E-05	2.38E-05	5.0000	1.687E+01
Kr-85	1.3791E-02	16.14	32.28	0.00E+00	2.23E-01	4.45E-01	7.0000	1.903E+00
Np-237	1.3038E-06	16.14	32.28	0.00E+00	2.10E-05	4.21E-05	11.0000	2.164E-01
Pa-231	1.5534E-06	16.14	32.28	0.00E+00	2.51E-07	5.01E-07		
Pb-210	7.1759E-13	16.14	32.28	0.00E+00	1.16E-11	2.32E-11		
Pm-147	1.4547E-05	16.14	32.28	0.00E+00	2.35E-04	4.70E-04		
Pu-238	7.2827E-04	16.14	32.28	0.00E+00	1.18E-02	2.35E-02		
Pu-239	5.5218E-03	16.14	32.28	0.00E+00	8.91E-02	1.78E-01		
Pu-240	2.1173E-03	16.14	32.28	0.00E+00	3.42E-02	6.83E-02		
Pu-241	1.1702E-02	16.14	32.28	0.00E+00	1.89E-01	3.78E-01		
Pu-242	2.3128E-07	16.14	32.28	0.00E+00	3.73E-06	7.46E-06		
Ra-226	1.6827E-12	16.14	32.28	0.00E+00	2.72E-11	5.43E-11		
Ra-228	2.5263E-10	16.14	32.28	0.00E+00	4.08E-09	8.15E-09		
Ru-106	3.4090E-15	16.14	32.28	0.00E+00	5.50E-14	1.10E-13		
Se-79	1.3012E-05	16.14	32.28	0.00E+00	2.10E-04	4.20E-04		
Sn-126	1.2162E-05	16.14	32.28	0.00E+00	1.96E-04	3.93E-04		
Sr-90	8.9323E-01	16.14	32.28	0.00E+00	1.44E+01	2.88E+01		
Tc-99	4.4241E-04	16.14	32.28	0.00E+00	7.14E-03	1.43E-02		
Th-229	7.6902E-10	16.14	32.28	0.00E+00	1.24E-08	2.48E-08		
Th-230	1.3059E-10	16.14	32.28	0.00E+00	2.11E-09	4.21E-09		
Th-232	2.5278E-10	16.14	32.28	0.00E+00	4.08E-09	8.16E-09		
Tl-208	1.1892E-08	16.14	32.28	0.00E+00	1.92E-07	3.84E-07		
U-232	3.1970E-08	16.14	32.28	0.00E+00	5.16E-07	1.03E-06		
U-233	1.2232E-07	16.14	32.28	0.00E+00	1.97E-06	3.95E-06		
U-234	2.8662E-07	16.14	32.28	0.00E+00	4.63E-06	9.25E-06		
U-235	-2.6194E-06	16.14	0.00	2.03E-04	1.61E-04	2.03E-04		
U-236	1.2696E-05	16.14	32.28	0.00E+00	2.05E-04	4.10E-04		
U-238	-3.6331E-08	16.14	0.00	1.27E-04	1.27E-04	1.27E-04		
Y-90	8.9338E-01	16.14	32.28	0.00E+00	1.44E+01	2.88E+01		
Other Radionuclides					1.59E+01	3.18E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.81E-01	3.61E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.87312476	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	16.14	15.46	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		32.28	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	1.00	0.96	1.00
Bounding:	2.00		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR SO. KOREA
SNF ID #: 734
Fuel Units & Descr: 3 - ELEMENT
Heavy Metal Mass: BOL=0.48kg; EOL=0.472kg
RDD Storage Site: INEEL

[1]Fuel decay start date: 1996
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 10 years

Estimated Canister usage: 18"x10' = 0.04

II. Estimates

	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	1.3731E-09	11.70	23.39	0.00E+00	1.61E-08	3.21E-08
Am-241	2.3865E-03	11.70	23.39	0.00E+00	2.79E-02	5.58E-02
Am-242m	1.3812E-06	11.70	23.39	0.00E+00	1.62E-05	3.23E-05
Am-243	1.4767E-07	11.70	23.39	0.00E+00	1.73E-06	3.45E-06
C-14	1.2863E-04	11.70	23.39	0.00E+00	1.50E-03	3.01E-03
Cl-36	2.8120E-06	11.70	23.39	0.00E+00	3.29E-05	6.58E-05
Cm-243	1.5895E-07	11.70	23.39	0.00E+00	1.86E-06	3.72E-06
Cm-244	1.4008E-06	11.70	23.39	0.00E+00	1.64E-05	3.28E-05
Co-60	6.6541E-01	11.70	23.39	0.00E+00	7.78E+00	1.56E+01
Cs-134	1.6887E-02	11.70	23.39	0.00E+00	1.97E-01	3.95E-01
Cs-135	3.2195E-05	11.70	23.39	0.00E+00	3.77E-04	7.53E-04
Cs-137	2.4556E+00	11.70	23.39	0.00E+00	2.87E+01	5.74E+01
Eu-154	1.0268E-02	11.70	23.39	0.00E+00	1.20E-01	2.40E-01
Eu-155	1.4570E-02	11.70	23.39	0.00E+00	1.70E-01	3.41E-01
Fe-55	2.0361E-01	11.70	23.39	0.00E+00	2.38E+00	4.76E+00
H-3	8.3940E-03	11.70	23.39	0.00E+00	9.82E-02	1.96E-01
I-129	7.3684E-07	11.70	23.39	0.00E+00	8.62E-06	1.72E-05
Kr-85	1.8286E-01	11.70	23.39	0.00E+00	2.14E+00	4.28E+00
Np-237	1.2462E-06	11.70	23.39	0.00E+00	1.46E-05	2.91E-05
Pa-231	4.9143E-09	11.70	23.39	0.00E+00	5.75E-08	1.15E-07
Pb-210	1.7173E-14	11.70	23.39	0.00E+00	2.01E-13	4.02E-13
Pm-147	5.6165E-01	11.70	23.39	0.00E+00	6.57E+00	1.31E+01
Pu-238	9.9820E-04	11.70	23.39	0.00E+00	1.17E-02	2.33E-02
Pu-239	5.5293E-03	11.70	23.39	0.00E+00	6.47E-02	1.29E-01
Pu-240	2.1263E-03	11.70	23.39	0.00E+00	2.49E-02	4.97E-02
Pu-241	8.0165E-02	11.70	23.39	0.00E+00	9.38E-01	1.88E+00
Pu-242	2.3128E-07	11.70	23.39	0.00E+00	2.70E-06	5.41E-06
Ra-226	9.9774E-14	11.70	23.39	0.00E+00	1.17E-12	2.33E-12
Ra-228	2.1729E-10	11.70	23.39	0.00E+00	2.54E-09	5.08E-09
Ru-106	2.9519E-03	11.70	23.39	0.00E+00	3.45E-02	6.90E-02
Se-79	1.3017E-05	11.70	23.39	0.00E+00	1.52E-04	3.04E-04
Sn-126	1.2167E-05	11.70	23.39	0.00E+00	1.42E-04	2.85E-04
Sr-90	2.3128E+00	11.70	23.39	0.00E+00	2.70E+01	5.41E+01
Tc-99	4.4241E-04	11.70	23.39	0.00E+00	5.17E-03	1.03E-02
Th-229	1.9459E-10	11.70	23.39	0.00E+00	2.28E-09	4.55E-09
Th-230	2.5564E-11	11.70	23.39	0.00E+00	2.99E-10	5.98E-10
Th-232	2.5278E-10	11.70	23.39	0.00E+00	2.96E-09	5.91E-09
Tl-208	1.6947E-08	11.70	23.39	0.00E+00	1.98E-07	3.96E-07
U-232	4.6812E-08	11.70	23.39	0.00E+00	5.47E-07	1.09E-06
U-233	1.2206E-07	11.70	23.39	0.00E+00	1.43E-06	2.86E-06
U-234	1.7323E-07	11.70	23.39	0.00E+00	2.03E-06	4.05E-06
U-235	-2.6194E-08	11.70	0.00	2.07E-04	1.77E-04	2.07E-04
U-236	1.2693E-05	11.70	23.39	0.00E+00	1.48E-04	2.97E-04
U-238	-3.6331E-08	11.70	0.00	1.29E-04	1.29E-04	1.29E-04
Y-90	2.3128E+00	11.70	23.39	0.00E+00	2.70E+01	5.41E+01
Other Radionuclides					2.67E+01	5.73E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.022E+12
0.0250	6.401E+11
0.0375	5.468E+11
0.0575	5.828E+11
0.0850	3.536E+11
0.1250	2.324E+11
0.2250	3.015E+11
0.3750	1.385E+11
0.5750	2.170E+12
0.8500	3.874E+10
1.2500	1.165E+12
1.7500	7.009E+08
2.2500	3.681E+07
2.7500	6.060E+05
3.5000	7.182E+04
5.0000	1.250E+01
7.0000	1.414E+00
11.0000	1.611E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.58E-01	9.16E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	11.70	7.45
Bounding:		23.39

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:	0.71	0.64
Bounding:	1.43	

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR U OF AZ
SNF ID #: 974
Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass: BOL=0.32kg; EOL=0.319kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
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' = 0.03

II. Estimates

Radionuclide	a_n Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	0.95	1.91	0.00E+00	8.13E-10	1.63E-09
Am-241	1.8331E-03	0.95	1.91	0.00E+00	1.75E-03	3.50E-03
Am-242m	1.4129E-06	0.95	1.91	0.00E+00	1.35E-06	2.70E-06
Am-243	1.4774E-07	0.95	1.91	0.00E+00	1.41E-07	2.82E-07
C-14	1.2871E-04	0.95	1.91	0.00E+00	1.23E-04	2.46E-04
Cl-36	2.8120E-06	0.95	1.91	0.00E+00	2.68E-06	5.37E-06
Cm-243	1.7940E-07	0.95	1.91	0.00E+00	1.71E-07	3.43E-07
Cm-244	1.6962E-06	0.95	1.91	0.00E+00	1.62E-06	3.24E-06
Co-60	1.2839E+00	0.95	1.91	0.00E+00	1.23E+00	2.45E+00
Cs-134	9.0541E-02	0.95	1.91	0.00E+00	8.64E-02	1.73E-01
Cs-135	3.2195E-05	0.95	1.91	0.00E+00	3.07E-05	6.15E-05
Cs-137	2.7564E+00	0.95	1.91	0.00E+00	2.63E+00	5.26E+00
Eu-154	1.5368E-02	0.95	1.91	0.00E+00	1.47E-02	2.93E-02
Eu-155	2.9293E-02	0.95	1.91	0.00E+00	2.80E-02	5.59E-02
Fe-55	7.7158E-01	0.95	1.91	0.00E+00	7.37E-01	1.47E+00
H-3	1.1111E-02	0.95	1.91	0.00E+00	1.06E-02	2.12E-02
I-129	7.3684E-07	0.95	1.91	0.00E+00	7.03E-07	1.41E-06
Kr-85	2.5263E-01	0.95	1.91	0.00E+00	2.41E-01	4.82E-01
Np-237	1.2427E-06	0.95	1.91	0.00E+00	1.19E-06	2.37E-06
Pa-231	3.8511E-09	0.95	1.91	0.00E+00	3.68E-09	7.35E-09
Pb-210	7.3880E-15	0.95	1.91	0.00E+00	7.05E-15	1.41E-14
Pm-147	2.1023E+00	0.95	1.91	0.00E+00	2.01E+00	4.01E+00
Pu-238	1.0383E-03	0.95	1.91	0.00E+00	9.91E-04	1.98E-03
Pu-239	5.5293E-03	0.95	1.91	0.00E+00	5.28E-03	1.06E-02
Pu-240	2.1278E-03	0.95	1.91	0.00E+00	2.03E-03	4.06E-03
Pu-241	1.0195E-01	0.95	1.91	0.00E+00	9.73E-02	1.95E-01
Pu-242	2.3128E-07	0.95	1.91	0.00E+00	2.21E-07	4.42E-07
Ra-226	5.2782E-14	0.95	1.91	0.00E+00	5.04E-14	1.01E-13
Ra-228	1.9338E-10	0.95	1.91	0.00E+00	1.85E-10	3.69E-10
Ru-106	9.1684E-02	0.95	1.91	0.00E+00	8.75E-02	1.75E-01
Se-79	1.3018E-05	0.95	1.91	0.00E+00	1.24E-05	2.49E-05
Sn-126	1.2167E-05	0.95	1.91	0.00E+00	1.16E-05	2.32E-05
Sr-90	2.6045E+00	0.95	1.91	0.00E+00	2.49E+00	4.97E+00
Tc-99	4.4241E-04	0.95	1.91	0.00E+00	4.22E-04	8.45E-04
Th-229	1.3713E-10	0.95	1.91	0.00E+00	1.31E-10	2.62E-10
Th-230	1.8090E-11	0.95	1.91	0.00E+00	1.73E-11	3.45E-11
Th-232	2.5278E-10	0.95	1.91	0.00E+00	2.41E-10	4.83E-10
Tl-208	1.6947E-08	0.95	1.91	0.00E+00	1.62E-08	3.24E-08
U-232	4.8737E-08	0.95	1.91	0.00E+00	4.65E-08	9.30E-08
U-233	1.2203E-07	0.95	1.91	0.00E+00	1.16E-07	2.33E-07
U-234	1.5925E-07	0.95	1.91	0.00E+00	1.52E-07	3.04E-07
U-235	-2.6194E-06	0.95	0.00	1.37E-04	1.35E-04	1.37E-04
U-236	1.2693E-05	0.95	1.91	0.00E+00	1.21E-05	2.42E-05
U-238	-3.6331E-08	0.95	0.00	8.62E-05	8.61E-05	8.62E-05
Y-90	2.6060E+00	0.95	1.91	0.00E+00	2.49E+00	4.98E+00
Other Radionuclides					3.44E+00	6.88E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.086E+11
0.0250	6.790E+10
0.0375	5.782E+10
0.0575	5.935E+10
0.0850	3.677E+10
0.1250	2.670E+10
0.2250	3.119E+10
0.3750	1.583E+10
0.5750	2.104E+11
0.8500	9.031E+09
1.2500	1.834E+11
1.7500	1.223E+08
2.2500	1.971E+08
2.7500	1.564E+06
3.5000	1.820E+05
5.0000	1.200E+00
7.0000	1.362E-01
11.0000	1.553E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.56E-02	1.11E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.875	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.78	0.95
Bounding:		1.91

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.09	1.22
Bounding:	0.17	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR U OF IL
SNF ID #: 448
Fuel Units & Descr: 4 - ELEMENT
Heavy Metal Mass: BOL=0.8kg; EOL=0.751kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.05

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	46.58	93.17	0.00E+00	3.97E-08	7.94E-08	Avg. MeV	
Am-241	1.8331E-03	46.58	93.17	0.00E+00	8.54E-02	1.71E-01	0.0150	1.506E+13
Am-242m	1.4129E-06	46.58	93.17	0.00E+00	6.58E-05	1.32E-04	0.0250	3.313E+12
Am-243	1.4774E-07	46.58	93.17	0.00E+00	6.88E-06	1.38E-05	0.0375	2.822E+12
C-14	1.2871E-04	46.58	93.17	0.00E+00	6.00E-03	1.20E-02	0.0575	2.896E+12
Cl-36	2.8120E-06	46.58	93.17	0.00E+00	1.31E-04	2.62E-04	0.0850	1.794E+12
Cm-243	1.7940E-07	46.58	93.17	0.00E+00	8.36E-06	1.67E-05	0.1250	1.303E+12
Cm-244	1.6962E-06	46.58	93.17	0.00E+00	7.90E-05	1.58E-04	0.2250	1.522E+12
Co-60	1.2839E+00	46.58	93.17	0.00E+00	5.98E+01	1.20E+02	0.3750	7.724E+11
Cs-134	9.0541E-02	46.58	93.17	0.00E+00	4.22E+00	8.44E+00	0.5750	1.027E+13
Cs-135	3.2195E-05	46.58	93.17	0.00E+00	1.50E-03	3.00E-03	0.8500	4.407E+11
Cs-137	2.7564E+00	46.58	93.17	0.00E+00	1.28E+02	2.57E+02	1.2500	8.950E+12
Eu-154	1.5368E-02	46.58	93.17	0.00E+00	7.16E-01	1.43E+00	1.7500	5.966E+09
Eu-155	2.9293E-02	46.58	93.17	0.00E+00	1.36E+00	2.73E+00	2.2500	9.817E+09
Fe-55	7.7158E-01	46.58	93.17	0.00E+00	3.59E+01	7.19E+01	2.7500	7.631E+07
H-3	1.1111E-02	46.58	93.17	0.00E+00	5.18E-01	1.04E+00	3.5000	8.881E+06
I-129	7.3684E-07	46.58	93.17	0.00E+00	3.43E-05	6.87E-05	5.0000	4.932E+01
Kr-85	2.5263E-01	46.58	93.17	0.00E+00	1.18E+01	2.35E+01	7.0000	5.583E+00
Np-237	1.2427E-06	46.58	93.17	0.00E+00	5.79E-05	1.16E-04	11.0000	6.360E-01
Pa-231	3.8511E-09	46.58	93.17	0.00E+00	1.79E-07	3.59E-07		
Pb-210	7.3880E-15	46.58	93.17	0.00E+00	3.44E-13	6.88E-13		
Pm-147	2.1023E+00	46.58	93.17	0.00E+00	9.79E+01	1.96E+02		
Pu-238	1.0383E-03	46.58	93.17	0.00E+00	4.84E-02	9.67E-02		
Pu-239	5.5293E-03	46.58	93.17	0.00E+00	2.58E-01	5.15E-01		
Pu-240	2.1278E-03	46.58	93.17	0.00E+00	9.91E-02	1.98E-01		
Pu-241	1.0195E-01	46.58	93.17	0.00E+00	4.75E+00	9.50E+00		
Pu-242	2.3128E-07	46.58	93.17	0.00E+00	1.08E-05	2.15E-05		
Ra-226	5.2782E-14	46.58	93.17	0.00E+00	2.46E-12	4.92E-12		
Ra-228	1.9338E-10	46.58	93.17	0.00E+00	9.01E-09	1.80E-08		
Ru-106	9.1684E-02	46.58	93.17	0.00E+00	4.27E+00	8.54E+00		
Se-79	1.3018E-05	46.58	93.17	0.00E+00	6.06E-04	1.21E-03		
Sn-126	1.2167E-05	46.58	93.17	0.00E+00	5.67E-04	1.13E-03		
Sr-90	2.6045E+00	46.58	93.17	0.00E+00	1.21E+02	2.43E+02		
Tc-99	4.4241E-04	46.58	93.17	0.00E+00	2.06E-02	4.12E-02		
Th-229	1.3713E-10	46.58	93.17	0.00E+00	6.39E-09	1.28E-08		
Th-230	1.8090E-11	46.58	93.17	0.00E+00	8.43E-10	1.69E-09		
Th-232	2.5278E-10	46.58	93.17	0.00E+00	1.18E-08	2.36E-08		
Tl-208	1.6947E-08	46.58	93.17	0.00E+00	7.89E-07	1.58E-06		
U-232	4.8737E-08	46.58	93.17	0.00E+00	2.27E-06	4.54E-06		
U-233	1.2203E-07	46.58	93.17	0.00E+00	5.68E-06	1.14E-05		
U-234	1.5925E-07	46.58	93.17	0.00E+00	7.42E-06	1.48E-05		
U-235	-2.6194E-06	46.58	0.00	3.46E-04	2.24E-04	3.46E-04		
U-236	1.2693E-05	46.58	93.17	0.00E+00	5.91E-04	1.18E-03		
U-238	-3.6331E-06	46.58	0.00	2.15E-04	2.13E-04	2.15E-04		
Y-90	2.6060E+00	46.58	93.17	0.00E+00	1.21E+02	2.43E+02		
Other Radionuclides					1.68E+02	3.36E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.71E+00	5.42E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000115	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	19.49	46.58	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		93.17	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	1.71	2.39	1.00
Bounding:	3.42		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR U OF TX AUSTIN
SNF ID #: 825
Fuel Units & Descr: 3 - ELEMENT
Heavy Metal Mass: BOL=0.48kg; EOL=0.48kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.04

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	9.16	18.33	0.00E+00	7.81E-09	1.56E-08
Am-241	1.8331E-03	9.16	18.33	0.00E+00	1.68E-02	3.36E-02
Am-242m	1.4129E-06	9.16	18.33	0.00E+00	1.29E-05	2.59E-05
Am-243	1.4774E-07	9.16	18.33	0.00E+00	1.35E-06	2.71E-06
C-14	1.2871E-04	9.16	18.33	0.00E+00	1.18E-03	2.36E-03
Cl-36	2.8120E-06	9.16	18.33	0.00E+00	2.58E-05	5.15E-05
Cm-243	1.7940E-07	9.16	18.33	0.00E+00	1.64E-06	3.29E-06
Cm-244	1.6962E-06	9.16	18.33	0.00E+00	1.55E-05	3.11E-05
Co-60	1.2839E+00	9.16	18.33	0.00E+00	1.18E+01	2.35E+01
Cs-134	9.0541E-02	9.16	18.33	0.00E+00	8.30E-01	1.66E+00
Cs-135	3.2195E-05	9.16	18.33	0.00E+00	2.95E-04	5.90E-04
Cs-137	2.7564E+00	9.16	18.33	0.00E+00	2.53E+01	5.06E+01
Eu-154	1.5368E-02	9.16	18.33	0.00E+00	1.41E-01	2.82E-01
Eu-155	2.9293E-02	9.16	18.33	0.00E+00	2.68E-01	5.37E-01
Fe-55	7.7158E-01	9.16	18.33	0.00E+00	7.07E+00	1.41E+01
H-3	1.1111E-02	9.16	18.33	0.00E+00	1.02E-01	2.04E-01
I-129	7.3684E-07	9.16	18.33	0.00E+00	6.75E-06	1.35E-05
Kr-85	2.5263E-01	9.16	18.33	0.00E+00	2.32E+00	4.63E+00
Np-237	1.2427E-06	9.16	18.33	0.00E+00	1.14E-05	2.28E-05
Pa-231	3.8511E-09	9.16	18.33	0.00E+00	3.53E-08	7.06E-08
Pb-210	7.3880E-15	9.16	18.33	0.00E+00	6.77E-14	1.35E-13
Pm-147	2.1023E+00	9.16	18.33	0.00E+00	1.93E+01	3.85E+01
Pu-238	1.0383E-03	9.16	18.33	0.00E+00	9.52E-03	1.90E-02
Pu-239	5.5293E-03	9.16	18.33	0.00E+00	5.07E-02	1.01E-01
Pu-240	2.1278E-03	9.16	18.33	0.00E+00	1.95E-02	3.90E-02
Pu-241	1.0195E-01	9.16	18.33	0.00E+00	9.34E-01	1.87E+00
Pu-242	2.3128E-07	9.16	18.33	0.00E+00	2.12E-06	4.24E-06
Ra-226	5.2782E-14	9.16	18.33	0.00E+00	4.84E-13	9.67E-13
Ra-228	1.9338E-10	9.16	18.33	0.00E+00	1.77E-09	3.54E-09
Ru-106	9.1684E-02	9.16	18.33	0.00E+00	8.40E-01	1.68E+00
Se-79	1.3018E-05	9.16	18.33	0.00E+00	1.19E-04	2.39E-04
Sn-126	1.2167E-05	9.16	18.33	0.00E+00	1.12E-04	2.23E-04
Sr-90	2.6045E+00	9.16	18.33	0.00E+00	2.39E+01	4.77E+01
Tc-99	4.4241E-04	9.16	18.33	0.00E+00	4.05E-03	8.11E-03
Th-229	1.3713E-10	9.16	18.33	0.00E+00	1.26E-09	2.51E-09
Th-230	1.8090E-11	9.16	18.33	0.00E+00	1.66E-10	3.32E-10
Th-232	2.5278E-10	9.16	18.33	0.00E+00	2.32E-09	4.63E-09
Tl-208	1.6947E-08	9.16	18.33	0.00E+00	1.55E-07	3.11E-07
U-232	4.8737E-08	9.16	18.33	0.00E+00	4.47E-07	8.93E-07
U-233	1.2203E-07	9.16	18.33	0.00E+00	1.12E-06	2.24E-06
U-234	1.5925E-07	9.16	18.33	0.00E+00	1.46E-06	2.92E-06
U-235	-2.6194E-06	9.16	0.00	2.05E-04	1.81E-04	2.05E-04
U-236	1.2693E-05	9.16	18.33	0.00E+00	1.16E-04	2.33E-04
U-238	-3.6331E-08	9.16	0.00	1.29E-04	1.29E-04	1.29E-04
Y-90	2.6060E+00	9.16	18.33	0.00E+00	2.39E+01	4.78E+01
Other Radionuclides					3.30E+01	6.61E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.962E+12
0.0250	6.518E+11
0.0375	5.551E+11
0.0575	5.698E+11
0.0850	3.530E+11
0.1250	2.563E+11
0.2250	2.994E+11
0.3750	1.520E+11
0.5750	2.020E+12
0.8500	8.670E+10
1.2500	1.761E+12
1.7500	1.174E+09
2.2500	1.892E+09
2.7500	1.501E+07
3.5000	1.747E+06
5.0000	9.905E+00
7.0000	1.122E+00
11.0000	1.278E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.33E-01	1.07E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.7916875	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		9.16
Bounding:		18.33

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:	0.56	
Bounding:	1.12	

Estimated EOL HM/Given EOL HM: 0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA 8.5/20 FFCR ZAIRE
SNF ID #: 735
Fuel Units & Descr: 4 - ELEMENT
Heavy Metal Mass: BOL=0.638kg; EOL=0.638kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.04

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	6.22	12.44	0.00E+00	5.30E-09	1.06E-08
Am-241	1.8331E-03	6.22	12.44	0.00E+00	1.14E-02	2.28E-02
Am-242m	1.4129E-06	6.22	12.44	0.00E+00	8.79E-06	1.76E-05
Am-243	1.4774E-07	6.22	12.44	0.00E+00	9.19E-07	1.84E-06
C-14	1.2871E-04	6.22	12.44	0.00E+00	8.00E-04	1.60E-03
Cl-36	2.8120E-06	6.22	12.44	0.00E+00	1.75E-05	3.50E-05
Cm-243	1.7940E-07	6.22	12.44	0.00E+00	1.12E-06	2.23E-06
Cm-244	1.6962E-06	6.22	12.44	0.00E+00	1.05E-05	2.11E-05
Co-60	1.2839E+00	6.22	12.44	0.00E+00	7.98E+00	1.60E+01
Cs-134	9.0541E-02	6.22	12.44	0.00E+00	5.63E-01	1.13E+00
Cs-135	3.2195E-05	6.22	12.44	0.00E+00	2.00E-04	4.00E-04
Cs-137	2.7564E+00	6.22	12.44	0.00E+00	1.71E+01	3.43E+01
Eu-154	1.5368E-02	6.22	12.44	0.00E+00	9.56E-02	1.91E-01
Eu-155	2.9293E-02	6.22	12.44	0.00E+00	1.82E-01	3.64E-01
Fe-55	7.7158E-01	6.22	12.44	0.00E+00	4.80E+00	9.60E+00
H-3	1.1111E-02	6.22	12.44	0.00E+00	6.91E-02	1.38E-01
I-129	7.3684E-07	6.22	12.44	0.00E+00	4.58E-06	9.16E-06
Kr-85	2.5263E-01	6.22	12.44	0.00E+00	1.57E+00	3.14E+00
Np-237	1.2427E-06	6.22	12.44	0.00E+00	7.73E-06	1.55E-05
Pa-231	3.8511E-09	6.22	12.44	0.00E+00	2.39E-08	4.79E-08
Pb-210	7.3880E-15	6.22	12.44	0.00E+00	4.59E-14	9.19E-14
Pm-147	2.1023E+00	6.22	12.44	0.00E+00	1.31E+01	2.61E+01
Pu-238	1.0383E-03	6.22	12.44	0.00E+00	6.46E-03	1.29E-02
Pu-239	5.5293E-03	6.22	12.44	0.00E+00	3.44E-02	6.88E-02
Pu-240	2.1278E-03	6.22	12.44	0.00E+00	1.32E-02	2.65E-02
Pu-241	1.0195E-01	6.22	12.44	0.00E+00	6.34E-01	1.27E+00
Pu-242	2.3128E-07	6.22	12.44	0.00E+00	1.44E-06	2.88E-06
Ra-226	5.2782E-14	6.22	12.44	0.00E+00	3.28E-13	6.56E-13
Ra-228	1.9338E-10	6.22	12.44	0.00E+00	1.20E-09	2.40E-09
Ru-106	9.1684E-02	6.22	12.44	0.00E+00	5.70E-01	1.14E+00
Se-79	1.3018E-05	6.22	12.44	0.00E+00	8.09E-05	1.62E-04
Sn-126	1.2167E-05	6.22	12.44	0.00E+00	7.57E-05	1.51E-04
Sr-90	2.6045E+00	6.22	12.44	0.00E+00	1.62E+01	3.24E+01
Tc-99	4.4241E-04	6.22	12.44	0.00E+00	2.75E-03	5.50E-03
Th-229	1.3713E-10	6.22	12.44	0.00E+00	8.53E-10	1.71E-09
Th-230	1.8090E-11	6.22	12.44	0.00E+00	1.12E-10	2.25E-10
Th-232	2.5278E-10	6.22	12.44	0.00E+00	1.57E-09	3.14E-09
Tl-208	1.6947E-06	6.22	12.44	0.00E+00	1.05E-07	2.11E-07
U-232	4.8737E-06	6.22	12.44	0.00E+00	3.03E-07	6.06E-07
U-233	1.2203E-07	6.22	12.44	0.00E+00	7.59E-07	1.52E-06
U-234	1.5925E-07	6.22	12.44	0.00E+00	9.90E-07	1.98E-06
U-235	-2.6194E-06	6.22	0.00	2.76E-04	2.59E-04	2.76E-04
U-236	1.2693E-05	6.22	12.44	0.00E+00	7.89E-05	1.58E-04
U-238	-3.6331E-06	6.22	0.00	1.72E-04	1.71E-04	1.72E-04
Y-90	2.6060E+00	6.22	12.44	0.00E+00	1.62E+01	3.24E+01
Other Radionuclides					2.24E+01	4.48E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.010E+12
0.0250	4.423E+11
0.0375	3.766E+11
0.0575	3.866E+11
0.0850	2.395E+11
0.1250	1.739E+11
0.2250	2.032E+11
0.3750	1.031E+11
0.5750	1.371E+12
0.8500	5.883E+10
1.2500	1.195E+12
1.7500	7.963E+08
2.2500	1.284E+09
2.7500	1.019E+07
3.5000	1.185E+08
5.0000	6.914E+00
7.0000	7.832E-01
11.0000	8.926E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.62E-01	7.24E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000041	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	6.22	
Bounding:		12.44

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.29	0.00
Bounding:	0.57	

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ACPR)
SNF ID #: 895
Fuel Units & Descr: 182 - ELEMENT
Heavy Metal Mass: BOL=48.357kg; EOL=48.357kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.85
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 1.64

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.2427E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pa-231	3.8511E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pb-210	7.3880E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pm-147	2.1023E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-238	1.0383E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-239	5.5293E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-240	2.1278E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-241	1.0195E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-242	2.3128E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ra-226	5.2782E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ra-228	1.9338E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ru-106	9.1684E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Se-79	1.3018E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Sn-126	1.2167E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Sr-90	2.6045E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Tc-99	4.4241E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-229	1.3713E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-230	1.8090E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-232	2.5278E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Tl-208	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-232	4.8737E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-233	1.2203E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-234	1.5925E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-235	-2.6194E-06	0.00	0.00	2.08E-02	2.08E-02	2.08E-02
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-238	-3.6331E-08	0.00	0.00	1.30E-02	1.30E-02	1.30E-02
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Other Radionuclides					0.00E+00	0.00E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.162E+08
0.0250	0.000E+00
0.0375	7.043E+05
0.0575	4.276E+05
0.0850	6.017E+07
0.1250	1.188E+08
0.2250	4.204E+08
0.3750	1.049E+06
0.5750	5.161E+04
0.8500	8.046E+03
1.2500	4.756E+02
1.7500	2.327E+02
2.2500	1.348E+02
2.7500	7.832E+01
3.5000	7.002E+01
5.0000	3.008E+01
7.0000	3.463E+00
11.0000	3.981E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.76E-04	8.76E-04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.95031243	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.00	
Bounding:		

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) ARRR
SNF ID #: 238
Fuel Units & Descr: 71 - ELEMENT
Heavy Metal Mass: BOL=13.376kg; EOL=9.322kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10'
0.84

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	3,869.71	7,739.43	0.00E+00	3.12E-06	6.24E-06	Avg. MeV	
Am-241	2.2586E-03	3,869.71	7,739.43	0.00E+00	8.74E+00	1.75E+01	0.0150	1.310E+15
Am-242m	1.9925E-06	3,869.71	7,739.43	0.00E+00	7.71E-03	1.54E-02	0.0250	2.843E+14
Am-243	2.3323E-07	3,869.71	7,739.43	0.00E+00	9.03E-04	1.81E-03	0.0375	3.541E+14
C-14	4.3308E-05	3,869.71	7,739.43	0.00E+00	1.68E-01	3.35E-01	0.0575	2.715E+14
Cl-36	4.3023E-06	3,869.71	7,739.43	0.00E+00	1.66E-04	3.33E-04	0.0850	1.900E+14
Cm-243	2.7429E-07	3,869.71	7,739.43	0.00E+00	1.06E-03	2.12E-03	0.1250	2.842E+14
Cm-244	3.1504E-06	3,869.71	7,739.43	0.00E+00	1.22E-02	2.44E-02	0.2250	1.586E+14
Co-60	3.1008E-02	3,869.71	7,739.43	0.00E+00	1.20E+02	2.40E+02	0.3750	7.061E+13
Cs-134	1.0367E-01	3,869.71	7,739.43	0.00E+00	4.01E+02	8.02E+02	0.5750	8.952E+14
Cs-135	3.1549E-05	3,869.71	7,739.43	0.00E+00	1.22E-01	2.44E-01	0.8500	2.204E+14
Cs-137	2.7564E+00	3,869.71	7,739.43	0.00E+00	1.07E+04	2.13E+04	1.2500	2.284E+14
Eu-154	1.3490E+00	3,869.71	7,739.43	0.00E+00	5.22E+03	1.04E+04	1.7500	6.537E+12
Eu-155	4.3880E-01	3,869.71	7,739.43	0.00E+00	1.70E+03	3.40E+03	2.2500	7.946E+11
Fe-55	8.6782E-03	3,869.71	7,739.43	0.00E+00	3.36E+01	6.72E+01	2.7500	6.454E+09
H-3	1.0805E-02	3,869.71	7,739.43	0.00E+00	4.18E+01	8.36E+01	3.5000	7.543E+08
I-129	7.3805E-07	3,869.71	7,739.43	0.00E+00	2.86E-03	5.71E-03	5.0000	4.423E+03
Kr-85	2.5218E-01	3,869.71	7,739.43	0.00E+00	9.76E+02	1.95E+03	7.0000	5.006E+02
Np-237	1.4463E-06	3,869.71	7,739.43	0.00E+00	5.60E-03	1.12E-02	11.0000	5.701E+01
Pa-231	3.5970E-09	3,869.71	7,739.43	0.00E+00	1.39E-05	2.78E-05		
Pb-210	8.2511E-15	3,869.71	7,739.43	0.00E+00	3.19E-11	6.39E-11		
Pm-147	2.0767E+00	3,869.71	7,739.43	0.00E+00	8.04E+03	1.61E+04		
Pu-238	1.3514E-03	3,869.71	7,739.43	0.00E+00	5.23E+00	1.05E+01		
Pu-239	5.6947E-03	3,869.71	7,739.43	0.00E+00	2.20E+01	4.41E+01		
Pu-240	2.2647E-03	3,869.71	7,739.43	0.00E+00	8.76E+00	1.75E+01		
Pu-241	1.2574E-01	3,869.71	7,739.43	0.00E+00	4.87E+02	9.73E+02		
Pu-242	3.0602E-07	3,869.71	7,739.43	0.00E+00	1.18E-03	2.37E-03		
Ra-226	5.7353E-14	3,869.71	7,739.43	0.00E+00	2.22E-10	4.44E-10		
Ra-228	1.8150E-10	3,869.71	7,739.43	0.00E+00	7.02E-07	1.40E-06		
Ru-106	9.3744E-02	3,869.71	7,739.43	0.00E+00	3.63E+02	7.26E+02		
Se-79	1.2938E-05	3,869.71	7,739.43	0.00E+00	5.01E-02	1.00E-01		
Sn-126	1.2239E-05	3,869.71	7,739.43	0.00E+00	4.74E-02	9.47E-02		
Sr-90	2.6000E+00	3,869.71	7,739.43	0.00E+00	1.01E+04	2.01E+04		
Tc-99	4.4120E-04	3,869.71	7,739.43	0.00E+00	1.71E+00	3.41E+00		
Th-229	1.4749E-10	3,869.71	7,739.43	0.00E+00	5.71E-07	1.14E-06		
Th-230	1.9549E-11	3,869.71	7,739.43	0.00E+00	7.56E-08	1.51E-07		
Th-232	2.3744E-10	3,869.71	7,739.43	0.00E+00	9.19E-07	1.84E-06		
Tl-208	1.9459E-08	3,869.71	7,739.43	0.00E+00	7.53E-05	1.51E-04		
U-232	5.6015E-08	3,869.71	7,739.43	0.00E+00	2.17E-04	4.34E-04		
U-233	1.3132E-07	3,869.71	7,739.43	0.00E+00	5.08E-04	1.02E-03		
U-234	1.7323E-07	3,869.71	7,739.43	0.00E+00	6.70E-04	1.34E-03		
U-235	-2.6159E-06	3,869.71	0.00	5.67E-03	0.00E+00	5.67E-03		
U-236	1.2717E-05	3,869.71	7,739.43	0.00E+00	4.92E-02	9.84E-02		
U-238	-3.8857E-06	3,869.71	0.00	3.61E-03	3.46E-03	3.61E-03		
Y-90	2.6015E+00	3,869.71	7,739.43	0.00E+00	1.01E+04	2.01E+04		
Other Radionuclides					1.47E+04	2.94E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.94E+02	3.89E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.62614987	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	494.30	3,869.71	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		7,739.43	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	7.83	7.83	1.23
Bounding:	15.66		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) AUSTRIA
SNF ID #: 462
Fuel Units & Descr: 66 - ELEMENT
Heavy Metal Mass: BOL=11.88kg; EOL=11.814kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10" 0.59

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	8.0632E-10	63.00	126.00	0.00E+00	5.08E-08	1.02E-07
Am-241	2.2586E-03	63.00	126.00	0.00E+00	1.42E-01	2.85E-01
Am-242m	1.9925E-06	63.00	126.00	0.00E+00	1.26E-04	2.51E-04
Am-243	2.3323E-07	63.00	126.00	0.00E+00	1.47E-05	2.94E-05
C-14	4.3308E-05	63.00	126.00	0.00E+00	2.73E-03	5.46E-03
Cl-36	4.3023E-06	63.00	126.00	0.00E+00	2.71E-06	5.42E-06
Cm-243	2.7429E-07	63.00	126.00	0.00E+00	1.73E-05	3.46E-05
Cm-244	3.1504E-06	63.00	126.00	0.00E+00	1.98E-04	3.97E-04
Co-60	3.1008E-02	63.00	126.00	0.00E+00	1.95E+00	3.91E+00
Cs-134	1.0367E-01	63.00	126.00	0.00E+00	6.53E+00	1.31E+01
Cs-135	3.1549E-05	63.00	126.00	0.00E+00	1.99E-03	3.98E-03
Cs-137	2.7564E+00	63.00	126.00	0.00E+00	1.74E+02	3.47E+02
Eu-154	1.3490E+00	63.00	126.00	0.00E+00	8.50E+01	1.70E+02
Eu-155	4.3880E-01	63.00	126.00	0.00E+00	2.76E+01	5.53E+01
Fe-55	8.6782E-03	63.00	126.00	0.00E+00	5.47E-01	1.09E+00
H-3	1.0805E-02	63.00	126.00	0.00E+00	6.81E-01	1.36E+00
I-129	7.3805E-07	63.00	126.00	0.00E+00	4.65E-05	9.30E-05
Kr-85	2.5218E-01	63.00	126.00	0.00E+00	1.59E+01	3.18E+01
Np-237	1.4463E-06	63.00	126.00	0.00E+00	9.11E-05	1.82E-04
Pa-231	3.5970E-09	63.00	126.00	0.00E+00	2.27E-07	4.53E-07
Pb-210	8.2511E-15	63.00	126.00	0.00E+00	5.20E-13	1.04E-12
Pm-147	2.0767E+00	63.00	126.00	0.00E+00	1.31E+02	2.62E+02
Pu-238	1.3514E-03	63.00	126.00	0.00E+00	8.51E-02	1.70E-01
Pu-239	5.6947E-03	63.00	126.00	0.00E+00	3.59E-01	7.18E-01
Pu-240	2.2647E-03	63.00	126.00	0.00E+00	1.43E-01	2.85E-01
Pu-241	1.2574E-01	63.00	126.00	0.00E+00	7.92E+00	1.58E+01
Pu-242	3.0602E-07	63.00	126.00	0.00E+00	1.93E-05	3.86E-05
Ra-226	5.7353E-14	63.00	126.00	0.00E+00	3.61E-12	7.23E-12
Ra-228	1.8150E-10	63.00	126.00	0.00E+00	1.14E-08	2.29E-08
Ru-106	9.3744E-02	63.00	126.00	0.00E+00	5.91E+00	1.18E+01
Se-79	1.2938E-05	63.00	126.00	0.00E+00	8.15E-04	1.63E-03
Sn-126	1.2239E-05	63.00	126.00	0.00E+00	7.71E-04	1.54E-03
Sr-90	2.6000E+00	63.00	126.00	0.00E+00	1.64E+02	3.28E+02
Tc-99	4.4120E-04	63.00	126.00	0.00E+00	2.78E-02	5.56E-02
Th-229	1.4749E-10	63.00	126.00	0.00E+00	9.29E-09	1.86E-08
Th-230	1.9549E-11	63.00	126.00	0.00E+00	1.23E-09	2.46E-09
Th-232	2.3744E-10	63.00	126.00	0.00E+00	1.50E-08	2.99E-08
Tl-208	1.9459E-08	63.00	126.00	0.00E+00	1.23E-06	2.45E-06
U-232	5.6015E-08	63.00	126.00	0.00E+00	3.53E-06	7.06E-06
U-233	1.3132E-07	63.00	126.00	0.00E+00	8.27E-06	1.65E-05
U-234	1.7323E-07	63.00	126.00	0.00E+00	1.09E-05	2.18E-05
U-235	-2.6159E-06	63.00	0.00	5.13E-03	4.97E-03	5.13E-03
U-236	1.2717E-05	63.00	126.00	0.00E+00	8.01E-04	1.60E-03
U-238	-3.8857E-08	63.00	0.00	3.19E-03	3.19E-03	3.19E-03
Y-90	2.6015E+00	63.00	126.00	0.00E+00	1.64E+02	3.28E+02
Other Radionuclides					2.39E+02	4.79E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.132E+13
0.0250	4.628E+12
0.0375	5.765E+12
0.0575	4.420E+12
0.0850	3.094E+12
0.1250	4.627E+12
0.2250	2.583E+12
0.3750	1.149E+12
0.5750	1.457E+13
0.8500	3.587E+12
1.2500	3.718E+12
1.7500	1.064E+11
2.2500	1.294E+10
2.7500	1.051E+08
3.5000	1.228E+07
5.0000	7.926E+01
7.0000	8.983E+00
11.0000	1.024E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.17E+00	6.33E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

[1]Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	57.89	63.00
Bounding:		126.00

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.14	1.09
Bounding:	0.29	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) BRAZIL
SNF ID #: 471
Fuel Units & Descr: 59 - ELEMENT
Heavy Metal Mass: BOL=11.086kg; EOL=10.585kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2006
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.53

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	478.69	957.38	0.00E+00	3.86E-07	7.72E-07	Avg. MeV	
Am-241	2.2586E-03	478.69	957.38	0.00E+00	1.08E+00	2.16E+00	0.0150	1.620E+14
Am-242m	1.9925E-06	478.69	957.38	0.00E+00	9.54E-04	1.91E-03	0.0250	3.517E+13
Am-243	2.3323E-07	478.69	957.38	0.00E+00	1.12E-04	2.23E-04	0.0375	4.381E+13
C-14	4.3308E-05	478.69	957.38	0.00E+00	2.07E-02	4.15E-02	0.0575	3.358E+13
Cl-36	4.3023E-08	478.69	957.38	0.00E+00	2.06E-05	4.12E-05	0.0850	2.351E+13
Cm-243	2.7429E-07	478.69	957.38	0.00E+00	1.31E-04	2.63E-04	0.1250	3.516E+13
Cm-244	3.1504E-06	478.69	957.38	0.00E+00	1.51E-03	3.02E-03	0.2250	1.962E+13
Co-60	3.1008E-02	478.69	957.38	0.00E+00	1.48E+01	2.97E+01	0.3750	8.734E+12
Cs-134	1.0367E-01	478.69	957.38	0.00E+00	4.96E+01	9.93E+01	0.5750	1.107E+14
Cs-135	3.1549E-05	478.69	957.38	0.00E+00	1.51E-02	3.02E-02	0.8500	2.726E+13
Cs-137	2.7564E+00	478.69	957.38	0.00E+00	1.32E+03	2.64E+03	1.2500	2.825E+13
Eu-154	1.3490E+00	478.69	957.38	0.00E+00	6.46E+02	1.29E+03	1.7500	8.086E+11
Eu-155	4.3880E-01	478.69	957.38	0.00E+00	2.10E+02	4.20E+02	2.2500	9.829E+10
Fe-55	8.6782E-03	478.69	957.38	0.00E+00	4.15E+00	8.31E+00	2.7500	7.983E+08
H-3	1.0805E-02	478.69	957.38	0.00E+00	5.17E+00	1.03E+01	3.5000	9.331E+07
I-129	7.3805E-07	478.69	957.38	0.00E+00	3.53E-04	7.07E-04	5.0000	5.531E+02
Kr-85	2.5218E-01	478.69	957.38	0.00E+00	1.21E+02	2.41E+02	7.0000	6.260E+01
Np-237	1.4463E-06	478.69	957.38	0.00E+00	6.92E-04	1.38E-03	11.0000	7.130E+00
Pa-231	3.5970E-09	478.69	957.38	0.00E+00	1.72E-06	3.44E-06		
Pb-210	8.2511E-15	478.69	957.38	0.00E+00	3.95E-12	7.90E-12		
Pm-147	2.0767E+00	478.69	957.38	0.00E+00	9.94E+02	1.99E+03		
Pu-238	1.3514E-03	478.69	957.38	0.00E+00	6.47E-01	1.29E+00		
Pu-239	5.6947E-03	478.69	957.38	0.00E+00	2.73E+00	5.45E+00		
Pu-240	2.2647E-03	478.69	957.38	0.00E+00	1.08E+00	2.17E+00		
Pu-241	1.2574E-01	478.69	957.38	0.00E+00	6.02E+01	1.20E+02		
Pu-242	3.0602E-07	478.69	957.38	0.00E+00	1.46E-04	2.93E-04		
Ra-226	5.7353E-14	478.69	957.38	0.00E+00	2.75E-11	5.49E-11		
Ra-228	1.8150E-10	478.69	957.38	0.00E+00	8.69E-08	1.74E-07		
Ru-106	9.3744E-02	478.69	957.38	0.00E+00	4.49E+01	8.97E+01		
Se-79	1.2938E-05	478.69	957.38	0.00E+00	6.19E-03	1.24E-02		
Sn-126	1.2239E-05	478.69	957.38	0.00E+00	5.86E-03	1.17E-02		
Sr-90	2.6000E+00	478.69	957.38	0.00E+00	1.24E+03	2.49E+03		
Tc-99	4.4120E-04	478.69	957.38	0.00E+00	2.11E-01	4.22E-01		
Th-229	1.4749E-10	478.69	957.38	0.00E+00	7.06E-08	1.41E-07		
Th-230	1.9549E-11	478.69	957.38	0.00E+00	9.36E-09	1.87E-08		
Th-232	2.3744E-10	478.69	957.38	0.00E+00	1.14E-07	2.27E-07		
Tl-208	1.9459E-08	478.69	957.38	0.00E+00	9.31E-06	1.86E-05		
U-232	5.6015E-08	478.69	957.38	0.00E+00	2.68E-05	5.36E-05		
U-233	1.3132E-07	478.69	957.38	0.00E+00	6.29E-05	1.26E-04		
U-234	1.7323E-07	478.69	957.38	0.00E+00	8.29E-05	1.66E-04		
U-235	-2.6159E-06	478.69	0.00	4.75E-03	3.49E-03	4.75E-03		
U-236	1.2717E-05	478.69	957.38	0.00E+00	6.09E-03	1.22E-02		
U-238	-3.8857E-08	478.69	0.00	2.99E-03	2.97E-03	2.99E-03		
Y-90	2.6015E+00	478.69	957.38	0.00E+00	1.25E+03	2.49E+03		
Other Radionuclides					1.82E+03	3.64E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.41E+01	4.81E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.81	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	108.05	478.69
Bounding:		957.38

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.17	4.43
Bounding:	2.34	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name:	TRIGA STD (ALUM) CORNELL	[1]Fuel decay start date:	2002	Estimated Canister usage: 18"x10'	
SNF ID #:	1047	Estimates as of:	2010		
Fuel Units & Descr:	7 - ELEMENT	Template:	TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)		0.06
Heavy Metal Mass:	BOL=1.295kg; EOL=1.263kg	[2]Template Burnup(MWd):	6.65		
ROD Storage Site:	INEEL	Template BOL Heavy Metal Mass (MT):	0.00018		
		Template Decay Time:	5 years		

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	30.07	60.13	0.00E+00	2.42E-08	4.85E-08	Avg. MeV	
Am-241	2.2586E-03	30.07	60.13	0.00E+00	6.79E-02	1.36E-01	0.0150	1.017E+13
Am-242m	1.9925E-06	30.07	60.13	0.00E+00	5.99E-05	1.20E-04	0.0250	2.209E+12
Am-243	2.3323E-07	30.07	60.13	0.00E+00	7.01E-06	1.40E-05	0.0375	2.752E+12
C-14	4.3308E-05	30.07	60.13	0.00E+00	1.30E-03	2.60E-03	0.0575	2.109E+12
Cl-36	4.3023E-08	30.07	60.13	0.00E+00	1.29E-06	2.59E-06	0.0850	1.477E+12
Cm-243	2.7429E-07	30.07	60.13	0.00E+00	8.25E-06	1.65E-05	0.1250	2.208E+12
Cm-244	3.1504E-06	30.07	60.13	0.00E+00	9.47E-05	1.89E-04	0.2250	1.233E+12
Co-60	3.1008E-02	30.07	60.13	0.00E+00	9.32E-01	1.86E+00	0.3750	5.486E+11
Cs-134	1.0367E-01	30.07	60.13	0.00E+00	3.12E+00	6.23E+00	0.5750	6.955E+12
Cs-135	3.1549E-05	30.07	60.13	0.00E+00	9.49E-04	1.90E-03	0.8500	1.712E+12
Cs-137	2.7564E+00	30.07	60.13	0.00E+00	8.29E+01	1.66E+02	1.2500	1.775E+12
Eu-154	1.3490E+00	30.07	60.13	0.00E+00	4.06E+01	8.11E+01	1.7500	5.079E+10
Eu-155	4.3880E-01	30.07	60.13	0.00E+00	1.32E+01	2.64E+01	2.2500	6.174E+09
Fe-55	8.6782E-03	30.07	60.13	0.00E+00	2.61E-01	5.22E-01	2.7500	5.015E+07
H-3	1.0805E-02	30.07	60.13	0.00E+00	3.25E-01	6.50E-01	3.5000	5.861E+06
I-129	7.3805E-07	30.07	60.13	0.00E+00	2.22E-05	4.44E-05	5.0000	3.511E+01
Kr-85	2.5218E-01	30.07	60.13	0.00E+00	7.58E+00	1.52E+01	7.0000	3.974E+00
Np-237	1.4463E-06	30.07	60.13	0.00E+00	4.35E-05	8.70E-05	11.0000	4.527E-01
Pa-231	3.5970E-09	30.07	60.13	0.00E+00	1.08E-07	2.16E-07		
Pb-210	8.2511E-15	30.07	60.13	0.00E+00	2.48E-13	4.96E-13		
Pm-147	2.0767E+00	30.07	60.13	0.00E+00	6.24E+01	1.25E+02		
Pu-238	1.3514E-03	30.07	60.13	0.00E+00	4.06E-02	8.13E-02		
Pu-239	5.6947E-03	30.07	60.13	0.00E+00	1.71E-01	3.42E-01		
Pu-240	2.2647E-03	30.07	60.13	0.00E+00	6.81E-02	1.36E-01		
Pu-241	1.2574E-01	30.07	60.13	0.00E+00	3.78E+00	7.56E+00		
Pu-242	3.0602E-07	30.07	60.13	0.00E+00	9.20E-06	1.84E-05		
Ra-226	5.7353E-14	30.07	60.13	0.00E+00	1.72E-12	3.45E-12		
Ra-228	1.8150E-10	30.07	60.13	0.00E+00	5.46E-09	1.09E-08		
Ru-106	9.3744E-02	30.07	60.13	0.00E+00	2.82E+00	5.64E+00		
Se-79	1.2938E-05	30.07	60.13	0.00E+00	3.89E-04	7.78E-04		
Sn-126	1.2239E-05	30.07	60.13	0.00E+00	3.68E-04	7.36E-04		
Sr-90	2.6000E+00	30.07	60.13	0.00E+00	7.82E+01	1.56E+02		
Tc-99	4.4120E-04	30.07	60.13	0.00E+00	1.33E-02	2.65E-02		
Th-229	1.4749E-10	30.07	60.13	0.00E+00	4.43E-09	8.87E-09		
Th-230	1.9549E-11	30.07	60.13	0.00E+00	5.88E-10	1.18E-09		
Th-232	2.3744E-10	30.07	60.13	0.00E+00	7.14E-09	1.43E-08		
Tl-208	1.9459E-06	30.07	60.13	0.00E+00	5.85E-07	1.17E-06		
U-232	5.6015E-06	30.07	60.13	0.00E+00	1.68E-06	3.37E-06		
U-233	1.3132E-07	30.07	60.13	0.00E+00	3.95E-06	7.90E-06		
U-234	1.7323E-07	30.07	60.13	0.00E+00	5.21E-06	1.04E-05		
U-235	-2.6159E-06	30.07	0.00	5.60E-04	4.81E-04	5.60E-04		
U-236	1.2717E-05	30.07	60.13	0.00E+00	3.82E-04	7.65E-04		
U-238	-3.8857E-08	30.07	0.00	3.48E-04	3.47E-04	3.48E-04		
Y-90	2.6015E+00	30.07	60.13	0.00E+00	7.82E+01	1.56E+02		
Other Radionuclides					1.14E+02	2.29E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.81E+00	3.62E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	6.31	30.07	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		60.13	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.63	4.76	1.00
Bounding:	1.26		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) CORNELL UNIV.
SNF ID #: 235
Fuel Units & Descr: 65 - ELEMENT
Heavy Metal Mass: BOL=12.025kg; EOL=11.94kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1973
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 0.59

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.1504E-09	80.66	161.31	0.00E+00	4.96E-07	9.92E-07
Am-241	4.8165E-03	80.66	161.31	0.00E+00	3.88E-01	7.77E-01
Am-242m	1.7383E-06	80.66	161.31	0.00E+00	1.40E-04	2.80E-04
Am-243	2.3263E-07	80.66	161.31	0.00E+00	1.88E-05	3.75E-05
C-14	4.3158E-05	80.66	161.31	0.00E+00	3.48E-03	6.96E-03
Cl-36	4.3023E-06	80.66	161.31	0.00E+00	3.47E-06	6.94E-06
Cm-243	1.3229E-07	80.66	161.31	0.00E+00	1.07E-05	2.13E-05
Cm-244	1.0000E-06	80.66	161.31	0.00E+00	8.07E-05	1.61E-04
Co-60	6.0120E-04	80.66	161.31	0.00E+00	4.85E-02	9.70E-02
Cs-134	4.3534E-06	80.66	161.31	0.00E+00	3.51E-04	7.02E-04
Cs-135	3.1549E-05	80.66	161.31	0.00E+00	2.54E-03	5.09E-03
Cs-137	1.3788E+00	80.66	161.31	0.00E+00	1.11E+02	2.22E+02
Eu-154	1.2041E-01	80.66	161.31	0.00E+00	9.71E+00	1.94E+01
Eu-155	6.6451E-03	80.66	161.31	0.00E+00	5.36E-01	1.07E+00
Fe-55	2.9338E-06	80.66	161.31	0.00E+00	2.37E-04	4.73E-04
H-3	2.0075E-03	80.66	161.31	0.00E+00	1.62E-01	3.24E-01
I-129	7.3805E-07	80.66	161.31	0.00E+00	5.95E-05	1.19E-04
Kr-85	3.6301E-02	80.66	161.31	0.00E+00	2.93E+00	5.86E+00
Np-237	1.4977E-06	80.66	161.31	0.00E+00	1.21E-04	2.42E-04
Pa-231	1.1275E-06	80.66	161.31	0.00E+00	9.09E-07	1.82E-06
Pb-210	3.8932E-13	80.66	161.31	0.00E+00	3.14E-11	6.28E-11
Pm-147	7.5383E-04	80.66	161.31	0.00E+00	6.08E-02	1.22E-01
Pu-238	1.0668E-03	80.66	161.31	0.00E+00	8.60E-02	1.72E-01
Pu-239	5.6902E-03	80.66	161.31	0.00E+00	4.59E-01	9.18E-01
Pu-240	2.2571E-03	80.66	161.31	0.00E+00	1.82E-01	3.64E-01
Pu-241	2.9699E-02	80.66	161.31	0.00E+00	2.40E+00	4.79E+00
Pu-242	3.0602E-07	80.66	161.31	0.00E+00	2.47E-05	4.94E-05
Ra-226	1.0704E-12	80.66	161.31	0.00E+00	8.63E-11	1.73E-10
Ra-228	2.3654E-10	80.66	161.31	0.00E+00	1.91E-08	3.82E-08
Ru-106	1.0444E-10	80.66	161.31	0.00E+00	8.42E-09	1.68E-08
Se-79	1.2934E-05	80.66	161.31	0.00E+00	1.04E-03	2.09E-03
Sn-126	1.2236E-05	80.66	161.31	0.00E+00	9.87E-04	1.97E-03
Sr-90	1.2740E+00	80.66	161.31	0.00E+00	1.03E+02	2.06E+02
Tc-99	4.4120E-04	80.66	161.31	0.00E+00	3.56E-02	7.12E-02
Th-229	6.4226E-10	80.66	161.31	0.00E+00	5.18E-08	1.04E-07
Th-230	1.0594E-10	80.66	161.31	0.00E+00	8.54E-09	1.71E-08
Th-232	2.3744E-10	80.66	161.31	0.00E+00	1.92E-08	3.83E-08
Tl-208	1.5774E-08	80.66	161.31	0.00E+00	1.27E-06	2.54E-06
U-232	4.2511E-08	80.66	161.31	0.00E+00	3.43E-06	6.86E-06
U-233	1.3155E-07	80.66	161.31	0.00E+00	1.06E-05	2.12E-05
U-234	3.0030E-07	80.66	161.31	0.00E+00	2.42E-05	4.84E-05
U-235	-2.6144E-06	80.66	0.00	5.20E-03	4.99E-03	5.20E-03
U-236	1.2720E-05	80.66	161.31	0.00E+00	1.03E-03	2.05E-03
U-238	-3.8857E-06	80.66	0.00	3.23E-03	3.23E-03	3.23E-03
Y-90	1.2744E+00	80.66	161.31	0.00E+00	1.03E+02	2.06E+02
Other Radionuclides					1.23E+02	2.46E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.138E+13
0.0250	2.355E+12
0.0375	2.222E+12
0.0575	2.239E+12
0.0850	1.336E+12
0.1250	1.154E+12
0.2250	1.194E+12
0.3750	5.067E+11
0.5750	8.346E+12
0.8500	4.259E+11
1.2500	4.178E+11
1.7500	1.344E+10
2.2500	2.652E+05
2.7500	8.973E+04
3.5000	2.310E+02
5.0000	9.729E+01
7.0000	1.098E+01
11.0000	1.249E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.36E+00	2.71E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	58.60	80.66
Bounding:		161.31

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.18	1.38
Bounding:	0.36	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) DOW
SNF ID #: 970
Fuel Units & Descr: 1 - ELEMENT
Heavy Metal Mass: BOL=0.19kg; EOL=0.18kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.01

II. Estimates

	m	x_n	x_b	b	y_a	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.0632E-10	9.55	19.09	0.00E+00	7.70E-09	1.54E-08
Am-241	2.2586E-03	9.55	19.09	0.00E+00	2.16E-02	4.31E-02
Am-242m	1.9925E-06	9.55	19.09	0.00E+00	1.90E-05	3.80E-05
Am-243	2.3323E-07	9.55	19.09	0.00E+00	2.23E-06	4.45E-06
C-14	4.3308E-05	9.55	19.09	0.00E+00	4.13E-04	8.27E-04
Cl-36	4.3023E-08	9.55	19.09	0.00E+00	4.11E-07	8.21E-07
Cm-243	2.7429E-07	9.55	19.09	0.00E+00	2.62E-06	5.24E-06
Cm-244	3.1504E-06	9.55	19.09	0.00E+00	3.01E-05	6.01E-05
Co-60	3.1008E-02	9.55	19.09	0.00E+00	2.96E-01	5.92E-01
Cs-134	1.0367E-01	9.55	19.09	0.00E+00	9.90E-01	1.98E+00
Cs-135	3.1549E-05	9.55	19.09	0.00E+00	3.01E-04	6.02E-04
Cs-137	2.7564E+00	9.55	19.09	0.00E+00	2.63E+01	5.26E+01
Eu-154	1.3490E+00	9.55	19.09	0.00E+00	1.29E+01	2.58E+01
Eu-155	4.3880E-01	9.55	19.09	0.00E+00	4.19E+00	8.38E+00
Fe-55	8.6782E-03	9.55	19.09	0.00E+00	8.28E-02	1.66E-01
H-3	1.0805E-02	9.55	19.09	0.00E+00	1.03E-01	2.06E-01
I-129	7.3805E-07	9.55	19.09	0.00E+00	7.04E-06	1.41E-05
Kr-85	2.5218E-01	9.55	19.09	0.00E+00	2.41E+00	4.81E+00
Np-237	1.4463E-06	9.55	19.09	0.00E+00	1.38E-05	2.76E-05
Pa-231	3.5970E-09	9.55	19.09	0.00E+00	3.43E-08	6.87E-08
Pb-210	8.2511E-15	9.55	19.09	0.00E+00	7.88E-14	1.58E-13
Pm-147	2.0767E+00	9.55	19.09	0.00E+00	1.98E+01	3.96E+01
Pu-238	1.3514E-03	9.55	19.09	0.00E+00	1.29E-02	2.58E-02
Pu-239	5.6947E-03	9.55	19.09	0.00E+00	5.44E-02	1.09E-01
Pu-240	2.2647E-03	9.55	19.09	0.00E+00	2.16E-02	4.32E-02
Pu-241	1.2574E-01	9.55	19.09	0.00E+00	1.20E+00	2.40E+00
Pu-242	3.0602E-07	9.55	19.09	0.00E+00	2.92E-06	5.84E-06
Ra-226	5.7353E-14	9.55	19.09	0.00E+00	5.47E-13	1.09E-12
Ra-228	1.8150E-10	9.55	19.09	0.00E+00	1.73E-09	3.46E-09
Ru-106	9.3744E-02	9.55	19.09	0.00E+00	8.95E-01	1.79E+00
Se-79	1.2938E-05	9.55	19.09	0.00E+00	1.23E-04	2.47E-04
Sn-126	1.2239E-05	9.55	19.09	0.00E+00	1.17E-04	2.34E-04
Sr-90	2.6000E+00	9.55	19.09	0.00E+00	2.48E+01	4.96E+01
Tc-99	4.4120E-04	9.55	19.09	0.00E+00	4.21E-03	8.42E-03
Th-229	1.4749E-10	9.55	19.09	0.00E+00	1.41E-09	2.82E-09
Th-230	1.9549E-11	9.55	19.09	0.00E+00	1.87E-10	3.73E-10
Th-232	2.3744E-10	9.55	19.09	0.00E+00	2.27E-09	4.53E-09
Tl-208	1.9459E-08	9.55	19.09	0.00E+00	1.86E-07	3.71E-07
U-232	5.6015E-08	9.55	19.09	0.00E+00	5.35E-07	1.07E-06
U-233	1.3132E-07	9.55	19.09	0.00E+00	1.25E-06	2.51E-06
U-234	1.7323E-07	9.55	19.09	0.00E+00	1.65E-06	3.31E-06
U-235	-2.6159E-06	9.55	0.00	8.21E-05	5.71E-05	8.21E-05
U-236	1.2717E-05	9.55	19.09	0.00E+00	1.21E-04	2.43E-04
U-238	-3.8857E-08	9.55	0.00	5.11E-05	5.07E-05	5.11E-05
Y-90	2.6015E+00	9.55	19.09	0.00E+00	2.48E+01	4.97E+01
Other Radionuclides					3.63E+01	7.26E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.230E+12
0.0250	7.013E+11
0.0375	8.735E+11
0.0575	6.697E+11
0.0850	4.687E+11
0.1250	7.011E+11
0.2250	3.913E+11
0.3750	1.742E+11
0.5750	2.208E+12
0.8500	5.435E+11
1.2500	5.634E+11
1.7500	1.612E+10
2.2500	1.960E+09
2.7500	1.592E+07
3.5000	1.861E+06
5.0000	1.101E+01
7.0000	1.246E+00
11.0000	1.419E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.80E-01	9.59E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	1.85	9.55
Bounding:		19.09

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.36	5.15
Bounding:	2.72	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) FINLAND
SNF ID #: 463
Fuel Units & Descr: 69 - ELEMENT
Heavy Metal Mass: BOL=12.42kg; EOL=12.344kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10'
0.62

II. Estimates

	m	x_a	x_b	b	y_a	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.0632E-10	72.45	144.90	0.00E+00	5.84E-08	1.17E-07
Am-241	2.2586E-03	72.45	144.90	0.00E+00	1.64E-01	3.27E-01
Am-242m	1.9925E-06	72.45	144.90	0.00E+00	1.44E-04	2.89E-04
Am-243	2.3323E-07	72.45	144.90	0.00E+00	1.69E-05	3.38E-05
C-14	4.3308E-05	72.45	144.90	0.00E+00	3.14E-03	6.28E-03
Cl-36	4.3023E-06	72.45	144.90	0.00E+00	3.12E-06	6.23E-06
Cm-243	2.7429E-07	72.45	144.90	0.00E+00	1.99E-05	3.97E-05
Cm-244	3.1504E-06	72.45	144.90	0.00E+00	2.28E-04	4.56E-04
Co-60	3.1008E-02	72.45	144.90	0.00E+00	2.25E+00	4.49E+00
Cs-134	1.0367E-01	72.45	144.90	0.00E+00	7.51E+00	1.50E+01
Cs-135	3.1549E-05	72.45	144.90	0.00E+00	2.29E-03	4.57E-03
Cs-137	2.7564E+00	72.45	144.90	0.00E+00	2.00E+02	3.99E+02
Eu-154	1.3490E+00	72.45	144.90	0.00E+00	9.77E+01	1.95E+02
Eu-155	4.3880E-01	72.45	144.90	0.00E+00	3.18E+01	6.36E+01
Fe-55	8.6782E-03	72.45	144.90	0.00E+00	6.29E-01	1.26E+00
H-3	1.0805E-02	72.45	144.90	0.00E+00	7.83E-01	1.57E+00
I-129	7.3805E-07	72.45	144.90	0.00E+00	5.35E-05	1.07E-04
Kr-85	2.5218E-01	72.45	144.90	0.00E+00	1.83E+01	3.65E+01
Np-237	1.4463E-06	72.45	144.90	0.00E+00	1.05E-04	2.10E-04
Pa-231	3.5970E-09	72.45	144.90	0.00E+00	2.61E-07	5.21E-07
Pb-210	8.2511E-15	72.45	144.90	0.00E+00	5.98E-13	1.20E-12
Pm-147	2.0767E+00	72.45	144.90	0.00E+00	1.50E+02	3.01E+02
Pu-238	1.3514E-03	72.45	144.90	0.00E+00	9.79E-02	1.96E-01
Pu-239	5.6947E-03	72.45	144.90	0.00E+00	4.13E-01	8.25E-01
Pu-240	2.2647E-03	72.45	144.90	0.00E+00	1.64E-01	3.28E-01
Pu-241	1.2574E-01	72.45	144.90	0.00E+00	9.11E+00	1.82E+01
Pu-242	3.0602E-07	72.45	144.90	0.00E+00	2.22E-05	4.43E-05
Ra-226	5.7353E-14	72.45	144.90	0.00E+00	4.16E-12	8.31E-12
Ra-228	1.8150E-10	72.45	144.90	0.00E+00	1.31E-08	2.63E-08
Ru-106	9.3744E-02	72.45	144.90	0.00E+00	6.79E+00	1.36E+01
Se-79	1.2938E-05	72.45	144.90	0.00E+00	9.37E-04	1.87E-03
Sn-126	1.2239E-05	72.45	144.90	0.00E+00	8.87E-04	1.77E-03
Sr-90	2.6000E+00	72.45	144.90	0.00E+00	1.88E+02	3.77E+02
Tc-99	4.4120E-04	72.45	144.90	0.00E+00	3.20E-02	6.39E-02
Th-229	1.4749E-10	72.45	144.90	0.00E+00	1.07E-08	2.14E-08
Th-230	1.9549E-11	72.45	144.90	0.00E+00	1.42E-09	2.83E-09
Th-232	2.3744E-10	72.45	144.90	0.00E+00	1.72E-08	3.44E-08
Tl-208	1.9459E-08	72.45	144.90	0.00E+00	1.41E-06	2.82E-06
U-232	5.6015E-08	72.45	144.90	0.00E+00	4.06E-06	8.12E-06
U-233	1.3132E-07	72.45	144.90	0.00E+00	9.51E-06	1.90E-05
U-234	1.7323E-07	72.45	144.90	0.00E+00	1.26E-05	2.51E-05
U-235	-2.6159E-06	72.45	0.00	5.37E-03	5.18E-03	5.37E-03
U-236	1.2717E-05	72.45	144.90	0.00E+00	9.21E-04	1.84E-03
U-238	-3.8857E-06	72.45	0.00	3.34E-03	3.34E-03	3.34E-03
Y-90	2.6015E+00	72.45	144.90	0.00E+00	1.88E+02	3.77E+02
Other Radionuclides					2.75E+02	5.51E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.452E+13
0.0250	5.323E+12
0.0375	6.630E+12
0.0575	5.083E+12
0.0850	3.558E+12
0.1250	5.321E+12
0.2250	2.970E+12
0.3750	1.322E+12
0.5750	1.676E+13
0.8500	4.125E+12
1.2500	4.276E+12
1.7500	1.224E+11
2.2500	1.488E+10
2.7500	1.208E+08
3.5000	1.412E+07
5.0000	9.038E+01
7.0000	1.024E+01
11.0000	1.167E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.64E+00	7.28E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	60.52	72.45
Bounding:		144.90

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:	0.16	1.20
Bounding:	0.32	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) GA
SNF ID #: 728
Fuel Units & Descr: 52 - ELEMENT
Heavy Metal Mass: BOL=9.412kg; EOL=9.329kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 0.47

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.0632E-10	91.73	183.46	0.00E+00	7.40E-08	1.48E-07
Am-241	2.2586E-03	91.73	183.46	0.00E+00	2.07E-01	4.14E-01
Am-242m	1.9925E-06	91.73	183.46	0.00E+00	1.83E-04	3.66E-04
Am-243	2.3323E-07	91.73	183.46	0.00E+00	2.14E-05	4.28E-05
C-14	4.3308E-05	91.73	183.46	0.00E+00	3.97E-03	7.95E-03
Cl-36	4.3023E-08	91.73	183.46	0.00E+00	3.95E-06	7.89E-06
Cm-243	2.7429E-07	91.73	183.46	0.00E+00	2.52E-05	5.03E-05
Cm-244	3.1504E-06	91.73	183.46	0.00E+00	2.89E-04	5.78E-04
Co-60	3.1008E-02	91.73	183.46	0.00E+00	2.84E+00	5.69E+00
Cs-134	1.0367E-01	91.73	183.46	0.00E+00	9.51E+00	1.90E+01
Cs-135	3.1549E-05	91.73	183.46	0.00E+00	2.89E-03	5.79E-03
Cs-137	2.7564E+00	91.73	183.46	0.00E+00	2.53E+02	5.06E+02
Eu-154	1.3490E+00	91.73	183.46	0.00E+00	1.24E+02	2.47E+02
Eu-155	4.3880E-01	91.73	183.46	0.00E+00	4.03E+01	8.06E+01
Fe-55	8.6782E-03	91.73	183.46	0.00E+00	7.96E-01	1.59E+00
H-3	1.0805E-02	91.73	183.46	0.00E+00	9.91E-01	1.98E+00
I-129	7.3805E-07	91.73	183.46	0.00E+00	6.77E-05	1.35E-04
Kr-85	2.5218E-01	91.73	183.46	0.00E+00	2.31E+01	4.63E+01
Np-237	1.4463E-06	91.73	183.46	0.00E+00	1.33E-04	2.65E-04
Pa-231	3.5970E-09	91.73	183.46	0.00E+00	3.30E-07	6.60E-07
Pb-210	8.2511E-15	91.73	183.46	0.00E+00	7.57E-13	1.51E-12
Pm-147	2.0767E+00	91.73	183.46	0.00E+00	1.90E+02	3.81E+02
Pu-238	1.3514E-03	91.73	183.46	0.00E+00	1.24E-01	2.48E-01
Pu-239	5.6947E-03	91.73	183.46	0.00E+00	5.22E-01	1.04E+00
Pu-240	2.2647E-03	91.73	183.46	0.00E+00	2.08E-01	4.15E-01
Pu-241	1.2574E-01	91.73	183.46	0.00E+00	1.15E+01	2.31E+01
Pu-242	3.0602E-07	91.73	183.46	0.00E+00	2.81E-05	5.61E-05
Ra-226	5.7353E-14	91.73	183.46	0.00E+00	5.26E-12	1.05E-11
Ra-228	1.8150E-10	91.73	183.46	0.00E+00	1.66E-08	3.33E-08
Ru-106	9.3744E-02	91.73	183.46	0.00E+00	8.60E+00	1.72E+01
Se-79	1.2938E-05	91.73	183.46	0.00E+00	1.19E-03	2.37E-03
Sn-126	1.2239E-05	91.73	183.46	0.00E+00	1.12E-03	2.25E-03
Sr-90	2.6000E+00	91.73	183.46	0.00E+00	2.38E+02	4.77E+02
Tc-99	4.4120E-04	91.73	183.46	0.00E+00	4.05E-02	8.09E-02
Th-229	1.4749E-10	91.73	183.46	0.00E+00	1.35E-08	2.71E-08
Th-230	1.9549E-11	91.73	183.46	0.00E+00	1.79E-09	3.59E-09
Th-232	2.3744E-10	91.73	183.46	0.00E+00	2.18E-08	4.36E-08
Tl-208	1.9459E-08	91.73	183.46	0.00E+00	1.78E-06	3.57E-06
U-232	5.6015E-08	91.73	183.46	0.00E+00	5.14E-06	1.03E-05
U-233	1.3132E-07	91.73	183.46	0.00E+00	1.20E-05	2.41E-05
U-234	1.7323E-07	91.73	183.46	0.00E+00	1.59E-05	3.18E-05
U-235	-2.6159E-06	91.73	0.00	4.03E-03	3.79E-03	4.03E-03
U-236	1.2717E-05	91.73	183.46	0.00E+00	1.17E-03	2.33E-03
U-238	-3.8857E-08	91.73	0.00	2.54E-03	2.53E-03	2.54E-03
Y-90	2.6015E+00	91.73	183.46	0.00E+00	2.39E+02	4.77E+02
Other Radionuclides					3.49E+02	6.97E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.104E+13
0.0250	6.739E+12
0.0375	8.395E+12
0.0575	6.435E+12
0.0850	4.505E+12
0.1250	6.737E+12
0.2250	3.761E+12
0.3750	1.674E+12
0.5750	2.122E+13
0.8500	5.223E+12
1.2500	5.414E+12
1.7500	1.550E+11
2.2500	1.884E+10
2.7500	1.530E+08
3.5000	1.788E+07
5.0000	1.105E+02
7.0000	1.252E+01
11.0000	1.426E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.61E+00	9.22E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.8109242	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	91.73	79.42	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		183.46	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.26	0.87
Bounding:	0.53	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) GA
SNF ID #: 870
Fuel Units & Descr: 246 - ELEMENT
Heavy Metal Mass: BOL=46.74kg; EOL=45.19kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1973
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 35 years

Estimated Canister usage: 18"x10" 2.22

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.1504E-09	1,479.31	2,958.63	0.00E+00	9.10E-06	1.82E-05
Am-241	4.8165E-03	1,479.31	2,958.63	0.00E+00	7.13E+00	1.43E+01
Am-242m	1.7383E-06	1,479.31	2,958.63	0.00E+00	2.57E-03	5.14E-03
Am-243	2.3263E-07	1,479.31	2,958.63	0.00E+00	3.44E-04	6.88E-04
C-14	4.3158E-05	1,479.31	2,958.63	0.00E+00	6.38E-02	1.28E-01
Cl-36	4.3023E-06	1,479.31	2,958.63	0.00E+00	6.36E-05	1.27E-04
Cm-243	1.3229E-07	1,479.31	2,958.63	0.00E+00	1.96E-04	3.91E-04
Cm-244	1.0000E-06	1,479.31	2,958.63	0.00E+00	1.48E-03	2.96E-03
Co-60	6.0120E-04	1,479.31	2,958.63	0.00E+00	8.89E-01	1.78E+00
Cs-134	4.3534E-06	1,479.31	2,958.63	0.00E+00	6.44E-03	1.29E-02
Cs-135	3.1549E-05	1,479.31	2,958.63	0.00E+00	4.67E-02	9.33E-02
Cs-137	1.3788E+00	1,479.31	2,958.63	0.00E+00	2.04E+03	4.08E+03
Eu-154	1.2041E-01	1,479.31	2,958.63	0.00E+00	1.78E+02	3.56E+02
Eu-155	6.6451E-03	1,479.31	2,958.63	0.00E+00	9.83E+00	1.97E+01
Fe-55	2.9338E-06	1,479.31	2,958.63	0.00E+00	4.34E-03	8.68E-03
H-3	2.0075E-03	1,479.31	2,958.63	0.00E+00	2.97E+00	5.94E+00
I-129	7.3805E-07	1,479.31	2,958.63	0.00E+00	1.09E-03	2.18E-03
Kr-85	3.6301E-02	1,479.31	2,958.63	0.00E+00	5.37E+01	1.07E+02
Np-237	1.4977E-06	1,479.31	2,958.63	0.00E+00	2.22E-03	4.43E-03
Pa-231	1.1275E-06	1,479.31	2,958.63	0.00E+00	1.67E-05	3.34E-05
Pb-210	3.8932E-13	1,479.31	2,958.63	0.00E+00	5.76E-10	1.15E-09
Pm-147	7.5383E-04	1,479.31	2,958.63	0.00E+00	1.12E+00	2.23E+00
Pu-238	1.0668E-03	1,479.31	2,958.63	0.00E+00	1.58E+00	3.16E+00
Pu-239	5.6902E-03	1,479.31	2,958.63	0.00E+00	8.42E+00	1.68E+01
Pu-240	2.2571E-03	1,479.31	2,958.63	0.00E+00	3.34E+00	6.68E+00
Pu-241	2.9699E-02	1,479.31	2,958.63	0.00E+00	4.39E+01	8.79E+01
Pu-242	3.0602E-07	1,479.31	2,958.63	0.00E+00	4.53E-04	9.05E-04
Ra-226	1.0704E-12	1,479.31	2,958.63	0.00E+00	1.58E-09	3.17E-09
Ra-228	2.3654E-10	1,479.31	2,958.63	0.00E+00	3.50E-07	7.00E-07
Ru-106	1.0444E-10	1,479.31	2,958.63	0.00E+00	1.54E-07	3.09E-07
Se-79	1.2934E-05	1,479.31	2,958.63	0.00E+00	1.91E-02	3.83E-02
Sn-126	1.2236E-05	1,479.31	2,958.63	0.00E+00	1.81E-02	3.62E-02
Sr-90	1.2740E+00	1,479.31	2,958.63	0.00E+00	1.88E+03	3.77E+03
Tc-99	4.4120E-04	1,479.31	2,958.63	0.00E+00	6.53E-01	1.31E+00
Th-229	6.4226E-10	1,479.31	2,958.63	0.00E+00	9.50E-07	1.90E-06
Th-230	1.0594E-10	1,479.31	2,958.63	0.00E+00	1.57E-07	3.13E-07
Th-232	2.3744E-10	1,479.31	2,958.63	0.00E+00	3.51E-07	7.03E-07
Tl-208	1.5774E-08	1,479.31	2,958.63	0.00E+00	2.33E-05	4.67E-05
U-232	4.2511E-08	1,479.31	2,958.63	0.00E+00	6.29E-05	1.26E-04
U-233	1.3155E-07	1,479.31	2,958.63	0.00E+00	1.95E-04	3.89E-04
U-234	3.0030E-07	1,479.31	2,958.63	0.00E+00	4.44E-04	8.88E-04
U-235	-2.6144E-06	1,479.31	0.00	2.01E-02	1.62E-02	2.01E-02
U-236	1.2720E-05	1,479.31	2,958.63	0.00E+00	1.88E-02	3.76E-02
U-238	-3.8857E-08	1,479.31	0.00	1.26E-02	1.25E-02	1.26E-02
Y-90	1.2744E+00	1,479.31	2,958.63	0.00E+00	1.89E+03	3.77E+03
Other Radionuclides					2.25E+03	4.51E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.087E+14
0.0250	4.319E+13
0.0375	4.075E+13
0.0575	4.106E+13
0.0850	2.451E+13
0.1250	2.117E+13
0.2250	2.189E+13
0.3750	9.292E+12
0.5750	1.531E+14
0.8500	7.811E+12
1.2500	7.664E+12
1.7500	2.466E+11
2.2500	4.863E+06
2.7500	1.645E+06
3.5000	3.984E+03
5.0000	1.676E+03
7.0000	1.890E+02
11.0000	2.148E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.9	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	455.53	1,479.31	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,958.63	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.86	3.25
Bounding:	1.71	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) GERMANY
SNF ID #: 465
Fuel Units & Descr: 65 - ELEMENT
Heavy Metal Mass: BOL=11.7kg; EOL=11.635kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.59

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	8.0632E-10	62.04	124.09	0.00E+00	5.00E-08	1.00E-07
Am-241	2.2586E-03	62.04	124.09	0.00E+00	1.40E-01	2.80E-01
Am-242m	1.9925E-06	62.04	124.09	0.00E+00	1.24E-04	2.47E-04
Am-243	2.3323E-07	62.04	124.09	0.00E+00	1.45E-05	2.89E-05
C-14	4.3308E-05	62.04	124.09	0.00E+00	2.69E-03	5.37E-03
Cl-36	4.3023E-08	62.04	124.09	0.00E+00	2.67E-06	5.34E-06
Cm-243	2.7429E-07	62.04	124.09	0.00E+00	1.70E-05	3.40E-05
Cm-244	3.1504E-06	62.04	124.09	0.00E+00	1.95E-04	3.91E-04
Co-60	3.1008E-02	62.04	124.09	0.00E+00	1.92E+00	3.85E+00
Cs-134	1.0367E-01	62.04	124.09	0.00E+00	6.43E+00	1.29E+01
Cs-135	3.1549E-05	62.04	124.09	0.00E+00	1.96E-03	3.91E-03
Cs-137	2.7564E+00	62.04	124.09	0.00E+00	1.71E+02	3.42E+02
Eu-154	1.3490E+00	62.04	124.09	0.00E+00	8.37E+01	1.67E+02
Eu-155	4.3880E-01	62.04	124.09	0.00E+00	2.72E+01	5.44E+01
Fe-55	8.6782E-03	62.04	124.09	0.00E+00	5.38E-01	1.08E+00
H-3	1.0805E-02	62.04	124.09	0.00E+00	6.70E-01	1.34E+00
I-129	7.3805E-07	62.04	124.09	0.00E+00	4.58E-05	9.16E-05
Kr-85	2.5218E-01	62.04	124.09	0.00E+00	1.56E+01	3.13E+01
Np-237	1.4463E-06	62.04	124.09	0.00E+00	8.97E-05	1.79E-04
Pa-231	3.5970E-09	62.04	124.09	0.00E+00	2.23E-07	4.46E-07
Pb-210	8.2511E-15	62.04	124.09	0.00E+00	5.12E-13	1.02E-12
Pm-147	2.0767E+00	62.04	124.09	0.00E+00	1.29E+02	2.58E+02
Pu-238	1.3514E-03	62.04	124.09	0.00E+00	8.38E-02	1.68E-01
Pu-239	5.6947E-03	62.04	124.09	0.00E+00	3.53E-01	7.07E-01
Pu-240	2.2647E-03	62.04	124.09	0.00E+00	1.41E-01	2.81E-01
Pu-241	1.2574E-01	62.04	124.09	0.00E+00	7.80E+00	1.56E+01
Pu-242	3.0602E-07	62.04	124.09	0.00E+00	1.90E-05	3.80E-05
Ra-226	5.7353E-14	62.04	124.09	0.00E+00	3.56E-12	7.12E-12
Ra-228	1.8150E-10	62.04	124.09	0.00E+00	1.13E-08	2.25E-08
Ru-106	9.3744E-02	62.04	124.09	0.00E+00	5.82E+00	1.16E+01
Se-79	1.2938E-05	62.04	124.09	0.00E+00	8.03E-04	1.61E-03
Sn-126	1.2239E-05	62.04	124.09	0.00E+00	7.59E-04	1.52E-03
Sr-90	2.6000E+00	62.04	124.09	0.00E+00	1.61E+02	3.23E+02
Tc-99	4.4120E-04	62.04	124.09	0.00E+00	2.74E-02	5.47E-02
Th-229	1.4749E-10	62.04	124.09	0.00E+00	9.15E-09	1.83E-08
Th-230	1.9549E-11	62.04	124.09	0.00E+00	1.21E-09	2.43E-09
Th-232	2.3744E-10	62.04	124.09	0.00E+00	1.47E-08	2.95E-08
Tl-208	1.9459E-06	62.04	124.09	0.00E+00	1.21E-06	2.41E-06
U-232	5.6015E-06	62.04	124.09	0.00E+00	3.48E-06	6.95E-06
U-233	1.3132E-07	62.04	124.09	0.00E+00	8.15E-06	1.63E-05
U-234	1.7323E-07	62.04	124.09	0.00E+00	1.07E-05	2.15E-05
U-235	-2.6159E-06	62.04	0.00	5.06E-03	4.89E-03	5.06E-03
U-236	1.2717E-05	62.04	124.09	0.00E+00	7.89E-04	1.58E-03
U-238	-3.8857E-08	62.04	0.00	3.15E-03	3.14E-03	3.15E-03
Y-90	2.6015E+00	62.04	124.09	0.00E+00	1.61E+02	3.23E+02
Other Radionuclides					2.36E+02	4.72E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.100E+13
0.0250	4.558E+12
0.0375	5.678E+12
0.0575	4.353E+12
0.0850	3.047E+12
0.1250	4.557E+12
0.2250	2.544E+12
0.3750	1.132E+12
0.5750	1.435E+13
0.8500	3.533E+12
1.2500	3.662E+12
1.7500	1.048E+11
2.2500	1.274E+10
2.7500	1.035E+08
3.5000	1.209E+07
5.0000	7.806E+01
7.0000	8.847E+00
11.0000	1.009E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.12E+00	6.23E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	57.01	62.04	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		124.09	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.14	1.09	1.00
Bounding:	0.29		

[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: TRIGA STD (ALUM) HANFORD
SNF ID #: 876
Fuel Units & Descr: 59 - ELEMENT
Heavy Metal Mass: BOL=10.915kg; EOL=10.838kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1973
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 0.53

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.1504E-09	73.21	146.42	0.00E+00	4.50E-07	9.01E-07
Am-241	4.8165E-03	73.21	146.42	0.00E+00	3.53E-01	7.05E-01
Am-242m	1.7383E-06	73.21	146.42	0.00E+00	1.27E-04	2.55E-04
Am-243	2.3263E-07	73.21	146.42	0.00E+00	1.70E-05	3.41E-05
C-14	4.3158E-05	73.21	146.42	0.00E+00	3.16E-03	6.32E-03
Cl-36	4.3023E-08	73.21	146.42	0.00E+00	3.15E-06	6.30E-06
Cm-243	1.3229E-07	73.21	146.42	0.00E+00	9.68E-06	1.94E-05
Cm-244	1.0000E-06	73.21	146.42	0.00E+00	7.32E-05	1.46E-04
Co-60	6.0120E-04	73.21	146.42	0.00E+00	4.40E-02	8.80E-02
Cs-134	4.3534E-06	73.21	146.42	0.00E+00	3.19E-04	6.37E-04
Cs-135	3.1549E-05	73.21	146.42	0.00E+00	2.31E-03	4.62E-03
Cs-137	1.3788E+00	73.21	146.42	0.00E+00	1.01E+02	2.02E+02
Eu-154	1.2041E-01	73.21	146.42	0.00E+00	8.82E+00	1.76E+01
Eu-155	6.6451E-03	73.21	146.42	0.00E+00	4.86E-01	9.73E-01
Fe-55	2.9338E-06	73.21	146.42	0.00E+00	2.15E-04	4.30E-04
H-3	2.0075E-03	73.21	146.42	0.00E+00	1.47E-01	2.94E-01
I-129	7.3805E-07	73.21	146.42	0.00E+00	5.40E-05	1.08E-04
Kr-85	3.6301E-02	73.21	146.42	0.00E+00	2.66E+00	5.32E+00
Np-237	1.4977E-06	73.21	146.42	0.00E+00	1.10E-04	2.19E-04
Pa-231	1.1275E-08	73.21	146.42	0.00E+00	8.25E-07	1.65E-06
Pb-210	3.8932E-13	73.21	146.42	0.00E+00	2.85E-11	5.70E-11
Pm-147	7.5383E-04	73.21	146.42	0.00E+00	5.52E-02	1.10E-01
Pu-238	1.0668E-03	73.21	146.42	0.00E+00	7.81E-02	1.56E-01
Pu-239	5.6902E-03	73.21	146.42	0.00E+00	4.17E-01	8.33E-01
Pu-240	2.2571E-03	73.21	146.42	0.00E+00	1.65E-01	3.30E-01
Pu-241	2.9699E-02	73.21	146.42	0.00E+00	2.17E+00	4.35E+00
Pu-242	3.0602E-07	73.21	146.42	0.00E+00	2.24E-05	4.48E-05
Ra-226	1.0704E-12	73.21	146.42	0.00E+00	7.84E-11	1.57E-10
Ra-228	2.3654E-10	73.21	146.42	0.00E+00	1.73E-08	3.46E-08
Ru-106	1.0444E-10	73.21	146.42	0.00E+00	7.65E-09	1.53E-08
Se-79	1.2934E-05	73.21	146.42	0.00E+00	9.47E-04	1.89E-03
Sn-126	1.2236E-05	73.21	146.42	0.00E+00	8.96E-04	1.79E-03
Sr-90	1.2740E+00	73.21	146.42	0.00E+00	9.33E+01	1.87E+02
Tc-99	4.4120E-04	73.21	146.42	0.00E+00	3.23E-02	6.46E-02
Th-229	6.4226E-10	73.21	146.42	0.00E+00	4.70E-08	9.40E-08
Th-230	1.0594E-10	73.21	146.42	0.00E+00	7.76E-09	1.55E-08
Th-232	2.3744E-10	73.21	146.42	0.00E+00	1.74E-08	3.48E-08
Tl-208	1.5774E-08	73.21	146.42	0.00E+00	1.15E-06	2.31E-06
U-232	4.2511E-08	73.21	146.42	0.00E+00	3.11E-06	6.22E-06
U-233	1.3155E-07	73.21	146.42	0.00E+00	9.63E-06	1.93E-05
U-234	3.0030E-07	73.21	146.42	0.00E+00	2.20E-05	4.40E-05
U-235	-2.6144E-06	73.21	0.00	4.72E-03	4.53E-03	4.72E-03
U-236	1.2720E-05	73.21	146.42	0.00E+00	9.31E-04	1.86E-03
U-238	-3.8857E-08	73.21	0.00	2.93E-03	2.93E-03	2.93E-03
Y-90	1.2744E+00	73.21	146.42	0.00E+00	9.33E+01	1.87E+02
Other Radionuclides					1.12E+02	2.23E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.033E+13
0.0250	2.138E+12
0.0375	2.017E+12
0.0575	2.032E+12
0.0850	1.213E+12
0.1250	1.048E+12
0.2250	1.064E+12
0.3750	4.593E+11
0.5750	7.576E+12
0.8500	3.866E+11
1.2500	3.793E+11
1.7500	1.220E+10
2.2500	2.407E+05
2.7500	8.145E+04
3.5000	2.096E+02
5.0000	8.831E+01
7.0000	9.970E+00
11.0000	1.134E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.23E+00	2.46E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	53.19	73.21
Bounding:		146.42

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.18	1.38
Bounding:	0.36	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) HANNOVER
SNF ID #: 303
Fuel Units & Descr: 71 - ELEMENT
Heavy Metal Mass: BOL=13.561kg; EOL=13.419kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1996
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 10 years

Estimated Canister usage: 18"x10" = 0.64

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.2892E-09	135.54	271.08	0.00E+00	1.75E-07	3.49E-07
Am-241	2.9429E-03	135.54	271.08	0.00E+00	3.99E-01	7.98E-01
Am-242m	1.9489E-06	135.54	271.08	0.00E+00	2.64E-04	5.28E-04
Am-243	2.3308E-07	135.54	271.08	0.00E+00	3.16E-05	6.32E-05
C-14	4.3278E-05	135.54	271.08	0.00E+00	5.87E-03	1.17E-02
Cl-36	4.3023E-06	135.54	271.08	0.00E+00	5.83E-06	1.17E-05
Cm-243	2.4286E-07	135.54	271.08	0.00E+00	3.29E-05	6.58E-05
Cm-244	2.6015E-06	135.54	271.08	0.00E+00	3.53E-04	7.05E-04
Co-60	1.6075E-02	135.54	271.08	0.00E+00	2.18E+00	4.36E+00
Cs-134	1.9323E-02	135.54	271.08	0.00E+00	2.62E+00	5.24E+00
Cs-135	3.1549E-05	135.54	271.08	0.00E+00	4.28E-03	8.55E-03
Cs-137	2.4556E+00	135.54	271.08	0.00E+00	3.33E+02	6.66E+02
Eu-154	9.0180E-01	135.54	271.08	0.00E+00	1.22E+02	2.44E+02
Eu-155	2.1820E-01	135.54	271.08	0.00E+00	2.96E+01	5.91E+01
Fe-55	2.2902E-03	135.54	271.08	0.00E+00	3.10E-01	6.21E-01
H-3	8.1609E-03	135.54	271.08	0.00E+00	1.11E+00	2.21E+00
I-129	7.3805E-07	135.54	271.08	0.00E+00	1.00E-04	2.00E-04
Kr-85	1.8256E-01	135.54	271.08	0.00E+00	2.47E+01	4.95E+01
Np-237	1.4505E-06	135.54	271.08	0.00E+00	1.97E-04	3.93E-04
Pa-231	4.5564E-09	135.54	271.08	0.00E+00	6.18E-07	1.24E-06
Pb-210	1.8842E-14	135.54	271.08	0.00E+00	2.55E-12	5.11E-12
Pm-147	5.5459E-01	135.54	271.08	0.00E+00	7.52E+01	1.50E+02
Pu-238	1.2992E-03	135.54	271.08	0.00E+00	1.76E-01	3.52E-01
Pu-239	5.6932E-03	135.54	271.08	0.00E+00	7.72E-01	1.54E+00
Pu-240	2.2632E-03	135.54	271.08	0.00E+00	3.07E-01	6.14E-01
Pu-241	9.8857E-02	135.54	271.08	0.00E+00	1.34E+01	2.68E+01
Pu-242	3.0602E-07	135.54	271.08	0.00E+00	4.15E-05	8.30E-05
Ra-226	1.0823E-13	135.54	271.08	0.00E+00	1.47E-11	2.93E-11
Ra-228	2.0406E-10	135.54	271.08	0.00E+00	2.77E-08	5.53E-08
Ru-106	3.0180E-03	135.54	271.08	0.00E+00	4.09E-01	8.18E-01
Se-79	1.2937E-05	135.54	271.08	0.00E+00	1.75E-03	3.51E-03
Sn-126	1.2238E-05	135.54	271.08	0.00E+00	1.66E-03	3.32E-03
Sr-90	2.3098E+00	135.54	271.08	0.00E+00	3.13E+02	6.26E+02
Tc-99	4.4120E-04	135.54	271.08	0.00E+00	5.98E-02	1.20E-01
Th-229	2.0932E-10	135.54	271.08	0.00E+00	2.84E-08	5.67E-08
Th-230	2.7744E-11	135.54	271.08	0.00E+00	3.76E-09	7.52E-09
Th-232	2.3744E-10	135.54	271.08	0.00E+00	3.22E-08	6.44E-08
Tl-208	1.9459E-08	135.54	271.08	0.00E+00	2.64E-06	5.27E-06
U-232	5.3850E-08	135.54	271.08	0.00E+00	7.30E-06	1.46E-05
U-233	1.3135E-07	135.54	271.08	0.00E+00	1.78E-05	3.56E-05
U-234	1.9143E-07	135.54	271.08	0.00E+00	2.59E-05	5.19E-05
U-235	-2.6159E-06	135.54	0.00	5.86E-03	5.51E-03	5.86E-03
U-236	1.2719E-05	135.54	271.08	0.00E+00	1.72E-03	3.45E-03
U-238	-3.8857E-08	135.54	0.00	3.65E-03	3.64E-03	3.65E-03
Y-90	2.3098E+00	135.54	271.08	0.00E+00	3.13E+02	6.26E+02
Other Radionuclides					3.58E+02	7.15E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.644E+13
0.0250	7.622E+12
0.0375	9.000E+12
0.0575	7.443E+12
0.0850	4.838E+12
0.1250	6.695E+12
0.2250	4.247E+12
0.3750	1.748E+12
0.5750	2.604E+13
0.8500	4.744E+12
1.2500	5.215E+12
1.7500	1.495E+11
2.2500	3.568E+08
2.7500	6.976E+06
3.5000	6.510E+05
5.0000	1.620E+02
7.0000	1.833E+01
11.0000	2.087E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.03E+00	1.01E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00391594	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	132.17	135.54	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		271.08	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.27	1.03	1.00
Bounding:	0.54		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) HEIDELBERG
SNF ID #: 464
Fuel Units & Descr: 65 - ELEMENT
Heavy Metal Mass: BOL=11.648kg; EOL=11.401kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.59

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	283.80	567.61	0.00E+00	2.29E-07	4.58E-07	Avg. MeV	
Am-241	2.2586E-03	283.80	567.61	0.00E+00	6.41E-01	1.28E+00	0.0150	9.604E+13
Am-242m	1.9925E-06	283.80	567.61	0.00E+00	5.65E-04	1.13E-03	0.0250	2.085E+13
Am-243	2.3323E-07	283.80	567.61	0.00E+00	6.62E-05	1.32E-04	0.0375	2.597E+13
C-14	4.3308E-05	283.80	567.61	0.00E+00	1.23E-02	2.46E-02	0.0575	1.991E+13
Cl-36	4.3023E-08	283.80	567.61	0.00E+00	1.22E-05	2.44E-05	0.0850	1.394E+13
Cm-243	2.7429E-07	283.80	567.61	0.00E+00	7.78E-05	1.56E-04	0.1250	2.084E+13
Cm-244	3.1504E-06	283.80	567.61	0.00E+00	8.94E-04	1.79E-03	0.2250	1.163E+13
Co-60	3.1008E-02	283.80	567.61	0.00E+00	8.80E+00	1.76E+01	0.3750	5.178E+12
Cs-134	1.0367E-01	283.80	567.61	0.00E+00	2.94E+01	5.88E+01	0.5750	6.565E+13
Cs-135	3.1549E-05	283.80	567.61	0.00E+00	8.95E-03	1.79E-02	0.8500	1.616E+13
Cs-137	2.7564E+00	283.80	567.61	0.00E+00	7.82E+02	1.56E+03	1.2500	1.675E+13
Eu-154	1.3490E+00	283.80	567.61	0.00E+00	3.83E+02	7.66E+02	1.7500	4.794E+11
Eu-155	4.3880E-01	283.80	567.61	0.00E+00	1.25E+02	2.49E+02	2.2500	5.829E+10
Fe-55	8.6782E-03	283.80	567.61	0.00E+00	2.46E+00	4.93E+00	2.7500	4.733E+08
H-3	1.0805E-02	283.80	567.61	0.00E+00	3.07E+00	6.13E+00	3.5000	5.532E+07
I-129	7.3805E-07	283.80	567.61	0.00E+00	2.09E-04	4.19E-04	5.0000	3.310E+02
Kr-85	2.5218E-01	283.80	567.61	0.00E+00	7.16E+01	1.43E+02	7.0000	3.747E+01
Np-237	1.4463E-06	283.80	567.61	0.00E+00	4.10E-04	8.21E-04	11.0000	4.269E+00
Pa-231	3.5970E-09	283.80	567.61	0.00E+00	1.02E-06	2.04E-06		
Pb-210	8.2511E-15	283.80	567.61	0.00E+00	2.34E-12	4.68E-12		
Pm-147	2.0767E+00	283.80	567.61	0.00E+00	5.89E+02	1.18E+03		
Pu-238	1.3514E-03	283.80	567.61	0.00E+00	3.84E-01	7.67E-01		
Pu-239	5.6947E-03	283.80	567.61	0.00E+00	1.62E+00	3.23E+00		
Pu-240	2.2647E-03	283.80	567.61	0.00E+00	6.43E-01	1.29E+00		
Pu-241	1.2574E-01	283.80	567.61	0.00E+00	3.57E+01	7.14E+01		
Pu-242	3.0602E-07	283.80	567.61	0.00E+00	8.68E-05	1.74E-04		
Ra-226	5.7353E-14	283.80	567.61	0.00E+00	1.63E-11	3.26E-11		
Ra-228	1.8150E-10	283.80	567.61	0.00E+00	5.15E-08	1.03E-07		
Ru-106	9.3744E-02	283.80	567.61	0.00E+00	2.66E+01	5.32E+01		
Se-79	1.2938E-05	283.80	567.61	0.00E+00	3.67E-03	7.34E-03		
Sn-126	1.2239E-05	283.80	567.61	0.00E+00	3.47E-03	6.95E-03		
Sr-90	2.6000E+00	283.80	567.61	0.00E+00	7.38E+02	1.48E+03		
Tc-99	4.4120E-04	283.80	567.61	0.00E+00	1.25E-01	2.50E-01		
Th-229	1.4749E-10	283.80	567.61	0.00E+00	4.19E-08	8.37E-08		
Th-230	1.9549E-11	283.80	567.61	0.00E+00	5.55E-09	1.11E-08		
Th-232	2.3744E-10	283.80	567.61	0.00E+00	6.74E-08	1.35E-07		
Tl-208	1.9459E-08	283.80	567.61	0.00E+00	5.52E-06	1.10E-05		
U-232	5.6015E-08	283.80	567.61	0.00E+00	1.59E-05	3.18E-05		
U-233	1.3132E-07	283.80	567.61	0.00E+00	3.73E-05	7.45E-05		
U-234	1.7323E-07	283.80	567.61	0.00E+00	4.92E-05	9.83E-05		
U-235	-2.6159E-06	283.80	0.00	5.06E-03	4.31E-03	5.06E-03		
U-236	1.2717E-05	283.80	567.61	0.00E+00	3.61E-03	7.22E-03		
U-238	-3.8857E-08	283.80	0.00	3.13E-03	3.12E-03	3.13E-03		
Y-90	2.6015E+00	283.80	567.61	0.00E+00	7.38E+02	1.48E+03		
Other Radionuclides					1.08E+03	2.16E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.43E+01	2.85E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.08410778	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	283.80	235.77
Bounding:		567.61

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:	0.66	0.83
Bounding:	1.32	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) ITALY
SNF ID #: 466
Fuel Units & Descr: 60 - ELEMENT
Heavy Metal Mass: BOL=10.8kg; EOL=10.74kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.54

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.0632E-10	57.27	114.54	0.00E+00	4.62E-08	9.24E-08
Am-241	2.2586E-03	57.27	114.54	0.00E+00	1.29E-01	2.59E-01
Am-242m	1.9925E-06	57.27	114.54	0.00E+00	1.14E-04	2.28E-04
Am-243	2.3323E-07	57.27	114.54	0.00E+00	1.34E-05	2.67E-05
C-14	4.3308E-05	57.27	114.54	0.00E+00	2.48E-03	4.96E-03
Cl-36	4.3023E-08	57.27	114.54	0.00E+00	2.46E-06	4.93E-06
Cm-243	2.7429E-07	57.27	114.54	0.00E+00	1.57E-05	3.14E-05
Cm-244	3.1504E-06	57.27	114.54	0.00E+00	1.80E-04	3.61E-04
Co-60	3.1008E-02	57.27	114.54	0.00E+00	1.78E+00	3.55E+00
Cs-134	1.0367E-01	57.27	114.54	0.00E+00	5.94E+00	1.19E+01
Cs-135	3.1549E-05	57.27	114.54	0.00E+00	1.81E-03	3.61E-03
Cs-137	2.7564E+00	57.27	114.54	0.00E+00	1.58E+02	3.16E+02
Eu-154	1.3490E+00	57.27	114.54	0.00E+00	7.73E+01	1.55E+02
Eu-155	4.3880E-01	57.27	114.54	0.00E+00	2.51E+01	5.03E+01
Fe-55	8.6782E-03	57.27	114.54	0.00E+00	4.97E-01	9.94E-01
H-3	1.0805E-02	57.27	114.54	0.00E+00	6.19E-01	1.24E+00
I-129	7.3805E-07	57.27	114.54	0.00E+00	4.23E-05	8.45E-05
Kr-85	2.5218E-01	57.27	114.54	0.00E+00	1.44E+01	2.89E+01
Np-237	1.4463E-06	57.27	114.54	0.00E+00	8.28E-05	1.66E-04
Pa-231	3.5970E-09	57.27	114.54	0.00E+00	2.06E-07	4.12E-07
Pb-210	8.2511E-15	57.27	114.54	0.00E+00	4.73E-13	9.45E-13
Pm-147	2.0767E+00	57.27	114.54	0.00E+00	1.19E+02	2.38E+02
Pu-238	1.3514E-03	57.27	114.54	0.00E+00	7.74E-02	1.55E-01
Pu-239	5.6947E-03	57.27	114.54	0.00E+00	3.26E-01	6.52E-01
Pu-240	2.2647E-03	57.27	114.54	0.00E+00	1.30E-01	2.59E-01
Pu-241	1.2574E-01	57.27	114.54	0.00E+00	7.20E+00	1.44E+01
Pu-242	3.0602E-07	57.27	114.54	0.00E+00	1.75E-05	3.51E-05
Ra-226	5.7353E-14	57.27	114.54	0.00E+00	3.28E-12	6.57E-12
Ra-228	1.8150E-10	57.27	114.54	0.00E+00	1.04E-08	2.08E-08
Ru-106	9.3744E-02	57.27	114.54	0.00E+00	5.37E+00	1.07E+01
Se-79	1.2938E-05	57.27	114.54	0.00E+00	7.41E-04	1.48E-03
Sn-126	1.2239E-05	57.27	114.54	0.00E+00	7.01E-04	1.40E-03
Sr-90	2.6000E+00	57.27	114.54	0.00E+00	1.49E+02	2.98E+02
Tc-99	4.4120E-04	57.27	114.54	0.00E+00	2.53E-02	5.05E-02
Th-229	1.4749E-10	57.27	114.54	0.00E+00	8.45E-09	1.69E-08
Th-230	1.9549E-11	57.27	114.54	0.00E+00	1.12E-09	2.24E-09
Th-232	2.3744E-10	57.27	114.54	0.00E+00	1.36E-08	2.72E-08
Tl-208	1.9459E-08	57.27	114.54	0.00E+00	1.11E-06	2.23E-06
U-232	5.6015E-08	57.27	114.54	0.00E+00	3.21E-06	6.42E-06
U-233	1.3132E-07	57.27	114.54	0.00E+00	7.52E-06	1.50E-05
U-234	1.7323E-07	57.27	114.54	0.00E+00	9.92E-06	1.98E-05
U-235	-2.6159E-06	57.27	0.00	4.67E-03	4.52E-03	4.67E-03
U-236	1.2717E-05	57.27	114.54	0.00E+00	7.28E-04	1.46E-03
U-238	-3.8857E-08	57.27	0.00	2.90E-03	2.90E-03	2.90E-03
Y-90	2.6015E+00	57.27	114.54	0.00E+00	1.49E+02	2.98E+02
Other Radionuclides					2.18E+02	4.35E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.938E+13
0.0250	4.208E+12
0.0375	5.241E+12
0.0575	4.018E+12
0.0850	2.812E+12
0.1250	4.206E+12
0.2250	2.348E+12
0.3750	1.045E+12
0.5750	1.325E+13
0.8500	3.261E+12
1.2500	3.380E+12
1.7500	9.675E+10
2.2500	1.176E+10
2.7500	9.552E+07
3.5000	1.116E+07
5.0000	7.206E+01
7.0000	8.167E+00
11.0000	9.309E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.88E+00	5.76E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	52.63	57.27	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		114.54	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.14	1.09	1.00
Bounding:	0.29		

[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: TRIGA STD (ALUM) ITALY
SNF ID #: 467
Fuel Units & Descr: 64 - ELEMENT
Heavy Metal Mass: BOL=11.93kg; EOL=11.904kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1997
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrc, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 10 years

Estimated Canister usage: 18"x10' 0.58

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.2892E-09	58.13	116.27	0.00E+00	7.49E-08	1.50E-07
Am-241	2.9429E-03	58.13	116.27	0.00E+00	1.71E-01	3.42E-01
Am-242m	1.9489E-06	58.13	116.27	0.00E+00	1.13E-04	2.27E-04
Am-243	2.3308E-07	58.13	116.27	0.00E+00	1.35E-05	2.71E-05
C-14	4.3278E-05	58.13	116.27	0.00E+00	2.52E-03	5.03E-03
Cl-36	4.3023E-06	58.13	116.27	0.00E+00	2.50E-06	5.00E-06
Cm-243	2.4286E-07	58.13	116.27	0.00E+00	1.41E-05	2.82E-05
Cm-244	2.6015E-06	58.13	116.27	0.00E+00	1.51E-04	3.02E-04
Co-60	1.6075E-02	58.13	116.27	0.00E+00	9.34E-01	1.87E+00
Cs-134	1.9323E-02	58.13	116.27	0.00E+00	1.12E+00	2.25E+00
Cs-135	3.1549E-05	58.13	116.27	0.00E+00	1.83E-03	3.67E-03
Cs-137	2.4556E+00	58.13	116.27	0.00E+00	1.43E+02	2.86E+02
Eu-154	9.0180E-01	58.13	116.27	0.00E+00	5.24E+01	1.05E+02
Eu-155	2.1820E-01	58.13	116.27	0.00E+00	1.27E+01	2.54E+01
Fe-55	2.2902E-03	58.13	116.27	0.00E+00	1.33E-01	2.66E-01
H-3	8.1609E-03	58.13	116.27	0.00E+00	4.74E-01	9.49E-01
I-129	7.3805E-07	58.13	116.27	0.00E+00	4.29E-05	8.58E-05
Kr-85	1.8256E-01	58.13	116.27	0.00E+00	1.06E+01	2.12E+01
Np-237	1.4505E-06	58.13	116.27	0.00E+00	8.43E-05	1.69E-04
Pa-231	4.5564E-09	58.13	116.27	0.00E+00	2.65E-07	5.30E-07
Pb-210	1.8842E-14	58.13	116.27	0.00E+00	1.10E-12	2.19E-12
Pm-147	5.5459E-01	58.13	116.27	0.00E+00	3.22E+01	6.45E+01
Pu-238	1.2992E-03	58.13	116.27	0.00E+00	7.55E-02	1.51E-01
Pu-239	5.6932E-03	58.13	116.27	0.00E+00	3.31E-01	6.62E-01
Pu-240	2.2632E-03	58.13	116.27	0.00E+00	1.32E-01	2.63E-01
Pu-241	9.8857E-02	58.13	116.27	0.00E+00	5.75E+00	1.15E+01
Pu-242	3.0602E-07	58.13	116.27	0.00E+00	1.78E-05	3.56E-05
Ra-226	1.0823E-13	58.13	116.27	0.00E+00	6.29E-12	1.26E-11
Ra-228	2.0406E-10	58.13	116.27	0.00E+00	1.19E-08	2.37E-08
Ru-106	3.0180E-03	58.13	116.27	0.00E+00	1.75E-01	3.51E-01
Se-79	1.2937E-05	58.13	116.27	0.00E+00	7.52E-04	1.50E-03
Sn-126	1.2238E-05	58.13	116.27	0.00E+00	7.11E-04	1.42E-03
Sr-90	2.3098E+00	58.13	116.27	0.00E+00	1.34E+02	2.69E+02
Tc-99	4.4120E-04	58.13	116.27	0.00E+00	2.56E-02	5.13E-02
Th-229	2.0932E-10	58.13	116.27	0.00E+00	1.22E-08	2.43E-08
Th-230	2.7744E-11	58.13	116.27	0.00E+00	1.61E-09	3.23E-09
Th-232	2.3744E-10	58.13	116.27	0.00E+00	1.38E-08	2.76E-08
Tl-208	1.9459E-08	58.13	116.27	0.00E+00	1.13E-06	2.26E-06
U-232	5.3850E-08	58.13	116.27	0.00E+00	3.13E-06	6.26E-06
U-233	1.3135E-07	58.13	116.27	0.00E+00	7.64E-06	1.53E-05
U-234	1.9143E-07	58.13	116.27	0.00E+00	1.11E-05	2.23E-05
U-235	-2.6159E-06	58.13	0.00	5.10E-03	4.94E-03	5.10E-03
U-236	1.2719E-05	58.13	116.27	0.00E+00	7.39E-04	1.48E-03
U-238	-3.8857E-08	58.13	0.00	3.22E-03	3.21E-03	3.22E-03
Y-90	2.3098E+00	58.13	116.27	0.00E+00	1.34E+02	2.69E+02
Other Radionuclides					1.53E+02	3.07E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.563E+13
0.0250	3.269E+12
0.0375	3.860E+12
0.0575	3.192E+12
0.0850	2.075E+12
0.1250	2.871E+12
0.2250	1.822E+12
0.3750	7.496E+11
0.5750	1.117E+13
0.8500	2.035E+12
1.2500	2.237E+12
1.7500	6.414E+10
2.2500	1.526E+08
2.7500	2.992E+06
3.5000	3.650E+05
5.0000	7.331E+01
7.0000	8.302E+00
11.0000	9.459E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.15E+09	4.31E+09
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.76448407	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	58.13	24.44	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		116.27	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.13	0.42
Bounding:	0.26	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) JAPAN
SNF ID #: 481
Fuel Units & Descr: 71 - ELEMENT
Heavy Metal Mass: BOL=13.845kg; EOL=13.774kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.64

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.0632E-10	134.93	269.87	0.00E+00	1.09E-07	2.18E-07
Am-241	2.2586E-03	134.93	269.87	0.00E+00	3.05E-01	6.10E-01
Am-242m	1.9925E-06	134.93	269.87	0.00E+00	2.69E-04	5.38E-04
Am-243	2.3323E-07	134.93	269.87	0.00E+00	3.15E-05	6.29E-05
C-14	4.3308E-05	134.93	269.87	0.00E+00	5.84E-03	1.17E-02
Cl-36	4.3023E-08	134.93	269.87	0.00E+00	5.81E-06	1.16E-05
Cm-243	2.7429E-07	134.93	269.87	0.00E+00	3.70E-05	7.40E-05
Cm-244	3.1504E-06	134.93	269.87	0.00E+00	4.25E-04	8.50E-04
Co-60	3.1008E-02	134.93	269.87	0.00E+00	4.18E+00	8.37E+00
Cs-134	1.0367E-01	134.93	269.87	0.00E+00	1.40E+01	2.80E+01
Cs-135	3.1549E-05	134.93	269.87	0.00E+00	4.26E-03	8.51E-03
Cs-137	2.7564E+00	134.93	269.87	0.00E+00	3.72E+02	7.44E+02
Eu-154	1.3490E+00	134.93	269.87	0.00E+00	1.82E+02	3.64E+02
Eu-155	4.3880E-01	134.93	269.87	0.00E+00	5.92E+01	1.18E+02
Fe-55	8.6782E-03	134.93	269.87	0.00E+00	1.17E+00	2.34E+00
H-3	1.0805E-02	134.93	269.87	0.00E+00	1.46E+00	2.92E+00
I-129	7.3805E-07	134.93	269.87	0.00E+00	9.96E-05	1.99E-04
Kr-85	2.5218E-01	134.93	269.87	0.00E+00	3.40E+01	6.81E+01
Np-237	1.4463E-06	134.93	269.87	0.00E+00	1.95E-04	3.90E-04
Pa-231	3.5970E-09	134.93	269.87	0.00E+00	4.85E-07	9.71E-07
Pb-210	8.2511E-15	134.93	269.87	0.00E+00	1.11E-12	2.23E-12
Pm-147	2.0767E+00	134.93	269.87	0.00E+00	2.80E+02	5.60E+02
Pu-238	1.3514E-03	134.93	269.87	0.00E+00	1.82E-01	3.65E-01
Pu-239	5.6947E-03	134.93	269.87	0.00E+00	7.68E-01	1.54E+00
Pu-240	2.2647E-03	134.93	269.87	0.00E+00	3.06E-01	6.11E-01
Pu-241	1.2574E-01	134.93	269.87	0.00E+00	1.70E+01	3.39E+01
Pu-242	3.0602E-07	134.93	269.87	0.00E+00	4.13E-05	8.26E-05
Ra-226	5.7353E-14	134.93	269.87	0.00E+00	7.74E-12	1.55E-11
Ra-228	1.8150E-10	134.93	269.87	0.00E+00	2.45E-08	4.90E-08
Ru-106	9.3744E-02	134.93	269.87	0.00E+00	1.26E+01	2.53E+01
Se-79	1.2938E-05	134.93	269.87	0.00E+00	1.75E-03	3.49E-03
Sn-126	1.2239E-05	134.93	269.87	0.00E+00	1.65E-03	3.30E-03
Sr-90	2.6000E+00	134.93	269.87	0.00E+00	3.51E+02	7.02E+02
Tc-99	4.4120E-04	134.93	269.87	0.00E+00	5.95E-02	1.19E-01
Th-229	1.4749E-10	134.93	269.87	0.00E+00	1.99E-08	3.98E-08
Th-230	1.9549E-11	134.93	269.87	0.00E+00	2.64E-09	5.28E-09
Th-232	2.3744E-10	134.93	269.87	0.00E+00	3.20E-08	6.41E-08
Tl-208	1.9459E-08	134.93	269.87	0.00E+00	2.63E-06	5.25E-06
U-232	5.6015E-08	134.93	269.87	0.00E+00	7.56E-06	1.51E-05
U-233	1.3132E-07	134.93	269.87	0.00E+00	1.77E-05	3.54E-05
U-234	1.7323E-07	134.93	269.87	0.00E+00	2.34E-05	4.67E-05
U-235	-2.6159E-06	134.93	0.00	5.98E-03	5.63E-03	5.98E-03
U-236	1.2717E-05	134.93	269.87	0.00E+00	1.72E-03	3.43E-03
U-238	-3.8857E-08	134.93	0.00	3.72E-03	3.72E-03	3.72E-03
Y-90	2.6015E+00	134.93	269.87	0.00E+00	3.51E+02	7.02E+02
Other Radionuclides					5.13E+02	1.03E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.568E+13
0.0250	9.913E+12
0.0375	1.235E+13
0.0575	9.466E+12
0.0850	6.626E+12
0.1250	9.911E+12
0.2250	5.532E+12
0.3750	2.462E+12
0.5750	3.121E+13
0.8500	7.683E+12
1.2500	7.965E+12
1.7500	2.279E+11
2.2500	2.771E+10
2.7500	2.250E+08
3.5000	2.630E+07
5.0000	1.626E+02
7.0000	1.841E+01
11.0000	2.098E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.78E+00	1.36E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000073	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	134.93	67.77	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		269.87	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.26	0.50	1.00
Bounding:	0.53		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) KANSAS STATE UNIV
SNF ID #: 804
Fuel Units & Descr: 3 - ELEMENT
Heavy Metal Mass: BOL=0.54kg; EOL=0.513kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.03

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	25.77	51.54	0.00E+00	2.08E-08	4.16E-08	Avg. MeV	
Am-241	2.2586E-03	25.77	51.54	0.00E+00	5.82E-02	1.16E-01	0.0150	8.721E+12
Am-242m	1.9925E-06	25.77	51.54	0.00E+00	5.14E-05	1.03E-04	0.0250	1.893E+12
Am-243	2.3323E-07	25.77	51.54	0.00E+00	6.01E-06	1.20E-05	0.0375	2.359E+12
C-14	4.3308E-05	25.77	51.54	0.00E+00	1.12E-03	2.23E-03	0.0575	1.808E+12
Cl-36	4.3023E-08	25.77	51.54	0.00E+00	1.11E-06	2.22E-06	0.0850	1.266E+12
Cm-243	2.7429E-07	25.77	51.54	0.00E+00	7.07E-06	1.41E-05	0.1250	1.893E+12
Cm-244	3.1504E-06	25.77	51.54	0.00E+00	8.12E-05	1.62E-04	0.2250	1.057E+12
Co-60	3.1008E-02	25.77	51.54	0.00E+00	7.99E-01	1.60E+00	0.3750	4.702E+11
Cs-134	1.0367E-01	25.77	51.54	0.00E+00	2.67E+00	5.34E+00	0.5750	5.962E+12
Cs-135	3.1549E-05	25.77	51.54	0.00E+00	8.13E-04	1.63E-03	0.8500	1.468E+12
Cs-137	2.7564E+00	25.77	51.54	0.00E+00	7.10E+01	1.42E+02	1.2500	1.521E+12
Eu-154	1.3490E+00	25.77	51.54	0.00E+00	3.48E+01	6.95E+01	1.7500	4.354E+10
Eu-155	4.3880E-01	25.77	51.54	0.00E+00	1.13E+01	2.26E+01	2.2500	5.292E+09
Fe-55	8.6782E-03	25.77	51.54	0.00E+00	2.24E-01	4.47E-01	2.7500	4.298E+07
H-3	1.0805E-02	25.77	51.54	0.00E+00	2.78E-01	5.57E-01	3.5000	5.024E+06
I-129	7.3805E-07	25.77	51.54	0.00E+00	1.90E-05	3.80E-05	5.0000	2.974E+01
Kr-85	2.5218E-01	25.77	51.54	0.00E+00	6.50E+00	1.30E+01	7.0000	3.366E+00
Np-237	1.4463E-06	25.77	51.54	0.00E+00	3.73E-05	7.45E-05	11.0000	3.834E-01
Pa-231	3.5970E-09	25.77	51.54	0.00E+00	9.27E-08	1.85E-07		
Pb-210	8.2511E-15	25.77	51.54	0.00E+00	2.13E-13	4.25E-13		
Pm-147	2.0767E+00	25.77	51.54	0.00E+00	5.35E+01	1.07E+02		
Pu-238	1.3514E-03	25.77	51.54	0.00E+00	3.48E-02	6.97E-02		
Pu-239	5.6947E-03	25.77	51.54	0.00E+00	1.47E-01	2.94E-01		
Pu-240	2.2647E-03	25.77	51.54	0.00E+00	5.84E-02	1.17E-01		
Pu-241	1.2574E-01	25.77	51.54	0.00E+00	3.24E+00	6.48E+00		
Pu-242	3.0602E-07	25.77	51.54	0.00E+00	7.89E-06	1.58E-05		
Ra-226	5.7353E-14	25.77	51.54	0.00E+00	1.48E-12	2.96E-12		
Ra-228	1.8150E-10	25.77	51.54	0.00E+00	4.68E-09	9.36E-09		
Ru-106	9.3744E-02	25.77	51.54	0.00E+00	2.42E+00	4.83E+00		
Se-79	1.2938E-05	25.77	51.54	0.00E+00	3.33E-04	6.67E-04		
Sn-126	1.2239E-05	25.77	51.54	0.00E+00	3.15E-04	6.31E-04		
Sr-90	2.6000E+00	25.77	51.54	0.00E+00	6.70E+01	1.34E+02		
Tc-99	4.4120E-04	25.77	51.54	0.00E+00	1.14E-02	2.27E-02		
Th-229	1.4749E-10	25.77	51.54	0.00E+00	3.80E-09	7.60E-09		
Th-230	1.9549E-11	25.77	51.54	0.00E+00	5.04E-10	1.01E-09		
Th-232	2.3744E-10	25.77	51.54	0.00E+00	6.12E-09	1.22E-08		
Tl-208	1.9459E-08	25.77	51.54	0.00E+00	5.01E-07	1.00E-06		
U-232	5.6015E-08	25.77	51.54	0.00E+00	1.44E-06	2.89E-06		
U-233	1.3132E-07	25.77	51.54	0.00E+00	3.38E-06	6.77E-06		
U-234	1.7323E-07	25.77	51.54	0.00E+00	4.46E-06	8.93E-06		
U-235	-2.6159E-08	25.77	0.00	2.33E-04	1.66E-04	2.33E-04		
U-236	1.2717E-05	25.77	51.54	0.00E+00	3.28E-04	6.55E-04		
U-238	-3.8857E-08	25.77	0.00	1.45E-04	1.44E-04	1.45E-04		
Y-90	2.6015E+00	25.77	51.54	0.00E+00	6.70E+01	1.34E+02		
Other Radionuclides					9.80E+01	1.96E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.29E+00	2.59E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.99999834	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		25.77
Bounding:		51.54

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.29	
Bounding:	2.58	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) KSU
SNF ID #: 871
Fuel Units & Descr: 61 - ELEMENT
Heavy Metal Mass: BOL=11.285kg; EOL=11.206kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1973
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 0.55

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.1504E-09	109.98	219.97	0.00E+00	6.76E-07	1.35E-06
Am-241	4.8165E-03	109.98	219.97	0.00E+00	5.30E-01	1.06E+00
Am-242m	1.7383E-06	109.98	219.97	0.00E+00	1.91E-04	3.82E-04
Am-243	2.3263E-07	109.98	219.97	0.00E+00	2.56E-05	5.12E-05
C-14	4.3158E-05	109.98	219.97	0.00E+00	4.75E-03	9.49E-03
Cl-36	4.3023E-08	109.98	219.97	0.00E+00	4.73E-06	9.46E-06
Cm-243	1.3229E-07	109.98	219.97	0.00E+00	1.45E-05	2.91E-05
Cm-244	1.0000E-06	109.98	219.97	0.00E+00	1.10E-04	2.20E-04
Co-60	6.0120E-04	109.98	219.97	0.00E+00	6.61E-02	1.32E-01
Cs-134	4.3534E-06	109.98	219.97	0.00E+00	4.79E-04	9.58E-04
Cs-135	3.1549E-05	109.98	219.97	0.00E+00	3.47E-03	6.94E-03
Cs-137	1.3788E+00	109.98	219.97	0.00E+00	1.52E+02	3.03E+02
Eu-154	1.2041E-01	109.98	219.97	0.00E+00	1.32E+01	2.65E+01
Eu-155	6.6451E-03	109.98	219.97	0.00E+00	7.31E-01	1.46E+00
Fe-55	2.9338E-06	109.98	219.97	0.00E+00	3.23E-04	6.45E-04
H-3	2.0075E-03	109.98	219.97	0.00E+00	2.21E-01	4.42E-01
I-129	7.3805E-07	109.98	219.97	0.00E+00	8.12E-05	1.62E-04
Kr-85	3.6301E-02	109.98	219.97	0.00E+00	3.99E+00	7.98E+00
Np-237	1.4977E-06	109.98	219.97	0.00E+00	1.65E-04	3.29E-04
Pa-231	1.1275E-08	109.98	219.97	0.00E+00	1.24E-06	2.48E-06
Pb-210	3.8932E-13	109.98	219.97	0.00E+00	4.28E-11	8.56E-11
Pm-147	7.5383E-04	109.98	219.97	0.00E+00	8.29E-02	1.66E-01
Pu-238	1.0668E-03	109.98	219.97	0.00E+00	1.17E-01	2.35E-01
Pu-239	5.6902E-03	109.98	219.97	0.00E+00	6.26E-01	1.25E+00
Pu-240	2.2571E-03	109.98	219.97	0.00E+00	2.48E-01	4.96E-01
Pu-241	2.9699E-02	109.98	219.97	0.00E+00	3.27E+00	6.53E+00
Pu-242	3.0602E-07	109.98	219.97	0.00E+00	3.37E-05	6.73E-05
Ra-226	1.0704E-12	109.98	219.97	0.00E+00	1.18E-10	2.35E-10
Ra-228	2.3654E-10	109.98	219.97	0.00E+00	2.60E-08	5.20E-08
Ru-106	1.0444E-10	109.98	219.97	0.00E+00	1.15E-08	2.30E-08
Se-79	1.2934E-05	109.98	219.97	0.00E+00	1.42E-03	2.85E-03
Sn-126	1.2236E-05	109.98	219.97	0.00E+00	1.35E-03	2.69E-03
Sr-90	1.2740E+00	109.98	219.97	0.00E+00	1.40E+02	2.80E+02
Tc-99	4.4120E-04	109.98	219.97	0.00E+00	4.85E-02	9.71E-02
Th-229	6.4226E-10	109.98	219.97	0.00E+00	7.06E-08	1.41E-07
Th-230	1.0594E-10	109.98	219.97	0.00E+00	1.17E-08	2.33E-08
Th-232	2.3744E-10	109.98	219.97	0.00E+00	2.61E-08	5.22E-08
Tl-208	1.5774E-08	109.98	219.97	0.00E+00	1.73E-06	3.47E-06
U-232	4.2511E-08	109.98	219.97	0.00E+00	4.68E-06	9.35E-06
U-233	1.3155E-07	109.98	219.97	0.00E+00	1.45E-05	2.89E-05
U-234	3.0030E-07	109.98	219.97	0.00E+00	3.30E-05	6.61E-05
U-235	-2.6144E-06	109.98	0.00	4.88E-03	4.59E-03	4.88E-03
U-236	1.2720E-05	109.98	219.97	0.00E+00	1.40E-03	2.80E-03
U-238	-3.8857E-08	109.98	0.00	3.03E-03	3.03E-03	3.03E-03
Y-90	1.2744E+00	109.98	219.97	0.00E+00	1.40E+02	2.80E+02
Other Radionuclides					1.68E+02	3.35E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.551E+13
0.0250	3.211E+12
0.0375	3.030E+12
0.0575	3.053E+12
0.0850	1.822E+12
0.1250	1.574E+12
0.2250	1.628E+12
0.3750	6.909E+11
0.5750	1.136E+13
0.8500	5.807E+11
1.2500	5.698E+11
1.7500	1.833E+10
2.2500	3.616E+05
2.7500	1.223E+05
3.5000	3.075E+02
5.0000	1.295E+02
7.0000	1.461E+01
11.0000	1.861E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.85E+00	3.70E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	109.98	75.69
Bounding:		219.97

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:	0.26	0.69
Bounding:	0.53	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) MSU
SNF ID #: 878
Fuel Units & Descr: 58 - ELEMENT
Heavy Metal Mass: BOL=10.73kg; EOL=10.655kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1973
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 35 years

Estimated Canister usage: 18"x10'
0.52

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.1504E-09	71.97	143.94	0.00E+00	4.43E-07	8.85E-07
Am-241	4.8165E-03	71.97	143.94	0.00E+00	3.47E-01	6.93E-01
Am-242m	1.7383E-06	71.97	143.94	0.00E+00	1.25E-04	2.50E-04
Am-243	2.3263E-07	71.97	143.94	0.00E+00	1.67E-05	3.35E-05
C-14	4.3158E-05	71.97	143.94	0.00E+00	3.11E-03	6.21E-03
Cl-36	4.3023E-06	71.97	143.94	0.00E+00	3.10E-06	6.19E-06
Cm-243	1.3229E-07	71.97	143.94	0.00E+00	9.52E-06	1.90E-05
Cm-244	1.0000E-06	71.97	143.94	0.00E+00	7.20E-05	1.44E-04
Co-60	6.0120E-04	71.97	143.94	0.00E+00	4.33E-02	8.65E-02
Cs-134	4.3534E-06	71.97	143.94	0.00E+00	3.13E-04	6.27E-04
Cs-135	3.1549E-05	71.97	143.94	0.00E+00	2.27E-03	4.54E-03
Cs-137	1.3788E+00	71.97	143.94	0.00E+00	9.92E+01	1.98E+02
Eu-154	1.2041E-01	71.97	143.94	0.00E+00	8.67E+00	1.73E+01
Eu-155	6.6451E-03	71.97	143.94	0.00E+00	4.78E-01	9.57E-01
Fe-55	2.9338E-06	71.97	143.94	0.00E+00	2.11E-04	4.22E-04
H-3	2.0075E-03	71.97	143.94	0.00E+00	1.44E-01	2.89E-01
I-129	7.3805E-07	71.97	143.94	0.00E+00	5.31E-05	1.06E-04
Kr-85	3.6301E-02	71.97	143.94	0.00E+00	2.61E+00	5.23E+00
Np-237	1.4977E-06	71.97	143.94	0.00E+00	1.08E-04	2.16E-04
Pa-231	1.1275E-06	71.97	143.94	0.00E+00	8.11E-07	1.62E-06
Pb-210	3.8932E-13	71.97	143.94	0.00E+00	2.80E-11	5.60E-11
Pm-147	7.5383E-04	71.97	143.94	0.00E+00	5.43E-02	1.09E-01
Pu-238	1.0668E-03	71.97	143.94	0.00E+00	7.68E-02	1.54E-01
Pu-239	5.6902E-03	71.97	143.94	0.00E+00	4.10E-01	8.19E-01
Pu-240	2.2571E-03	71.97	143.94	0.00E+00	1.62E-01	3.25E-01
Pu-241	2.9699E-02	71.97	143.94	0.00E+00	2.14E+00	4.27E+00
Pu-242	3.0602E-07	71.97	143.94	0.00E+00	2.20E-05	4.40E-05
Ra-226	1.0704E-12	71.97	143.94	0.00E+00	7.70E-11	1.54E-10
Ra-228	2.3654E-10	71.97	143.94	0.00E+00	1.70E-08	3.40E-08
Ru-106	1.0444E-10	71.97	143.94	0.00E+00	7.52E-09	1.50E-08
Se-79	1.2934E-05	71.97	143.94	0.00E+00	9.31E-04	1.86E-03
Sn-126	1.2236E-05	71.97	143.94	0.00E+00	8.81E-04	1.76E-03
Sr-90	1.2740E+00	71.97	143.94	0.00E+00	9.17E+01	1.83E+02
Tc-99	4.4120E-04	71.97	143.94	0.00E+00	3.18E-02	6.35E-02
Th-229	6.4226E-10	71.97	143.94	0.00E+00	4.62E-08	9.24E-08
Th-230	1.0594E-10	71.97	143.94	0.00E+00	7.62E-09	1.52E-08
Th-232	2.3744E-10	71.97	143.94	0.00E+00	1.71E-08	3.42E-08
Tl-208	1.5774E-08	71.97	143.94	0.00E+00	1.14E-06	2.27E-06
U-232	4.2511E-08	71.97	143.94	0.00E+00	3.06E-06	6.12E-06
U-233	1.3155E-07	71.97	143.94	0.00E+00	9.47E-06	1.89E-05
U-234	3.0030E-07	71.97	143.94	0.00E+00	2.16E-05	4.32E-05
U-235	-2.6144E-06	71.97	0.00	4.64E-03	4.45E-03	4.64E-03
U-236	1.2720E-05	71.97	143.94	0.00E+00	9.15E-04	1.83E-03
U-238	-3.8857E-08	71.97	0.00	2.89E-03	2.88E-03	2.89E-03
Y-90	1.2744E+00	71.97	143.94	0.00E+00	9.17E+01	1.83E+02
Other Radionuclides					1.10E+02	2.19E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.015E+13
0.0250	2.101E+12
0.0375	1.983E+12
0.0575	1.998E+12
0.0850	1.192E+12
0.1250	1.030E+12
0.2250	1.065E+12
0.3750	4.521E+11
0.5750	7.447E+12
0.8500	3.800E+11
1.2500	3.728E+11
1.7500	1.200E+10
2.2500	2.366E+05
2.7500	8.007E+04
3.5000	2.061E+02
5.0000	8.681E+01
7.0000	9.801E+00
11.0000	1.115E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.21E+00	2.42E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	52.29	71.97
Bounding:		143.94

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.18	1.38
Bounding:	0.36	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) REED COLLEGE
SNF ID #: 256
Fuel Units & Descr: 58 - ELEMENT
Heavy Metal Mass: BOL=10.927kg; EOL=10.887kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2026
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10" 0.52

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.0632E-10	53.25	106.50	0.00E+00	4.29E-08	8.59E-08
Am-241	2.2586E-03	53.25	106.50	0.00E+00	1.20E-01	2.41E-01
Am-242m	1.9925E-06	53.25	106.50	0.00E+00	1.06E-04	2.12E-04
Am-243	2.3323E-07	53.25	106.50	0.00E+00	1.24E-05	2.48E-05
C-14	4.3308E-05	53.25	106.50	0.00E+00	2.31E-03	4.61E-03
Cl-36	4.3023E-08	53.25	106.50	0.00E+00	2.29E-06	4.58E-06
Cm-243	2.7429E-07	53.25	106.50	0.00E+00	1.46E-05	2.92E-05
Cm-244	3.1504E-06	53.25	106.50	0.00E+00	1.68E-04	3.36E-04
Co-60	3.1008E-02	53.25	106.50	0.00E+00	1.65E+00	3.30E+00
Cs-134	1.0367E-01	53.25	106.50	0.00E+00	5.52E+00	1.10E+01
Cs-135	3.1549E-05	53.25	106.50	0.00E+00	1.68E-03	3.36E-03
Cs-137	2.7564E+00	53.25	106.50	0.00E+00	1.47E+02	2.94E+02
Eu-154	1.3490E+00	53.25	106.50	0.00E+00	7.18E+01	1.44E+02
Eu-155	4.3880E-01	53.25	106.50	0.00E+00	2.34E+01	4.67E+01
Fe-55	8.6782E-03	53.25	106.50	0.00E+00	4.62E-01	9.24E-01
H-3	1.0805E-02	53.25	106.50	0.00E+00	5.75E-01	1.15E+00
I-129	7.3805E-07	53.25	106.50	0.00E+00	3.93E-05	7.86E-05
Kr-85	2.5218E-01	53.25	106.50	0.00E+00	1.34E+01	2.69E+01
Np-237	1.4463E-06	53.25	106.50	0.00E+00	7.70E-05	1.54E-04
Pa-231	3.5970E-09	53.25	106.50	0.00E+00	1.92E-07	3.83E-07
Pb-210	8.2511E-15	53.25	106.50	0.00E+00	4.39E-13	8.79E-13
Pm-147	2.0767E+00	53.25	106.50	0.00E+00	1.11E+02	2.21E+02
Pu-238	1.3514E-03	53.25	106.50	0.00E+00	7.20E-02	1.44E-01
Pu-239	5.6947E-03	53.25	106.50	0.00E+00	3.03E-01	6.06E-01
Pu-240	2.2647E-03	53.25	106.50	0.00E+00	1.21E-01	2.41E-01
Pu-241	1.2574E-01	53.25	106.50	0.00E+00	6.70E+00	1.34E+01
Pu-242	3.0602E-07	53.25	106.50	0.00E+00	1.63E-05	3.26E-05
Ra-226	5.7353E-14	53.25	106.50	0.00E+00	3.05E-12	6.11E-12
Ra-228	1.8150E-10	53.25	106.50	0.00E+00	9.66E-09	1.93E-08
Ru-106	9.3744E-02	53.25	106.50	0.00E+00	4.99E+00	9.98E+00
Se-79	1.2938E-05	53.25	106.50	0.00E+00	6.89E-04	1.38E-03
Sn-126	1.2239E-05	53.25	106.50	0.00E+00	6.52E-04	1.30E-03
Sr-90	2.6000E+00	53.25	106.50	0.00E+00	1.38E+02	2.77E+02
Tc-99	4.4120E-04	53.25	106.50	0.00E+00	2.35E-02	4.70E-02
Th-229	1.4749E-10	53.25	106.50	0.00E+00	7.85E-09	1.57E-08
Th-230	1.9549E-11	53.25	106.50	0.00E+00	1.04E-09	2.08E-09
Th-232	2.3744E-10	53.25	106.50	0.00E+00	1.26E-08	2.53E-08
Tl-208	1.9459E-08	53.25	106.50	0.00E+00	1.04E-06	2.07E-06
U-232	5.6015E-08	53.25	106.50	0.00E+00	2.98E-06	5.97E-06
U-233	1.3132E-07	53.25	106.50	0.00E+00	6.99E-06	1.40E-05
U-234	1.7323E-07	53.25	106.50	0.00E+00	9.22E-06	1.84E-05
U-235	-2.6159E-06	53.25	0.00	4.70E-03	4.56E-03	4.70E-03
U-236	1.2717E-05	53.25	106.50	0.00E+00	6.77E-04	1.35E-03
U-238	-3.8857E-06	53.25	0.00	2.94E-03	2.94E-03	2.94E-03
Y-90	2.6015E+00	53.25	106.50	0.00E+00	1.39E+02	2.77E+02
Other Radionuclides					2.02E+02	4.05E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.802E+13
0.0250	3.912E+12
0.0375	4.873E+12
0.0575	3.736E+12
0.0850	2.615E+12
0.1250	3.911E+12
0.2250	2.183E+12
0.3750	9.716E+11
0.5750	1.232E+13
0.8500	3.032E+12
1.2500	3.143E+12
1.7500	8.995E+10
2.2500	1.093E+10
2.7500	8.881E+07
3.5000	1.038E+07
5.0000	6.755E+01
7.0000	7.658E+00
11.0000	8.730E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.88E+00	5.35E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.89205598	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	53.25	38.75
Bounding:		106.50

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.13	0.73
Bounding:	0.26	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) SLOVENIA
SNF ID #: 468
Fuel Units & Descr: 67 - ELEMENT
Heavy Metal Mass: BOL=11.879kg; EOL=11.531kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1999
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrc, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 10 years

Estimated Canister usage: 18"x10" 0.60

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.2892E-09	405.21	810.42	0.00E+00	5.22E-07	1.04E-06
Am-241	2.9429E-03	405.21	810.42	0.00E+00	1.19E+00	2.38E+00
Am-242m	1.9489E-06	405.21	810.42	0.00E+00	7.90E-04	1.58E-03
Am-243	2.3308E-07	405.21	810.42	0.00E+00	9.44E-05	1.89E-04
C-14	4.3278E-05	405.21	810.42	0.00E+00	1.75E-02	3.51E-02
Cl-36	4.3023E-08	405.21	810.42	0.00E+00	1.74E-05	3.49E-05
Cm-243	2.4286E-07	405.21	810.42	0.00E+00	9.84E-05	1.97E-04
Cm-244	2.6015E-06	405.21	810.42	0.00E+00	1.05E-03	2.11E-03
Co-60	1.6075E-02	405.21	810.42	0.00E+00	6.51E+00	1.30E+01
Cs-134	1.9323E-02	405.21	810.42	0.00E+00	7.83E+00	1.57E+01
Cs-135	3.1549E-05	405.21	810.42	0.00E+00	1.28E-02	2.56E-02
Cs-137	2.4556E+00	405.21	810.42	0.00E+00	9.95E+02	1.99E+03
Eu-154	9.0180E-01	405.21	810.42	0.00E+00	3.65E+02	7.31E+02
Eu-155	2.1820E-01	405.21	810.42	0.00E+00	8.84E+01	1.77E+02
Fe-55	2.2902E-03	405.21	810.42	0.00E+00	9.28E-01	1.86E+00
H-3	8.1609E-03	405.21	810.42	0.00E+00	3.31E+00	6.61E+00
I-129	7.3805E-07	405.21	810.42	0.00E+00	2.99E-04	5.98E-04
Kr-85	1.8256E-01	405.21	810.42	0.00E+00	7.40E+01	1.48E+02
Np-237	1.4505E-06	405.21	810.42	0.00E+00	5.88E-04	1.18E-03
Pa-231	4.5564E-09	405.21	810.42	0.00E+00	1.85E-06	3.69E-06
Pb-210	1.8842E-14	405.21	810.42	0.00E+00	7.63E-12	1.53E-11
Pm-147	5.5459E-01	405.21	810.42	0.00E+00	2.25E+02	4.49E+02
Pu-238	1.2992E-03	405.21	810.42	0.00E+00	5.26E-01	1.05E+00
Pu-239	5.6932E-03	405.21	810.42	0.00E+00	2.31E+00	4.61E+00
Pu-240	2.2632E-03	405.21	810.42	0.00E+00	9.17E-01	1.83E+00
Pu-241	9.8857E-02	405.21	810.42	0.00E+00	4.01E+01	8.01E+01
Pu-242	3.0602E-07	405.21	810.42	0.00E+00	1.24E-04	2.48E-04
Ra-226	1.0823E-13	405.21	810.42	0.00E+00	4.39E-11	8.77E-11
Ra-228	2.0406E-10	405.21	810.42	0.00E+00	8.27E-08	1.65E-07
Ru-106	3.0180E-03	405.21	810.42	0.00E+00	1.22E+00	2.45E+00
Se-79	1.2937E-05	405.21	810.42	0.00E+00	5.24E-03	1.05E-02
Sn-126	1.2238E-05	405.21	810.42	0.00E+00	4.96E-03	9.92E-03
Sr-90	2.3098E+00	405.21	810.42	0.00E+00	9.36E+02	1.87E+03
Tc-99	4.4120E-04	405.21	810.42	0.00E+00	1.79E-01	3.58E-01
Th-229	2.0932E-10	405.21	810.42	0.00E+00	8.48E-08	1.70E-07
Th-230	2.7744E-11	405.21	810.42	0.00E+00	1.12E-08	2.25E-08
Th-232	2.3744E-10	405.21	810.42	0.00E+00	9.62E-08	1.92E-07
Tl-208	1.9459E-08	405.21	810.42	0.00E+00	7.88E-06	1.58E-05
U-232	5.3850E-08	405.21	810.42	0.00E+00	2.18E-05	4.36E-05
U-233	1.3135E-07	405.21	810.42	0.00E+00	5.32E-05	1.06E-04
U-234	1.9143E-07	405.21	810.42	0.00E+00	7.76E-05	1.55E-04
U-235	-2.6159E-06	405.21	0.00	5.14E-03	4.08E-03	5.14E-03
U-236	1.2719E-05	405.21	810.42	0.00E+00	5.15E-03	1.03E-02
U-238	-3.8857E-08	405.21	0.00	3.19E-03	3.18E-03	3.19E-03
Y-90	2.3098E+00	405.21	810.42	0.00E+00	9.36E+02	1.87E+03
Other Radionuclides					1.07E+03	2.14E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.090E+14
0.0250	2.279E+13
0.0375	2.691E+13
0.0575	2.225E+13
0.0850	1.446E+13
0.1250	2.001E+13
0.2250	1.270E+13
0.3750	5.225E+12
0.5750	7.784E+13
0.8500	1.418E+13
1.2500	1.559E+13
1.7500	4.471E+11
2.2500	1.064E+09
2.7500	2.086E+07
3.5000	2.544E+06
5.0000	4.665E+02
7.0000	5.275E+01
11.0000	6.005E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.50E+01	3.01E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00337313	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	405.21	332.55	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		810.42	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.92	0.82	0.99
Bounding:	1.85		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) SO. KOREA
SNF ID #: 483
Fuel Units & Descr: 69 - ELEMENT
Heavy Metal Mass: BOL=13.11kg; EOL=12.958kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1972
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 35 years

Estimated Canister usage: 18"x10" 0.62

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.1504E-09	383.31	766.62	0.00E+00	2.36E-06	4.72E-06
Am-241	4.8165E-03	383.31	766.62	0.00E+00	1.85E+00	3.69E+00
Am-242m	1.7383E-06	383.31	766.62	0.00E+00	6.66E-04	1.33E-03
Am-243	2.3263E-07	383.31	766.62	0.00E+00	8.92E-05	1.78E-04
C-14	4.3158E-05	383.31	766.62	0.00E+00	1.65E-02	3.31E-02
Cl-36	4.3023E-08	383.31	766.62	0.00E+00	1.65E-05	3.30E-05
Cm-243	1.3229E-07	383.31	766.62	0.00E+00	5.07E-05	1.01E-04
Cm-244	1.0000E-06	383.31	766.62	0.00E+00	3.83E-04	7.67E-04
Co-60	6.0120E-04	383.31	766.62	0.00E+00	2.30E-01	4.61E-01
Cs-134	4.3534E-06	383.31	766.62	0.00E+00	1.67E-03	3.34E-03
Cs-135	3.1549E-05	383.31	766.62	0.00E+00	1.21E-02	2.42E-02
Cs-137	1.3788E+00	383.31	766.62	0.00E+00	5.29E+02	1.06E+03
Eu-154	1.2041E-01	383.31	766.62	0.00E+00	4.62E+01	9.23E+01
Eu-155	6.6451E-03	383.31	766.62	0.00E+00	2.55E+00	5.09E+00
Fe-55	2.9338E-06	383.31	766.62	0.00E+00	1.12E-03	2.25E-03
H-3	2.0075E-03	383.31	766.62	0.00E+00	7.70E-01	1.54E+00
I-129	7.3805E-07	383.31	766.62	0.00E+00	2.83E-04	5.66E-04
Kr-85	3.6301E-02	383.31	766.62	0.00E+00	1.39E+01	2.78E+01
Np-237	1.4977E-06	383.31	766.62	0.00E+00	5.74E-04	1.15E-03
Pa-231	1.1275E-08	383.31	766.62	0.00E+00	4.32E-06	8.64E-06
Pb-210	3.8932E-13	383.31	766.62	0.00E+00	1.49E-10	2.98E-10
Pm-147	7.5383E-04	383.31	766.62	0.00E+00	2.89E-01	5.78E-01
Pu-238	1.0668E-03	383.31	766.62	0.00E+00	4.09E-01	8.18E-01
Pu-239	5.6902E-03	383.31	766.62	0.00E+00	2.18E+00	4.36E+00
Pu-240	2.2571E-03	383.31	766.62	0.00E+00	8.65E-01	1.73E+00
Pu-241	2.9699E-02	383.31	766.62	0.00E+00	1.14E+01	2.28E+01
Pu-242	3.0602E-07	383.31	766.62	0.00E+00	1.17E-04	2.35E-04
Ra-226	1.0704E-12	383.31	766.62	0.00E+00	4.10E-10	8.21E-10
Ra-228	2.3654E-10	383.31	766.62	0.00E+00	9.07E-08	1.81E-07
Ru-106	1.0444E-10	383.31	766.62	0.00E+00	4.00E-08	8.01E-08
Se-79	1.2934E-05	383.31	766.62	0.00E+00	4.96E-03	9.92E-03
Sn-126	1.2236E-05	383.31	766.62	0.00E+00	4.69E-03	9.38E-03
Sr-90	1.2740E+00	383.31	766.62	0.00E+00	4.88E+02	9.77E+02
Tc-99	4.4120E-04	383.31	766.62	0.00E+00	1.69E-01	3.38E-01
Th-229	6.4226E-10	383.31	766.62	0.00E+00	2.46E-07	4.92E-07
Th-230	1.0594E-10	383.31	766.62	0.00E+00	4.06E-08	8.12E-08
Th-232	2.3744E-10	383.31	766.62	0.00E+00	9.10E-08	1.82E-07
Tl-208	1.5774E-08	383.31	766.62	0.00E+00	6.05E-06	1.21E-05
U-232	4.2511E-08	383.31	766.62	0.00E+00	1.63E-05	3.26E-05
U-233	1.3155E-07	383.31	766.62	0.00E+00	5.04E-05	1.01E-04
U-234	3.0030E-07	383.31	766.62	0.00E+00	1.15E-04	2.30E-04
U-235	-2.6144E-06	383.31	0.00	5.67E-03	4.66E-03	5.67E-03
U-236	1.2720E-05	383.31	766.62	0.00E+00	4.88E-03	9.75E-03
U-238	-3.8857E-08	383.31	0.00	3.53E-03	3.51E-03	3.53E-03
Y-90	1.2744E+00	383.31	766.62	0.00E+00	4.89E+02	9.77E+02
Other Radionuclides					5.84E+02	1.17E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.407E+13
0.0250	1.119E+13
0.0375	1.056E+13
0.0575	1.064E+13
0.0850	6.350E+12
0.1250	5.485E+12
0.2250	5.673E+12
0.3750	2.408E+12
0.5750	3.966E+13
0.8500	2.024E+12
1.2500	1.966E+12
1.7500	6.389E+10
2.2500	1.260E+06
2.7500	4.264E+05
3.5000	1.034E+03
5.0000	4.350E+02
7.0000	4.905E+01
11.0000	5.574E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.45E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	383.31	144.90
Bounding:		766.62

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.79	0.38
Bounding:	1.58	

Estimated EOL HM/Given EOL HM: 0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) U OF IL
SNF ID #: 447
Fuel Units & Descr: 58 - ELEMENT
Heavy Metal Mass: BOL=10.44kg; EOL=10.057kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.52

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	365.39	730.78	0.00E+00	2.95E-07	5.89E-07	Avg. MeV	
Am-241	2.2586E-03	365.39	730.78	0.00E+00	8.25E-01	1.65E+00	0.0150	1.236E+14
Am-242m	1.9925E-06	365.39	730.78	0.00E+00	7.28E-04	1.46E-03	0.0250	2.684E+13
Am-243	2.3323E-07	365.39	730.78	0.00E+00	8.52E-05	1.70E-04	0.0375	3.344E+13
C-14	4.3308E-05	365.39	730.78	0.00E+00	1.58E-02	3.16E-02	0.0575	2.563E+13
Cl-36	4.3023E-08	365.39	730.78	0.00E+00	1.57E-05	3.14E-05	0.0850	1.794E+13
Cm-243	2.7429E-07	365.39	730.78	0.00E+00	1.00E-04	2.00E-04	0.1250	2.684E+13
Cm-244	3.1504E-06	365.39	730.78	0.00E+00	1.15E-03	2.30E-03	0.2250	1.498E+13
Co-60	3.1008E-02	365.39	730.78	0.00E+00	1.13E+01	2.27E+01	0.3750	6.667E+12
Cs-134	1.0367E-01	365.39	730.78	0.00E+00	3.79E+01	7.58E+01	0.5750	8.452E+13
Cs-135	3.1549E-05	365.39	730.78	0.00E+00	1.15E-02	2.31E-02	0.8500	2.081E+13
Cs-137	2.7564E+00	365.39	730.78	0.00E+00	1.01E+03	2.01E+03	1.2500	2.157E+13
Eu-154	1.3490E+00	365.39	730.78	0.00E+00	4.93E+02	9.86E+02	1.7500	6.172E+11
Eu-155	4.3880E-01	365.39	730.78	0.00E+00	1.60E+02	3.21E+02	2.2500	7.503E+10
Fe-55	8.6782E-03	365.39	730.78	0.00E+00	3.17E+00	6.34E+00	2.7500	6.094E+08
H-3	1.0805E-02	365.39	730.78	0.00E+00	3.95E+00	7.90E+00	3.5000	7.123E+07
I-129	7.3805E-07	365.39	730.78	0.00E+00	2.70E-04	5.39E-04	5.0000	4.234E+02
Kr-85	2.5218E-01	365.39	730.78	0.00E+00	9.21E+01	1.84E+02	7.0000	4.792E+01
Np-237	1.4463E-06	365.39	730.78	0.00E+00	5.28E-04	1.06E-03	11.0000	5.458E+00
Pa-231	3.5970E-09	365.39	730.78	0.00E+00	1.31E-06	2.63E-06		
Pb-210	8.2511E-15	365.39	730.78	0.00E+00	3.01E-12	6.03E-12		
Pm-147	2.0767E+00	365.39	730.78	0.00E+00	7.59E+02	1.52E+03		
Pu-238	1.3514E-03	365.39	730.78	0.00E+00	4.94E-01	9.88E-01		
Pu-239	5.6947E-03	365.39	730.78	0.00E+00	2.08E+00	4.16E+00		
Pu-240	2.2647E-03	365.39	730.78	0.00E+00	8.27E-01	1.65E+00		
Pu-241	1.2574E-01	365.39	730.78	0.00E+00	4.59E+01	9.19E+01		
Pu-242	3.0602E-07	365.39	730.78	0.00E+00	1.12E-04	2.24E-04		
Ra-226	5.7353E-14	365.39	730.78	0.00E+00	2.10E-11	4.19E-11		
Ra-228	1.8150E-10	365.39	730.78	0.00E+00	6.63E-08	1.33E-07		
Ru-106	9.3744E-02	365.39	730.78	0.00E+00	3.43E+01	6.85E+01		
Se-79	1.2938E-05	365.39	730.78	0.00E+00	4.73E-03	9.46E-03		
Sn-126	1.2239E-05	365.39	730.78	0.00E+00	4.47E-03	8.94E-03		
Sr-90	2.6000E+00	365.39	730.78	0.00E+00	9.50E+02	1.90E+03		
Tc-99	4.4120E-04	365.39	730.78	0.00E+00	1.61E-01	3.22E-01		
Th-229	1.4749E-10	365.39	730.78	0.00E+00	5.39E-08	1.08E-07		
Th-230	1.9549E-11	365.39	730.78	0.00E+00	7.14E-09	1.43E-08		
Th-232	2.3744E-10	365.39	730.78	0.00E+00	8.68E-08	1.74E-07		
Tl-208	1.9459E-08	365.39	730.78	0.00E+00	7.11E-06	1.42E-05		
U-232	5.6015E-08	365.39	730.78	0.00E+00	2.05E-05	4.09E-05		
U-233	1.3132E-07	365.39	730.78	0.00E+00	4.80E-05	9.60E-05		
U-234	1.7323E-07	365.39	730.78	0.00E+00	6.33E-05	1.27E-04		
U-235	-2.6159E-06	365.39	0.00	4.51E-03	3.56E-03	4.51E-03		
U-236	1.2717E-05	365.39	730.78	0.00E+00	4.65E-03	9.29E-03		
U-238	-3.8857E-08	365.39	0.00	2.81E-03	2.79E-03	2.81E-03		
Y-90	2.6015E+00	365.39	730.78	0.00E+00	9.51E+02	1.90E+03		
Other Radionuclides					1.39E+03	2.78E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.84E+01	3.67E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.99999834	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	203.50	365.39
Bounding:		730.78

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.95	1.80
Bounding:	1.89	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) U OF IL
SNF ID #: 501
Fuel Units & Descr: 1 - ELEMENT
Heavy Metal Mass: BOL=0.18kg; EOL=0.173kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.01

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	6.30	12.60	0.00E+00	5.37E-09	1.07E-08
Am-241	1.8331E-03	6.30	12.60	0.00E+00	1.15E-02	2.31E-02
Am-242m	1.4129E-06	6.30	12.60	0.00E+00	8.90E-06	1.78E-05
Am-243	1.4774E-07	6.30	12.60	0.00E+00	9.31E-07	1.86E-06
C-14	1.2871E-04	6.30	12.60	0.00E+00	8.11E-04	1.62E-03
Cl-36	2.8120E-06	6.30	12.60	0.00E+00	1.77E-05	3.54E-05
Cm-243	1.7940E-07	6.30	12.60	0.00E+00	1.13E-06	2.26E-06
Cm-244	1.6962E-06	6.30	12.60	0.00E+00	1.07E-05	2.14E-05
Co-60	1.2839E+00	6.30	12.60	0.00E+00	8.09E+00	1.62E+01
Cs-134	9.0541E-02	6.30	12.60	0.00E+00	5.70E-01	1.14E+00
Cs-135	3.2195E-05	6.30	12.60	0.00E+00	2.03E-04	4.06E-04
Cs-137	2.7564E+00	6.30	12.60	0.00E+00	1.74E+01	3.47E+01
Eu-154	1.5368E-02	6.30	12.60	0.00E+00	9.68E-02	1.94E-01
Eu-155	2.9293E-02	6.30	12.60	0.00E+00	1.85E-01	3.69E-01
Fe-55	7.7158E-01	6.30	12.60	0.00E+00	4.86E+00	9.72E+00
H-3	1.1111E-02	6.30	12.60	0.00E+00	7.00E-02	1.40E-01
I-129	7.3684E-07	6.30	12.60	0.00E+00	4.64E-06	9.28E-06
Kr-85	2.5263E-01	6.30	12.60	0.00E+00	1.59E+00	3.18E+00
Np-237	1.2427E-06	6.30	12.60	0.00E+00	7.83E-06	1.57E-05
Pa-231	3.8511E-09	6.30	12.60	0.00E+00	2.43E-08	4.85E-08
Pb-210	7.3880E-15	6.30	12.60	0.00E+00	4.65E-14	9.31E-14
Pm-147	2.1023E+00	6.30	12.60	0.00E+00	1.32E+01	2.65E+01
Pu-238	1.0383E-03	6.30	12.60	0.00E+00	6.54E-03	1.31E-02
Pu-239	5.5293E-03	6.30	12.60	0.00E+00	3.48E-02	6.97E-02
Pu-240	2.1278E-03	6.30	12.60	0.00E+00	1.34E-02	2.68E-02
Pu-241	1.0195E-01	6.30	12.60	0.00E+00	6.42E-01	1.28E+00
Pu-242	2.3128E-07	6.30	12.60	0.00E+00	1.46E-06	2.91E-06
Ra-226	5.2782E-14	6.30	12.60	0.00E+00	3.33E-13	6.65E-13
Ra-228	1.9338E-10	6.30	12.60	0.00E+00	1.22E-09	2.44E-09
Ru-106	9.1684E-02	6.30	12.60	0.00E+00	5.78E-01	1.16E+00
Se-79	1.3018E-05	6.30	12.60	0.00E+00	8.20E-05	1.64E-04
Sn-126	1.2167E-05	6.30	12.60	0.00E+00	7.67E-05	1.53E-04
Sr-90	2.6045E+00	6.30	12.60	0.00E+00	1.64E+01	3.28E+01
Tc-99	4.4241E-04	6.30	12.60	0.00E+00	2.79E-03	5.57E-03
Th-229	1.3713E-10	6.30	12.60	0.00E+00	8.64E-10	1.73E-09
Th-230	1.8090E-11	6.30	12.60	0.00E+00	1.14E-10	2.28E-10
Th-232	2.5278E-10	6.30	12.60	0.00E+00	1.59E-09	3.19E-09
Tl-208	1.6947E-06	6.30	12.60	0.00E+00	1.07E-07	2.14E-07
U-232	4.8737E-06	6.30	12.60	0.00E+00	3.07E-07	6.14E-07
U-233	1.2203E-07	6.30	12.60	0.00E+00	7.69E-07	1.54E-06
U-234	1.5925E-07	6.30	12.60	0.00E+00	1.00E-06	2.01E-06
U-235	-2.6194E-06	6.30	0.00	7.78E-05	6.13E-05	7.78E-05
U-236	1.2693E-05	6.30	12.60	0.00E+00	8.00E-05	1.60E-04
U-238	-3.6331E-08	6.30	0.00	4.84E-05	4.82E-05	4.84E-05
Y-90	2.6060E+00	6.30	12.60	0.00E+00	1.64E+01	3.28E+01
Other Radionuclides					2.27E+01	4.54E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.037E+12
0.0250	4.481E+11
0.0375	3.816E+11
0.0575	3.917E+11
0.0850	2.427E+11
0.1250	1.762E+11
0.2250	2.059E+11
0.3750	1.045E+11
0.5750	1.389E+12
0.8500	5.961E+10
1.2500	1.211E+12
1.7500	8.069E+08
2.2500	1.301E+09
2.7500	1.032E+07
3.5000	1.201E+06
5.0000	6.716E+00
7.0000	7.602E-01
11.0000	8.661E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.67E-01	7.33E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.99999634	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	3.51	6.30	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		12.60	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	1.03	1.80	1.00
Bounding:	2.05		

[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: TRIGA STD (ALUM) U OF UTAH
SNF ID #: 699
Fuel Units & Descr: 63 - ELEMENT
Heavy Metal Mass: BOL=11kg; EOL=10.723kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10" 0.57

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.0632E-10	264.59	529.19	0.00E+00	2.13E-07	4.27E-07
Am-241	2.2586E-03	264.59	529.19	0.00E+00	5.98E-01	1.20E+00
Am-242m	1.9925E-06	264.59	529.19	0.00E+00	5.27E-04	1.05E-03
Am-243	2.3323E-07	264.59	529.19	0.00E+00	6.17E-05	1.23E-04
C-14	4.3308E-05	264.59	529.19	0.00E+00	1.15E-02	2.29E-02
Cl-36	4.3023E-06	264.59	529.19	0.00E+00	1.14E-05	2.28E-05
Cm-243	2.7429E-07	264.59	529.19	0.00E+00	7.26E-05	1.45E-04
Cm-244	3.1504E-06	264.59	529.19	0.00E+00	8.34E-04	1.67E-03
Co-60	3.1008E-02	264.59	529.19	0.00E+00	8.20E+00	1.64E+01
Cs-134	1.0367E-01	264.59	529.19	0.00E+00	2.74E+01	5.49E+01
Cs-135	3.1549E-05	264.59	529.19	0.00E+00	8.35E-03	1.67E-02
Cs-137	2.7564E+00	264.59	529.19	0.00E+00	7.29E+02	1.46E+03
Eu-154	1.3490E+00	264.59	529.19	0.00E+00	3.57E+02	7.14E+02
Eu-155	4.3880E-01	264.59	529.19	0.00E+00	1.16E+02	2.32E+02
Fe-55	8.6782E-03	264.59	529.19	0.00E+00	2.30E+00	4.59E+00
H-3	1.0805E-02	264.59	529.19	0.00E+00	2.86E+00	5.72E+00
I-129	7.3805E-07	264.59	529.19	0.00E+00	1.95E-04	3.91E-04
Kr-85	2.5218E-01	264.59	529.19	0.00E+00	6.67E+01	1.33E+02
Np-237	1.4463E-06	264.59	529.19	0.00E+00	3.83E-04	7.65E-04
Pa-231	3.5970E-09	264.59	529.19	0.00E+00	9.52E-07	1.90E-06
Pb-210	8.2511E-15	264.59	529.19	0.00E+00	2.18E-12	4.37E-12
Pm-147	2.0767E+00	264.59	529.19	0.00E+00	5.49E+02	1.10E+03
Pu-238	1.3514E-03	264.59	529.19	0.00E+00	3.58E-01	7.15E-01
Pu-239	5.6947E-03	264.59	529.19	0.00E+00	1.51E+00	3.01E+00
Pu-240	2.2647E-03	264.59	529.19	0.00E+00	5.99E-01	1.20E+00
Pu-241	1.2574E-01	264.59	529.19	0.00E+00	3.33E+01	6.65E+01
Pu-242	3.0602E-07	264.59	529.19	0.00E+00	8.10E-05	1.62E-04
Ra-226	5.7353E-14	264.59	529.19	0.00E+00	1.52E-11	3.04E-11
Ra-228	1.8150E-10	264.59	529.19	0.00E+00	4.80E-08	9.60E-08
Ru-106	9.3744E-02	264.59	529.19	0.00E+00	2.48E+01	4.96E+01
Se-79	1.2938E-05	264.59	529.19	0.00E+00	3.42E-03	6.85E-03
Sn-126	1.2239E-05	264.59	529.19	0.00E+00	3.24E-03	6.48E-03
Sr-90	2.6000E+00	264.59	529.19	0.00E+00	6.88E+02	1.38E+03
Tc-99	4.4120E-04	264.59	529.19	0.00E+00	1.17E-01	2.33E-01
Th-229	1.4749E-10	264.59	529.19	0.00E+00	3.90E-08	7.80E-08
Th-230	1.9549E-11	264.59	529.19	0.00E+00	5.17E-09	1.03E-08
Th-232	2.3744E-10	264.59	529.19	0.00E+00	6.28E-08	1.26E-07
Tl-208	1.9459E-06	264.59	529.19	0.00E+00	5.15E-06	1.03E-05
U-232	5.6015E-06	264.59	529.19	0.00E+00	1.48E-05	2.96E-05
U-233	1.3132E-07	264.59	529.19	0.00E+00	3.47E-05	6.95E-05
U-234	1.7323E-07	264.59	529.19	0.00E+00	4.58E-05	9.17E-05
U-235	-2.6159E-06	264.59	0.00	4.73E-03	4.04E-03	4.73E-03
U-236	1.2717E-05	264.59	529.19	0.00E+00	3.36E-03	6.73E-03
U-238	-3.8857E-06	264.59	0.00	2.96E-03	2.95E-03	2.96E-03
Y-90	2.6015E+00	264.59	529.19	0.00E+00	6.88E+02	1.38E+03
Other Radionuclides					1.01E+03	2.01E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.954E+13
0.0250	1.944E+13
0.0375	2.421E+13
0.0575	1.856E+13
0.0850	1.299E+13
0.1250	1.943E+13
0.2250	1.085E+13
0.3750	4.828E+12
0.5750	6.121E+13
0.8500	1.507E+13
1.2500	1.562E+13
1.7500	4.470E+11
2.2500	5.433E+10
2.7500	4.413E+08
3.5000	5.158E+07
5.0000	3.087E+02
7.0000	3.495E+01
11.0000	3.981E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.33E+01	2.66E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.89699819	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	214.41	264.59	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		529.19	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.65	1.23
Bounding:	1.30	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) UNIV. OF TEXAS
SNF ID #: 877
Fuel Units & Descr: 69 - ELEMENT
Heavy Metal Mass: BOL=12.765kg; EOL=12.675kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1973
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 0.62

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.1504E-09	85.62	171.24	0.00E+00	5.27E-07	1.05E-06	Avg. MeV	
Am-241	4.8165E-03	85.62	171.24	0.00E+00	4.12E-01	8.25E-01	0.0150	1.208E+13
Am-242m	1.7383E-06	85.62	171.24	0.00E+00	1.49E-04	2.98E-04	0.0250	2.500E+12
Am-243	2.3263E-07	85.62	171.24	0.00E+00	1.99E-05	3.98E-05	0.0375	2.359E+12
C-14	4.3158E-05	85.62	171.24	0.00E+00	3.70E-03	7.39E-03	0.0575	2.376E+12
Cl-36	4.3023E-08	85.62	171.24	0.00E+00	3.68E-06	7.37E-06	0.0850	1.418E+12
Cm-243	1.3229E-07	85.62	171.24	0.00E+00	1.13E-05	2.27E-05	0.1250	1.225E+12
Cm-244	1.0000E-06	85.62	171.24	0.00E+00	8.56E-05	1.71E-04	0.2250	1.267E+12
Co-60	6.0120E-04	85.62	171.24	0.00E+00	5.15E-02	1.03E-01	0.3750	5.378E+11
Cs-134	4.3534E-06	85.62	171.24	0.00E+00	3.73E-04	7.45E-04	0.5750	8.860E+12
Cs-135	3.1549E-05	85.62	171.24	0.00E+00	2.70E-03	5.40E-03	0.8500	4.521E+11
Cs-137	1.3788E+00	85.62	171.24	0.00E+00	1.18E+02	2.36E+02	1.2500	4.436E+11
Eu-154	1.2041E-01	85.62	171.24	0.00E+00	1.03E+01	2.06E+01	1.7500	1.427E+10
Eu-155	6.6451E-03	85.62	171.24	0.00E+00	5.69E-01	1.14E+00	2.2500	2.815E+05
Fe-55	2.9338E-06	85.62	171.24	0.00E+00	2.51E-04	5.02E-04	2.7500	9.525E+04
H-3	2.0075E-03	85.62	171.24	0.00E+00	1.72E-01	3.44E-01	3.5000	2.452E+02
I-129	7.3805E-07	85.62	171.24	0.00E+00	6.32E-05	1.26E-04	5.0000	1.033E+02
Kr-85	3.6301E-02	85.62	171.24	0.00E+00	3.11E+00	6.22E+00	7.0000	1.166E+01
Np-237	1.4977E-06	85.62	171.24	0.00E+00	1.28E-04	2.56E-04	11.0000	1.326E+00
Pa-231	1.1275E-08	85.62	171.24	0.00E+00	9.65E-07	1.93E-06		
Pb-210	3.8932E-13	85.62	171.24	0.00E+00	3.33E-11	6.67E-11		
Pm-147	7.5383E-04	85.62	171.24	0.00E+00	6.45E-02	1.29E-01		
Pu-238	1.0668E-03	85.62	171.24	0.00E+00	9.13E-02	1.83E-01		
Pu-239	5.6902E-03	85.62	171.24	0.00E+00	4.87E-01	9.74E-01		
Pu-240	2.2571E-03	85.62	171.24	0.00E+00	1.93E-01	3.87E-01		
Pu-241	2.9699E-02	85.62	171.24	0.00E+00	2.54E+00	5.09E+00		
Pu-242	3.0602E-07	85.62	171.24	0.00E+00	2.62E-05	5.24E-05		
Ra-226	1.0704E-12	85.62	171.24	0.00E+00	9.16E-11	1.83E-10		
Ra-228	2.3654E-10	85.62	171.24	0.00E+00	2.03E-08	4.05E-08		
Ru-106	1.0444E-10	85.62	171.24	0.00E+00	8.94E-09	1.79E-08		
Se-79	1.2934E-05	85.62	171.24	0.00E+00	1.11E-03	2.21E-03		
Sn-126	1.2236E-05	85.62	171.24	0.00E+00	1.05E-03	2.10E-03		
Sr-90	1.2740E+00	85.62	171.24	0.00E+00	1.09E+02	2.18E+02		
Tc-99	4.4120E-04	85.62	171.24	0.00E+00	3.78E-02	7.56E-02		
Th-229	6.4226E-10	85.62	171.24	0.00E+00	5.50E-08	1.10E-07		
Th-230	1.0594E-10	85.62	171.24	0.00E+00	9.07E-09	1.81E-08		
Th-232	2.3744E-10	85.62	171.24	0.00E+00	2.03E-08	4.07E-08		
Tl-208	1.5774E-08	85.62	171.24	0.00E+00	1.35E-06	2.70E-06		
U-232	4.2511E-08	85.62	171.24	0.00E+00	3.64E-06	7.28E-06		
U-233	1.3155E-07	85.62	171.24	0.00E+00	1.13E-05	2.25E-05		
U-234	3.0030E-07	85.62	171.24	0.00E+00	2.57E-05	5.14E-05		
U-235	-2.6144E-06	85.62	0.00	5.52E-03	5.29E-03	5.52E-03		
U-236	1.2720E-05	85.62	171.24	0.00E+00	1.09E-03	2.18E-03		
U-238	-3.8857E-08	85.62	0.00	3.43E-03	3.43E-03	3.43E-03		
Y-90	1.2744E+00	85.62	171.24	0.00E+00	1.09E+02	2.18E+02		
Other Radionuclides					1.30E+02	2.61E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.44E+00	2.88E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	62.20	85.62	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		171.24	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.18	1.38
Bounding:	0.36	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD (ALUM) USGS
SNF ID #: 267
Fuel Units & Descr: 222 - ELEMENT
Heavy Metal Mass: BOL=42.224kg; EOL=41.292kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 2.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	889.99	1,779.99	0.00E+00	7.18E-07	1.44E-06	Avg. MeV	
Am-241	2.2586E-03	889.99	1,779.99	0.00E+00	2.01E+00	4.02E+00	0.0150	3.012E+14
Am-242m	1.9925E-06	889.99	1,779.99	0.00E+00	1.77E-03	3.55E-03	0.0250	6.539E+13
Am-243	2.3323E-07	889.99	1,779.99	0.00E+00	2.08E-04	4.15E-04	0.0375	8.145E+13
C-14	4.3308E-05	889.99	1,779.99	0.00E+00	3.85E-02	7.71E-02	0.0575	6.244E+13
Cl-36	4.3023E-08	889.99	1,779.99	0.00E+00	3.83E-05	7.66E-05	0.0850	4.371E+13
Cm-243	2.7429E-07	889.99	1,779.99	0.00E+00	2.44E-04	4.88E-04	0.1250	6.537E+13
Cm-244	3.1504E-06	889.99	1,779.99	0.00E+00	2.80E-03	5.61E-03	0.2250	3.649E+13
Co-60	3.1008E-02	889.99	1,779.99	0.00E+00	2.76E+01	5.52E+01	0.3750	1.624E+13
Cs-134	1.0367E-01	889.99	1,779.99	0.00E+00	9.23E+01	1.85E+02	0.5750	2.059E+14
Cs-135	3.1549E-05	889.99	1,779.99	0.00E+00	2.81E-02	5.62E-02	0.8500	5.068E+13
Cs-137	2.7564E+00	889.99	1,779.99	0.00E+00	2.45E+03	4.91E+03	1.2500	5.253E+13
Eu-154	1.3490E+00	889.99	1,779.99	0.00E+00	1.20E+03	2.40E+03	1.7500	1.503E+12
Eu-155	4.3880E-01	889.99	1,779.99	0.00E+00	3.91E+02	7.81E+02	2.2500	1.827E+11
Fe-55	8.6782E-03	889.99	1,779.99	0.00E+00	7.72E+00	1.54E+01	2.7500	1.484E+09
H-3	1.0805E-02	889.99	1,779.99	0.00E+00	9.62E+00	1.92E+01	3.5000	1.735E+08
I-129	7.3805E-07	889.99	1,779.99	0.00E+00	6.57E-04	1.31E-03	5.0000	1.042E+03
Kr-85	2.5218E-01	889.99	1,779.99	0.00E+00	2.24E+02	4.49E+02	7.0000	1.179E+02
Np-237	1.4463E-06	889.99	1,779.99	0.00E+00	1.29E-03	2.57E-03	11.0000	1.343E+01
Pa-231	3.5970E-09	889.99	1,779.99	0.00E+00	3.20E-06	6.40E-06		
Pb-210	8.2511E-15	889.99	1,779.99	0.00E+00	7.34E-12	1.47E-11		
Pm-147	2.0767E+00	889.99	1,779.99	0.00E+00	1.85E+03	3.70E+03		
Pu-238	1.3514E-03	889.99	1,779.99	0.00E+00	1.20E+00	2.41E+00		
Pu-239	5.6947E-03	889.99	1,779.99	0.00E+00	5.07E+00	1.01E+01		
Pu-240	2.2647E-03	889.99	1,779.99	0.00E+00	2.02E+00	4.03E+00		
Pu-241	1.2574E-01	889.99	1,779.99	0.00E+00	1.12E+02	2.24E+02		
Pu-242	3.0602E-07	889.99	1,779.99	0.00E+00	2.72E-04	5.45E-04		
Ra-226	5.7353E-14	889.99	1,779.99	0.00E+00	5.10E-11	1.02E-10		
Ra-228	1.8150E-10	889.99	1,779.99	0.00E+00	1.62E-07	3.23E-07		
Ru-106	9.3744E-02	889.99	1,779.99	0.00E+00	8.34E+01	1.67E+02		
Se-79	1.2938E-05	889.99	1,779.99	0.00E+00	1.15E-02	2.30E-02		
Sn-126	1.2239E-05	889.99	1,779.99	0.00E+00	1.09E-02	2.18E-02		
Sr-90	2.6000E+00	889.99	1,779.99	0.00E+00	2.31E+03	4.63E+03		
Tc-99	4.4120E-04	889.99	1,779.99	0.00E+00	3.93E-01	7.85E-01		
Th-229	1.4749E-10	889.99	1,779.99	0.00E+00	1.31E-07	2.63E-07		
Th-230	1.9549E-11	889.99	1,779.99	0.00E+00	1.74E-08	3.48E-08		
Th-232	2.3744E-10	889.99	1,779.99	0.00E+00	2.11E-07	4.23E-07		
Tl-208	1.9459E-06	889.99	1,779.99	0.00E+00	1.73E-05	3.46E-05		
U-232	5.6015E-06	889.99	1,779.99	0.00E+00	4.99E-05	9.97E-05		
U-233	1.3132E-07	889.99	1,779.99	0.00E+00	1.17E-04	2.34E-04		
U-234	1.7323E-07	889.99	1,779.99	0.00E+00	1.54E-04	3.08E-04		
U-235	-2.6159E-06	889.99	0.00	1.82E-02	1.58E-02	1.82E-02		
U-236	1.2717E-05	889.99	1,779.99	0.00E+00	1.13E-02	2.26E-02		
U-238	-3.8857E-06	889.99	0.00	1.14E-02	1.13E-02	1.14E-02		
Y-90	2.6015E+00	889.99	1,779.99	0.00E+00	2.32E+03	4.63E+03		
Other Radionuclides					3.38E+03	6.77E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.47E+01	8.94E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	102.86	889.99	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,779.99	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.57	8.65	1.00
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: TRIGA STD (ALUM) ZAIRE
SNF ID #: 487
Fuel Units & Descr: 56 - ELEMENT
Heavy Metal Mass: BOL=10.08kg; EOL=10.052kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.50

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	8.0632E-10	147.36	294.72	0.00E+00	1.19E-07	2.38E-07
Am-241	2.2586E-03	147.36	294.72	0.00E+00	3.33E-01	6.66E-01
Am-242m	1.9925E-06	147.36	294.72	0.00E+00	2.94E-04	5.87E-04
Am-243	2.3323E-07	147.36	294.72	0.00E+00	3.44E-05	6.87E-05
C-14	4.3308E-05	147.36	294.72	0.00E+00	6.38E-03	1.28E-02
Cl-36	4.3023E-08	147.36	294.72	0.00E+00	6.34E-06	1.27E-05
Cm-243	2.7429E-07	147.36	294.72	0.00E+00	4.04E-05	8.08E-05
Cm-244	3.1504E-06	147.36	294.72	0.00E+00	4.64E-04	9.28E-04
Co-60	3.1008E-02	147.36	294.72	0.00E+00	4.57E+00	9.14E+00
Cs-134	1.0367E-01	147.36	294.72	0.00E+00	1.53E+01	3.06E+01
Cs-135	3.1549E-05	147.36	294.72	0.00E+00	4.65E-03	9.30E-03
Cs-137	2.7564E+00	147.36	294.72	0.00E+00	4.06E+02	8.12E+02
Eu-154	1.3490E+00	147.36	294.72	0.00E+00	1.99E+02	3.98E+02
Eu-155	4.3880E-01	147.36	294.72	0.00E+00	6.47E+01	1.29E+02
Fe-55	8.6782E-03	147.36	294.72	0.00E+00	1.28E+00	2.56E+00
H-3	1.0805E-02	147.36	294.72	0.00E+00	1.59E+00	3.18E+00
I-129	7.3805E-07	147.36	294.72	0.00E+00	1.09E-04	2.18E-04
Kr-85	2.5218E-01	147.36	294.72	0.00E+00	3.72E+01	7.43E+01
Np-237	1.4463E-06	147.36	294.72	0.00E+00	2.13E-04	4.26E-04
Pa-231	3.5970E-09	147.36	294.72	0.00E+00	5.30E-07	1.06E-06
Pb-210	8.2511E-15	147.36	294.72	0.00E+00	1.22E-12	2.43E-12
Pm-147	2.0767E+00	147.36	294.72	0.00E+00	3.06E+02	6.12E+02
Pu-238	1.3514E-03	147.36	294.72	0.00E+00	1.99E-01	3.98E-01
Pu-239	5.6947E-03	147.36	294.72	0.00E+00	8.39E-01	1.68E+00
Pu-240	2.2647E-03	147.36	294.72	0.00E+00	3.34E-01	6.67E-01
Pu-241	1.2574E-01	147.36	294.72	0.00E+00	1.85E+01	3.71E+01
Pu-242	3.0602E-07	147.36	294.72	0.00E+00	4.51E-05	9.02E-05
Ra-226	5.7353E-14	147.36	294.72	0.00E+00	8.45E-12	1.69E-11
Ra-228	1.8150E-10	147.36	294.72	0.00E+00	2.67E-08	5.35E-08
Ru-106	9.3744E-02	147.36	294.72	0.00E+00	1.38E+01	2.76E+01
Se-79	1.2938E-05	147.36	294.72	0.00E+00	1.91E-03	3.81E-03
Sn-126	1.2239E-05	147.36	294.72	0.00E+00	1.80E-03	3.61E-03
Sr-90	2.6000E+00	147.36	294.72	0.00E+00	3.83E+02	7.66E+02
Tc-99	4.4120E-04	147.36	294.72	0.00E+00	6.50E-02	1.30E-01
Th-229	1.4749E-10	147.36	294.72	0.00E+00	2.17E-08	4.35E-08
Th-230	1.9549E-11	147.36	294.72	0.00E+00	2.88E-09	5.76E-09
Th-232	2.3744E-10	147.36	294.72	0.00E+00	3.50E-08	7.00E-08
Tl-208	1.9459E-08	147.36	294.72	0.00E+00	2.87E-06	5.73E-06
U-232	5.6015E-06	147.36	294.72	0.00E+00	8.25E-06	1.65E-05
U-233	1.3132E-07	147.36	294.72	0.00E+00	1.94E-05	3.87E-05
U-234	1.7323E-07	147.36	294.72	0.00E+00	2.55E-05	5.11E-05
U-235	-2.6159E-06	147.36	0.00	4.36E-03	3.97E-03	4.36E-03
U-236	1.2717E-05	147.36	294.72	0.00E+00	1.87E-03	3.75E-03
U-238	-3.8857E-08	147.36	0.00	2.71E-03	2.70E-03	2.71E-03
Y-90	2.6015E+00	147.36	294.72	0.00E+00	3.83E+02	7.67E+02
Other Radionuclides					5.60E+02	1.12E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.967E+13
0.0250	1.083E+13
0.0375	1.349E+13
0.0575	1.034E+13
0.0850	7.237E+12
0.1250	1.082E+13
0.2250	6.041E+12
0.3750	2.689E+12
0.5750	3.409E+13
0.8500	8.391E+12
1.2500	8.898E+12
1.7500	2.489E+11
2.2500	3.026E+10
2.7500	2.458E+08
3.5000	2.873E+07
5.0000	1.744E+02
7.0000	1.975E+01
11.0000	2.250E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.40E+00	1.48E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	147.36	26.73	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		294.72	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.40	0.18	0.99
Bounding:	0.79		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 12/20 ROMANIA
SNF ID #: 1078
Fuel Units & Descr: 498 - ELEMENT
Heavy Metal Mass: BOL=124.5kg; EOL=121.462kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' 4.49

II. Estimates

	m	x_a	x_b	b	y_a	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	2,899.91	5,799.81	0.00E+00	2.47E-06	4.94E-06
Am-241	1.8331E-03	2,899.91	5,799.81	0.00E+00	5.32E+00	1.06E+01
Am-242m	1.4129E-06	2,899.91	5,799.81	0.00E+00	4.10E-03	8.19E-03
Am-243	1.4774E-07	2,899.91	5,799.81	0.00E+00	4.28E-04	8.57E-04
C-14	1.2871E-04	2,899.91	5,799.81	0.00E+00	3.73E-01	7.46E-01
Cl-36	2.8120E-06	2,899.91	5,799.81	0.00E+00	8.15E-03	1.63E-02
Cm-243	1.7940E-07	2,899.91	5,799.81	0.00E+00	5.20E-04	1.04E-03
Cm-244	1.6962E-06	2,899.91	5,799.81	0.00E+00	4.92E-03	9.84E-03
Co-60	1.2839E+00	2,899.91	5,799.81	0.00E+00	3.72E+03	7.45E+03
Cs-134	9.0541E-02	2,899.91	5,799.81	0.00E+00	2.63E+02	5.25E+02
Cs-135	3.2195E-05	2,899.91	5,799.81	0.00E+00	9.34E-02	1.87E-01
Cs-137	2.7564E+00	2,899.91	5,799.81	0.00E+00	7.99E+03	1.60E+04
Eu-154	1.5368E-02	2,899.91	5,799.81	0.00E+00	4.46E+01	8.91E+01
Eu-155	2.9293E-02	2,899.91	5,799.81	0.00E+00	8.49E+01	1.70E+02
Fe-55	7.7158E-01	2,899.91	5,799.81	0.00E+00	2.24E+03	4.48E+03
H-3	1.1111E-02	2,899.91	5,799.81	0.00E+00	3.22E+01	6.44E+01
I-129	7.3684E-07	2,899.91	5,799.81	0.00E+00	2.14E-03	4.27E-03
Kr-85	2.5263E-01	2,899.91	5,799.81	0.00E+00	7.33E+02	1.47E+03
Np-237	1.2427E-06	2,899.91	5,799.81	0.00E+00	3.60E-03	7.21E-03
Pa-231	3.8511E-09	2,899.91	5,799.81	0.00E+00	1.12E-05	2.23E-05
Pb-210	7.3880E-15	2,899.91	5,799.81	0.00E+00	2.14E-11	4.28E-11
Pm-147	2.1023E+00	2,899.91	5,799.81	0.00E+00	6.10E+03	1.22E+04
Pu-238	1.0383E-03	2,899.91	5,799.81	0.00E+00	3.01E+00	6.02E+00
Pu-239	5.5293E-03	2,899.91	5,799.81	0.00E+00	1.60E+01	3.21E+01
Pu-240	2.1278E-03	2,899.91	5,799.81	0.00E+00	6.17E+00	1.23E+01
Pu-241	1.0195E-01	2,899.91	5,799.81	0.00E+00	2.96E+02	5.91E+02
Pu-242	2.3128E-07	2,899.91	5,799.81	0.00E+00	6.71E-04	1.34E-03
Ra-226	5.2782E-14	2,899.91	5,799.81	0.00E+00	1.53E-10	3.06E-10
Ra-228	1.9338E-10	2,899.91	5,799.81	0.00E+00	5.61E-07	1.12E-06
Ru-106	9.1684E-02	2,899.91	5,799.81	0.00E+00	2.66E+02	5.32E+02
Se-79	1.3018E-05	2,899.91	5,799.81	0.00E+00	3.78E-02	7.55E-02
Sn-126	1.2167E-05	2,899.91	5,799.81	0.00E+00	3.53E-02	7.06E-02
Sr-90	2.6045E+00	2,899.91	5,799.81	0.00E+00	7.55E+03	1.51E+04
Tc-99	4.4241E-04	2,899.91	5,799.81	0.00E+00	1.28E+00	2.57E+00
Th-229	1.3713E-10	2,899.91	5,799.81	0.00E+00	3.98E-07	7.95E-07
Th-230	1.8090E-11	2,899.91	5,799.81	0.00E+00	5.25E-08	1.05E-07
Th-232	2.5278E-10	2,899.91	5,799.81	0.00E+00	7.33E-07	1.47E-06
Tl-208	1.6947E-08	2,899.91	5,799.81	0.00E+00	4.91E-05	9.83E-05
U-232	4.8737E-08	2,899.91	5,799.81	0.00E+00	1.41E-04	2.83E-04
U-233	1.2203E-07	2,899.91	5,799.81	0.00E+00	3.54E-04	7.08E-04
U-234	1.5925E-07	2,899.91	5,799.81	0.00E+00	4.62E-04	9.24E-04
U-235	-2.6194E-06	2,899.91	0.00	5.35E-02	4.59E-02	5.35E-02
U-236	1.2693E-05	2,899.91	5,799.81	0.00E+00	3.68E-02	7.36E-02
U-238	-3.6331E-08	2,899.91	0.00	3.35E-02	3.34E-02	3.35E-02
Y-90	2.6060E+00	2,899.91	5,799.81	0.00E+00	7.56E+03	1.51E+04
Other Radionuclides					1.05E+04	2.09E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.374E+14
0.0250	2.063E+14
0.0375	1.757E+14
0.0575	1.803E+14
0.0850	1.117E+14
0.1250	8.111E+13
0.2250	9.475E+13
0.3750	4.808E+13
0.5750	6.392E+14
0.8500	2.744E+13
1.2500	5.572E+14
1.7500	3.714E+11
2.2500	5.966E+11
2.7500	4.751E+09
3.5000	5.529E+08
5.0000	3.117E+03
7.0000	3.529E+02
11.0000	4.021E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.69E+02	3.38E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	1,213.38	2,899.91	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		5,799.81	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.68	2.39
Bounding:	1.37	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 20/20 (IFE) ENGLAND
SNF ID #: 1043
Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass: BOL=0.376kg; EOL=0.367kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
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

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	10.63	21.27	0.00E+00	9.06E-09	1.81E-08	Avg. MeV	
Am-241	1.8331E-03	10.63	21.27	0.00E+00	1.95E-02	3.90E-02	0.0150	3.437E+12
Am-242m	1.4129E-06	10.63	21.27	0.00E+00	1.50E-05	3.00E-05	0.0250	7.563E+11
Am-243	1.4774E-07	10.63	21.27	0.00E+00	1.57E-06	3.14E-06	0.0375	6.441E+11
C-14	1.2871E-04	10.63	21.27	0.00E+00	1.37E-03	2.74E-03	0.0575	6.611E+11
Cl-36	2.8120E-06	10.63	21.27	0.00E+00	2.99E-05	5.98E-05	0.0850	4.096E+11
Cm-243	1.7940E-07	10.63	21.27	0.00E+00	1.91E-06	3.82E-06	0.1250	2.974E+11
Cm-244	1.6962E-06	10.63	21.27	0.00E+00	1.80E-05	3.61E-05	0.2250	3.474E+11
Co-60	1.2839E+00	10.63	21.27	0.00E+00	1.37E+01	2.73E+01	0.3750	1.763E+11
Cs-134	9.0541E-02	10.63	21.27	0.00E+00	9.63E-01	1.93E+00	0.5750	2.344E+12
Cs-135	3.2195E-05	10.63	21.27	0.00E+00	3.42E-04	6.85E-04	0.8500	1.006E+11
Cs-137	2.7564E+00	10.63	21.27	0.00E+00	2.93E+01	5.86E+01	1.2500	2.043E+12
Eu-154	1.5368E-02	10.63	21.27	0.00E+00	1.63E-01	3.27E-01	1.7500	1.362E+09
Eu-155	2.9293E-02	10.63	21.27	0.00E+00	3.11E-01	6.23E-01	2.2500	2.195E+09
Fe-55	7.7158E-01	10.63	21.27	0.00E+00	8.20E+00	1.64E+01	2.7500	1.742E+07
H-3	1.1111E-02	10.63	21.27	0.00E+00	1.18E-01	2.36E-01	3.5000	2.027E+06
I-129	7.3684E-07	10.63	21.27	0.00E+00	7.84E-06	1.57E-05	5.0000	1.138E+01
Kr-85	2.5263E-01	10.63	21.27	0.00E+00	2.69E+00	5.37E+00	7.0000	1.288E+00
Np-237	1.2427E-06	10.63	21.27	0.00E+00	1.32E-05	2.64E-05	11.0000	1.468E-01
Pa-231	3.8511E-09	10.63	21.27	0.00E+00	4.10E-08	8.19E-08		
Pb-210	7.3880E-15	10.63	21.27	0.00E+00	7.86E-14	1.57E-13		
Pm-147	2.1023E+00	10.63	21.27	0.00E+00	2.24E+01	4.47E+01		
Pu-238	1.0383E-03	10.63	21.27	0.00E+00	1.10E-02	2.21E-02		
Pu-239	5.5293E-03	10.63	21.27	0.00E+00	5.88E-02	1.18E-01		
Pu-240	2.1278E-03	10.63	21.27	0.00E+00	2.26E-02	4.53E-02		
Pu-241	1.0195E-01	10.63	21.27	0.00E+00	1.08E+00	2.17E+00		
Pu-242	2.3128E-07	10.63	21.27	0.00E+00	2.46E-06	4.92E-06		
Ra-226	5.2782E-14	10.63	21.27	0.00E+00	5.61E-13	1.12E-12		
Ra-228	1.9338E-10	10.63	21.27	0.00E+00	2.06E-09	4.11E-09		
Ru-106	9.1684E-02	10.63	21.27	0.00E+00	9.75E-01	1.95E+00		
Se-79	1.3018E-05	10.63	21.27	0.00E+00	1.38E-04	2.77E-04		
Sn-126	1.2167E-05	10.63	21.27	0.00E+00	1.29E-04	2.59E-04		
Sr-90	2.6045E+00	10.63	21.27	0.00E+00	2.77E+01	5.54E+01		
Tc-99	4.4241E-04	10.63	21.27	0.00E+00	4.70E-03	9.41E-03		
Th-229	1.3713E-10	10.63	21.27	0.00E+00	1.46E-09	2.92E-09		
Th-230	1.8090E-11	10.63	21.27	0.00E+00	1.92E-10	3.85E-10		
Th-232	2.5278E-10	10.63	21.27	0.00E+00	2.69E-09	5.38E-09		
Tl-208	1.6947E-08	10.63	21.27	0.00E+00	1.80E-07	3.60E-07		
U-232	4.8737E-08	10.63	21.27	0.00E+00	5.18E-07	1.04E-06		
U-233	1.2203E-07	10.63	21.27	0.00E+00	1.30E-06	2.60E-06		
U-234	1.5925E-07	10.63	21.27	0.00E+00	1.69E-06	3.39E-06		
U-235	-2.6194E-06	10.63	0.00	1.62E-04	1.34E-04	1.62E-04		
U-236	1.2693E-05	10.63	21.27	0.00E+00	1.35E-04	2.70E-04		
U-238	-3.6331E-08	10.63	0.00	1.01E-04	1.01E-04	1.01E-04		
Y-90	2.6060E+00	10.63	21.27	0.00E+00	2.77E+01	5.54E+01		
Other Radionuclides					3.83E+01	7.67E+01		

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.94680851	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	10.63	6.97	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		21.27	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.63	0.84	1.00
Bounding:	1.66		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 20/20 ARRR
SNF ID #: 780
Fuel Units & Descr: 15 - ELEMENT
Heavy Metal Mass: BOL=10.275kg; EOL=8.179kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.14

II. Estimates

Radionuclide	i Ci/MWd From Template	m Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	2,000.38	4,000.76	0.00E+00	1.70E-06	3.41E-06
Am-241	1.8331E-03	2,000.38	4,000.76	0.00E+00	3.67E+00	7.33E+00
Am-242m	1.4129E-06	2,000.38	4,000.76	0.00E+00	2.83E-03	5.65E-03
Am-243	1.4774E-07	2,000.38	4,000.76	0.00E+00	2.96E-04	5.91E-04
C-14	1.2871E-04	2,000.38	4,000.76	0.00E+00	2.57E-01	5.15E-01
Cl-36	2.8120E-06	2,000.38	4,000.76	0.00E+00	5.63E-03	1.13E-02
Cm-243	1.7940E-07	2,000.38	4,000.76	0.00E+00	3.59E-04	7.18E-04
Cm-244	1.6962E-06	2,000.38	4,000.76	0.00E+00	3.39E-03	6.79E-03
Co-60	1.2839E+00	2,000.38	4,000.76	0.00E+00	2.57E+03	5.14E+03
Cs-134	9.0541E-02	2,000.38	4,000.76	0.00E+00	1.81E+02	3.62E+02
Cs-135	3.2195E-05	2,000.38	4,000.76	0.00E+00	6.44E-02	1.29E-01
Cs-137	2.7564E+00	2,000.38	4,000.76	0.00E+00	5.51E+03	1.10E+04
Eu-154	1.5368E-02	2,000.38	4,000.76	0.00E+00	3.07E+01	6.15E+01
Eu-155	2.9293E-02	2,000.38	4,000.76	0.00E+00	5.86E+01	1.17E+02
Fe-55	7.7158E-01	2,000.38	4,000.76	0.00E+00	1.54E+03	3.09E+03
H-3	1.1111E-02	2,000.38	4,000.76	0.00E+00	2.22E+01	4.45E+01
I-129	7.3684E-07	2,000.38	4,000.76	0.00E+00	1.47E-03	2.95E-03
Kr-85	2.5263E-01	2,000.38	4,000.76	0.00E+00	5.05E+02	1.01E+03
Np-237	1.2427E-06	2,000.38	4,000.76	0.00E+00	2.49E-03	4.97E-03
Pa-231	3.8511E-09	2,000.38	4,000.76	0.00E+00	7.70E-06	1.54E-05
Pb-210	7.3880E-15	2,000.38	4,000.76	0.00E+00	1.48E-11	2.96E-11
Pm-147	2.1023E+00	2,000.38	4,000.76	0.00E+00	4.21E+03	8.41E+03
Pu-238	1.0383E-03	2,000.38	4,000.76	0.00E+00	2.08E+00	4.15E+00
Pu-239	5.5293E-03	2,000.38	4,000.76	0.00E+00	1.11E+01	2.21E+01
Pu-240	2.1278E-03	2,000.38	4,000.76	0.00E+00	4.26E+00	8.51E+00
Pu-241	1.0195E-01	2,000.38	4,000.76	0.00E+00	2.04E+02	4.08E+02
Pu-242	2.3128E-07	2,000.38	4,000.76	0.00E+00	4.63E-04	9.25E-04
Ra-226	5.2782E-14	2,000.38	4,000.76	0.00E+00	1.06E-10	2.11E-10
Ra-228	1.9338E-10	2,000.38	4,000.76	0.00E+00	3.87E-07	7.74E-07
Ru-106	9.1684E-02	2,000.38	4,000.76	0.00E+00	1.83E+02	3.67E+02
Se-79	1.3018E-05	2,000.38	4,000.76	0.00E+00	2.60E-02	5.21E-02
Sn-126	1.2167E-05	2,000.38	4,000.76	0.00E+00	2.43E-02	4.87E-02
Sr-90	2.6045E+00	2,000.38	4,000.76	0.00E+00	5.21E+03	1.04E+04
Tc-99	4.4241E-04	2,000.38	4,000.76	0.00E+00	8.85E-01	1.77E+00
Th-229	1.3713E-10	2,000.38	4,000.76	0.00E+00	2.74E-07	5.49E-07
Th-230	1.8090E-11	2,000.38	4,000.76	0.00E+00	3.62E-08	7.24E-08
Th-232	2.5278E-10	2,000.38	4,000.76	0.00E+00	5.06E-07	1.01E-06
Tl-208	1.6947E-06	2,000.38	4,000.76	0.00E+00	3.39E-05	6.78E-05
U-232	4.8737E-06	2,000.38	4,000.76	0.00E+00	9.75E-05	1.95E-04
U-233	1.2203E-07	2,000.38	4,000.76	0.00E+00	2.44E-04	4.88E-04
U-234	1.5925E-07	2,000.38	4,000.76	0.00E+00	3.19E-04	6.37E-04
U-235	-2.6194E-06	2,000.38	0.00	4.36E-03	0.00E+00	4.36E-03
U-236	1.2693E-05	2,000.38	4,000.76	0.00E+00	2.54E-02	5.08E-02
U-238	-3.6331E-06	2,000.38	0.00	2.77E-03	2.70E-03	2.77E-03
Y-90	2.6060E+00	2,000.38	4,000.76	0.00E+00	5.21E+03	1.04E+04
Other Radionuclides					7.21E+03	1.44E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.466E+14
0.0250	1.423E+14
0.0375	1.212E+14
0.0575	1.244E+14
0.0850	7.705E+13
0.1250	5.595E+13
0.2250	6.536E+13
0.3750	3.317E+13
0.5750	4.410E+14
0.8500	1.893E+13
1.2500	3.843E+14
1.7500	2.562E+11
2.2500	4.129E+11
2.7500	3.277E+09
3.5000	3.814E+08
5.0000	2.103E+03
7.0000	2.390E+02
11.0000	2.711E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.16E+02	2.33E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.64963504	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	581.16	2,000.38	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		4,000.76	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	5.71	3.44	1.06
Bounding:	11.42		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 20/20 MNRC
SNF ID #: 1053
Fuel Units & Descr: 8 - ELEMENT
Heavy Metal Mass: BOL=3.962kg; EOL=3.962kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.07

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.2427E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pa-231	3.8511E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pb-210	7.3880E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pm-147	2.1023E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-238	1.0383E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-239	5.5293E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-240	2.1278E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-241	1.0195E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-242	2.3128E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ra-226	5.2782E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ra-228	1.9338E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ru-106	9.1684E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Se-79	1.3018E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Sn-126	1.2167E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Sr-90	2.6045E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Tc-99	4.4241E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-229	1.3713E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-230	1.8090E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-232	2.5278E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Tl-208	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-232	4.8737E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-233	1.2203E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-234	1.5925E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-235	-2.6194E-06	0.00	0.00	1.69E-03	1.69E-03	1.69E-03
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-238	-3.6331E-08	0.00	0.00	1.07E-03	1.07E-03	1.07E-03
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Other Radionuclides					0.00E+00	0.00E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.193E+07
0.0250	0.000E+00
0.0375	5.713E+04
0.0575	3.498E+04
0.0850	4.881E+06
0.1250	9.636E+06
0.2250	3.410E+07
0.3750	8.510E+04
0.5750	4.186E+03
0.8500	6.537E+02
1.2500	3.906E+01
1.7500	1.911E+01
2.2500	1.107E+01
2.7500	6.433E+00
3.5000	5.751E+00
5.0000	2.471E+00
7.0000	2.844E-01
11.0000	3.270E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.14E-05	7.14E-05
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.74990819	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.00	
Bounding:		

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 20/20 MNRC
SNF ID #: 1054
Fuel Units & Descr: 84 - ELEMENT
Heavy Metal Mass: BOL=41.605kg; EOL=40.555kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000196
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.76

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	1,002.34	2,004.68	0.00E+00	8.54E-07	1.71E-06
Am-241	1.8331E-03	1,002.34	2,004.68	0.00E+00	1.84E+00	3.67E+00
Am-242m	1.4129E-06	1,002.34	2,004.68	0.00E+00	1.42E-03	2.83E-03
Am-243	1.4774E-07	1,002.34	2,004.68	0.00E+00	1.48E-04	2.96E-04
C-14	1.2871E-04	1,002.34	2,004.68	0.00E+00	1.29E-01	2.58E-01
Cl-36	2.8120E-06	1,002.34	2,004.68	0.00E+00	2.82E-03	5.64E-03
Cm-243	1.7940E-07	1,002.34	2,004.68	0.00E+00	1.80E-04	3.60E-04
Cm-244	1.6962E-06	1,002.34	2,004.68	0.00E+00	1.70E-03	3.40E-03
Co-60	1.2839E+00	1,002.34	2,004.68	0.00E+00	1.29E+03	2.57E+03
Cs-134	9.0541E-02	1,002.34	2,004.68	0.00E+00	9.08E+01	1.82E+02
Cs-135	3.2195E-05	1,002.34	2,004.68	0.00E+00	3.23E-02	6.45E-02
Cs-137	2.7564E+00	1,002.34	2,004.68	0.00E+00	2.76E+03	5.53E+03
Eu-154	1.5368E-02	1,002.34	2,004.68	0.00E+00	1.54E+01	3.08E+01
Eu-155	2.9293E-02	1,002.34	2,004.68	0.00E+00	2.94E+01	5.87E+01
Fe-55	7.7158E-01	1,002.34	2,004.68	0.00E+00	7.73E+02	1.55E+03
H-3	1.1111E-02	1,002.34	2,004.68	0.00E+00	1.11E+01	2.23E+01
I-129	7.3684E-07	1,002.34	2,004.68	0.00E+00	7.39E-04	1.48E-03
Kr-85	2.5263E-01	1,002.34	2,004.68	0.00E+00	2.53E+02	5.06E+02
Np-237	1.2427E-06	1,002.34	2,004.68	0.00E+00	1.25E-03	2.49E-03
Pa-231	3.8511E-09	1,002.34	2,004.68	0.00E+00	3.86E-06	7.72E-06
Pb-210	7.3880E-15	1,002.34	2,004.68	0.00E+00	7.41E-12	1.48E-11
Pm-147	2.1023E+00	1,002.34	2,004.68	0.00E+00	2.11E+03	4.21E+03
Pu-238	1.0383E-03	1,002.34	2,004.68	0.00E+00	1.04E+00	2.08E+00
Pu-239	5.5293E-03	1,002.34	2,004.68	0.00E+00	5.54E+00	1.11E+01
Pu-240	2.1278E-03	1,002.34	2,004.68	0.00E+00	2.13E+00	4.27E+00
Pu-241	1.0195E-01	1,002.34	2,004.68	0.00E+00	1.02E+02	2.04E+02
Pu-242	2.3128E-07	1,002.34	2,004.68	0.00E+00	2.32E-04	4.64E-04
Ra-226	5.2782E-14	1,002.34	2,004.68	0.00E+00	5.29E-11	1.06E-10
Ra-228	1.9338E-10	1,002.34	2,004.68	0.00E+00	1.94E-07	3.88E-07
Ru-106	9.1684E-02	1,002.34	2,004.68	0.00E+00	9.19E+01	1.84E+02
Se-79	1.3018E-05	1,002.34	2,004.68	0.00E+00	1.30E-02	2.61E-02
Sn-126	1.2167E-05	1,002.34	2,004.68	0.00E+00	1.22E-02	2.44E-02
Sr-90	2.6045E+00	1,002.34	2,004.68	0.00E+00	2.61E+03	5.22E+03
Tc-99	4.4241E-04	1,002.34	2,004.68	0.00E+00	4.43E-01	8.87E-01
Th-229	1.3713E-10	1,002.34	2,004.68	0.00E+00	1.37E-07	2.75E-07
Th-230	1.8090E-11	1,002.34	2,004.68	0.00E+00	1.81E-08	3.63E-08
Th-232	2.5278E-10	1,002.34	2,004.68	0.00E+00	2.53E-07	5.07E-07
Tl-208	1.6947E-06	1,002.34	2,004.68	0.00E+00	1.70E-05	3.40E-05
U-232	4.8737E-08	1,002.34	2,004.68	0.00E+00	4.89E-05	9.77E-05
U-233	1.2203E-07	1,002.34	2,004.68	0.00E+00	1.22E-04	2.45E-04
U-234	1.5925E-07	1,002.34	2,004.68	0.00E+00	1.60E-04	3.19E-04
U-235	-2.6194E-06	1,002.34	0.00	1.78E-02	1.51E-02	1.78E-02
U-238	1.2693E-05	1,002.34	2,004.68	0.00E+00	1.27E-02	2.54E-02
U-238	-3.6331E-08	1,002.34	0.00	1.12E-02	1.12E-02	1.12E-02
Y-90	2.6060E+00	1,002.34	2,004.68	0.00E+00	2.61E+03	5.22E+03
Other Radionuclides					3.61E+03	7.23E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.240E+14
0.0250	7.129E+13
0.0375	6.071E+13
0.0575	6.232E+13
0.0850	3.861E+13
0.1250	2.804E+13
0.2250	3.275E+13
0.3750	1.662E+13
0.5750	2.210E+14
0.8500	9.483E+12
1.2500	1.926E+14
1.7500	1.284E+11
2.2500	2.069E+11
2.7500	1.642E+09
3.5000	1.911E+08
5.0000	1.077E+03
7.0000	1.219E+02
11.0000	1.389E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.83E+01	1.17E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.74990819	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	784.42	1,002.34
Bounding:		2,004.68

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:	0.71	1.28
Bounding:	1.41	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 20/20 SOLVENIA
SNF ID #: 731
Fuel Units & Descr: 10 - ELEMENT
Heavy Metal Mass: BOL=4.949kg; EOL=4.754kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 0.09

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	186.62	373.23	0.00E+00	1.59E-07	3.18E-07
Am-241	1.8331E-03	186.62	373.23	0.00E+00	3.42E-01	6.84E-01
Am-242m	1.4129E-06	186.62	373.23	0.00E+00	2.64E-04	5.27E-04
Am-243	1.4774E-07	186.62	373.23	0.00E+00	2.76E-05	5.51E-05
C-14	1.2871E-04	186.62	373.23	0.00E+00	2.40E-02	4.80E-02
Cl-36	2.8120E-06	186.62	373.23	0.00E+00	5.25E-04	1.05E-03
Cm-243	1.7940E-07	186.62	373.23	0.00E+00	3.35E-05	6.70E-05
Cm-244	1.6962E-06	186.62	373.23	0.00E+00	3.17E-04	6.33E-04
Co-60	1.2839E+00	186.62	373.23	0.00E+00	2.40E+02	4.79E+02
Cs-134	9.0541E-02	186.62	373.23	0.00E+00	1.69E+01	3.38E+01
Cs-135	3.2195E-05	186.62	373.23	0.00E+00	6.01E-03	1.20E-02
Cs-137	2.7564E+00	186.62	373.23	0.00E+00	5.14E+02	1.03E+03
Eu-154	1.5368E-02	186.62	373.23	0.00E+00	2.87E+00	5.74E+00
Eu-155	2.9293E-02	186.62	373.23	0.00E+00	5.47E+00	1.09E+01
Fe-55	7.7158E-01	186.62	373.23	0.00E+00	1.44E+02	2.88E+02
H-3	1.1111E-02	186.62	373.23	0.00E+00	2.07E+00	4.15E+00
I-129	7.3684E-07	186.62	373.23	0.00E+00	1.38E-04	2.75E-04
Kr-85	2.5263E-01	186.62	373.23	0.00E+00	4.71E+01	9.43E+01
Np-237	1.2427E-06	186.62	373.23	0.00E+00	2.32E-04	4.64E-04
Pa-231	3.8511E-09	186.62	373.23	0.00E+00	7.19E-07	1.44E-06
Pb-210	7.3880E-15	186.62	373.23	0.00E+00	1.38E-12	2.76E-12
Pm-147	2.1023E+00	186.62	373.23	0.00E+00	3.92E+02	7.85E+02
Pu-238	1.0383E-03	186.62	373.23	0.00E+00	1.94E-01	3.88E-01
Pu-239	5.5293E-03	186.62	373.23	0.00E+00	1.03E+00	2.06E+00
Pu-240	2.1278E-03	186.62	373.23	0.00E+00	3.97E-01	7.94E-01
Pu-241	1.0195E-01	186.62	373.23	0.00E+00	1.90E+01	3.81E+01
Pu-242	2.3128E-07	186.62	373.23	0.00E+00	4.32E-05	8.63E-05
Ra-226	5.2782E-14	186.62	373.23	0.00E+00	9.85E-12	1.97E-11
Ra-228	1.9338E-10	186.62	373.23	0.00E+00	3.61E-08	7.22E-08
Ru-106	9.1684E-02	186.62	373.23	0.00E+00	1.71E+01	3.42E+01
Se-79	1.3018E-05	186.62	373.23	0.00E+00	2.43E-03	4.86E-03
Sn-126	1.2167E-05	186.62	373.23	0.00E+00	2.27E-03	4.54E-03
Sr-90	2.6045E+00	186.62	373.23	0.00E+00	4.86E+02	9.72E+02
Tc-99	4.4241E-04	186.62	373.23	0.00E+00	8.26E-02	1.65E-01
Th-229	1.3713E-10	186.62	373.23	0.00E+00	2.56E-08	5.12E-08
Th-230	1.8090E-11	186.62	373.23	0.00E+00	3.38E-09	6.75E-09
Th-232	2.5278E-10	186.62	373.23	0.00E+00	4.72E-08	9.43E-08
Tl-208	1.6947E-08	186.62	373.23	0.00E+00	3.16E-06	6.33E-06
U-232	4.8737E-08	186.62	373.23	0.00E+00	9.10E-06	1.82E-05
U-233	1.2203E-07	186.62	373.23	0.00E+00	2.28E-05	4.55E-05
U-234	1.5925E-07	186.62	373.23	0.00E+00	2.97E-05	5.94E-05
U-235	-2.6194E-06	186.62	0.00	2.11E-03	1.63E-03	2.11E-03
U-236	1.2693E-05	186.62	373.23	0.00E+00	2.37E-03	4.74E-03
U-238	-3.6331E-08	186.62	0.00	1.33E-03	1.33E-03	1.33E-03
Y-90	2.6060E+00	186.62	373.23	0.00E+00	4.86E+02	9.73E+02
Other Radionuclides					6.73E+02	1.35E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.032E+13
0.0250	1.327E+13
0.0375	1.130E+13
0.0575	1.160E+13
0.0850	7.188E+12
0.1250	5.220E+12
0.2250	6.098E+12
0.3750	3.094E+12
0.5750	4.114E+13
0.8500	1.766E+12
1.2500	3.586E+13
1.7500	2.390E+10
2.2500	3.852E+10
2.7500	3.057E+08
3.5000	3.558E+07
5.0000	1.987E+02
7.0000	2.249E+01
11.0000	2.562E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.09E+01	2.17E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.76747705	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	186.62	186.15	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		373.23	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.11	1.00
Bounding:	2.21	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 30/20
SNF ID #: 995
Fuel Units & Descr: 19 - ELEMENT
Heavy Metal Mass: BOL=16.625kg; EOL=16.433kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10" 0.17

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	183.19	366.38	0.00E+00	1.56E-07	3.12E-07	Avg. MeV	
Am-241	1.8331E-03	183.19	366.38	0.00E+00	3.36E-01	6.72E-01	0.0150	5.922E+13
Am-242m	1.4129E-06	183.19	366.38	0.00E+00	2.59E-04	5.18E-04	0.0250	1.303E+13
Am-243	1.4774E-07	183.19	366.38	0.00E+00	2.71E-05	5.41E-05	0.0375	1.110E+13
C-14	1.2871E-04	183.19	366.38	0.00E+00	2.36E-02	4.72E-02	0.0575	1.139E+13
Cl-36	2.8120E-06	183.19	366.38	0.00E+00	5.15E-04	1.03E-03	0.0850	7.056E+12
Cm-243	1.7940E-07	183.19	366.38	0.00E+00	3.29E-05	6.57E-05	0.1250	5.124E+12
Cm-244	1.6962E-06	183.19	366.38	0.00E+00	3.11E-04	6.21E-04	0.2250	5.986E+12
Co-60	1.2839E+00	183.19	366.38	0.00E+00	2.35E+02	4.70E+02	0.3750	3.038E+12
Cs-134	9.0541E-02	183.19	366.38	0.00E+00	1.66E+01	3.32E+01	0.5750	4.038E+13
Cs-135	3.2195E-05	183.19	366.38	0.00E+00	5.90E-03	1.18E-02	0.8500	1.733E+12
Cs-137	2.7564E+00	183.19	366.38	0.00E+00	5.05E+02	1.01E+03	1.2500	3.520E+13
Eu-154	1.5368E-02	183.19	366.38	0.00E+00	2.82E+00	5.63E+00	1.7500	2.346E+10
Eu-155	2.9293E-02	183.19	366.38	0.00E+00	5.37E+00	1.07E+01	2.2500	3.782E+10
Fe-55	7.7158E-01	183.19	366.38	0.00E+00	1.41E+02	2.83E+02	2.7500	3.001E+08
H-3	1.1111E-02	183.19	366.38	0.00E+00	2.04E+00	4.07E+00	3.5000	3.493E+07
I-129	7.3684E-07	183.19	366.38	0.00E+00	1.35E-04	2.70E-04	5.0000	2.023E+02
Kr-85	2.5263E-01	183.19	366.38	0.00E+00	4.63E+01	9.26E+01	7.0000	2.292E+01
Np-237	1.2427E-06	183.19	366.38	0.00E+00	2.28E-04	4.55E-04	11.0000	2.612E+00
Pa-231	3.8511E-09	183.19	366.38	0.00E+00	7.05E-07	1.41E-06		
Pb-210	7.3880E-15	183.19	366.38	0.00E+00	1.35E-12	2.71E-12		
Pm-147	2.1023E+00	183.19	366.38	0.00E+00	3.85E+02	7.70E+02		
Pu-238	1.0383E-03	183.19	366.38	0.00E+00	1.90E-01	3.80E-01		
Pu-239	5.5293E-03	183.19	366.38	0.00E+00	1.01E+00	2.03E+00		
Pu-240	2.1278E-03	183.19	366.38	0.00E+00	3.90E-01	7.80E-01		
Pu-241	1.0195E-01	183.19	366.38	0.00E+00	1.87E+01	3.74E+01		
Pu-242	2.3128E-07	183.19	366.38	0.00E+00	4.24E-05	8.47E-05		
Ra-226	5.2782E-14	183.19	366.38	0.00E+00	9.67E-12	1.93E-11		
Ra-228	1.9338E-10	183.19	366.38	0.00E+00	3.54E-08	7.09E-08		
Ru-106	9.1684E-02	183.19	366.38	0.00E+00	1.68E+01	3.36E+01		
Se-79	1.3018E-05	183.19	366.38	0.00E+00	2.38E-03	4.77E-03		
Sn-126	1.2167E-05	183.19	366.38	0.00E+00	2.23E-03	4.46E-03		
Sr-90	2.6045E+00	183.19	366.38	0.00E+00	4.77E+02	9.54E+02		
Tc-99	4.4241E-04	183.19	366.38	0.00E+00	8.10E-02	1.62E-01		
Th-229	1.3713E-10	183.19	366.38	0.00E+00	2.51E-08	5.02E-08		
Th-230	1.8090E-11	183.19	366.38	0.00E+00	3.31E-09	6.63E-09		
Th-232	2.5278E-10	183.19	366.38	0.00E+00	4.63E-08	9.26E-08		
Tl-208	1.6947E-08	183.19	366.38	0.00E+00	3.10E-06	6.21E-06		
U-232	4.8737E-08	183.19	366.38	0.00E+00	8.93E-06	1.79E-05		
U-233	1.2203E-07	183.19	366.38	0.00E+00	2.24E-05	4.47E-05		
U-234	1.5925E-07	183.19	366.38	0.00E+00	2.92E-05	5.83E-05		
U-235	-2.6194E-08	183.19	0.00	7.19E-03	6.71E-03	7.19E-03		
U-236	1.2693E-05	183.19	366.38	0.00E+00	2.33E-03	4.65E-03		
U-238	-3.6331E-08	183.19	0.00	4.47E-03	4.46E-03	4.47E-03		
Y-90	2.6060E+00	183.19	366.38	0.00E+00	4.77E+02	9.55E+02		
Other Radionuclides					6.60E+02	1.32E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.07E+01	2.13E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		183.19
Bounding:		366.38

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.32	
Bounding:	0.65	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 30/20 MNRC
SNF ID #: 704
Fuel Units & Descr: 6 - ELEMENT
Heavy Metal Mass: BOL=4.974kg; EOL=4.974kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.05

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.2427E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pa-231	3.8511E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pb-210	7.3880E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pm-147	2.1023E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-238	1.0383E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-239	5.5293E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-240	2.1278E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-241	1.0195E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-242	2.3128E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ra-226	5.2782E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ra-228	1.9338E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ru-106	9.1684E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Se-79	1.3018E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Sn-126	1.2167E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Sr-90	2.6045E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Tc-99	4.4241E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-229	1.3713E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-230	1.8090E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-232	2.5278E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Tl-208	1.6947E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-232	4.8737E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-233	1.2203E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-234	1.5925E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-235	-2.6194E-06	0.00	0.00	2.13E-03	2.13E-03	2.13E-03
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-238	-3.6331E-08	0.00	0.00	1.34E-03	1.34E-03	1.34E-03
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Other Radionuclides					0.00E+00	0.00E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.280E+07
0.0250	0.000E+00
0.0375	7.199E+04
0.0575	4.394E+04
0.0850	6.150E+06
0.1250	1.214E+07
0.2250	4.297E+07
0.3750	1.072E+05
0.5750	5.275E+03
0.8500	8.232E+02
1.2500	4.899E+01
1.7500	2.397E+01
2.2500	1.389E+01
2.7500	8.068E+00
3.5000	7.213E+00
5.0000	3.099E+00
7.0000	3.567E-01
11.0000	4.101E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.98E-05	8.98E-05
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.82495894	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.00	
Bounding:		

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20
SNF ID #: 252
Fuel Units & Descr: 50 - ELEMENT
Heavy Metal Mass: BOL=9.37kg; EOL=9.07kg
RCD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.45

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	286.38	572.76	0.00E+00	2.44E-07	4.88E-07
Am-241	1.8331E-03	286.38	572.76	0.00E+00	5.25E-01	1.05E+00
Am-242m	1.4129E-06	286.38	572.76	0.00E+00	4.05E-04	8.09E-04
Am-243	1.4774E-07	286.38	572.76	0.00E+00	4.23E-05	8.46E-05
C-14	1.2871E-04	286.38	572.76	0.00E+00	3.69E-02	7.37E-02
Cl-36	2.8120E-06	286.38	572.76	0.00E+00	8.05E-04	1.61E-03
Cm-243	1.7940E-07	286.38	572.76	0.00E+00	5.14E-05	1.03E-04
Cm-244	1.6962E-06	286.38	572.76	0.00E+00	4.86E-04	9.72E-04
Co-60	1.2839E+00	286.38	572.76	0.00E+00	3.68E+02	7.35E+02
Cs-134	9.0541E-02	286.38	572.76	0.00E+00	2.59E+01	5.19E+01
Cs-135	3.2195E-05	286.38	572.76	0.00E+00	9.22E-03	1.84E-02
Cs-137	2.7564E+00	286.38	572.76	0.00E+00	7.89E+02	1.58E+03
Eu-154	1.5368E-02	286.38	572.76	0.00E+00	4.40E+00	8.80E+00
Eu-155	2.9293E-02	286.38	572.76	0.00E+00	8.39E+00	1.68E+01
Fe-55	7.7158E-01	286.38	572.76	0.00E+00	2.21E+02	4.42E+02
H-3	1.1111E-02	286.38	572.76	0.00E+00	3.18E+00	6.36E+00
I-129	7.3684E-07	286.38	572.76	0.00E+00	2.11E-04	4.22E-04
Kr-85	2.5263E-01	286.38	572.76	0.00E+00	7.23E+01	1.45E+02
Np-237	1.2427E-06	286.38	572.76	0.00E+00	3.56E-04	7.12E-04
Pa-231	3.8511E-09	286.38	572.76	0.00E+00	1.10E-06	2.21E-06
Pb-210	7.3880E-15	286.38	572.76	0.00E+00	2.12E-12	4.23E-12
Pm-147	2.1023E+00	286.38	572.76	0.00E+00	6.02E+02	1.20E+03
Pu-238	1.0383E-03	286.38	572.76	0.00E+00	2.97E-01	5.95E-01
Pu-239	5.5293E-03	286.38	572.76	0.00E+00	1.58E+00	3.17E+00
Pu-240	2.1278E-03	286.38	572.76	0.00E+00	6.09E-01	1.22E+00
Pu-241	1.0195E-01	286.38	572.76	0.00E+00	2.92E+01	5.84E+01
Pu-242	2.3128E-07	286.38	572.76	0.00E+00	6.62E-05	1.32E-04
Ra-226	5.2782E-14	286.38	572.76	0.00E+00	1.51E-11	3.02E-11
Ra-228	1.9338E-10	286.38	572.76	0.00E+00	5.54E-08	1.11E-07
Ru-106	9.1684E-02	286.38	572.76	0.00E+00	2.63E+01	5.25E+01
Se-79	1.3018E-05	286.38	572.76	0.00E+00	3.73E-03	7.46E-03
Sn-126	1.2167E-05	286.38	572.76	0.00E+00	3.48E-03	6.97E-03
Sr-90	2.6045E+00	286.38	572.76	0.00E+00	7.46E+02	1.49E+03
Tc-99	4.4241E-04	286.38	572.76	0.00E+00	1.27E-01	2.53E-01
Th-229	1.3713E-10	286.38	572.76	0.00E+00	3.93E-08	7.85E-08
Th-230	1.8090E-11	286.38	572.76	0.00E+00	5.18E-09	1.04E-08
Th-232	2.5278E-10	286.38	572.76	0.00E+00	7.24E-08	1.45E-07
Tl-208	1.6947E-06	286.38	572.76	0.00E+00	4.85E-06	9.71E-06
U-232	4.8737E-06	286.38	572.76	0.00E+00	1.40E-05	2.79E-05
U-233	1.2203E-07	286.38	572.76	0.00E+00	3.49E-05	6.99E-05
U-234	1.5925E-07	286.38	572.76	0.00E+00	4.56E-05	9.12E-05
U-235	-2.6194E-06	286.38	0.00	3.95E-03	3.20E-03	3.95E-03
U-236	1.2693E-05	286.38	572.76	0.00E+00	3.64E-03	7.27E-03
U-238	-3.6331E-08	286.38	0.00	2.54E-03	2.53E-03	2.54E-03
Y-90	2.6060E+00	286.38	572.76	0.00E+00	7.46E+02	1.49E+03
Other Radionuclides					1.03E+03	2.06E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.257E+13
0.0250	2.037E+13
0.0375	1.735E+13
0.0575	1.781E+13
0.0850	1.103E+13
0.1250	8.010E+12
0.2250	9.357E+12
0.3750	4.749E+12
0.5750	6.313E+13
0.8500	2.709E+12
1.2500	5.502E+13
1.7500	3.668E+10
2.2500	5.912E+10
2.7500	4.691E+08
3.5000	5.460E+07
5.0000	3.060E+02
7.0000	3.465E+01
11.0000	3.947E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.67E+01	3.33E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.49184744	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	273.96	286.38	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		572.76	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.90	1.05	1.00
Bounding:	1.79		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 (IFE) ITALY
SNF ID #: 929
Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass: BOL=0.383kg; EOL=0.372kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1999
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 10 years

Estimated Canister usage: 18"x10' 0.02

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.3731E-09	13.06	26.13	0.00E+00	1.79E-08	3.59E-08
Am-241	2.3865E-03	13.06	26.13	0.00E+00	3.12E-02	6.24E-02
Am-242m	1.3812E-06	13.06	26.13	0.00E+00	1.80E-05	3.61E-05
Am-243	1.4767E-07	13.06	26.13	0.00E+00	1.93E-06	3.86E-06
C-14	1.2863E-04	13.06	26.13	0.00E+00	1.68E-03	3.36E-03
Cl-36	2.8120E-06	13.06	26.13	0.00E+00	3.67E-05	7.35E-05
Cm-243	1.5895E-07	13.06	26.13	0.00E+00	2.08E-06	4.15E-06
Cm-244	1.4008E-06	13.06	26.13	0.00E+00	1.83E-05	3.66E-05
Co-60	6.6541E-01	13.06	26.13	0.00E+00	8.69E+00	1.74E+01
Cs-134	1.6887E-02	13.06	26.13	0.00E+00	2.21E-01	4.41E-01
Cs-135	3.2195E-05	13.06	26.13	0.00E+00	4.21E-04	8.41E-04
Cs-137	2.4556E+00	13.06	26.13	0.00E+00	3.21E+01	6.42E+01
Eu-154	1.0268E-02	13.06	26.13	0.00E+00	1.34E-01	2.68E-01
Eu-155	1.4570E-02	13.06	26.13	0.00E+00	1.90E-01	3.81E-01
Fe-55	2.0361E-01	13.06	26.13	0.00E+00	2.66E+00	5.32E+00
H-3	8.3940E-03	13.06	26.13	0.00E+00	1.10E-01	2.19E-01
I-129	7.3684E-07	13.06	26.13	0.00E+00	9.63E-06	1.93E-05
Kr-85	1.8286E-01	13.06	26.13	0.00E+00	2.39E+00	4.78E+00
Np-237	1.2462E-06	13.06	26.13	0.00E+00	1.63E-05	3.26E-05
Pa-231	4.9143E-09	13.06	26.13	0.00E+00	6.42E-08	1.28E-07
Pb-210	1.7173E-14	13.06	26.13	0.00E+00	2.24E-13	4.49E-13
Pm-147	5.6165E-01	13.06	26.13	0.00E+00	7.34E+00	1.47E+01
Pu-238	9.9820E-04	13.06	26.13	0.00E+00	1.30E-02	2.61E-02
Pu-239	5.5293E-03	13.06	26.13	0.00E+00	7.22E-02	1.44E-01
Pu-240	2.1263E-03	13.06	26.13	0.00E+00	2.78E-02	5.56E-02
Pu-241	8.0165E-02	13.06	26.13	0.00E+00	1.05E+00	2.09E+00
Pu-242	2.3128E-07	13.06	26.13	0.00E+00	3.02E-06	6.04E-06
Ra-226	9.9774E-14	13.06	26.13	0.00E+00	1.30E-12	2.61E-12
Ra-228	2.1729E-10	13.06	26.13	0.00E+00	2.84E-09	5.68E-09
Ru-106	2.9519E-03	13.06	26.13	0.00E+00	3.86E-02	7.71E-02
Se-79	1.3017E-05	13.06	26.13	0.00E+00	1.70E-04	3.40E-04
Sn-126	1.2167E-05	13.06	26.13	0.00E+00	1.59E-04	3.18E-04
Sr-90	2.3128E+00	13.06	26.13	0.00E+00	3.02E+01	6.04E+01
Tc-99	4.4241E-04	13.06	26.13	0.00E+00	5.78E-03	1.16E-02
Th-229	1.9459E-10	13.06	26.13	0.00E+00	2.54E-09	5.08E-09
Th-230	2.5564E-11	13.06	26.13	0.00E+00	3.34E-10	6.68E-10
Th-232	2.5278E-10	13.06	26.13	0.00E+00	3.30E-09	6.60E-09
Tl-208	1.6947E-08	13.06	26.13	0.00E+00	2.21E-07	4.43E-07
U-232	4.6812E-08	13.06	26.13	0.00E+00	6.12E-07	1.22E-06
U-233	1.2206E-07	13.06	26.13	0.00E+00	1.59E-06	3.19E-06
U-234	1.7323E-07	13.06	26.13	0.00E+00	2.26E-06	4.53E-06
U-235	-2.6194E-06	13.06	0.00	1.66E-04	1.32E-04	1.66E-04
U-236	1.2693E-05	13.06	26.13	0.00E+00	1.66E-04	3.32E-04
U-238	-3.6331E-08	13.06	0.00	1.03E-04	1.02E-04	1.03E-04
Y-90	2.3128E+00	13.06	26.13	0.00E+00	3.02E+01	6.04E+01
Other Radionuclides					3.20E+01	6.41E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.376E+12
0.0250	7.151E+11
0.0375	6.108E+11
0.0575	6.510E+11
0.0850	3.950E+11
0.1250	2.596E+11
0.2250	3.369E+11
0.3750	1.547E+11
0.5750	2.424E+12
0.8500	4.328E+10
1.2500	1.301E+12
1.7500	7.830E+08
2.2500	4.090E+07
2.7500	6.770E+05
3.5000	8.022E+04
5.0000	1.387E+01
7.0000	1.569E+00
11.0000	1.787E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.12E-01	1.02E+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 %:	20.10443864	10 to 20.1

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (very close to 20%)

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	13.06	10.50
Bounding:		26.13

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.00	0.80
Bounding:	2.00	

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 (IFE) OSU
SNF ID #: 1040
Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass: BOL=0.39kg; EOL=0.38kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2025
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.02

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	9.55	19.09	0.00E+00	8.13E-09	1.63E-08
Am-241	1.8331E-03	9.55	19.09	0.00E+00	1.75E-02	3.50E-02
Am-242m	1.4129E-06	9.55	19.09	0.00E+00	1.35E-05	2.70E-05
Am-243	1.4774E-07	9.55	19.09	0.00E+00	1.41E-06	2.82E-06
C-14	1.2871E-04	9.55	19.09	0.00E+00	1.23E-03	2.46E-03
Cl-36	2.8120E-06	9.55	19.09	0.00E+00	2.68E-05	5.37E-05
Cm-243	1.7940E-07	9.55	19.09	0.00E+00	1.71E-06	3.43E-06
Cm-244	1.6962E-06	9.55	19.09	0.00E+00	1.62E-05	3.24E-05
Co-60	1.2839E+00	9.55	19.09	0.00E+00	1.23E+01	2.45E+01
Cs-134	9.0541E-02	9.55	19.09	0.00E+00	8.64E-01	1.73E+00
Cs-135	3.2195E-05	9.55	19.09	0.00E+00	3.07E-04	6.15E-04
Cs-137	2.7564E+00	9.55	19.09	0.00E+00	2.63E+01	5.26E+01
Eu-154	1.5368E-02	9.55	19.09	0.00E+00	1.47E-01	2.93E-01
Eu-155	2.9293E-02	9.55	19.09	0.00E+00	2.80E-01	5.59E-01
Fe-55	7.7158E-01	9.55	19.09	0.00E+00	7.37E+00	1.47E+01
H-3	1.1111E-02	9.55	19.09	0.00E+00	1.06E-01	2.12E-01
I-129	7.3684E-07	9.55	19.09	0.00E+00	7.03E-06	1.41E-05
Kr-85	2.5263E-01	9.55	19.09	0.00E+00	2.41E+00	4.82E+00
Np-237	1.2427E-06	9.55	19.09	0.00E+00	1.19E-05	2.37E-05
Pa-231	3.8511E-09	9.55	19.09	0.00E+00	3.68E-08	7.35E-08
Pb-210	7.3880E-15	9.55	19.09	0.00E+00	7.05E-14	1.41E-13
Pm-147	2.1023E+00	9.55	19.09	0.00E+00	2.01E+01	4.01E+01
Pu-238	1.0383E-03	9.55	19.09	0.00E+00	9.91E-03	1.98E-02
Pu-239	5.5293E-03	9.55	19.09	0.00E+00	5.28E-02	1.06E-01
Pu-240	2.1278E-03	9.55	19.09	0.00E+00	2.03E-02	4.06E-02
Pu-241	1.0195E-01	9.55	19.09	0.00E+00	9.73E-01	1.95E+00
Pu-242	2.3128E-07	9.55	19.09	0.00E+00	2.21E-06	4.42E-06
Ra-226	5.2782E-14	9.55	19.09	0.00E+00	5.04E-13	1.01E-12
Ra-228	1.9338E-10	9.55	19.09	0.00E+00	1.85E-09	3.69E-09
Ru-106	9.1684E-02	9.55	19.09	0.00E+00	8.75E-01	1.75E+00
Se-79	1.3018E-05	9.55	19.09	0.00E+00	1.24E-04	2.49E-04
Sn-126	1.2167E-05	9.55	19.09	0.00E+00	1.16E-04	2.32E-04
Sr-90	2.6045E+00	9.55	19.09	0.00E+00	2.49E+01	4.97E+01
Tc-99	4.4241E-04	9.55	19.09	0.00E+00	4.22E-03	8.45E-03
Th-229	1.3713E-10	9.55	19.09	0.00E+00	1.31E-09	2.62E-09
Th-230	1.8090E-11	9.55	19.09	0.00E+00	1.73E-10	3.45E-10
Th-232	2.5278E-10	9.55	19.09	0.00E+00	2.41E-09	4.83E-09
Tl-208	1.6947E-08	9.55	19.09	0.00E+00	1.62E-07	3.24E-07
U-232	4.8737E-08	9.55	19.09	0.00E+00	4.65E-07	9.30E-07
U-233	1.2203E-07	9.55	19.09	0.00E+00	1.16E-06	2.33E-06
U-234	1.5925E-07	9.55	19.09	0.00E+00	1.52E-06	3.04E-06
U-235	-2.6194E-06	9.55	0.00	1.68E-04	1.43E-04	1.68E-04
U-236	1.2693E-05	9.55	19.09	0.00E+00	1.21E-04	2.42E-04
U-238	-3.6331E-08	9.55	0.00	1.05E-04	1.05E-04	1.05E-04
Y-90	2.6060E+00	9.55	19.09	0.00E+00	2.49E+01	4.98E+01
Other Radionuclides					3.44E+01	6.88E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.086E+12
0.0250	6.790E+11
0.0375	5.782E+11
0.0575	5.935E+11
0.0850	3.677E+11
0.1250	2.670E+11
0.2250	3.119E+11
0.3750	1.583E+11
0.5750	2.104E+12
0.8500	9.031E+10
1.2500	1.834E+12
1.7500	1.223E+09
2.2500	1.971E+09
2.7500	1.564E+07
3.5000	1.820E+08
5.0000	1.025E+01
7.0000	1.160E+00
11.0000	1.322E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.56E-01	1.11E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	3.80	9.55	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		19.09	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.72	2.51
Bounding:	1.44	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 (IFE) U OF AZ
SNF ID #: 972
Fuel Units & Descr: 1 - ELEMENT
Heavy Metal Mass: BOL=0.195kg; EOL=0.188kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1998
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 10 years

Estimated Canister usage: 18"x10' 0.01

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	1.3731E-09	6.68	13.36	0.00E+00	9.18E-09	1.84E-08
Am-241	2.3865E-03	6.68	13.36	0.00E+00	1.59E-02	3.19E-02
Am-242m	1.3812E-06	6.68	13.36	0.00E+00	9.23E-06	1.85E-05
Am-243	1.4767E-07	6.68	13.36	0.00E+00	9.87E-07	1.97E-06
C-14	1.2863E-04	6.68	13.36	0.00E+00	8.60E-04	1.72E-03
Cl-36	2.8120E-06	6.68	13.36	0.00E+00	1.88E-05	3.76E-05
Cm-243	1.5895E-07	6.68	13.36	0.00E+00	1.06E-06	2.12E-06
Cm-244	1.4008E-06	6.68	13.36	0.00E+00	9.36E-06	1.87E-05
Co-60	6.6541E-01	6.68	13.36	0.00E+00	4.45E+00	8.89E+00
Cs-134	1.6887E-02	6.68	13.36	0.00E+00	1.13E-01	2.26E-01
Cs-135	3.2195E-05	6.68	13.36	0.00E+00	2.15E-04	4.30E-04
Cs-137	2.4556E+00	6.68	13.36	0.00E+00	1.64E+01	3.28E+01
Eu-154	1.0268E-02	6.68	13.36	0.00E+00	6.86E-02	1.37E-01
Eu-155	1.4570E-02	6.68	13.36	0.00E+00	9.74E-02	1.95E-01
Fe-55	2.0361E-01	6.68	13.36	0.00E+00	1.36E+00	2.72E+00
H-3	8.3940E-03	6.68	13.36	0.00E+00	5.61E-02	1.12E-01
I-129	7.3684E-07	6.68	13.36	0.00E+00	4.92E-06	9.85E-06
Kr-85	1.8286E-01	6.68	13.36	0.00E+00	1.22E+00	2.44E+00
Np-237	1.2462E-06	6.68	13.36	0.00E+00	8.33E-06	1.67E-05
Pa-231	4.9143E-09	6.68	13.36	0.00E+00	3.28E-08	6.57E-08
Pb-210	1.7173E-14	6.68	13.36	0.00E+00	1.15E-13	2.30E-13
Pm-147	5.6165E-01	6.68	13.36	0.00E+00	3.75E+00	7.51E+00
Pu-238	9.9820E-04	6.68	13.36	0.00E+00	6.67E-03	1.33E-02
Pu-239	5.5293E-03	6.68	13.36	0.00E+00	3.69E-02	7.39E-02
Pu-240	2.1263E-03	6.68	13.36	0.00E+00	1.42E-02	2.84E-02
Pu-241	8.0165E-02	6.68	13.36	0.00E+00	5.36E-01	1.07E+00
Pu-242	2.3128E-07	6.68	13.36	0.00E+00	1.55E-06	3.09E-06
Ra-226	9.9774E-14	6.68	13.36	0.00E+00	6.67E-13	1.33E-12
Ra-228	2.1729E-10	6.68	13.36	0.00E+00	1.45E-09	2.90E-09
Ru-106	2.9519E-03	6.68	13.36	0.00E+00	1.97E-02	3.95E-02
Se-79	1.3017E-05	6.68	13.36	0.00E+00	8.70E-05	1.74E-04
Sn-126	1.2167E-05	6.68	13.36	0.00E+00	8.13E-05	1.63E-04
Sr-90	2.3128E+00	6.68	13.36	0.00E+00	1.55E+01	3.09E+01
Tc-99	4.4241E-04	6.68	13.36	0.00E+00	2.96E-03	5.91E-03
Th-229	1.9459E-10	6.68	13.36	0.00E+00	1.30E-09	2.60E-09
Th-230	2.5564E-11	6.68	13.36	0.00E+00	1.71E-10	3.42E-10
Th-232	2.5278E-10	6.68	13.36	0.00E+00	1.69E-09	3.38E-09
Tl-208	1.6947E-08	6.68	13.36	0.00E+00	1.13E-07	2.26E-07
U-232	4.6812E-08	6.68	13.36	0.00E+00	3.13E-07	6.26E-07
U-233	1.2206E-07	6.68	13.36	0.00E+00	8.16E-07	1.63E-06
U-234	1.7323E-07	6.68	13.36	0.00E+00	1.16E-06	2.32E-06
U-235	-2.6194E-06	6.68	0.00	8.43E-05	6.68E-05	8.43E-05
U-236	1.2693E-05	6.68	13.36	0.00E+00	8.48E-05	1.70E-04
U-238	-3.6331E-08	6.68	0.00	5.24E-05	5.22E-05	5.24E-05
Y-90	2.3128E+00	6.68	13.36	0.00E+00	1.55E+01	3.09E+01
Other Radionuclides					1.64E+01	3.28E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.727E+12
0.0250	3.658E+11
0.0375	3.124E+11
0.0575	3.330E+11
0.0850	2.020E+11
0.1250	1.328E+11
0.2250	1.723E+11
0.3750	7.914E+10
0.5750	1.240E+12
0.8500	2.213E+10
1.2500	6.855E+11
1.7500	4.005E+08
2.2500	2.092E+07
2.7500	3.463E+05
3.5000	4.103E+04
5.0000	7.095E+00
7.0000	8.025E-01
11.0000	9.137E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.62E-01	5.23E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	1.90	6.68	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		13.36	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	1.00	3.52	1.00
Bounding:	2.01		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 (IFE) U OF AZ
SNF ID #: 973
Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass: BOL=0.39kg; EOL=0.378kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
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

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	11.46	22.91	0.00E+00	9.76E-09	1.95E-08	Avg. MeV	
Am-241	1.8331E-03	11.46	22.91	0.00E+00	2.10E-02	4.20E-02	0.0150	3.703E+12
Am-242m	1.4129E-06	11.46	22.91	0.00E+00	1.62E-05	3.24E-05	0.0250	8.148E+11
Am-243	1.4774E-07	11.46	22.91	0.00E+00	1.69E-06	3.38E-06	0.0375	6.939E+11
C-14	1.2871E-04	11.46	22.91	0.00E+00	1.47E-03	2.95E-03	0.0575	7.122E+11
Cl-36	2.8120E-06	11.46	22.91	0.00E+00	3.22E-05	6.44E-05	0.0850	4.412E+11
Cm-243	1.7940E-07	11.46	22.91	0.00E+00	2.06E-06	4.11E-06	0.1250	3.204E+11
Cm-244	1.6962E-06	11.46	22.91	0.00E+00	1.94E-05	3.89E-05	0.2250	3.743E+11
Co-60	1.2839E+00	11.46	22.91	0.00E+00	1.47E+01	2.94E+01	0.3750	1.899E+11
Cs-134	9.0541E-02	11.46	22.91	0.00E+00	1.04E+00	2.07E+00	0.5750	2.525E+12
Cs-135	3.2195E-05	11.46	22.91	0.00E+00	3.69E-04	7.38E-04	0.8500	1.084E+11
Cs-137	2.7564E+00	11.46	22.91	0.00E+00	3.16E+01	6.32E+01	1.2500	2.201E+12
Eu-154	1.5368E-02	11.46	22.91	0.00E+00	1.76E-01	3.52E-01	1.7500	1.467E+09
Eu-155	2.9293E-02	11.46	22.91	0.00E+00	3.36E-01	6.71E-01	2.2500	2.365E+09
Fe-55	7.7158E-01	11.46	22.91	0.00E+00	8.84E+00	1.77E+01	2.7500	1.877E+07
H-3	1.1111E-02	11.46	22.91	0.00E+00	1.27E-01	2.55E-01	3.5000	2.184E+06
I-129	7.3684E-07	11.46	22.91	0.00E+00	8.44E-06	1.69E-05	5.0000	1.225E+01
Kr-85	2.5263E-01	11.46	22.91	0.00E+00	2.89E+00	5.79E+00	7.0000	1.387E+00
Np-237	1.2427E-06	11.46	22.91	0.00E+00	1.42E-05	2.85E-05	11.0000	1.580E-01
Pa-231	3.8511E-09	11.46	22.91	0.00E+00	4.41E-08	8.82E-08		
Pb-210	7.3880E-15	11.46	22.91	0.00E+00	8.46E-14	1.69E-13		
Pm-147	2.1023E+00	11.46	22.91	0.00E+00	2.41E+01	4.82E+01		
Pu-238	1.0383E-03	11.46	22.91	0.00E+00	1.19E-02	2.38E-02		
Pu-239	5.5293E-03	11.46	22.91	0.00E+00	6.33E-02	1.27E-01		
Pu-240	2.1278E-03	11.46	22.91	0.00E+00	2.44E-02	4.87E-02		
Pu-241	1.0195E-01	11.46	22.91	0.00E+00	1.17E+00	2.34E+00		
Pu-242	2.3128E-07	11.46	22.91	0.00E+00	2.65E-06	5.30E-06		
Ra-226	5.2782E-14	11.46	22.91	0.00E+00	6.05E-13	1.21E-12		
Ra-228	1.9338E-10	11.46	22.91	0.00E+00	2.22E-09	4.43E-09		
Ru-106	9.1684E-02	11.46	22.91	0.00E+00	1.05E+00	2.10E+00		
Se-79	1.3018E-05	11.46	22.91	0.00E+00	1.49E-04	2.98E-04		
Sn-126	1.2167E-05	11.46	22.91	0.00E+00	1.39E-04	2.79E-04		
Sr-90	2.6045E+00	11.46	22.91	0.00E+00	2.98E+01	5.97E+01		
Tc-99	4.4241E-04	11.46	22.91	0.00E+00	5.07E-03	1.01E-02		
Th-229	1.3713E-10	11.46	22.91	0.00E+00	1.57E-09	3.14E-09		
Th-230	1.8090E-11	11.46	22.91	0.00E+00	2.07E-10	4.14E-10		
Th-232	2.5278E-10	11.46	22.91	0.00E+00	2.90E-09	5.79E-09		
Tl-208	1.6947E-08	11.46	22.91	0.00E+00	1.94E-07	3.88E-07		
U-232	4.8737E-08	11.46	22.91	0.00E+00	5.58E-07	1.12E-06		
U-233	1.2203E-07	11.46	22.91	0.00E+00	1.40E-06	2.80E-06		
U-234	1.5925E-07	11.46	22.91	0.00E+00	1.82E-06	3.65E-06		
U-235	-2.6194E-08	11.46	0.00	1.69E-04	1.39E-04	1.69E-04		
U-236	1.2693E-05	11.46	22.91	0.00E+00	1.45E-04	2.91E-04		
U-238	-3.6331E-08	11.46	0.00	1.05E-04	1.04E-04	1.05E-04		
Y-90	2.6060E+00	11.46	22.91	0.00E+00	2.99E+01	5.97E+01		
Other Radionuclides					4.13E+01	8.26E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.67E-01	1.33E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	1.90	11.46	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		22.91	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.86	6.03	1.00
Bounding:	1.72		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 (IFE) U OF IL
SNF ID #: 1048
Fuel Units & Descr: 8 - ELEMENT
Heavy Metal Mass: BOL=1.56kg; EOL=1.52kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.07

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	38.18	76.37	0.00E+00	3.25E-08	6.50E-08
Am-241	1.8331E-03	38.18	76.37	0.00E+00	7.00E-02	1.40E-01
Am-242m	1.4129E-06	38.18	76.37	0.00E+00	5.40E-05	1.08E-04
Am-243	1.4774E-07	38.18	76.37	0.00E+00	5.64E-06	1.13E-05
C-14	1.2871E-04	38.18	76.37	0.00E+00	4.91E-03	9.83E-03
Cl-36	2.8120E-06	38.18	76.37	0.00E+00	1.07E-04	2.15E-04
Cm-243	1.7940E-07	38.18	76.37	0.00E+00	6.85E-06	1.37E-05
Cm-244	1.6962E-06	38.18	76.37	0.00E+00	6.48E-05	1.30E-04
Co-60	1.2839E+00	38.18	76.37	0.00E+00	4.90E+01	9.81E+01
Cs-134	9.0541E-02	38.18	76.37	0.00E+00	3.46E+00	6.91E+00
Cs-135	3.2195E-05	38.18	76.37	0.00E+00	1.23E-03	2.46E-03
Cs-137	2.7564E+00	38.18	76.37	0.00E+00	1.05E+02	2.11E+02
Eu-154	1.5368E-02	38.18	76.37	0.00E+00	5.87E-01	1.17E+00
Eu-155	2.9293E-02	38.18	76.37	0.00E+00	1.12E+00	2.24E+00
Fe-55	7.7158E-01	38.18	76.37	0.00E+00	2.95E+01	5.89E+01
H-3	1.1111E-02	38.18	76.37	0.00E+00	4.24E-01	8.49E-01
I-129	7.3684E-07	38.18	76.37	0.00E+00	2.81E-05	5.63E-05
Kr-85	2.5263E-01	38.18	76.37	0.00E+00	9.65E+00	1.93E+01
Np-237	1.2427E-06	38.18	76.37	0.00E+00	4.75E-05	9.49E-05
Pa-231	3.8511E-09	38.18	76.37	0.00E+00	1.47E-07	2.94E-07
Pb-210	7.3880E-15	38.18	76.37	0.00E+00	2.82E-13	5.64E-13
Pm-147	2.1023E+00	38.18	76.37	0.00E+00	8.03E+01	1.61E+02
Pu-238	1.0383E-03	38.18	76.37	0.00E+00	3.96E-02	7.93E-02
Pu-239	5.5293E-03	38.18	76.37	0.00E+00	2.11E-01	4.22E-01
Pu-240	2.1278E-03	38.18	76.37	0.00E+00	8.12E-02	1.62E-01
Pu-241	1.0195E-01	38.18	76.37	0.00E+00	3.89E+00	7.79E+00
Pu-242	2.3128E-07	38.18	76.37	0.00E+00	8.83E-06	1.77E-05
Ra-226	5.2782E-14	38.18	76.37	0.00E+00	2.02E-12	4.03E-12
Ra-228	1.9338E-10	38.18	76.37	0.00E+00	7.38E-09	1.48E-08
Ru-106	9.1684E-02	38.18	76.37	0.00E+00	3.50E+00	7.00E+00
Se-79	1.3018E-05	38.18	76.37	0.00E+00	4.97E-04	9.94E-04
Sn-126	1.2167E-05	38.18	76.37	0.00E+00	4.65E-04	9.29E-04
Sr-90	2.6045E+00	38.18	76.37	0.00E+00	9.95E+01	1.99E+02
Tc-99	4.4241E-04	38.18	76.37	0.00E+00	1.69E-02	3.38E-02
Th-229	1.3713E-10	38.18	76.37	0.00E+00	5.24E-09	1.05E-08
Th-230	1.8090E-11	38.18	76.37	0.00E+00	6.91E-10	1.38E-09
Th-232	2.5278E-10	38.18	76.37	0.00E+00	9.65E-09	1.93E-08
Tl-208	1.6947E-08	38.18	76.37	0.00E+00	6.47E-07	1.29E-06
U-232	4.8737E-08	38.18	76.37	0.00E+00	1.86E-06	3.72E-06
U-233	1.2203E-07	38.18	76.37	0.00E+00	4.66E-06	9.32E-06
U-234	1.5925E-07	38.18	76.37	0.00E+00	6.08E-06	1.22E-05
U-235	-2.6194E-06	38.18	0.00	6.74E-04	5.74E-04	6.74E-04
U-236	1.2693E-05	38.18	76.37	0.00E+00	4.85E-04	9.69E-04
U-238	-3.6331E-08	38.18	0.00	4.19E-04	4.18E-04	4.19E-04
Y-90	2.6060E+00	38.18	76.37	0.00E+00	9.95E+01	1.99E+02
Other Radionuclides					1.38E+02	2.75E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.234E+13
0.0250	2.716E+12
0.0375	2.313E+12
0.0575	2.374E+12
0.0850	1.471E+12
0.1250	1.068E+12
0.2250	1.248E+12
0.3750	6.331E+11
0.5750	8.417E+12
0.8500	3.613E+11
1.2500	7.336E+12
1.7500	4.890E+09
2.2500	7.883E+09
2.7500	6.255E+07
3.5000	7.280E+06
5.0000	4.099E+01
7.0000	4.641E+00
11.0000	5.288E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.22E+00	4.44E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	30.41	38.18	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		76.37	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.72	1.26	1.00
Bounding:	1.44		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 (IFE) UNIV. OF CAL-IRVINE
SNF ID #: 824
Fuel Units & Descr: 5 - ELEMENT
Heavy Metal Mass: BOL=0.916kg; EOL=0.916kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.05

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	Avg. MeV	
Am-241	1.8331E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0150	9.804E+06
Am-242m	1.4129E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0250	0.000E+00
Am-243	1.4774E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0375	1.338E+04
C-14	1.2871E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0575	8.107E+03
Cl-36	2.8120E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.0850	1.143E+08
Cm-243	1.7940E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.1250	2.257E+06
Cm-244	1.6962E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.2250	7.988E+06
Co-60	1.2839E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.3750	1.993E+04
Cs-134	9.0541E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.5750	9.805E+02
Cs-135	3.2195E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.8500	1.528E+02
Cs-137	2.7564E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.2500	9.009E+00
Eu-154	1.5368E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	1.7500	4.408E+00
Eu-155	2.9293E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.2500	2.553E+00
Fe-55	7.7158E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	2.7500	1.484E+00
H-3	1.1111E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	3.5000	1.328E+00
I-129	7.3684E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	5.0000	5.698E-01
Kr-85	2.5263E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	7.0000	6.559E-02
Np-237	1.2427E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	11.0000	7.541E-03
Pa-231	3.8511E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pb-210	7.3880E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pm-147	2.1023E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-238	1.0383E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-239	5.5293E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-240	2.1278E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-241	1.0195E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Pu-242	2.3128E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-226	5.2782E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ra-228	1.9338E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Ru-106	9.1684E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Se-79	1.3018E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sn-126	1.2167E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Sr-90	2.6045E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Tc-99	4.4241E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-229	1.3713E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-230	1.8090E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Th-232	2.5278E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
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	3.96E-04	3.96E-04	3.96E-04		
U-236	1.2693E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
U-238	-3.6331E-08	0.00	0.00	2.46E-04	2.46E-04	2.46E-04		
Y-90	2.6060E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00		
Other Radionuclides					0.00E+00	0.00E+00		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.66E-06	1.66E-06
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.99996708	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.00	
Bounding:		

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name:	TRIGA STD 8.5/20 (IFE) UNIV. OF CAL-IRVINE	**[1]Fuel decay start date:**	2035
SNF ID #:	1051	**Estimates as of:**	2010
Fuel Units & Descr:	1 - ELEMENT	**Template:**	TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
Heavy Metal Mass:	BOL=0.192kg; EOL=0.19kg	**[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'
0.01

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	1.87	3.73	0.00E+00	1.59E-09	3.18E-09
Am-241	1.8331E-03	1.87	3.73	0.00E+00	3.42E-03	6.85E-03
Am-242m	1.4129E-06	1.87	3.73	0.00E+00	2.64E-06	5.28E-06
Am-243	1.4774E-07	1.87	3.73	0.00E+00	2.76E-07	5.52E-07
C-14	1.2871E-04	1.87	3.73	0.00E+00	2.40E-04	4.81E-04
Cl-36	2.8120E-06	1.87	3.73	0.00E+00	5.25E-06	1.05E-05
Cm-243	1.7940E-07	1.87	3.73	0.00E+00	3.35E-07	6.70E-07
Cm-244	1.6962E-06	1.87	3.73	0.00E+00	3.17E-06	6.33E-06
Co-60	1.2839E+00	1.87	3.73	0.00E+00	2.40E+00	4.79E+00
Cs-134	9.0541E-02	1.87	3.73	0.00E+00	1.69E-01	3.38E-01
Cs-135	3.2195E-05	1.87	3.73	0.00E+00	6.01E-05	1.20E-04
Cs-137	2.7564E+00	1.87	3.73	0.00E+00	5.15E+00	1.03E+01
Eu-154	1.5368E-02	1.87	3.73	0.00E+00	2.87E-02	5.74E-02
Eu-155	2.9293E-02	1.87	3.73	0.00E+00	5.47E-02	1.09E-01
Fe-55	7.7158E-01	1.87	3.73	0.00E+00	1.44E+00	2.88E+00
H-3	1.1111E-02	1.87	3.73	0.00E+00	2.07E-02	4.15E-02
I-129	7.3684E-07	1.87	3.73	0.00E+00	1.38E-06	2.75E-06
Kr-85	2.5263E-01	1.87	3.73	0.00E+00	4.72E-01	9.43E-01
Np-237	1.2427E-06	1.87	3.73	0.00E+00	2.32E-06	4.64E-06
Pa-231	3.8511E-09	1.87	3.73	0.00E+00	7.19E-09	1.44E-08
Pb-210	7.3880E-15	1.87	3.73	0.00E+00	1.38E-14	2.76E-14
Pm-147	2.1023E+00	1.87	3.73	0.00E+00	3.93E+00	7.85E+00
Pu-238	1.0383E-03	1.87	3.73	0.00E+00	1.94E-03	3.88E-03
Pu-239	5.5293E-03	1.87	3.73	0.00E+00	1.03E-02	2.07E-02
Pu-240	2.1278E-03	1.87	3.73	0.00E+00	3.97E-03	7.95E-03
Pu-241	1.0195E-01	1.87	3.73	0.00E+00	1.90E-01	3.81E-01
Pu-242	2.3128E-07	1.87	3.73	0.00E+00	4.32E-07	8.64E-07
Ra-226	5.2782E-14	1.87	3.73	0.00E+00	9.86E-14	1.97E-13
Ra-228	1.9338E-10	1.87	3.73	0.00E+00	3.61E-10	7.22E-10
Ru-106	9.1684E-02	1.87	3.73	0.00E+00	1.71E-01	3.42E-01
Se-79	1.3018E-05	1.87	3.73	0.00E+00	2.43E-05	4.86E-05
Sn-126	1.2167E-05	1.87	3.73	0.00E+00	2.27E-05	4.54E-05
Sr-90	2.6045E+00	1.87	3.73	0.00E+00	4.86E+00	9.73E+00
Tc-99	4.4241E-04	1.87	3.73	0.00E+00	8.26E-04	1.65E-03
Th-229	1.3713E-10	1.87	3.73	0.00E+00	2.56E-10	5.12E-10
Th-230	1.8090E-11	1.87	3.73	0.00E+00	3.38E-11	6.76E-11
Th-232	2.5278E-10	1.87	3.73	0.00E+00	4.72E-10	9.44E-10
Tl-206	1.6947E-08	1.87	3.73	0.00E+00	3.16E-08	6.33E-08
U-232	4.8737E-08	1.87	3.73	0.00E+00	9.10E-08	1.82E-07
U-233	1.2203E-07	1.87	3.73	0.00E+00	2.28E-07	4.56E-07
U-234	1.5925E-07	1.87	3.73	0.00E+00	2.97E-07	5.95E-07
U-235	-2.6194E-06	1.87	0.00	8.28E-05	7.79E-05	8.28E-05
U-236	1.2693E-05	1.87	3.73	0.00E+00	2.37E-05	4.74E-05
U-238	-3.6331E-08	1.87	0.00	5.15E-05	5.14E-05	5.15E-05
Y-90	2.6060E+00	1.87	3.73	0.00E+00	4.87E+00	9.73E+00
Other Radionuclides					6.73E+00	1.35E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.036E+11
0.0250	1.328E+11
0.0375	1.131E+11
0.0575	1.161E+11
0.0850	7.192E+10
0.1250	5.223E+10
0.2250	6.101E+10
0.3750	3.096E+10
0.5750	4.116E+11
0.8500	1.767E+10
1.2500	3.588E+11
1.7500	2.392E+08
2.2500	3.855E+08
2.7500	3.059E+06
3.5000	3.560E+05
5.0000	2.076E+00
7.0000	2.352E-01
11.0000	2.681E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.69E-01	2.17E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	1.87	1.43	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		3.73	Bounding burnup assumed to be twice nominal burnup.

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 AFRRI
SNF ID #: 250
Fuel Units & Descr: 95 - ELEMENT
Heavy Metal Mass: BOL=18.525kg; EOL=18.012kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2019
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.86

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	489.71	979.43	0.00E+00	4.17E-07	8.34E-07	Avg. MeV	
Am-241	1.8331E-03	489.71	979.43	0.00E+00	8.98E-01	1.80E+00	0.0150	1.583E+14
Am-242m	1.4129E-06	489.71	979.43	0.00E+00	6.92E-04	1.38E-03	0.0250	3.483E+13
Am-243	1.4774E-07	489.71	979.43	0.00E+00	7.24E-05	1.45E-04	0.0375	2.966E+13
C-14	1.2871E-04	489.71	979.43	0.00E+00	6.30E-02	1.26E-01	0.0575	3.045E+13
Cl-36	2.8120E-06	489.71	979.43	0.00E+00	1.38E-03	2.75E-03	0.0850	1.886E+13
Cm-243	1.7940E-07	489.71	979.43	0.00E+00	8.79E-05	1.76E-04	0.1250	1.370E+13
Cm-244	1.6962E-06	489.71	979.43	0.00E+00	8.31E-04	1.66E-03	0.2250	1.600E+13
Co-60	1.2839E+00	489.71	979.43	0.00E+00	6.29E+02	1.26E+03	0.3750	8.120E+12
Cs-134	9.0541E-02	489.71	979.43	0.00E+00	4.43E+01	8.87E+01	0.5750	1.080E+14
Cs-135	3.2195E-05	489.71	979.43	0.00E+00	1.58E-02	3.15E-02	0.8500	4.633E+12
Cs-137	2.7564E+00	489.71	979.43	0.00E+00	1.35E+03	2.70E+03	1.2500	9.409E+13
Eu-154	1.5368E-02	489.71	979.43	0.00E+00	7.53E+00	1.51E+01	1.7500	6.272E+10
Eu-155	2.9293E-02	489.71	979.43	0.00E+00	1.43E+01	2.87E+01	2.2500	1.011E+11
Fe-55	7.7158E-01	489.71	979.43	0.00E+00	3.78E+02	7.56E+02	2.7500	8.022E+08
H-3	1.1111E-02	489.71	979.43	0.00E+00	5.44E+00	1.09E+01	3.5000	9.336E+07
I-129	7.3684E-07	489.71	979.43	0.00E+00	3.61E-04	7.22E-04	5.0000	5.248E+02
Kr-85	2.5263E-01	489.71	979.43	0.00E+00	1.24E+02	2.47E+02	7.0000	5.942E+01
Np-237	1.2427E-06	489.71	979.43	0.00E+00	6.09E-04	1.22E-03	11.0000	6.769E+00
Pa-231	3.8511E-09	489.71	979.43	0.00E+00	1.89E-06	3.77E-06		
Pb-210	7.3880E-15	489.71	979.43	0.00E+00	3.62E-12	7.24E-12		
Pm-147	2.1023E+00	489.71	979.43	0.00E+00	1.03E+03	2.06E+03		
Pu-238	1.0383E-03	489.71	979.43	0.00E+00	5.08E-01	1.02E+00		
Pu-239	5.5293E-03	489.71	979.43	0.00E+00	2.71E+00	5.42E+00		
Pu-240	2.1278E-03	489.71	979.43	0.00E+00	1.04E+00	2.08E+00		
Pu-241	1.0195E-01	489.71	979.43	0.00E+00	4.99E+01	9.99E+01		
Pu-242	2.3128E-07	489.71	979.43	0.00E+00	1.13E-04	2.27E-04		
Ra-226	5.2782E-14	489.71	979.43	0.00E+00	2.58E-11	5.17E-11		
Ra-228	1.9338E-10	489.71	979.43	0.00E+00	9.47E-08	1.89E-07		
Ru-106	9.1684E-02	489.71	979.43	0.00E+00	4.49E+01	8.98E+01		
Se-79	1.3018E-05	489.71	979.43	0.00E+00	6.38E-03	1.28E-02		
Sn-126	1.2167E-05	489.71	979.43	0.00E+00	5.96E-03	1.19E-02		
Sr-90	2.6045E+00	489.71	979.43	0.00E+00	1.28E+03	2.55E+03		
Tc-99	4.4241E-04	489.71	979.43	0.00E+00	2.17E-01	4.33E-01		
Th-229	1.3713E-10	489.71	979.43	0.00E+00	6.72E-08	1.34E-07		
Th-230	1.8090E-11	489.71	979.43	0.00E+00	8.86E-09	1.77E-08		
Th-232	2.5278E-10	489.71	979.43	0.00E+00	1.24E-07	2.48E-07		
Tl-208	1.6947E-08	489.71	979.43	0.00E+00	8.30E-06	1.66E-05		
U-232	4.8737E-08	489.71	979.43	0.00E+00	2.39E-05	4.77E-05		
U-233	1.2203E-07	489.71	979.43	0.00E+00	5.98E-05	1.20E-04		
U-234	1.5925E-07	489.71	979.43	0.00E+00	7.80E-05	1.56E-04		
U-235	-2.6194E-06	489.71	0.00	8.01E-03	6.72E-03	8.01E-03		
U-236	1.2693E-05	489.71	979.43	0.00E+00	6.22E-03	1.24E-02		
U-238	-3.6331E-08	489.71	0.00	4.98E-03	4.96E-03	4.98E-03		
Y-90	2.6060E+00	489.71	979.43	0.00E+00	1.28E+03	2.55E+03		
Other Radionuclides					1.77E+03	3.53E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.85E+01	5.70E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	90.27	489.71
Bounding:		979.43

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.78	5.42
Bounding:	1.55	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 ANL-W
SNF ID #: 353
Fuel Units & Descr: 2 - ELEMENT
Heavy Metal Mass: BOL=0.39kg; EOL=0.17kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1994
Estimates as of: 2010
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: 15 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	1.9744E-09	209.82	372.30	0.00E+00	4.14E-07	7.35E-07
Am-241	2.8150E-03	209.82	372.30	0.00E+00	5.91E-01	1.05E+00
Am-242m	1.3501E-06	209.82	372.30	0.00E+00	2.83E-04	5.03E-04
Am-243	1.4761E-07	209.82	372.30	0.00E+00	3.10E-05	5.50E-05
C-14	1.2854E-04	209.82	372.30	0.00E+00	2.70E-02	4.79E-02
Cl-36	2.8120E-06	209.82	372.30	0.00E+00	5.90E-04	1.05E-03
Cm-243	1.4075E-07	209.82	372.30	0.00E+00	2.95E-05	5.24E-05
Cm-244	1.1570E-06	209.82	372.30	0.00E+00	2.43E-04	4.31E-04
Co-60	3.4481E-01	209.82	372.30	0.00E+00	7.23E+01	1.28E+02
Cs-134	3.1474E-03	209.82	372.30	0.00E+00	6.60E-01	1.17E+00
Cs-135	3.2195E-05	209.82	372.30	0.00E+00	6.76E-03	1.20E-02
Cs-137	2.1880E+00	209.82	372.30	0.00E+00	4.59E+02	8.15E+02
Eu-154	6.8647E-03	209.82	372.30	0.00E+00	1.44E+00	2.56E+00
Eu-155	7.2481E-03	209.82	372.30	0.00E+00	1.52E+00	2.70E+00
Fe-55	5.3744E-02	209.82	372.30	0.00E+00	1.13E+01	2.00E+01
H-3	6.3414E-03	209.82	372.30	0.00E+00	1.33E+00	2.36E+00
I-129	7.3684E-07	209.82	372.30	0.00E+00	1.55E-04	2.74E-04
Kr-85	1.3236E-01	209.82	372.30	0.00E+00	2.78E+01	4.93E+01
Np-237	1.2504E-06	209.82	372.30	0.00E+00	2.62E-04	4.66E-04
Pa-231	5.9774E-09	209.82	372.30	0.00E+00	1.25E-06	2.23E-06
Pb-210	3.3534E-14	209.82	372.30	0.00E+00	7.04E-12	1.25E-11
Pm-147	1.5002E-01	209.82	372.30	0.00E+00	3.15E+01	5.59E+01
Pu-238	9.5970E-04	209.82	372.30	0.00E+00	2.01E-01	3.57E-01
Pu-239	5.5278E-03	209.82	372.30	0.00E+00	1.16E+00	2.06E+00
Pu-240	2.1248E-03	209.82	372.30	0.00E+00	4.46E-01	7.91E-01
Pu-241	6.3023E-02	209.82	372.30	0.00E+00	1.32E+01	2.35E+01
Pu-242	2.3128E-07	209.82	372.30	0.00E+00	4.85E-05	8.61E-05
Ra-226	1.6346E-13	209.82	372.30	0.00E+00	3.43E-11	6.09E-11
Ra-228	2.3173E-10	209.82	372.30	0.00E+00	4.86E-08	8.63E-08
Ru-106	9.5038E-05	209.82	372.30	0.00E+00	1.99E-02	3.54E-02
Se-79	1.3017E-05	209.82	372.30	0.00E+00	2.73E-03	4.85E-03
Sn-126	1.2165E-05	209.82	372.30	0.00E+00	2.55E-03	4.53E-03
Sr-90	2.0541E+00	209.82	372.30	0.00E+00	4.31E+02	7.65E+02
Tc-99	4.4241E-04	209.82	372.30	0.00E+00	9.28E-02	1.65E-01
Th-229	2.5218E-10	209.82	372.30	0.00E+00	5.29E-08	9.39E-08
Th-230	3.3654E-11	209.82	372.30	0.00E+00	7.06E-09	1.25E-08
Th-232	2.5278E-10	209.82	372.30	0.00E+00	5.30E-08	9.41E-08
Tl-208	1.6511E-08	209.82	372.30	0.00E+00	3.46E-06	6.15E-06
U-232	4.4722E-08	209.82	372.30	0.00E+00	9.38E-06	1.66E-05
U-233	1.2209E-07	209.82	372.30	0.00E+00	2.56E-05	4.55E-05
U-234	1.8662E-07	209.82	372.30	0.00E+00	3.92E-05	6.95E-05
U-235	-2.6194E-06	209.82	0.00	1.69E-04	0.00E+00	1.69E-04
U-236	1.2693E-05	209.82	372.30	0.00E+00	2.66E-03	4.73E-03
U-238	-3.6331E-08	209.82	0.00	1.05E-04	9.72E-05	1.05E-04
Y-90	2.0541E+00	209.82	372.30	0.00E+00	4.31E+02	7.65E+02
Other Radionuclides					4.54E+02	8.05E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.223E+13
0.0250	8.827E+12
0.0375	7.620E+12
0.0575	8.176E+12
0.0850	4.945E+12
0.1250	3.239E+12
0.2250	4.234E+12
0.3750	1.877E+12
0.5750	3.046E+13
0.8500	3.853E+11
1.2500	9.656E+12
1.7500	9.200E+09
2.2500	5.808E+07
2.7500	6.581E+05
3.5000	3.725E+04
5.0000	1.940E+02
7.0000	2.192E+01
11.0000	2.495E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.40E+00	1.14E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	13.30	209.82	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	15.99	372.30	Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	15.78	15.77	2.07
Bounding:	27.99	23.28	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 ANL-W
SNF ID #: 370
Fuel Units & Descr: 40 - ELEMENT
Heavy Metal Mass: BOL=7.12kg; EOL=6.86kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1994
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10'
0.36

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.9744E-09	248.20	496.40	0.00E+00	4.90E-07	9.80E-07
Am-241	2.8150E-03	248.20	496.40	0.00E+00	6.99E-01	1.40E+00
Am-242m	1.3501E-06	248.20	496.40	0.00E+00	3.35E-04	6.70E-04
Am-243	1.4761E-07	248.20	496.40	0.00E+00	3.66E-05	7.33E-05
C-14	1.2854E-04	248.20	496.40	0.00E+00	3.19E-02	6.38E-02
Cl-36	2.8120E-06	248.20	496.40	0.00E+00	6.98E-04	1.40E-03
Cm-243	1.4075E-07	248.20	496.40	0.00E+00	3.49E-05	6.99E-05
Cm-244	1.1570E-06	248.20	496.40	0.00E+00	2.87E-04	5.74E-04
Co-60	3.4481E-01	248.20	496.40	0.00E+00	8.56E+01	1.71E+02
Cs-134	3.1474E-03	248.20	496.40	0.00E+00	7.81E-01	1.56E+00
Cs-135	3.2195E-05	248.20	496.40	0.00E+00	7.99E-03	1.60E-02
Cs-137	2.1880E+00	248.20	496.40	0.00E+00	5.43E+02	1.09E+03
Eu-154	6.8647E-03	248.20	496.40	0.00E+00	1.70E+00	3.41E+00
Eu-155	7.2481E-03	248.20	496.40	0.00E+00	1.80E+00	3.60E+00
Fe-55	5.3744E-02	248.20	496.40	0.00E+00	1.33E+01	2.67E+01
H-3	6.3414E-03	248.20	496.40	0.00E+00	1.57E+00	3.15E+00
I-129	7.3684E-07	248.20	496.40	0.00E+00	1.83E-04	3.66E-04
Kr-85	1.3236E-01	248.20	496.40	0.00E+00	3.29E+01	6.57E+01
Np-237	1.2504E-06	248.20	496.40	0.00E+00	3.10E-04	6.21E-04
Pa-231	5.9774E-09	248.20	496.40	0.00E+00	1.48E-06	2.97E-06
Pb-210	3.3534E-14	248.20	496.40	0.00E+00	8.32E-12	1.66E-11
Pm-147	1.5002E-01	248.20	496.40	0.00E+00	3.72E+01	7.45E+01
Pu-238	9.5970E-04	248.20	496.40	0.00E+00	2.38E-01	4.76E-01
Pu-239	5.5278E-03	248.20	496.40	0.00E+00	1.37E+00	2.74E+00
Pu-240	2.1248E-03	248.20	496.40	0.00E+00	5.27E-01	1.05E+00
Pu-241	6.3023E-02	248.20	496.40	0.00E+00	1.56E+01	3.13E+01
Pu-242	2.3128E-07	248.20	496.40	0.00E+00	5.74E-05	1.15E-04
Ra-226	1.6346E-13	248.20	496.40	0.00E+00	4.06E-11	8.11E-11
Ra-228	2.3173E-10	248.20	496.40	0.00E+00	5.75E-08	1.15E-07
Ru-106	9.5038E-05	248.20	496.40	0.00E+00	2.36E-02	4.72E-02
Se-79	1.3017E-05	248.20	496.40	0.00E+00	3.23E-03	6.46E-03
Sn-126	1.2165E-05	248.20	496.40	0.00E+00	3.02E-03	6.04E-03
Sr-90	2.0541E+00	248.20	496.40	0.00E+00	5.10E+02	1.02E+03
Tc-99	4.4241E-04	248.20	496.40	0.00E+00	1.10E-01	2.20E-01
Th-229	2.5218E-10	248.20	496.40	0.00E+00	6.26E-08	1.25E-07
Th-230	3.3654E-11	248.20	496.40	0.00E+00	8.35E-09	1.67E-08
Th-232	2.5278E-10	248.20	496.40	0.00E+00	6.27E-08	1.25E-07
Tl-208	1.6511E-08	248.20	496.40	0.00E+00	4.10E-06	8.20E-06
U-232	4.4722E-08	248.20	496.40	0.00E+00	1.11E-05	2.22E-05
U-233	1.2209E-07	248.20	496.40	0.00E+00	3.03E-05	6.06E-05
U-234	1.8662E-07	248.20	496.40	0.00E+00	4.63E-05	9.26E-05
U-235	-2.6194E-06	248.20	0.00	3.03E-03	2.38E-03	3.03E-03
U-236	1.2693E-05	248.20	496.40	0.00E+00	3.15E-03	6.30E-03
U-238	-3.6331E-08	248.20	0.00	1.92E-03	1.91E-03	1.92E-03
Y-90	2.0541E+00	248.20	496.40	0.00E+00	5.10E+02	1.02E+03
Other Radionuclides					5.37E+02	1.07E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.630E+13
0.0250	1.177E+13
0.0375	1.016E+13
0.0575	1.090E+13
0.0850	6.594E+12
0.1250	4.318E+12
0.2250	5.646E+12
0.3750	2.503E+12
0.5750	4.061E+13
0.8500	5.138E+11
1.2500	1.287E+13
1.7500	1.227E+10
2.2500	7.744E+07
2.7500	8.774E+05
3.5000	4.967E+04
5.0000	2.628E+02
7.0000	2.970E+01
11.0000	3.381E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.57E+00	1.51E+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 %:	19.66292135	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	173.48	248.20	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	291.92	496.40	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.02	1.43
Bounding:	2.04	1.70

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 AUSTRIA
SNF ID #: 469
Fuel Units & Descr: 30 - ELEMENT
Heavy Metal Mass: BOL=5.85kg; EOL=5.643kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.85
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage:

18"x10'
0.27

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	197.60	395.21	0.00E+00	1.68E-07	3.37E-07
Am-241	1.8331E-03	197.60	395.21	0.00E+00	3.62E-01	7.24E-01
Am-242m	1.4129E-06	197.60	395.21	0.00E+00	2.79E-04	5.58E-04
Am-243	1.4774E-07	197.60	395.21	0.00E+00	2.92E-05	5.84E-05
C-14	1.2871E-04	197.60	395.21	0.00E+00	2.54E-02	5.09E-02
Cl-36	2.8120E-06	197.60	395.21	0.00E+00	5.56E-04	1.11E-03
Cm-243	1.7940E-07	197.60	395.21	0.00E+00	3.54E-05	7.09E-05
Cm-244	1.6962E-06	197.60	395.21	0.00E+00	3.35E-04	6.70E-04
Co-60	1.2839E+00	197.60	395.21	0.00E+00	2.54E+02	5.07E+02
Cs-134	9.0541E-02	197.60	395.21	0.00E+00	1.79E+01	3.58E+01
Cs-135	3.2195E-05	197.60	395.21	0.00E+00	6.36E-03	1.27E-02
Cs-137	2.7564E+00	197.60	395.21	0.00E+00	5.45E+02	1.09E+03
Eu-154	1.5368E-02	197.60	395.21	0.00E+00	3.04E+00	6.07E+00
Eu-155	2.9293E-02	197.60	395.21	0.00E+00	5.79E+00	1.16E+01
Fe-55	7.7158E-01	197.60	395.21	0.00E+00	1.52E+02	3.05E+02
H-3	1.1111E-02	197.60	395.21	0.00E+00	2.20E+00	4.39E+00
I-129	7.3684E-07	197.60	395.21	0.00E+00	1.46E-04	2.91E-04
Kr-85	2.5263E-01	197.60	395.21	0.00E+00	4.99E+01	9.98E+01
Np-237	1.2427E-06	197.60	395.21	0.00E+00	2.46E-04	4.91E-04
Pa-231	3.8511E-09	197.60	395.21	0.00E+00	7.61E-07	1.52E-06
Pb-210	7.3880E-15	197.60	395.21	0.00E+00	1.46E-12	2.92E-12
Pm-147	2.1023E+00	197.60	395.21	0.00E+00	4.15E+02	8.31E+02
Pu-238	1.0383E-03	197.60	395.21	0.00E+00	2.05E-01	4.10E-01
Pu-239	5.5293E-03	197.60	395.21	0.00E+00	1.09E+00	2.19E+00
Pu-240	2.1278E-03	197.60	395.21	0.00E+00	4.20E-01	8.41E-01
Pu-241	1.0195E-01	197.60	395.21	0.00E+00	2.01E+01	4.03E+01
Pu-242	2.3128E-07	197.60	395.21	0.00E+00	4.57E-05	9.14E-05
Ra-226	5.2782E-14	197.60	395.21	0.00E+00	1.04E-11	2.09E-11
Ra-228	1.9338E-10	197.60	395.21	0.00E+00	3.82E-08	7.64E-08
Ru-106	9.1684E-02	197.60	395.21	0.00E+00	1.81E+01	3.62E+01
Se-79	1.3018E-05	197.60	395.21	0.00E+00	2.57E-03	5.14E-03
Sn-126	1.2167E-05	197.60	395.21	0.00E+00	2.40E-03	4.81E-03
Sr-90	2.6045E+00	197.60	395.21	0.00E+00	5.15E+02	1.03E+03
Tc-99	4.4241E-04	197.60	395.21	0.00E+00	8.74E-02	1.75E-01
Th-229	1.3713E-10	197.60	395.21	0.00E+00	2.71E-08	5.42E-08
Th-230	1.8090E-11	197.60	395.21	0.00E+00	3.57E-09	7.15E-09
Th-232	2.5278E-10	197.60	395.21	0.00E+00	5.00E-08	9.99E-08
Tl-208	1.6947E-08	197.60	395.21	0.00E+00	3.35E-06	6.70E-06
U-232	4.8737E-08	197.60	395.21	0.00E+00	9.63E-06	1.93E-05
U-233	1.2203E-07	197.60	395.21	0.00E+00	2.41E-05	4.82E-05
U-234	1.5925E-07	197.60	395.21	0.00E+00	3.15E-05	6.29E-05
U-235	-2.6194E-06	197.60	0.00	2.53E-03	2.01E-03	2.53E-03
U-236	1.2693E-05	197.60	395.21	0.00E+00	2.51E-03	5.02E-03
U-238	-3.6331E-08	197.60	0.00	1.57E-03	1.57E-03	1.57E-03
Y-90	2.6060E+00	197.60	395.21	0.00E+00	5.15E+02	1.03E+03
Other Radionuclides					7.12E+02	1.42E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.388E+13
0.0250	1.406E+13
0.0375	1.197E+13
0.0575	1.229E+13
0.0850	7.611E+12
0.1250	5.527E+12
0.2250	6.457E+12
0.3750	3.277E+12
0.5750	4.356E+13
0.8500	1.869E+12
1.2500	3.797E+13
1.7500	2.531E+10
2.2500	4.079E+10
2.7500	3.237E+08
3.5000	3.767E+07
5.0000	2.108E+02
7.0000	2.386E+01
11.0000	2.718E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.18E+01	2.30E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000041	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	57.01	197.60	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		395.21	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.99	3.47	1.00
Bounding:	1.98		

[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 BRAZIL
SNF ID #: 1063
Fuel Units & Descr: 9 - ELEMENT
Heavy Metal Mass: BOL=1.755kg; EOL=1.741kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2006
Estimates as of: 2010
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' 0.08

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	8.5173E-10	17.10	34.21	0.00E+00	1.46E-08	2.91E-08
Am-241	1.8331E-03	17.10	34.21	0.00E+00	3.14E-02	6.27E-02
Am-242m	1.4129E-06	17.10	34.21	0.00E+00	2.42E-05	4.83E-05
Am-243	1.4774E-07	17.10	34.21	0.00E+00	2.53E-06	5.05E-06
C-14	1.2871E-04	17.10	34.21	0.00E+00	2.20E-03	4.40E-03
Cl-36	2.8120E-06	17.10	34.21	0.00E+00	4.81E-05	9.62E-05
Cm-243	1.7940E-07	17.10	34.21	0.00E+00	3.07E-06	6.14E-06
Cm-244	1.6962E-06	17.10	34.21	0.00E+00	2.90E-05	5.80E-05
Co-60	1.2839E+00	17.10	34.21	0.00E+00	2.20E+01	4.39E+01
Cs-134	9.0541E-02	17.10	34.21	0.00E+00	1.55E+00	3.10E+00
Cs-135	3.2195E-05	17.10	34.21	0.00E+00	5.51E-04	1.10E-03
Cs-137	2.7564E+00	17.10	34.21	0.00E+00	4.71E+01	9.43E+01
Eu-154	1.5368E-02	17.10	34.21	0.00E+00	2.63E-01	5.26E-01
Eu-155	2.9293E-02	17.10	34.21	0.00E+00	5.01E-01	1.00E+00
Fe-55	7.7158E-01	17.10	34.21	0.00E+00	1.32E+01	2.64E+01
H-3	1.1111E-02	17.10	34.21	0.00E+00	1.90E-01	3.80E-01
I-129	7.3684E-07	17.10	34.21	0.00E+00	1.26E-05	2.52E-05
Kr-85	2.5263E-01	17.10	34.21	0.00E+00	4.32E+00	8.64E+00
Np-237	1.2427E-06	17.10	34.21	0.00E+00	2.13E-05	4.25E-05
Pa-231	3.8511E-09	17.10	34.21	0.00E+00	6.59E-08	1.32E-07
Pb-210	7.3880E-15	17.10	34.21	0.00E+00	1.26E-13	2.53E-13
Pm-147	2.1023E+00	17.10	34.21	0.00E+00	3.60E+01	7.19E+01
Pu-238	1.0383E-03	17.10	34.21	0.00E+00	1.78E-02	3.55E-02
Pu-239	5.5293E-03	17.10	34.21	0.00E+00	9.46E-02	1.89E-01
Pu-240	2.1278E-03	17.10	34.21	0.00E+00	3.64E-02	7.28E-02
Pu-241	1.0195E-01	17.10	34.21	0.00E+00	1.74E+00	3.49E+00
Pu-242	2.3128E-07	17.10	34.21	0.00E+00	3.96E-06	7.91E-06
Ra-226	5.2782E-14	17.10	34.21	0.00E+00	9.03E-13	1.81E-12
Ra-228	1.9338E-10	17.10	34.21	0.00E+00	3.31E-09	6.62E-09
Ru-106	9.1684E-02	17.10	34.21	0.00E+00	1.57E+00	3.14E+00
Se-79	1.3018E-05	17.10	34.21	0.00E+00	2.23E-04	4.45E-04
Sn-126	1.2167E-05	17.10	34.21	0.00E+00	2.08E-04	4.16E-04
Sr-90	2.6045E+00	17.10	34.21	0.00E+00	4.45E+01	8.91E+01
Tc-99	4.4241E-04	17.10	34.21	0.00E+00	7.57E-03	1.51E-02
Th-229	1.3713E-10	17.10	34.21	0.00E+00	2.35E-09	4.69E-09
Th-230	1.8090E-11	17.10	34.21	0.00E+00	3.09E-10	6.19E-10
Th-232	2.5278E-10	17.10	34.21	0.00E+00	4.32E-09	8.65E-09
Tl-208	1.6947E-08	17.10	34.21	0.00E+00	2.90E-07	5.80E-07
U-232	4.8737E-08	17.10	34.21	0.00E+00	8.34E-07	1.67E-06
U-233	1.2203E-07	17.10	34.21	0.00E+00	2.09E-06	4.17E-06
U-234	1.5925E-07	17.10	34.21	0.00E+00	2.72E-06	5.45E-06
U-235	-2.6194E-06	17.10	0.00	7.59E-04	7.14E-04	7.59E-04
U-236	1.2693E-05	17.10	34.21	0.00E+00	2.17E-04	4.34E-04
U-238	-3.6331E-08	17.10	0.00	4.72E-04	4.71E-04	4.72E-04
Y-90	2.6060E+00	17.10	34.21	0.00E+00	4.46E+01	8.91E+01
Other Radionuclides					6.17E+01	1.23E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.529E+12
0.0250	1.217E+12
0.0375	1.036E+12
0.0575	1.063E+12
0.0850	6.588E+11
0.1250	4.784E+11
0.2250	5.589E+11
0.3750	2.836E+11
0.5750	3.770E+12
0.8500	1.618E+11
1.2500	3.286E+12
1.7500	2.191E+09
2.2500	3.531E+09
2.7500	2.802E+07
3.5000	3.261E+06
5.0000	1.902E+01
7.0000	2.155E+00
11.0000	2.455E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.95E-01	1.99E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	17.10	13.75
Bounding:		34.21

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.29	0.80
Bounding:	0.57	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 CORNELL
SNF ID #: 246
Fuel Units & Descr: 115 - ELEMENT
Heavy Metal Mass: BOL=21.896kg; EOL=21.586kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.04

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	320.10	640.20	0.00E+00	2.73E-07	5.45E-07	Avg. MeV	
Am-241	1.8331E-03	320.10	640.20	0.00E+00	5.87E-01	1.17E+00	0.0150	1.035E+14
Am-242m	1.4129E-06	320.10	640.20	0.00E+00	4.52E-04	9.05E-04	0.0250	2.277E+13
Am-243	1.4774E-07	320.10	640.20	0.00E+00	4.73E-05	9.46E-05	0.0375	1.939E+13
C-14	1.2871E-04	320.10	640.20	0.00E+00	4.12E-02	8.24E-02	0.0575	1.990E+13
Cl-36	2.8120E-06	320.10	640.20	0.00E+00	9.00E-04	1.80E-03	0.0850	1.233E+13
Cm-243	1.7940E-07	320.10	640.20	0.00E+00	5.74E-05	1.15E-04	0.1250	8.953E+12
Cm-244	1.6962E-06	320.10	640.20	0.00E+00	5.43E-04	1.09E-03	0.2250	1.046E+13
Co-60	1.2839E+00	320.10	640.20	0.00E+00	4.11E+02	8.22E+02	0.3750	5.308E+12
Cs-134	9.0541E-02	320.10	640.20	0.00E+00	2.90E+01	5.80E+01	0.5750	7.056E+13
Cs-135	3.2195E-05	320.10	640.20	0.00E+00	1.03E-02	2.06E-02	0.8500	3.028E+12
Cs-137	2.7564E+00	320.10	640.20	0.00E+00	8.82E+02	1.76E+03	1.2500	6.150E+13
Eu-154	1.5368E-02	320.10	640.20	0.00E+00	4.92E+00	9.84E+00	1.7500	4.100E+10
Eu-155	2.9293E-02	320.10	640.20	0.00E+00	9.38E+00	1.88E+01	2.2500	6.608E+10
Fe-55	7.7158E-01	320.10	640.20	0.00E+00	2.47E+02	4.94E+02	2.7500	5.244E+08
H-3	1.1111E-02	320.10	640.20	0.00E+00	3.56E+00	7.11E+00	3.5000	6.103E+07
I-129	7.3684E-07	320.10	640.20	0.00E+00	2.36E-04	4.72E-04	5.0000	3.491E+02
Kr-85	2.5263E-01	320.10	640.20	0.00E+00	8.09E+01	1.62E+02	7.0000	3.954E+01
Np-237	1.2427E-06	320.10	640.20	0.00E+00	3.98E-04	7.96E-04	11.0000	4.505E+00
Pa-231	3.8511E-09	320.10	640.20	0.00E+00	1.23E-06	2.47E-06		
Pb-210	7.3880E-15	320.10	640.20	0.00E+00	2.36E-12	4.73E-12		
Pm-147	2.1023E+00	320.10	640.20	0.00E+00	6.73E+02	1.35E+03		
Pu-238	1.0383E-03	320.10	640.20	0.00E+00	3.32E-01	6.65E-01		
Pu-239	5.5293E-03	320.10	640.20	0.00E+00	1.77E+00	3.54E+00		
Pu-240	2.1278E-03	320.10	640.20	0.00E+00	6.81E-01	1.36E+00		
Pu-241	1.0195E-01	320.10	640.20	0.00E+00	3.26E+01	6.53E+01		
Pu-242	2.3128E-07	320.10	640.20	0.00E+00	7.40E-05	1.48E-04		
Ra-226	5.2782E-14	320.10	640.20	0.00E+00	1.69E-11	3.38E-11		
Ra-228	1.9338E-10	320.10	640.20	0.00E+00	6.19E-08	1.24E-07		
Ru-106	9.1684E-02	320.10	640.20	0.00E+00	2.93E+01	5.87E+01		
Se-79	1.3018E-05	320.10	640.20	0.00E+00	4.17E-03	8.33E-03		
Sn-126	1.2167E-05	320.10	640.20	0.00E+00	3.89E-03	7.79E-03		
Sr-90	2.6045E+00	320.10	640.20	0.00E+00	8.34E+02	1.67E+03		
Tc-99	4.4241E-04	320.10	640.20	0.00E+00	1.42E-01	2.83E-01		
Th-229	1.3713E-10	320.10	640.20	0.00E+00	4.39E-08	8.78E-08		
Th-230	1.8090E-11	320.10	640.20	0.00E+00	5.79E-09	1.16E-08		
Th-232	2.5278E-10	320.10	640.20	0.00E+00	8.09E-08	1.62E-07		
Tl-208	1.6947E-08	320.10	640.20	0.00E+00	5.42E-06	1.08E-05		
U-232	4.8737E-08	320.10	640.20	0.00E+00	1.56E-05	3.12E-05		
U-233	1.2203E-07	320.10	640.20	0.00E+00	3.91E-05	7.81E-05		
U-234	1.5925E-07	320.10	640.20	0.00E+00	5.10E-05	1.02E-04		
U-235	-2.6194E-06	320.10	0.00	9.45E-03	8.61E-03	9.45E-03		
U-236	1.2693E-05	320.10	640.20	0.00E+00	4.06E-03	8.13E-03		
U-238	-3.6331E-08	320.10	0.00	5.89E-03	5.88E-03	5.89E-03		
Y-90	2.6060E+00	320.10	640.20	0.00E+00	8.34E+02	1.67E+03		
Other Radionuclides					1.15E+03	2.31E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.86E+01	3.73E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.97350572	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	320.10	296.41	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		640.20	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.43	0.93	1.00
Bounding:	0.86		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 DOW
SNF ID #: 251
Fuel Units & Descr: 77 - ELEMENT
Heavy Metal Mass: BOL=15.015kg; EOL=14.63kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.69

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	367.52	735.05	0.00E+00	3.13E-07	6.26E-07
Am-241	1.8331E-03	367.52	735.05	0.00E+00	6.74E-01	1.35E+00
Am-242m	1.4129E-06	367.52	735.05	0.00E+00	5.19E-04	1.04E-03
Am-243	1.4774E-07	367.52	735.05	0.00E+00	5.43E-05	1.09E-04
C-14	1.2871E-04	367.52	735.05	0.00E+00	4.73E-02	9.46E-02
Cl-36	2.8120E-06	367.52	735.05	0.00E+00	1.03E-03	2.07E-03
Cm-243	1.7940E-07	367.52	735.05	0.00E+00	6.59E-05	1.32E-04
Cm-244	1.6962E-06	367.52	735.05	0.00E+00	6.23E-04	1.25E-03
Co-60	1.2839E+00	367.52	735.05	0.00E+00	4.72E+02	9.44E+02
Cs-134	9.0541E-02	367.52	735.05	0.00E+00	3.33E+01	6.66E+01
Cs-135	3.2195E-05	367.52	735.05	0.00E+00	1.18E-02	2.37E-02
Cs-137	2.7564E+00	367.52	735.05	0.00E+00	1.01E+03	2.03E+03
Eu-154	1.5368E-02	367.52	735.05	0.00E+00	5.65E+00	1.13E+01
Eu-155	2.9293E-02	367.52	735.05	0.00E+00	1.08E+01	2.15E+01
Fe-55	7.7158E-01	367.52	735.05	0.00E+00	2.84E+02	5.67E+02
H-3	1.1111E-02	367.52	735.05	0.00E+00	4.08E+00	8.17E+00
I-129	7.3684E-07	367.52	735.05	0.00E+00	2.71E-04	5.42E-04
Kr-85	2.5263E-01	367.52	735.05	0.00E+00	9.28E+01	1.86E+02
Np-237	1.2427E-06	367.52	735.05	0.00E+00	4.57E-04	9.13E-04
Pa-231	3.8511E-09	367.52	735.05	0.00E+00	1.42E-06	2.83E-06
Pb-210	7.3880E-15	367.52	735.05	0.00E+00	2.72E-12	5.43E-12
Pm-147	2.1023E+00	367.52	735.05	0.00E+00	7.73E+02	1.55E+03
Pu-238	1.0383E-03	367.52	735.05	0.00E+00	3.82E-01	7.63E-01
Pu-239	5.5293E-03	367.52	735.05	0.00E+00	2.03E+00	4.06E+00
Pu-240	2.1278E-03	367.52	735.05	0.00E+00	7.82E-01	1.56E+00
Pu-241	1.0195E-01	367.52	735.05	0.00E+00	3.75E+01	7.49E+01
Pu-242	2.3128E-07	367.52	735.05	0.00E+00	8.50E-05	1.70E-04
Ra-226	5.2782E-14	367.52	735.05	0.00E+00	1.94E-11	3.88E-11
Ra-228	1.9338E-10	367.52	735.05	0.00E+00	7.11E-08	1.42E-07
Ru-106	9.1684E-02	367.52	735.05	0.00E+00	3.37E+01	6.74E+01
Se-79	1.3018E-05	367.52	735.05	0.00E+00	4.78E-03	9.57E-03
Sn-126	1.2167E-05	367.52	735.05	0.00E+00	4.47E-03	8.94E-03
Sr-90	2.6045E+00	367.52	735.05	0.00E+00	9.57E+02	1.91E+03
Tc-99	4.4241E-04	367.52	735.05	0.00E+00	1.63E-01	3.25E-01
Th-229	1.3713E-10	367.52	735.05	0.00E+00	5.04E-08	1.01E-07
Th-230	1.8090E-11	367.52	735.05	0.00E+00	6.65E-09	1.33E-08
Th-232	2.5278E-10	367.52	735.05	0.00E+00	9.29E-08	1.86E-07
Tl-208	1.6947E-08	367.52	735.05	0.00E+00	6.23E-06	1.25E-05
U-232	4.8737E-08	367.52	735.05	0.00E+00	1.79E-05	3.58E-05
U-233	1.2203E-07	367.52	735.05	0.00E+00	4.48E-05	8.97E-05
U-234	1.5925E-07	367.52	735.05	0.00E+00	5.85E-05	1.17E-04
U-235	-2.6194E-06	367.52	0.00	6.49E-03	5.53E-03	6.49E-03
U-236	1.2693E-05	367.52	735.05	0.00E+00	4.67E-03	9.33E-03
U-238	-3.6331E-08	367.52	0.00	4.04E-03	4.02E-03	4.04E-03
Y-90	2.6060E+00	367.52	735.05	0.00E+00	9.58E+02	1.92E+03
Other Radionuclides					1.33E+03	2.65E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.188E+14
0.0250	2.614E+13
0.0375	2.226E+13
0.0575	2.285E+13
0.0850	1.416E+13
0.1250	1.028E+13
0.2250	1.201E+13
0.3750	6.094E+12
0.5750	8.102E+13
0.8500	3.477E+12
1.2500	7.061E+13
1.7500	4.707E+10
2.2500	7.587E+10
2.7500	6.021E+08
3.5000	7.007E+07
5.0000	3.946E+02
7.0000	4.467E+01
11.0000	5.089E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.14E+01	4.28E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	219.50	367.52
Bounding:		735.05

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.72	1.67
Bounding:	1.44	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 ENGLAND
SNF ID #: 485
Fuel Units & Descr: 84 - ELEMENT
Heavy Metal Mass: BOL=16.187kg; EOL=15.826kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.85
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10" 0.76

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	394.39	788.78	0.00E+00	3.36E-07	6.72E-07
Am-241	1.8331E-03	394.39	788.78	0.00E+00	7.23E-01	1.45E+00
Am-242m	1.4129E-06	394.39	788.78	0.00E+00	5.57E-04	1.11E-03
Am-243	1.4774E-07	394.39	788.78	0.00E+00	5.83E-05	1.17E-04
C-14	1.2871E-04	394.39	788.78	0.00E+00	5.08E-02	1.02E-01
Cl-36	2.8120E-06	394.39	788.78	0.00E+00	1.11E-03	2.22E-03
Cm-243	1.7940E-07	394.39	788.78	0.00E+00	7.08E-05	1.42E-04
Cm-244	1.6962E-06	394.39	788.78	0.00E+00	6.69E-04	1.34E-03
Co-60	1.2839E+00	394.39	788.78	0.00E+00	5.06E+02	1.01E+03
Cs-134	9.0541E-02	394.39	788.78	0.00E+00	3.57E+01	7.14E+01
Cs-135	3.2195E-05	394.39	788.78	0.00E+00	1.27E-02	2.54E-02
Cs-137	2.7564E+00	394.39	788.78	0.00E+00	1.09E+03	2.17E+03
Eu-154	1.5368E-02	394.39	788.78	0.00E+00	6.06E+00	1.21E+01
Eu-155	2.9293E-02	394.39	788.78	0.00E+00	1.16E+01	2.31E+01
Fe-55	7.7158E-01	394.39	788.78	0.00E+00	3.04E+02	6.09E+02
H-3	1.1111E-02	394.39	788.78	0.00E+00	4.38E+00	8.76E+00
I-129	7.3684E-07	394.39	788.78	0.00E+00	2.91E-04	5.81E-04
Kr-85	2.5263E-01	394.39	788.78	0.00E+00	9.96E+01	1.99E+02
Np-237	1.2427E-06	394.39	788.78	0.00E+00	4.90E-04	9.80E-04
Pa-231	3.8511E-09	394.39	788.78	0.00E+00	1.52E-06	3.04E-06
Pb-210	7.3880E-15	394.39	788.78	0.00E+00	2.91E-12	5.83E-12
Pm-147	2.1023E+00	394.39	788.78	0.00E+00	8.29E+02	1.66E+03
Pu-238	1.0383E-03	394.39	788.78	0.00E+00	4.10E-01	8.19E-01
Pu-239	5.5293E-03	394.39	788.78	0.00E+00	2.18E+00	4.36E+00
Pu-240	2.1278E-03	394.39	788.78	0.00E+00	8.39E-01	1.68E+00
Pu-241	1.0195E-01	394.39	788.78	0.00E+00	4.02E+01	8.04E+01
Pu-242	2.3128E-07	394.39	788.78	0.00E+00	9.12E-05	1.82E-04
Ra-226	5.2782E-14	394.39	788.78	0.00E+00	2.08E-11	4.16E-11
Ra-228	1.9338E-10	394.39	788.78	0.00E+00	7.63E-08	1.53E-07
Ru-106	9.1684E-02	394.39	788.78	0.00E+00	3.62E+01	7.23E+01
Se-79	1.3018E-05	394.39	788.78	0.00E+00	5.13E-03	1.03E-02
Sn-126	1.2167E-05	394.39	788.78	0.00E+00	4.80E-03	9.60E-03
Sr-90	2.6045E+00	394.39	788.78	0.00E+00	1.03E+03	2.05E+03
Tc-99	4.4241E-04	394.39	788.78	0.00E+00	1.74E-01	3.49E-01
Th-229	1.3713E-10	394.39	788.78	0.00E+00	5.41E-08	1.08E-07
Th-230	1.8090E-11	394.39	788.78	0.00E+00	7.13E-09	1.43E-08
Th-232	2.5278E-10	394.39	788.78	0.00E+00	9.97E-08	1.99E-07
Tl-208	1.6947E-08	394.39	788.78	0.00E+00	6.68E-06	1.34E-05
U-232	4.8737E-08	394.39	788.78	0.00E+00	1.92E-05	3.84E-05
U-233	1.2203E-07	394.39	788.78	0.00E+00	4.81E-05	9.63E-05
U-234	1.5925E-07	394.39	788.78	0.00E+00	6.28E-05	1.26E-04
U-235	-2.6194E-06	394.39	0.00	6.93E-03	5.90E-03	6.93E-03
U-236	1.2693E-05	394.39	788.78	0.00E+00	5.01E-03	1.00E-02
U-238	-3.6331E-08	394.39	0.00	4.36E-03	4.35E-03	4.36E-03
Y-90	2.6060E+00	394.39	788.78	0.00E+00	1.03E+03	2.06E+03
Other Radionuclides					1.42E+03	2.84E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.275E+14
0.0250	2.805E+13
0.0375	2.389E+13
0.0575	2.452E+13
0.0850	1.519E+13
0.1250	1.103E+13
0.2250	1.289E+13
0.3750	6.540E+12
0.5750	8.694E+13
0.8500	3.731E+12
1.2500	7.578E+13
1.7500	5.051E+10
2.2500	8.142E+10
2.7500	6.461E+08
3.5000	7.519E+07
5.0000	4.235E+02
7.0000	4.794E+01
11.0000	5.462E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.30E+01	4.59E+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 %:	19.80853811	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	394.39	344.80	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		788.78	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.71	0.87	1.00
Bounding:	1.43		

[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: TRIGA STD 8.5/20 FINLAND
SNF ID #: 472
Fuel Units & Descr: 102 - ELEMENT
Heavy Metal Mass: BOL=19.89kg; EOL=19.686kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' 0.92

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	194.74	389.48	0.00E+00	1.66E-07	3.32E-07	Avg. MeV	
Am-241	1.8331E-03	194.74	389.48	0.00E+00	3.57E-01	7.14E-01	0.0150	6.295E+13
Am-242m	1.4129E-06	194.74	389.48	0.00E+00	2.75E-04	5.50E-04	0.0250	1.385E+13
Am-243	1.4774E-07	194.74	389.48	0.00E+00	2.88E-05	5.75E-05	0.0375	1.180E+13
C-14	1.2871E-04	194.74	389.48	0.00E+00	2.51E-02	5.01E-02	0.0575	1.211E+13
Cl-36	2.8120E-06	194.74	389.48	0.00E+00	5.48E-04	1.10E-03	0.0850	7.501E+12
Cm-243	1.7940E-07	194.74	389.48	0.00E+00	3.49E-05	6.99E-05	0.1250	5.447E+12
Cm-244	1.6962E-06	194.74	389.48	0.00E+00	3.30E-04	6.61E-04	0.2250	6.363E+12
Co-60	1.2839E+00	194.74	389.48	0.00E+00	2.50E+02	5.00E+02	0.3750	3.229E+12
Cs-134	9.0541E-02	194.74	389.48	0.00E+00	1.76E+01	3.53E+01	0.5750	4.293E+13
Cs-135	3.2195E-05	194.74	389.48	0.00E+00	6.27E-03	1.25E-02	0.8500	1.842E+12
Cs-137	2.7564E+00	194.74	389.48	0.00E+00	5.37E+02	1.07E+03	1.2500	3.742E+13
Eu-154	1.5368E-02	194.74	389.48	0.00E+00	2.99E+00	5.99E+00	1.7500	2.494E+10
Eu-155	2.9293E-02	194.74	389.48	0.00E+00	5.70E+00	1.14E+01	2.2500	4.020E+10
Fe-55	7.7158E-01	194.74	389.48	0.00E+00	1.50E+02	3.01E+02	2.7500	3.190E+08
H-3	1.1111E-02	194.74	389.48	0.00E+00	2.16E+00	4.33E+00	3.5000	3.713E+07
I-129	7.3684E-07	194.74	389.48	0.00E+00	1.43E-04	2.87E-04	5.0000	2.165E+02
Kr-85	2.5263E-01	194.74	389.48	0.00E+00	4.92E+01	9.84E+01	7.0000	2.452E+01
Np-237	1.2427E-06	194.74	389.48	0.00E+00	2.42E-04	4.84E-04	11.0000	2.795E+00
Pa-231	3.8511E-09	194.74	389.48	0.00E+00	7.50E-07	1.50E-06		
Pb-210	7.3880E-15	194.74	389.48	0.00E+00	1.44E-12	2.88E-12		
Pm-147	2.1023E+00	194.74	389.48	0.00E+00	4.09E+02	8.19E+02		
Pu-238	1.0383E-03	194.74	389.48	0.00E+00	2.02E-01	4.04E-01		
Pu-239	5.5293E-03	194.74	389.48	0.00E+00	1.08E+00	2.15E+00		
Pu-240	2.1278E-03	194.74	389.48	0.00E+00	4.14E-01	8.29E-01		
Pu-241	1.0195E-01	194.74	389.48	0.00E+00	1.99E+01	3.97E+01		
Pu-242	2.3128E-07	194.74	389.48	0.00E+00	4.50E-05	9.01E-05		
Ra-226	5.2782E-14	194.74	389.48	0.00E+00	1.03E-11	2.06E-11		
Ra-228	1.9338E-10	194.74	389.48	0.00E+00	3.77E-08	7.53E-08		
Ru-106	9.1684E-02	194.74	389.48	0.00E+00	1.79E+01	3.57E+01		
Se-79	1.3018E-05	194.74	389.48	0.00E+00	2.54E-03	5.07E-03		
Sn-126	1.2167E-05	194.74	389.48	0.00E+00	2.37E-03	4.74E-03		
Sr-90	2.6045E+00	194.74	389.48	0.00E+00	5.07E+02	1.01E+03		
Tc-99	4.4241E-04	194.74	389.48	0.00E+00	8.62E-02	1.72E-01		
Th-229	1.3713E-10	194.74	389.48	0.00E+00	2.67E-08	5.34E-08		
Th-230	1.8090E-11	194.74	389.48	0.00E+00	3.52E-09	7.05E-09		
Th-232	2.5278E-10	194.74	389.48	0.00E+00	4.92E-08	9.85E-08		
Tl-208	1.6947E-08	194.74	389.48	0.00E+00	3.30E-06	6.60E-06		
U-232	4.8737E-08	194.74	389.48	0.00E+00	9.49E-06	1.90E-05		
U-233	1.2203E-07	194.74	389.48	0.00E+00	2.38E-05	4.75E-05		
U-234	1.5925E-07	194.74	389.48	0.00E+00	3.10E-05	6.20E-05		
U-235	-2.6194E-06	194.74	0.00	8.60E-03	8.09E-03	8.60E-03		
U-236	1.2693E-05	194.74	389.48	0.00E+00	2.47E-03	4.94E-03		
U-238	-3.6331E-08	194.74	0.00	5.35E-03	5.34E-03	5.35E-03		
Y-90	2.6060E+00	194.74	389.48	0.00E+00	5.07E+02	1.01E+03		
Other Radionuclides					7.02E+02	1.40E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.13E+01	2.27E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000041	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	193.85	194.74	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		389.48	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.29	1.00
Bounding:	0.57	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 GA
SNF ID #: 244
Fuel Units & Descr: 114 - ELEMENT
Heavy Metal Mass: BOL=22.23kg; EOL=19.688kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1982
Estimates as of: 2010
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' 1.03

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.1459E-09	2,426.80	4,853.61	0.00E+00	1.01E-05	2.01E-05
Am-241	3.5850E-03	2,426.80	4,853.61	0.00E+00	8.70E+00	1.74E+01
Am-242m	1.2899E-06	2,426.80	4,853.61	0.00E+00	3.13E-03	6.26E-03
Am-243	1.4747E-07	2,426.80	4,853.61	0.00E+00	3.58E-04	7.16E-04
C-14	1.2839E-04	2,426.80	4,853.61	0.00E+00	3.12E-01	6.23E-01
Cl-36	2.8120E-06	2,426.80	4,853.61	0.00E+00	6.82E-03	1.36E-02
Cm-243	1.1038E-07	2,426.80	4,853.61	0.00E+00	2.68E-04	5.36E-04
Cm-244	7.8917E-07	2,426.80	4,853.61	0.00E+00	1.92E-03	3.83E-03
Co-60	9.2647E-02	2,426.80	4,853.61	0.00E+00	2.25E+02	4.50E+02
Cs-134	1.0940E-04	2,426.80	4,853.61	0.00E+00	2.65E-01	5.31E-01
Cs-135	3.2195E-05	2,426.80	4,853.61	0.00E+00	7.81E-02	1.56E-01
Cs-137	1.7368E+00	2,426.80	4,853.61	0.00E+00	4.21E+03	8.43E+03
Eu-154	3.0677E-03	2,426.80	4,853.61	0.00E+00	7.44E+00	1.49E+01
Eu-155	1.7925E-03	2,426.80	4,853.61	0.00E+00	4.35E+00	8.70E+00
Fe-55	3.7444E-03	2,426.80	4,853.61	0.00E+00	9.09E+00	1.82E+01
H-3	3.6180E-03	2,426.80	4,853.61	0.00E+00	8.78E+00	1.76E+01
I-129	7.3684E-07	2,426.80	4,853.61	0.00E+00	1.79E-03	3.58E-03
Kr-85	6.9368E-02	2,426.80	4,853.61	0.00E+00	1.68E+02	3.37E+02
Np-237	1.2662E-06	2,426.80	4,853.61	0.00E+00	3.07E-03	6.15E-03
Pa-231	9.1654E-09	2,426.80	4,853.61	0.00E+00	2.22E-05	4.45E-05
Pb-210	1.3728E-13	2,426.80	4,853.61	0.00E+00	3.33E-10	6.66E-10
Pm-147	1.0702E-02	2,426.80	4,853.61	0.00E+00	2.60E+01	5.19E+01
Pu-238	8.8692E-04	2,426.80	4,853.61	0.00E+00	2.15E+00	4.30E+00
Pu-239	5.5263E-03	2,426.80	4,853.61	0.00E+00	1.34E+01	2.68E+01
Pu-240	2.1233E-03	2,426.80	4,853.61	0.00E+00	5.15E+00	1.03E+01
Pu-241	3.8962E-02	2,426.80	4,853.61	0.00E+00	9.46E+01	1.89E+02
Pu-242	2.3128E-07	2,426.80	4,853.61	0.00E+00	5.61E-04	1.12E-03
Ra-226	4.6752E-13	2,426.80	4,853.61	0.00E+00	1.13E-09	2.27E-09
Ra-228	2.4827E-10	2,426.80	4,853.61	0.00E+00	6.03E-07	1.21E-06
Ru-106	9.8526E-08	2,426.80	4,853.61	0.00E+00	2.39E-04	4.78E-04
Se-79	1.3015E-05	2,426.80	4,853.61	0.00E+00	3.16E-02	6.32E-02
Sn-126	1.2165E-05	2,426.80	4,853.61	0.00E+00	2.95E-02	5.90E-02
Sr-90	1.6195E+00	2,426.80	4,853.61	0.00E+00	3.93E+03	7.86E+03
Tc-99	4.4241E-04	2,426.80	4,853.61	0.00E+00	1.07E+00	2.15E+00
Th-229	4.2451E-10	2,426.80	4,853.61	0.00E+00	1.03E-06	2.06E-06
Th-230	6.1398E-11	2,426.80	4,853.61	0.00E+00	1.49E-07	2.98E-07
Th-232	2.5278E-10	2,426.80	4,853.61	0.00E+00	6.13E-07	1.23E-06
Tl-208	1.5098E-08	2,426.80	4,853.61	0.00E+00	3.66E-05	7.33E-05
U-232	4.0662E-08	2,426.80	4,853.61	0.00E+00	9.87E-05	1.97E-04
U-233	1.2217E-07	2,426.80	4,853.61	0.00E+00	2.96E-04	5.93E-04
U-234	2.2391E-07	2,426.80	4,853.61	0.00E+00	5.43E-04	1.09E-03
U-235	-2.6194E-06	2,426.80	0.00	9.61E-03	3.25E-03	9.61E-03
U-236	1.2695E-05	2,426.80	4,853.61	0.00E+00	3.08E-02	6.16E-02
U-238	-3.6331E-08	2,426.80	0.00	5.98E-03	5.89E-03	5.98E-03
Y-90	1.6195E+00	2,426.80	4,853.61	0.00E+00	3.93E+03	7.86E+03
Other Radionuclides					4.18E+03	8.35E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.308E+14
0.0250	8.956E+13
0.0375	7.771E+13
0.0575	8.368E+13
0.0850	5.044E+13
0.1250	3.291E+13
0.2250	4.338E+13
0.3750	1.895E+13
0.5750	3.141E+14
0.8500	3.372E+12
1.2500	3.462E+13
1.7500	8.776E+10
2.2500	1.851E+08
2.7500	3.129E+06
3.5000	6.507E+03
5.0000	2.531E+03
7.0000	2.857E+02
11.0000	3.249E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.15E+01	1.03E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	758.29	2,426.80
Bounding:		4,853.61

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.20	3.20
Bounding:	6.40	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 GERMANY
SNF ID #: 305
Fuel Units & Descr: 15 - ELEMENT
Heavy Metal Mass: BOL=2.925kg; EOL=2.883kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.14

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	40.09	80.19	0.00E+00	3.41E-08	6.83E-08
Am-241	1.8331E-03	40.09	80.19	0.00E+00	7.35E-02	1.47E-01
Am-242m	1.4129E-06	40.09	80.19	0.00E+00	5.66E-05	1.13E-04
Am-243	1.4774E-07	40.09	80.19	0.00E+00	5.92E-06	1.18E-05
C-14	1.2871E-04	40.09	80.19	0.00E+00	5.16E-03	1.03E-02
Cl-36	2.8120E-06	40.09	80.19	0.00E+00	1.13E-04	2.25E-04
Cm-243	1.7940E-07	40.09	80.19	0.00E+00	7.19E-06	1.44E-05
Cm-244	1.6962E-06	40.09	80.19	0.00E+00	6.80E-05	1.36E-04
Co-60	1.2839E+00	40.09	80.19	0.00E+00	5.15E+01	1.03E+02
Cs-134	9.0541E-02	40.09	80.19	0.00E+00	3.63E+00	7.26E+00
Cs-135	3.2195E-05	40.09	80.19	0.00E+00	1.29E-03	2.58E-03
Cs-137	2.7564E+00	40.09	80.19	0.00E+00	1.11E+02	2.21E+02
Eu-154	1.5368E-02	40.09	80.19	0.00E+00	6.16E-01	1.23E+00
Eu-155	2.9293E-02	40.09	80.19	0.00E+00	1.17E+00	2.35E+00
Fe-55	7.7158E-01	40.09	80.19	0.00E+00	3.09E+01	6.19E+01
H-3	1.1111E-02	40.09	80.19	0.00E+00	4.45E-01	8.91E-01
I-129	7.3684E-07	40.09	80.19	0.00E+00	2.95E-05	5.91E-05
Kr-85	2.5263E-01	40.09	80.19	0.00E+00	1.01E+01	2.03E+01
Np-237	1.2427E-06	40.09	80.19	0.00E+00	4.98E-05	9.96E-05
Pa-231	3.8511E-09	40.09	80.19	0.00E+00	1.54E-07	3.09E-07
Pb-210	7.3880E-15	40.09	80.19	0.00E+00	2.96E-13	5.92E-13
Pm-147	2.1023E+00	40.09	80.19	0.00E+00	8.43E+01	1.69E+02
Pu-238	1.0383E-03	40.09	80.19	0.00E+00	4.16E-02	8.33E-02
Pu-239	5.5293E-03	40.09	80.19	0.00E+00	2.22E-01	4.43E-01
Pu-240	2.1278E-03	40.09	80.19	0.00E+00	8.53E-02	1.71E-01
Pu-241	1.0195E-01	40.09	80.19	0.00E+00	4.09E+00	8.18E+00
Pu-242	2.3128E-07	40.09	80.19	0.00E+00	9.27E-06	1.85E-05
Ra-226	5.2782E-14	40.09	80.19	0.00E+00	2.12E-12	4.23E-12
Ra-228	1.9338E-10	40.09	80.19	0.00E+00	7.75E-09	1.55E-08
Ru-106	9.1684E-02	40.09	80.19	0.00E+00	3.68E+00	7.35E+00
Se-79	1.3018E-05	40.09	80.19	0.00E+00	5.22E-04	1.04E-03
Sn-126	1.2167E-05	40.09	80.19	0.00E+00	4.88E-04	9.76E-04
Sr-90	2.6045E+00	40.09	80.19	0.00E+00	1.04E+02	2.09E+02
Tc-99	4.4241E-04	40.09	80.19	0.00E+00	1.77E-02	3.55E-02
Th-229	1.3713E-10	40.09	80.19	0.00E+00	5.50E-09	1.10E-08
Th-230	1.8090E-11	40.09	80.19	0.00E+00	7.25E-10	1.45E-09
Th-232	2.5278E-10	40.09	80.19	0.00E+00	1.01E-08	2.03E-08
Tl-208	1.6947E-08	40.09	80.19	0.00E+00	6.79E-07	1.36E-06
U-232	4.8737E-08	40.09	80.19	0.00E+00	1.95E-06	3.91E-06
U-233	1.2203E-07	40.09	80.19	0.00E+00	4.89E-06	9.79E-06
U-234	1.5925E-07	40.09	80.19	0.00E+00	6.38E-06	1.28E-05
U-235	-2.6194E-06	40.09	0.00	1.26E-03	1.16E-03	1.26E-03
U-236	1.2693E-05	40.09	80.19	0.00E+00	5.09E-04	1.02E-03
U-238	-3.6331E-08	40.09	0.00	7.86E-04	7.85E-04	7.86E-04
Y-90	2.6060E+00	40.09	80.19	0.00E+00	1.04E+02	2.09E+02
Other Radionuclides					1.45E+02	2.89E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.296E+13
0.0250	2.852E+12
0.0375	2.429E+12
0.0575	2.493E+12
0.0850	1.544E+12
0.1250	1.121E+12
0.2250	1.310E+12
0.3750	6.648E+11
0.5750	6.838E+12
0.8500	3.793E+11
1.2500	7.703E+12
1.7500	5.135E+09
2.2500	8.277E+09
2.7500	6.568E+07
3.5000	7.644E+08
5.0000	4.384E+01
7.0000	4.965E+00
11.0000	5.658E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.33E+09	4.67E+09
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000041	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	28.51	40.09	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		80.19	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.40	1.41	1.00
Bounding:	0.80		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 GERMANY
SNF ID #: 474
Fuel Units & Descr: 70 - ELEMENT
Heavy Metal Mass: BOL=13.65kg; EOL=13.377kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' 0.63

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	8.5173E-10	260.61	521.22	0.00E+00	2.22E-07	4.44E-07
Am-241	1.8331E-03	260.61	521.22	0.00E+00	4.78E-01	9.55E-01
Am-242m	1.4129E-06	260.61	521.22	0.00E+00	3.68E-04	7.36E-04
Am-243	1.4774E-07	260.61	521.22	0.00E+00	3.85E-05	7.70E-05
C-14	1.2871E-04	260.61	521.22	0.00E+00	3.35E-02	6.71E-02
Cl-36	2.8120E-06	260.61	521.22	0.00E+00	7.33E-04	1.47E-03
Cm-243	1.7940E-07	260.61	521.22	0.00E+00	4.68E-05	9.35E-05
Cm-244	1.6962E-06	260.61	521.22	0.00E+00	4.42E-04	8.84E-04
Co-60	1.2839E+00	260.61	521.22	0.00E+00	3.35E+02	6.69E+02
Cs-134	9.0541E-02	260.61	521.22	0.00E+00	2.36E+01	4.72E+01
Cs-135	3.2195E-05	260.61	521.22	0.00E+00	8.39E-03	1.68E-02
Cs-137	2.7564E+00	260.61	521.22	0.00E+00	7.18E+02	1.44E+03
Eu-154	1.5368E-02	260.61	521.22	0.00E+00	4.01E+00	8.01E+00
Eu-155	2.9293E-02	260.61	521.22	0.00E+00	7.63E+00	1.53E+01
Fe-55	7.7158E-01	260.61	521.22	0.00E+00	2.01E+02	4.02E+02
H-3	1.1111E-02	260.61	521.22	0.00E+00	2.90E+00	5.79E+00
I-129	7.3684E-07	260.61	521.22	0.00E+00	1.92E-04	3.84E-04
Kr-85	2.5263E-01	260.61	521.22	0.00E+00	6.58E+01	1.32E+02
Np-237	1.2427E-06	260.61	521.22	0.00E+00	3.24E-04	6.48E-04
Pa-231	3.8511E-09	260.61	521.22	0.00E+00	1.00E-06	2.01E-06
Pb-210	7.3880E-15	260.61	521.22	0.00E+00	1.93E-12	3.85E-12
Pm-147	2.1023E+00	260.61	521.22	0.00E+00	5.48E+02	1.10E+03
Pu-238	1.0383E-03	260.61	521.22	0.00E+00	2.71E-01	5.41E-01
Pu-239	5.5293E-03	260.61	521.22	0.00E+00	1.44E+00	2.88E+00
Pu-240	2.1278E-03	260.61	521.22	0.00E+00	5.55E-01	1.11E+00
Pu-241	1.0195E-01	260.61	521.22	0.00E+00	2.66E+01	5.31E+01
Pu-242	2.3128E-07	260.61	521.22	0.00E+00	6.03E-05	1.21E-04
Ra-226	5.2782E-14	260.61	521.22	0.00E+00	1.38E-11	2.75E-11
Ra-228	1.9338E-10	260.61	521.22	0.00E+00	5.04E-08	1.01E-07
Ru-106	9.1684E-02	260.61	521.22	0.00E+00	2.39E+01	4.78E+01
Se-79	1.3018E-05	260.61	521.22	0.00E+00	3.39E-03	6.79E-03
Sn-126	1.2167E-05	260.61	521.22	0.00E+00	3.17E-03	6.34E-03
Sr-90	2.6045E+00	260.61	521.22	0.00E+00	6.79E+02	1.36E+03
Tc-99	4.4241E-04	260.61	521.22	0.00E+00	1.15E-01	2.31E-01
Th-229	1.3713E-10	260.61	521.22	0.00E+00	3.57E-08	7.15E-08
Th-230	1.8090E-11	260.61	521.22	0.00E+00	4.71E-09	9.43E-09
Th-232	2.5278E-10	260.61	521.22	0.00E+00	6.59E-08	1.32E-07
Tl-208	1.6947E-08	260.61	521.22	0.00E+00	4.42E-06	8.83E-06
U-232	4.8737E-08	260.61	521.22	0.00E+00	1.27E-05	2.54E-05
U-233	1.2203E-07	260.61	521.22	0.00E+00	3.18E-05	6.36E-05
U-234	1.5925E-07	260.61	521.22	0.00E+00	4.15E-05	8.30E-05
U-235	-2.6194E-06	260.61	0.00	5.90E-03	5.22E-03	5.90E-03
U-236	1.2693E-05	260.61	521.22	0.00E+00	3.31E-03	6.62E-03
U-238	-3.6331E-08	260.61	0.00	3.67E-03	3.66E-03	3.67E-03
Y-90	2.6060E+00	260.61	521.22	0.00E+00	6.79E+02	1.36E+03
Other Radionuclides					9.40E+02	1.88E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.424E+13
0.0250	1.854E+13
0.0375	1.579E+13
0.0575	1.620E+13
0.0850	1.004E+13
0.1250	7.289E+12
0.2250	8.515E+12
0.3750	4.321E+12
0.5750	5.745E+13
0.8500	2.466E+12
1.2500	5.007E+13
1.7500	3.338E+10
2.2500	5.380E+10
2.7500	4.269E+08
3.5000	4.969E+07
5.0000	2.816E+02
7.0000	3.189E+01
11.0000	3.633E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.52E+01	3.03E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000041	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	133.03	260.61	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		521.22	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.56	1.96	1.00
Bounding:	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: TRIGA STD 8.5/20 HANNOVER
SNF ID #: 473
Fuel Units & Descr: 5 - ELEMENT
Heavy Metal Mass: BOL=0.972kg; EOL=0.95kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1999
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 10 years

Estimated Canister usage: 18"x10' 0.05

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.3731E-09	21.48	42.96	0.00E+00	2.95E-08	5.90E-08
Am-241	2.3865E-03	21.48	42.96	0.00E+00	5.13E-02	1.03E-01
Am-242m	1.3812E-06	21.48	42.96	0.00E+00	2.97E-05	5.93E-05
Am-243	1.4767E-07	21.48	42.96	0.00E+00	3.17E-06	6.34E-06
C-14	1.2863E-04	21.48	42.96	0.00E+00	2.76E-03	5.53E-03
Cl-36	2.8120E-06	21.48	42.96	0.00E+00	6.04E-05	1.21E-04
Cm-243	1.5895E-07	21.48	42.96	0.00E+00	3.41E-06	6.83E-06
Cm-244	1.4008E-06	21.48	42.96	0.00E+00	3.01E-05	6.02E-05
Co-60	6.6541E-01	21.48	42.96	0.00E+00	1.43E+01	2.86E+01
Cs-134	1.6887E-02	21.48	42.96	0.00E+00	3.63E-01	7.25E-01
Cs-135	3.2195E-05	21.48	42.96	0.00E+00	6.92E-04	1.38E-03
Cs-137	2.4556E+00	21.48	42.96	0.00E+00	5.27E+01	1.05E+02
Eu-154	1.0268E-02	21.48	42.96	0.00E+00	2.21E-01	4.41E-01
Eu-155	1.4570E-02	21.48	42.96	0.00E+00	3.13E-01	6.26E-01
Fe-55	2.0361E-01	21.48	42.96	0.00E+00	4.37E+00	8.75E+00
H-3	8.3940E-03	21.48	42.96	0.00E+00	1.80E-01	3.61E-01
I-129	7.3684E-07	21.48	42.96	0.00E+00	1.58E-05	3.17E-05
Kr-85	1.8286E-01	21.48	42.96	0.00E+00	3.93E+00	7.86E+00
Np-237	1.2462E-06	21.48	42.96	0.00E+00	2.68E-05	5.35E-05
Pa-231	4.9143E-09	21.48	42.96	0.00E+00	1.06E-07	2.11E-07
Pb-210	1.7173E-14	21.48	42.96	0.00E+00	3.69E-13	7.38E-13
Pm-147	5.6165E-01	21.48	42.96	0.00E+00	1.21E+01	2.41E+01
Pu-238	9.9820E-04	21.48	42.96	0.00E+00	2.14E-02	4.29E-02
Pu-239	5.5293E-03	21.48	42.96	0.00E+00	1.19E-01	2.38E-01
Pu-240	2.1263E-03	21.48	42.96	0.00E+00	4.57E-02	9.13E-02
Pu-241	8.0165E-02	21.48	42.96	0.00E+00	1.72E+00	3.44E+00
Pu-242	2.3128E-07	21.48	42.96	0.00E+00	4.97E-06	9.94E-06
Ra-226	9.9774E-14	21.48	42.96	0.00E+00	2.14E-12	4.29E-12
Ra-228	2.1729E-10	21.48	42.96	0.00E+00	4.67E-09	9.33E-09
Ru-106	2.9519E-03	21.48	42.96	0.00E+00	6.34E-02	1.27E-01
Se-79	1.3017E-05	21.48	42.96	0.00E+00	2.80E-04	5.59E-04
Sn-126	1.2167E-05	21.48	42.96	0.00E+00	2.61E-04	5.23E-04
Sr-90	2.3128E+00	21.48	42.96	0.00E+00	4.97E+01	9.94E+01
Tc-99	4.4241E-04	21.48	42.96	0.00E+00	9.50E-03	1.90E-02
Th-229	1.9459E-10	21.48	42.96	0.00E+00	4.18E-09	8.36E-09
Th-230	2.5564E-11	21.48	42.96	0.00E+00	5.49E-10	1.10E-09
Th-232	2.5278E-10	21.48	42.96	0.00E+00	5.43E-09	1.09E-08
Tl-208	1.6947E-08	21.48	42.96	0.00E+00	3.64E-07	7.28E-07
U-232	4.6812E-08	21.48	42.96	0.00E+00	1.01E-06	2.01E-06
U-233	1.2206E-07	21.48	42.96	0.00E+00	2.62E-06	5.24E-06
U-234	1.7323E-07	21.48	42.96	0.00E+00	3.72E-06	7.44E-06
U-235	-2.6194E-06	21.48	0.00	4.16E-04	3.60E-04	4.16E-04
U-236	1.2693E-05	21.48	42.96	0.00E+00	2.73E-04	5.45E-04
U-238	-3.6331E-08	21.48	0.00	2.62E-04	2.61E-04	2.62E-04
Y-90	2.3128E+00	21.48	42.96	0.00E+00	4.97E+01	9.94E+01
Other Radionuclides					5.27E+01	1.05E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.550E+12
0.0250	1.176E+12
0.0375	1.004E+12
0.0575	1.070E+12
0.0850	6.493E+11
0.1250	4.268E+11
0.2250	5.538E+11
0.3750	2.544E+11
0.5750	3.985E+12
0.8500	7.115E+10
1.2500	2.139E+12
1.7500	1.287E+09
2.2500	6.724E+07
2.7500	1.113E+08
3.5000	1.319E+05
5.0000	2.302E+01
7.0000	2.604E+00
11.0000	2.966E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.41E-01	1.68E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.81481481	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	2.37	21.48	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		42.96	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.65	9.07	1.00
Bounding:	1.30		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 HEIDELBERG
SNF ID #: 1044
Fuel Units & Descr: 56 - ELEMENT
Heavy Metal Mass: BOL=10.713kg; EOL=10.556kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2006
Estimates as of: 2010
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' 0.50

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	208.81	417.63	0.00E+00	1.78E-07	3.56E-07
Am-241	1.8331E-03	208.81	417.63	0.00E+00	3.83E-01	7.66E-01
Am-242m	1.4129E-06	208.81	417.63	0.00E+00	2.95E-04	5.90E-04
Am-243	1.4774E-07	208.81	417.63	0.00E+00	3.09E-05	6.17E-05
C-14	1.2871E-04	208.81	417.63	0.00E+00	2.69E-02	5.38E-02
Cl-36	2.8120E-06	208.81	417.63	0.00E+00	5.87E-04	1.17E-03
Cm-243	1.7940E-07	208.81	417.63	0.00E+00	3.75E-05	7.49E-05
Cm-244	1.6962E-06	208.81	417.63	0.00E+00	3.54E-04	7.08E-04
Co-60	1.2839E+00	208.81	417.63	0.00E+00	2.68E+02	5.36E+02
Cs-134	9.0541E-02	208.81	417.63	0.00E+00	1.89E+01	3.78E+01
Cs-135	3.2195E-05	208.81	417.63	0.00E+00	6.72E-03	1.34E-02
Cs-137	2.7564E+00	208.81	417.63	0.00E+00	5.76E+02	1.15E+03
Eu-154	1.5368E-02	208.81	417.63	0.00E+00	3.21E+00	6.42E+00
Eu-155	2.9293E-02	208.81	417.63	0.00E+00	6.12E+00	1.22E+01
Fe-55	7.7158E-01	208.81	417.63	0.00E+00	1.61E+02	3.22E+02
H-3	1.1111E-02	208.81	417.63	0.00E+00	2.32E+00	4.64E+00
I-129	7.3684E-07	208.81	417.63	0.00E+00	1.54E-04	3.08E-04
Kr-85	2.5263E-01	208.81	417.63	0.00E+00	5.28E+01	1.06E+02
Np-237	1.2427E-06	208.81	417.63	0.00E+00	2.59E-04	5.19E-04
Pa-231	3.8511E-09	208.81	417.63	0.00E+00	8.04E-07	1.61E-06
Pb-210	7.3880E-15	208.81	417.63	0.00E+00	1.54E-12	3.09E-12
Pm-147	2.1023E+00	208.81	417.63	0.00E+00	4.39E+02	8.78E+02
Pu-238	1.0383E-03	208.81	417.63	0.00E+00	2.17E-01	4.34E-01
Pu-239	5.5293E-03	208.81	417.63	0.00E+00	1.15E+00	2.31E+00
Pu-240	2.1278E-03	208.81	417.63	0.00E+00	4.44E-01	8.89E-01
Pu-241	1.0195E-01	208.81	417.63	0.00E+00	2.13E+01	4.26E+01
Pu-242	2.3128E-07	208.81	417.63	0.00E+00	4.83E-05	9.66E-05
Ra-226	5.2782E-14	208.81	417.63	0.00E+00	1.10E-11	2.20E-11
Ra-228	1.9338E-10	208.81	417.63	0.00E+00	4.04E-08	8.08E-08
Ru-106	9.1684E-02	208.81	417.63	0.00E+00	1.91E+01	3.83E+01
Se-79	1.3018E-05	208.81	417.63	0.00E+00	2.72E-03	5.44E-03
Sn-126	1.2167E-05	208.81	417.63	0.00E+00	2.54E-03	5.08E-03
Sr-90	2.6045E+00	208.81	417.63	0.00E+00	5.44E+02	1.09E+03
Tc-99	4.4241E-04	208.81	417.63	0.00E+00	9.24E-02	1.85E-01
Th-229	1.3713E-10	208.81	417.63	0.00E+00	2.86E-08	5.73E-08
Th-230	1.8090E-11	208.81	417.63	0.00E+00	3.78E-09	7.55E-09
Th-232	2.5278E-10	208.81	417.63	0.00E+00	5.28E-08	1.06E-07
Tl-208	1.6947E-08	208.81	417.63	0.00E+00	3.54E-06	7.08E-06
U-232	4.8737E-08	208.81	417.63	0.00E+00	1.02E-05	2.04E-05
U-233	1.2203E-07	208.81	417.63	0.00E+00	2.55E-05	5.10E-05
U-234	1.5925E-07	208.81	417.63	0.00E+00	3.33E-05	6.65E-05
U-235	-2.6194E-06	208.81	0.00	4.57E-03	4.02E-03	4.57E-03
U-236	1.2693E-05	208.81	417.63	0.00E+00	2.65E-03	5.30E-03
U-238	-3.6331E-08	208.81	0.00	2.89E-03	2.88E-03	2.89E-03
Y-90	2.6060E+00	208.81	417.63	0.00E+00	5.44E+02	1.09E+03
Other Radionuclides					7.53E+02	1.51E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.750E+13
0.0250	1.485E+13
0.0375	1.265E+13
0.0575	1.298E+13
0.0850	8.043E+12
0.1250	5.841E+12
0.2250	6.823E+12
0.3750	3.462E+12
0.5750	4.603E+13
0.8500	1.976E+12
1.2500	4.012E+13
1.7500	2.674E+10
2.2500	4.311E+10
2.7500	3.421E+08
3.5000	3.981E+07
5.0000	2.255E+02
7.0000	2.554E+01
11.0000	2.910E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.22E+01	2.43E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.72849245	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	208.81	149.68	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		417.63	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.57	0.72	0.99
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: TRIGA STD 8.5/20 INDONESIA
SNF ID #: 475
Fuel Units & Descr: 174 - ELEMENT
Heavy Metal Mass: BOL=33.93kg; EOL=33.251kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10'
1.57

II. Estimates

Radionuclide	r_n Ci/MWd From Template	x_o Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_o Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	647.80	1,295.59	0.00E+00	5.52E-07	1.10E-06
Am-241	1.8331E-03	647.80	1,295.59	0.00E+00	1.19E+00	2.37E+00
Am-242m	1.4129E-06	647.80	1,295.59	0.00E+00	9.15E-04	1.83E-03
Am-243	1.4774E-07	647.80	1,295.59	0.00E+00	9.57E-05	1.91E-04
C-14	1.2871E-04	647.80	1,295.59	0.00E+00	8.34E-02	1.67E-01
Cl-36	2.8120E-06	647.80	1,295.59	0.00E+00	1.82E-03	3.64E-03
Cm-243	1.7940E-07	647.80	1,295.59	0.00E+00	1.16E-04	2.32E-04
Cm-244	1.6962E-06	647.80	1,295.59	0.00E+00	1.10E-03	2.20E-03
Co-60	1.2839E+00	647.80	1,295.59	0.00E+00	8.32E+02	1.66E+03
Cs-134	9.0541E-02	647.80	1,295.59	0.00E+00	5.87E+01	1.17E+02
Cs-135	3.2195E-05	647.80	1,295.59	0.00E+00	2.09E-02	4.17E-02
Cs-137	2.7564E+00	647.80	1,295.59	0.00E+00	1.79E+03	3.57E+03
Eu-154	1.5368E-02	647.80	1,295.59	0.00E+00	9.96E+00	1.99E+01
Eu-155	2.9293E-02	647.80	1,295.59	0.00E+00	1.90E+01	3.80E+01
Fe-55	7.7158E-01	647.80	1,295.59	0.00E+00	5.00E+02	1.00E+03
H-3	1.1111E-02	647.80	1,295.59	0.00E+00	7.20E+00	1.44E+01
I-129	7.3684E-07	647.80	1,295.59	0.00E+00	4.77E-04	9.55E-04
Kr-85	2.5263E-01	647.80	1,295.59	0.00E+00	1.64E+02	3.27E+02
Np-237	1.2427E-06	647.80	1,295.59	0.00E+00	8.05E-04	1.61E-03
Pa-231	3.8511E-09	647.80	1,295.59	0.00E+00	2.49E-06	4.99E-06
Pb-210	7.3880E-15	647.80	1,295.59	0.00E+00	4.79E-12	9.57E-12
Pm-147	2.1023E+00	647.80	1,295.59	0.00E+00	1.36E+03	2.72E+03
Pu-238	1.0383E-03	647.80	1,295.59	0.00E+00	6.73E-01	1.35E+00
Pu-239	5.5293E-03	647.80	1,295.59	0.00E+00	3.58E+00	7.16E+00
Pu-240	2.1278E-03	647.80	1,295.59	0.00E+00	1.38E+00	2.76E+00
Pu-241	1.0195E-01	647.80	1,295.59	0.00E+00	6.60E+01	1.32E+02
Pu-242	2.3128E-07	647.80	1,295.59	0.00E+00	1.50E-04	3.00E-04
Ra-226	5.2782E-14	647.80	1,295.59	0.00E+00	3.42E-11	6.84E-11
Ra-228	1.9338E-10	647.80	1,295.59	0.00E+00	1.25E-07	2.51E-07
Ru-106	9.1684E-02	647.80	1,295.59	0.00E+00	5.94E+01	1.19E+02
Se-79	1.3018E-05	647.80	1,295.59	0.00E+00	8.43E-03	1.69E-02
Sn-126	1.2167E-05	647.80	1,295.59	0.00E+00	7.88E-03	1.58E-02
Sr-90	2.6045E+00	647.80	1,295.59	0.00E+00	1.69E+03	3.37E+03
Tc-99	4.4241E-04	647.80	1,295.59	0.00E+00	2.87E-01	5.73E-01
Th-229	1.3713E-10	647.80	1,295.59	0.00E+00	8.88E-08	1.78E-07
Th-230	1.8090E-11	647.80	1,295.59	0.00E+00	1.17E-08	2.34E-08
Th-232	2.5278E-10	647.80	1,295.59	0.00E+00	1.64E-07	3.28E-07
Tl-208	1.6947E-06	647.80	1,295.59	0.00E+00	1.10E-05	2.20E-05
U-232	4.8737E-08	647.80	1,295.59	0.00E+00	3.16E-05	6.31E-05
U-233	1.2203E-07	647.80	1,295.59	0.00E+00	7.91E-05	1.58E-04
U-234	1.5925E-07	647.80	1,295.59	0.00E+00	1.03E-04	2.06E-04
U-235	-2.6194E-06	647.80	0.00	1.47E-02	1.30E-02	1.47E-02
U-236	1.2693E-05	647.80	1,295.59	0.00E+00	8.22E-03	1.64E-02
U-238	-3.6331E-08	647.80	0.00	9.12E-03	9.10E-03	9.12E-03
Y-90	2.6060E+00	647.80	1,295.59	0.00E+00	1.69E+03	3.38E+03
Other Radionuclides					2.34E+03	4.67E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.094E+14
0.0250	4.608E+13
0.0375	3.924E+13
0.0575	4.027E+13
0.0850	2.495E+13
0.1250	1.812E+13
0.2250	2.117E+13
0.3750	1.074E+13
0.5750	1.428E+14
0.8500	6.129E+12
1.2500	1.245E+14
1.7500	8.298E+10
2.2500	1.337E+11
2.7500	1.061E+09
3.5000	1.235E+08
5.0000	7.001E+02
7.0000	7.927E+01
11.0000	9.032E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.77E+01	7.54E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000041	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	330.68	647.80	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,295.59	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.56	1.96
Bounding:	1.12	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 INDONESIA
SNF ID #: 476
Fuel Units & Descr: 71 - ELEMENT
Heavy Metal Mass: BOL=13.845kg; EOL=13.568kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' 0.64

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	264.33	528.66	0.00E+00	2.25E-07	4.50E-07
Am-241	1.8331E-03	264.33	528.66	0.00E+00	4.85E-01	9.69E-01
Am-242m	1.4129E-06	264.33	528.66	0.00E+00	3.73E-04	7.47E-04
Am-243	1.4774E-07	264.33	528.66	0.00E+00	3.91E-05	7.81E-05
C-14	1.2871E-04	264.33	528.66	0.00E+00	3.40E-02	6.80E-02
Cl-36	2.8120E-06	264.33	528.66	0.00E+00	7.43E-04	1.49E-03
Cm-243	1.7940E-07	264.33	528.66	0.00E+00	4.74E-05	9.48E-05
Cm-244	1.6962E-06	264.33	528.66	0.00E+00	4.48E-04	8.97E-04
Co-60	1.2839E+00	264.33	528.66	0.00E+00	3.39E+02	6.79E+02
Cs-134	9.0541E-02	264.33	528.66	0.00E+00	2.39E+01	4.79E+01
Cs-135	3.2195E-05	264.33	528.66	0.00E+00	8.51E-03	1.70E-02
Cs-137	2.7564E+00	264.33	528.66	0.00E+00	7.29E+02	1.46E+03
Eu-154	1.5368E-02	264.33	528.66	0.00E+00	4.06E+00	8.12E+00
Eu-155	2.9293E-02	264.33	528.66	0.00E+00	7.74E+00	1.55E+01
Fe-55	7.7158E-01	264.33	528.66	0.00E+00	2.04E+02	4.08E+02
H-3	1.1111E-02	264.33	528.66	0.00E+00	2.94E+00	5.87E+00
I-129	7.3684E-07	264.33	528.66	0.00E+00	1.95E-04	3.90E-04
Kr-85	2.5263E-01	264.33	528.66	0.00E+00	6.68E+01	1.34E+02
Np-237	1.2427E-06	264.33	528.66	0.00E+00	3.28E-04	6.57E-04
Pa-231	3.8511E-09	264.33	528.66	0.00E+00	1.02E-06	2.04E-06
Pb-210	7.3880E-15	264.33	528.66	0.00E+00	1.95E-12	3.91E-12
Pm-147	2.1023E+00	264.33	528.66	0.00E+00	5.56E+02	1.11E+03
Pu-238	1.0383E-03	264.33	528.66	0.00E+00	2.74E-01	5.49E-01
Pu-239	5.5293E-03	264.33	528.66	0.00E+00	1.46E+00	2.92E+00
Pu-240	2.1278E-03	264.33	528.66	0.00E+00	5.62E-01	1.12E+00
Pu-241	1.0195E-01	264.33	528.66	0.00E+00	2.69E+01	5.39E+01
Pu-242	2.3128E-07	264.33	528.66	0.00E+00	6.11E-05	1.22E-04
Ra-226	5.2782E-14	264.33	528.66	0.00E+00	1.40E-11	2.79E-11
Ra-228	1.9338E-10	264.33	528.66	0.00E+00	5.11E-08	1.02E-07
Ru-106	9.1684E-02	264.33	528.66	0.00E+00	2.42E+01	4.85E+01
Se-79	1.3018E-05	264.33	528.66	0.00E+00	3.44E-03	6.88E-03
Sn-126	1.2167E-05	264.33	528.66	0.00E+00	3.22E-03	6.43E-03
Sr-90	2.6045E+00	264.33	528.66	0.00E+00	6.88E+02	1.38E+03
Tc-99	4.4241E-04	264.33	528.66	0.00E+00	1.17E-01	2.34E-01
Th-229	1.3713E-10	264.33	528.66	0.00E+00	3.62E-08	7.25E-08
Th-230	1.8090E-11	264.33	528.66	0.00E+00	4.78E-09	9.56E-09
Th-232	2.5278E-10	264.33	528.66	0.00E+00	6.68E-08	1.34E-07
Tl-208	1.6947E-08	264.33	528.66	0.00E+00	4.48E-06	8.96E-06
U-232	4.8737E-08	264.33	528.66	0.00E+00	1.29E-05	2.58E-05
U-233	1.2203E-07	264.33	528.66	0.00E+00	3.23E-05	6.45E-05
U-234	1.5925E-07	264.33	528.66	0.00E+00	4.21E-05	8.42E-05
U-235	-2.6194E-06	264.33	0.00	5.98E-03	5.29E-03	5.98E-03
U-236	1.2693E-05	264.33	528.66	0.00E+00	3.36E-03	6.71E-03
U-238	-3.6331E-08	264.33	0.00	3.72E-03	3.71E-03	3.72E-03
Y-90	2.6060E+00	264.33	528.66	0.00E+00	6.89E+02	1.38E+03
Other Radionuclides					9.53E+02	1.91E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.544E+13
0.0250	1.880E+13
0.0375	1.601E+13
0.0575	1.643E+13
0.0850	1.018E+13
0.1250	7.393E+12
0.2250	8.637E+12
0.3750	4.383E+12
0.5750	5.827E+13
0.8500	2.501E+12
1.2500	5.079E+13
1.7500	3.385E+10
2.2500	5.457E+10
2.7500	4.330E+08
3.5000	5.039E+07
5.0000	2.857E+02
7.0000	3.235E+01
11.0000	3.685E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.84E+01	3.68E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000041	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	134.93	264.33
Bounding:		528.66

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.56	1.96
Bounding:	1.12	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 ITALY
SNF ID #: 477
Fuel Units & Descr: 48 - ELEMENT
Heavy Metal Mass: BOL=9.36kg; EOL=9.173kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' 0.43

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	178.70	357.41	0.00E+00	1.52E-07	3.04E-07	Avg. MeV	
Am-241	1.8331E-03	178.70	357.41	0.00E+00	3.28E-01	6.55E-01	0.0150	5.777E+13
Am-242m	1.4129E-06	178.70	357.41	0.00E+00	2.52E-04	5.05E-04	0.0250	1.271E+13
Am-243	1.4774E-07	178.70	357.41	0.00E+00	2.64E-05	5.28E-05	0.0375	1.082E+13
C-14	1.2871E-04	178.70	357.41	0.00E+00	2.30E-02	4.60E-02	0.0575	1.111E+13
Cl-36	2.8120E-06	178.70	357.41	0.00E+00	5.03E-04	1.01E-03	0.0850	6.883E+12
Cm-243	1.7940E-07	178.70	357.41	0.00E+00	3.21E-05	6.41E-05	0.1250	4.998E+12
Cm-244	1.6962E-06	178.70	357.41	0.00E+00	3.03E-04	6.06E-04	0.2250	5.839E+12
Co-60	1.2839E+00	178.70	357.41	0.00E+00	2.29E+02	4.59E+02	0.3750	2.963E+12
Cs-134	9.0541E-02	178.70	357.41	0.00E+00	1.62E+01	3.24E+01	0.5750	3.939E+13
Cs-135	3.2195E-05	178.70	357.41	0.00E+00	5.75E-03	1.15E-02	0.8500	1.691E+12
Cs-137	2.7564E+00	178.70	357.41	0.00E+00	4.93E+02	9.85E+02	1.2500	3.433E+13
Eu-154	1.5368E-02	178.70	357.41	0.00E+00	2.75E+00	5.49E+00	1.7500	2.289E+10
Eu-155	2.9293E-02	178.70	357.41	0.00E+00	5.23E+00	1.05E+01	2.2500	3.689E+10
Fe-55	7.7158E-01	178.70	357.41	0.00E+00	1.38E+02	2.76E+02	2.7500	2.927E+08
H-3	1.1111E-02	178.70	357.41	0.00E+00	1.99E+00	3.97E+00	3.5000	3.407E+07
I-129	7.3684E-07	178.70	357.41	0.00E+00	1.32E-04	2.63E-04	5.0000	1.931E+02
Kr-85	2.5263E-01	178.70	357.41	0.00E+00	4.51E+01	9.03E+01	7.0000	2.187E+01
Np-237	1.2427E-06	178.70	357.41	0.00E+00	2.22E-04	4.44E-04	11.0000	2.492E+00
Pa-231	3.8511E-09	178.70	357.41	0.00E+00	6.88E-07	1.38E-06		
Pb-210	7.3880E-15	178.70	357.41	0.00E+00	1.32E-12	2.64E-12		
Pm-147	2.1023E+00	178.70	357.41	0.00E+00	3.76E+02	7.51E+02		
Pu-238	1.0383E-03	178.70	357.41	0.00E+00	1.86E-01	3.71E-01		
Pu-239	5.5293E-03	178.70	357.41	0.00E+00	9.88E-01	1.98E+00		
Pu-240	2.1278E-03	178.70	357.41	0.00E+00	3.80E-01	7.60E-01		
Pu-241	1.0195E-01	178.70	357.41	0.00E+00	1.82E+01	3.64E+01		
Pu-242	2.3128E-07	178.70	357.41	0.00E+00	4.13E-05	8.27E-05		
Ra-226	5.2782E-14	178.70	357.41	0.00E+00	9.43E-12	1.89E-11		
Ra-228	1.9338E-10	178.70	357.41	0.00E+00	3.46E-08	6.91E-08		
Ru-106	9.1684E-02	178.70	357.41	0.00E+00	1.64E+01	3.28E+01		
Se-79	1.3018E-05	178.70	357.41	0.00E+00	2.33E-03	4.65E-03		
Sn-126	1.2167E-05	178.70	357.41	0.00E+00	2.17E-03	4.35E-03		
Sr-90	2.6045E+00	178.70	357.41	0.00E+00	4.65E+02	9.31E+02		
Tc-99	4.4241E-04	178.70	357.41	0.00E+00	7.91E-02	1.58E-01		
Th-229	1.3713E-10	178.70	357.41	0.00E+00	2.45E-08	4.90E-08		
Th-230	1.8090E-11	178.70	357.41	0.00E+00	3.23E-09	6.47E-09		
Th-232	2.5278E-10	178.70	357.41	0.00E+00	4.52E-08	9.03E-08		
Tl-208	1.6947E-06	178.70	357.41	0.00E+00	3.03E-06	6.06E-06		
U-232	4.8737E-06	178.70	357.41	0.00E+00	8.71E-06	1.74E-05	Thermal Power	
U-233	1.2203E-07	178.70	357.41	0.00E+00	2.18E-05	4.36E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.5925E-07	178.70	357.41	0.00E+00	2.85E-05	5.69E-05		
U-235	-2.6194E-06	178.70	0.00	4.05E-03	3.58E-03	4.05E-03		
U-236	1.2693E-05	178.70	357.41	0.00E+00	2.27E-03	4.54E-03	1.04E+01	2.08E+01
U-238	-3.6331E-08	178.70	0.00	2.52E-03	2.51E-03	2.52E-03	Total	Total
Y-90	2.6060E+00	178.70	357.41	0.00E+00	4.66E+02	9.31E+02		
Other Radionuclides					6.44E+02	1.29E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	91.22	178.70
Bounding:		357.41

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.56	1.96
Bounding:	1.12	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 ITALY
SNF ID #: 478
Fuel Units & Descr: 71 - ELEMENT
Heavy Metal Mass: BOL=13.639kg; EOL=12.837kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1999
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 10 years

Estimated Canister usage: 18"x10' = 0.64

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	1.3731E-09	765.88	1,531.76	0.00E+00	1.05E-06	2.10E-06
Am-241	2.3865E-03	765.88	1,531.76	0.00E+00	1.83E+00	3.66E+00
Am-242m	1.3812E-06	765.88	1,531.76	0.00E+00	1.06E-03	2.12E-03
Am-243	1.4767E-07	765.88	1,531.76	0.00E+00	1.13E-04	2.26E-04
C-14	1.2863E-04	765.88	1,531.76	0.00E+00	9.85E-02	1.97E-01
Cl-36	2.8120E-06	765.88	1,531.76	0.00E+00	2.15E-03	4.31E-03
Cm-243	1.5895E-07	765.88	1,531.76	0.00E+00	1.22E-04	2.43E-04
Cm-244	1.4008E-06	765.88	1,531.76	0.00E+00	1.07E-03	2.15E-03
Co-60	6.6541E-01	765.88	1,531.76	0.00E+00	5.10E+02	1.02E+03
Cs-134	1.6887E-02	765.88	1,531.76	0.00E+00	1.29E+01	2.59E+01
Cs-135	3.2195E-05	765.88	1,531.76	0.00E+00	2.47E-02	4.93E-02
Cs-137	2.4556E+00	765.88	1,531.76	0.00E+00	1.88E+03	3.76E+03
Eu-154	1.0268E-02	765.88	1,531.76	0.00E+00	7.86E+00	1.57E+01
Eu-155	1.4570E-02	765.88	1,531.76	0.00E+00	1.12E+01	2.23E+01
Fe-55	2.0361E-01	765.88	1,531.76	0.00E+00	1.56E+02	3.12E+02
H-3	8.3940E-03	765.88	1,531.76	0.00E+00	6.43E+00	1.29E+01
I-129	7.3684E-07	765.88	1,531.76	0.00E+00	5.64E-04	1.13E-03
Kr-85	1.8286E-01	765.88	1,531.76	0.00E+00	1.40E+02	2.80E+02
Np-237	1.2462E-06	765.88	1,531.76	0.00E+00	9.54E-04	1.91E-03
Pa-231	4.9143E-09	765.88	1,531.76	0.00E+00	3.76E-06	7.53E-06
Pb-210	1.7173E-14	765.88	1,531.76	0.00E+00	1.32E-11	2.63E-11
Pm-147	5.6165E-01	765.88	1,531.76	0.00E+00	4.30E+02	8.60E+02
Pu-238	9.9820E-04	765.88	1,531.76	0.00E+00	7.64E-01	1.53E+00
Pu-239	5.5293E-03	765.88	1,531.76	0.00E+00	4.23E+00	8.47E+00
Pu-240	2.1263E-03	765.88	1,531.76	0.00E+00	1.63E+00	3.26E+00
Pu-241	8.0165E-02	765.88	1,531.76	0.00E+00	6.14E+01	1.23E+02
Pu-242	2.3128E-07	765.88	1,531.76	0.00E+00	1.77E-04	3.54E-04
Ra-226	9.9774E-14	765.88	1,531.76	0.00E+00	7.64E-11	1.53E-10
Ra-228	2.1729E-10	765.88	1,531.76	0.00E+00	1.66E-07	3.33E-07
Ru-106	2.9519E-03	765.88	1,531.76	0.00E+00	2.26E+00	4.52E+00
Se-79	1.3017E-05	765.88	1,531.76	0.00E+00	9.97E-03	1.99E-02
Sn-126	1.2167E-05	765.88	1,531.76	0.00E+00	9.32E-03	1.86E-02
Sr-90	2.3128E+00	765.88	1,531.76	0.00E+00	1.77E+03	3.54E+03
Tc-99	4.4241E-04	765.88	1,531.76	0.00E+00	3.39E-01	6.78E-01
Th-229	1.9459E-10	765.88	1,531.76	0.00E+00	1.49E-07	2.98E-07
Th-230	2.5564E-11	765.88	1,531.76	0.00E+00	1.96E-08	3.92E-08
Th-232	2.5278E-10	765.88	1,531.76	0.00E+00	1.94E-07	3.87E-07
Tl-208	1.6947E-08	765.88	1,531.76	0.00E+00	1.30E-05	2.60E-05
U-232	4.6812E-08	765.88	1,531.76	0.00E+00	3.59E-05	7.17E-05
U-233	1.2206E-07	765.88	1,531.76	0.00E+00	9.35E-05	1.87E-04
U-234	1.7323E-07	765.88	1,531.76	0.00E+00	1.33E-04	2.65E-04
U-235	-2.6194E-06	765.88	0.00	5.90E-03	3.90E-03	5.90E-03
U-236	1.2693E-05	765.88	1,531.76	0.00E+00	9.72E-03	1.94E-02
U-238	-3.6331E-08	765.88	0.00	3.67E-03	3.64E-03	3.67E-03
Y-90	2.3128E+00	765.88	1,531.76	0.00E+00	1.77E+03	3.54E+03
Other Radionuclides					1.88E+03	3.76E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.979E+14
0.0250	4.192E+13
0.0375	3.581E+13
0.0575	3.816E+13
0.0850	2.315E+13
0.1250	1.522E+13
0.2250	1.975E+13
0.3750	9.071E+12
0.5750	1.421E+14
0.8500	2.537E+12
1.2500	7.628E+13
1.7500	4.590E+10
2.2500	2.397E+09
2.7500	3.969E+07
3.5000	4.703E+06
5.0000	8.078E+02
7.0000	9.136E+01
11.0000	1.040E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.00E+01	6.00E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.02640698	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	465.24	765.88
Bounding:		1,531.76

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.65	1.65
Bounding:	3.29	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 ITALY
SNF ID #: 1080
Fuel Units & Descr: 140 - ELEMENT
Heavy Metal Mass: BOL=26.894kg; EOL=25.312kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2006
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.26

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	1,510.19	3,020.38	0.00E+00	1.29E-06	2.57E-06	Avg. MeV	
Am-241	1.8331E-03	1,510.19	3,020.38	0.00E+00	2.77E+00	5.54E+00	0.0150	4.882E+14
Am-242m	1.4129E-06	1,510.19	3,020.38	0.00E+00	2.13E-03	4.27E-03	0.0250	1.074E+14
Am-243	1.4774E-07	1,510.19	3,020.38	0.00E+00	2.23E-04	4.46E-04	0.0375	9.147E+13
C-14	1.2871E-04	1,510.19	3,020.38	0.00E+00	1.94E-01	3.89E-01	0.0575	9.389E+13
Cl-36	2.8120E-06	1,510.19	3,020.38	0.00E+00	4.25E-03	8.49E-03	0.0850	5.817E+13
Cm-243	1.7940E-07	1,510.19	3,020.38	0.00E+00	2.71E-04	5.42E-04	0.1250	4.224E+13
Cm-244	1.6962E-06	1,510.19	3,020.38	0.00E+00	2.56E-03	5.12E-03	0.2250	4.934E+13
Co-60	1.2839E+00	1,510.19	3,020.38	0.00E+00	1.94E+03	3.88E+03	0.3750	2.504E+13
Cs-134	9.0541E-02	1,510.19	3,020.38	0.00E+00	1.37E+02	2.73E+02	0.5750	3.329E+14
Cs-135	3.2195E-05	1,510.19	3,020.38	0.00E+00	4.86E-02	9.72E-02	0.8500	1.429E+13
Cs-137	2.7564E+00	1,510.19	3,020.38	0.00E+00	4.16E+03	8.33E+03	1.2500	2.902E+14
Eu-154	1.5368E-02	1,510.19	3,020.38	0.00E+00	2.32E+01	4.64E+01	1.7500	1.934E+11
Eu-155	2.9293E-02	1,510.19	3,020.38	0.00E+00	4.42E+01	8.85E+01	2.2500	3.118E+11
Fe-55	7.7158E-01	1,510.19	3,020.38	0.00E+00	1.17E+03	2.33E+03	2.7500	2.474E+09
H-3	1.1111E-02	1,510.19	3,020.38	0.00E+00	1.68E+01	3.36E+01	3.5000	2.879E+08
I-129	7.3684E-07	1,510.19	3,020.38	0.00E+00	1.11E-03	2.23E-03	5.0000	1.600E+03
Kr-85	2.5263E-01	1,510.19	3,020.38	0.00E+00	3.82E+02	7.63E+02	7.0000	1.811E+02
Np-237	1.2427E-06	1,510.19	3,020.38	0.00E+00	1.88E-03	3.75E-03	11.0000	2.063E+01
Pa-231	3.8511E-09	1,510.19	3,020.38	0.00E+00	5.82E-06	1.16E-05		
Pb-210	7.3880E-15	1,510.19	3,020.38	0.00E+00	1.12E-11	2.23E-11		
Pm-147	2.1023E+00	1,510.19	3,020.38	0.00E+00	3.17E+03	6.35E+03		
Pu-238	1.0383E-03	1,510.19	3,020.38	0.00E+00	1.57E+00	3.14E+00		
Pu-239	5.5293E-03	1,510.19	3,020.38	0.00E+00	8.35E+00	1.67E+01		
Pu-240	2.1278E-03	1,510.19	3,020.38	0.00E+00	3.21E+00	6.43E+00		
Pu-241	1.0195E-01	1,510.19	3,020.38	0.00E+00	1.54E+02	3.08E+02		
Pu-242	2.3128E-07	1,510.19	3,020.38	0.00E+00	3.49E-04	6.99E-04		
Ra-226	5.2782E-14	1,510.19	3,020.38	0.00E+00	7.97E-11	1.59E-10		
Ra-228	1.9338E-10	1,510.19	3,020.38	0.00E+00	2.92E-07	5.84E-07		
Ru-106	9.1684E-02	1,510.19	3,020.38	0.00E+00	1.38E+02	2.77E+02		
Se-79	1.3018E-05	1,510.19	3,020.38	0.00E+00	1.97E-02	3.93E-02		
Sn-126	1.2167E-05	1,510.19	3,020.38	0.00E+00	1.84E-02	3.67E-02		
Sr-90	2.6045E+00	1,510.19	3,020.38	0.00E+00	3.93E+03	7.87E+03		
Tc-99	4.4241E-04	1,510.19	3,020.38	0.00E+00	6.68E-01	1.34E+00		
Th-229	1.3713E-10	1,510.19	3,020.38	0.00E+00	2.07E-07	4.14E-07		
Th-230	1.8090E-11	1,510.19	3,020.38	0.00E+00	2.73E-08	5.46E-08		
Th-232	2.5278E-10	1,510.19	3,020.38	0.00E+00	3.82E-07	7.63E-07		
Tl-208	1.6947E-08	1,510.19	3,020.38	0.00E+00	2.56E-05	5.12E-05		
U-232	4.8737E-08	1,510.19	3,020.38	0.00E+00	7.36E-05	1.47E-04		
U-233	1.2203E-07	1,510.19	3,020.38	0.00E+00	1.84E-04	3.69E-04		
U-234	1.5925E-07	1,510.19	3,020.38	0.00E+00	2.40E-04	4.81E-04		
U-235	-2.6194E-06	1,510.19	0.00	1.16E-02	7.68E-03	1.16E-02		
U-236	1.2693E-05	1,510.19	3,020.38	0.00E+00	1.92E-02	3.83E-02		
U-238	-3.6331E-08	1,510.19	0.00	7.23E-03	7.17E-03	7.23E-03		
Y-90	2.6060E+00	1,510.19	3,020.38	0.00E+00	3.94E+03	7.87E+03		
Other Radionuclides					5.44E+03	1.09E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.79E+01	1.76E+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 %:	20.026	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	917.38	1,510.19	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		3,020.38	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.65	1.65
Bounding:	3.29	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 JAPAN
SNF ID #: 479
Fuel Units & Descr: 73 - ELEMENT
Heavy Metal Mass: BOL=14.235kg; EOL=14.089kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.85
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10" 0.66

II. Estimates

Radionuclide	a_n Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	139.37	278.75	0.00E+00	1.19E-07	2.37E-07
Am-241	1.8331E-03	139.37	278.75	0.00E+00	2.55E-01	5.11E-01
Am-242m	1.4129E-06	139.37	278.75	0.00E+00	1.97E-04	3.94E-04
Am-243	1.4774E-07	139.37	278.75	0.00E+00	2.06E-05	4.12E-05
C-14	1.2871E-04	139.37	278.75	0.00E+00	1.79E-02	3.59E-02
Cl-36	2.8120E-06	139.37	278.75	0.00E+00	3.92E-04	7.84E-04
Cm-243	1.7940E-07	139.37	278.75	0.00E+00	2.50E-05	5.00E-05
Cm-244	1.6962E-06	139.37	278.75	0.00E+00	2.36E-04	4.73E-04
Co-60	1.2839E+00	139.37	278.75	0.00E+00	1.79E+02	3.58E+02
Cs-134	9.0541E-02	139.37	278.75	0.00E+00	1.26E+01	2.52E+01
Cs-135	3.2195E-05	139.37	278.75	0.00E+00	4.49E-03	8.97E-03
Cs-137	2.7564E+00	139.37	278.75	0.00E+00	3.84E+02	7.68E+02
Eu-154	1.5368E-02	139.37	278.75	0.00E+00	2.14E+00	4.28E+00
Eu-155	2.9293E-02	139.37	278.75	0.00E+00	4.08E+00	8.17E+00
Fe-55	7.7158E-01	139.37	278.75	0.00E+00	1.08E+02	2.15E+02
H-3	1.1111E-02	139.37	278.75	0.00E+00	1.55E+00	3.10E+00
I-129	7.3684E-07	139.37	278.75	0.00E+00	1.03E-04	2.05E-04
Kr-85	2.5263E-01	139.37	278.75	0.00E+00	3.52E+01	7.04E+01
Np-237	1.2427E-06	139.37	278.75	0.00E+00	1.73E-04	3.46E-04
Pa-231	3.8511E-09	139.37	278.75	0.00E+00	5.37E-07	1.07E-06
Pb-210	7.3880E-15	139.37	278.75	0.00E+00	1.03E-12	2.06E-12
Pm-147	2.1023E+00	139.37	278.75	0.00E+00	2.93E+02	5.86E+02
Pu-238	1.0383E-03	139.37	278.75	0.00E+00	1.45E-01	2.89E-01
Pu-239	5.5293E-03	139.37	278.75	0.00E+00	7.71E-01	1.54E+00
Pu-240	2.1278E-03	139.37	278.75	0.00E+00	2.97E-01	5.93E-01
Pu-241	1.0195E-01	139.37	278.75	0.00E+00	1.42E+01	2.84E+01
Pu-242	2.3128E-07	139.37	278.75	0.00E+00	3.22E-05	6.45E-05
Ra-226	5.2782E-14	139.37	278.75	0.00E+00	7.36E-12	1.47E-11
Ra-228	1.9338E-10	139.37	278.75	0.00E+00	2.70E-08	5.39E-08
Ru-106	9.1684E-02	139.37	278.75	0.00E+00	1.28E+01	2.56E+01
Se-79	1.3018E-05	139.37	278.75	0.00E+00	1.81E-03	3.63E-03
Sn-126	1.2167E-05	139.37	278.75	0.00E+00	1.70E-03	3.39E-03
Sr-90	2.6045E+00	139.37	278.75	0.00E+00	3.63E+02	7.26E+02
Tc-99	4.4241E-04	139.37	278.75	0.00E+00	6.17E-02	1.23E-01
Th-229	1.3713E-10	139.37	278.75	0.00E+00	1.91E-08	3.82E-08
Th-230	1.8090E-11	139.37	278.75	0.00E+00	2.52E-09	5.04E-09
Th-232	2.5278E-10	139.37	278.75	0.00E+00	3.52E-08	7.05E-08
Tl-208	1.6947E-08	139.37	278.75	0.00E+00	2.36E-06	4.72E-06
U-232	4.8737E-08	139.37	278.75	0.00E+00	6.79E-06	1.36E-05
U-233	1.2203E-07	139.37	278.75	0.00E+00	1.70E-05	3.40E-05
U-234	1.5925E-07	139.37	278.75	0.00E+00	2.22E-05	4.44E-05
U-235	-2.6194E-06	139.37	0.00	6.15E-03	5.79E-03	6.15E-03
U-236	1.2693E-05	139.37	278.75	0.00E+00	1.77E-03	3.54E-03
U-238	-3.6331E-06	139.37	0.00	3.83E-03	3.82E-03	3.83E-03
Y-90	2.6060E+00	139.37	278.75	0.00E+00	3.63E+02	7.26E+02
Other Radionuclides					5.02E+02	1.00E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.505E+13
0.0250	9.913E+12
0.0375	8.442E+12
0.0575	6.665E+12
0.0850	5.368E+12
0.1250	3.898E+12
0.2250	4.554E+12
0.3750	2.311E+12
0.5750	3.072E+13
0.8500	1.319E+12
1.2500	2.678E+13
1.7500	1.785E+10
2.2500	2.877E+10
2.7500	2.283E+08
3.5000	2.657E+07
5.0000	1.549E+02
7.0000	1.755E+01
11.0000	2.000E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.11E+00	1.62E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	138.73	139.37	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		278.75	Bounding burnup assumed to be twice nominal burnup.

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 KANSAS STATE UNIV
SNF ID #: 253
Fuel Units & Descr: 163 - ELEMENT
Heavy Metal Mass: BOL=31.785kg; EOL=30.481kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.47

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	1,244.81	2,489.62	0.00E+00	1.06E-06	2.12E-06	Avg. MeV	
Am-241	1.8331E-03	1,244.81	2,489.62	0.00E+00	2.28E+00	4.56E+00	0.0150	4.024E+14
Am-242m	1.4129E-06	1,244.81	2,489.62	0.00E+00	1.76E-03	3.52E-03	0.0250	8.854E+13
Am-243	1.4774E-07	1,244.81	2,489.62	0.00E+00	1.84E-04	3.68E-04	0.0375	7.540E+13
C-14	1.2871E-04	1,244.81	2,489.62	0.00E+00	1.60E-01	3.20E-01	0.0575	7.739E+13
Cl-36	2.8120E-06	1,244.81	2,489.62	0.00E+00	3.50E-03	7.00E-03	0.0850	4.795E+13
Cm-243	1.7940E-07	1,244.81	2,489.62	0.00E+00	2.23E-04	4.47E-04	0.1250	3.482E+13
Cm-244	1.6962E-06	1,244.81	2,489.62	0.00E+00	2.11E-03	4.22E-03	0.2250	4.067E+13
Co-60	1.2839E+00	1,244.81	2,489.62	0.00E+00	1.60E+03	3.20E+03	0.3750	2.064E+13
Cs-134	9.0541E-02	1,244.81	2,489.62	0.00E+00	1.13E+02	2.25E+02	0.5750	2.744E+14
Cs-135	3.2195E-05	1,244.81	2,489.62	0.00E+00	4.01E-02	8.02E-02	0.8500	1.178E+13
Cs-137	2.7564E+00	1,244.81	2,489.62	0.00E+00	3.43E+03	6.86E+03	1.2500	2.392E+14
Eu-154	1.5368E-02	1,244.81	2,489.62	0.00E+00	1.91E+01	3.83E+01	1.7500	1.594E+11
Eu-155	2.9293E-02	1,244.81	2,489.62	0.00E+00	3.65E+01	7.29E+01	2.2500	2.570E+11
Fe-55	7.7158E-01	1,244.81	2,489.62	0.00E+00	9.60E+02	1.92E+03	2.7500	2.039E+09
H-3	1.1111E-02	1,244.81	2,489.62	0.00E+00	1.38E+01	2.77E+01	3.5000	2.373E+08
I-129	7.3684E-07	1,244.81	2,489.62	0.00E+00	9.17E-04	1.83E-03	5.0000	1.324E+03
Kr-85	2.5263E-01	1,244.81	2,489.62	0.00E+00	3.14E+02	6.29E+02	7.0000	1.499E+02
Np-237	1.2427E-06	1,244.81	2,489.62	0.00E+00	1.55E-03	3.09E-03	11.0000	1.708E+01
Pa-231	3.8511E-09	1,244.81	2,489.62	0.00E+00	4.79E-06	9.59E-06		
Pb-210	7.3880E-15	1,244.81	2,489.62	0.00E+00	9.20E-12	1.84E-11		
Pm-147	2.1023E+00	1,244.81	2,489.62	0.00E+00	2.62E+03	5.23E+03		
Pu-238	1.0383E-03	1,244.81	2,489.62	0.00E+00	1.29E+00	2.59E+00		
Pu-239	5.5293E-03	1,244.81	2,489.62	0.00E+00	6.88E+00	1.38E+01		
Pu-240	2.1278E-03	1,244.81	2,489.62	0.00E+00	2.65E+00	5.30E+00		
Pu-241	1.0195E-01	1,244.81	2,489.62	0.00E+00	1.27E+02	2.54E+02		
Pu-242	2.3128E-07	1,244.81	2,489.62	0.00E+00	2.88E-04	5.76E-04		
Ra-226	5.2782E-14	1,244.81	2,489.62	0.00E+00	6.57E-11	1.31E-10		
Ra-228	1.9338E-10	1,244.81	2,489.62	0.00E+00	2.41E-07	4.81E-07		
Ru-106	9.1684E-02	1,244.81	2,489.62	0.00E+00	1.14E+02	2.28E+02		
Se-79	1.3018E-05	1,244.81	2,489.62	0.00E+00	1.62E-02	3.24E-02		
Sn-126	1.2167E-05	1,244.81	2,489.62	0.00E+00	1.51E-02	3.03E-02		
Sr-90	2.6045E+00	1,244.81	2,489.62	0.00E+00	3.24E+03	6.48E+03		
Tc-99	4.4241E-04	1,244.81	2,489.62	0.00E+00	5.51E-01	1.10E+00		
Th-229	1.3713E-10	1,244.81	2,489.62	0.00E+00	1.71E-07	3.41E-07		
Th-230	1.8090E-11	1,244.81	2,489.62	0.00E+00	2.25E-08	4.50E-08		
Th-232	2.5278E-10	1,244.81	2,489.62	0.00E+00	3.15E-07	6.29E-07		
Tl-208	1.6947E-08	1,244.81	2,489.62	0.00E+00	2.11E-05	4.22E-05		
U-232	4.8737E-08	1,244.81	2,489.62	0.00E+00	6.07E-05	1.21E-04	Thermal Power	
U-233	1.2203E-07	1,244.81	2,489.62	0.00E+00	1.52E-04	3.04E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.5925E-07	1,244.81	2,489.62	0.00E+00	1.98E-04	3.96E-04		
U-235	-2.6194E-06	1,244.81	0.00	1.37E-02	1.05E-02	1.37E-02		
U-236	1.2693E-05	1,244.81	2,489.62	0.00E+00	1.58E-02	3.16E-02	7.24E+01	1.45E+02
U-238	-3.6331E-08	1,244.81	0.00	8.55E-03	8.50E-03	8.55E-03	Total	Total
Y-90	2.6060E+00	1,244.81	2,489.62	0.00E+00	3.24E+03	6.49E+03		
Other Radionuclides					4.49E+03	8.98E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	774.44	1,244.81	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,489.62	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	1.15	1.61	1.00
Bounding:	2.30		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 MEXICO
SNF ID #: 482
Fuel Units & Descr: 151 - ELEMENT
Heavy Metal Mass: BOL=29.445kg; EOL=28.403kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2006
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.36

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	8.5173E-10	994.60	1,989.21	0.00E+00	8.47E-07	1.69E-06
Am-241	1.8331E-03	994.60	1,989.21	0.00E+00	1.82E+00	3.65E+00
Am-242m	1.4129E-06	994.60	1,989.21	0.00E+00	1.41E-03	2.81E-03
Am-243	1.4774E-07	994.60	1,989.21	0.00E+00	1.47E-04	2.94E-04
C-14	1.2871E-04	994.60	1,989.21	0.00E+00	1.28E-01	2.56E-01
Cl-36	2.8120E-06	994.60	1,989.21	0.00E+00	2.80E-03	5.59E-03
Cm-243	1.7940E-07	994.60	1,989.21	0.00E+00	1.78E-04	3.57E-04
Cm-244	1.6962E-06	994.60	1,989.21	0.00E+00	1.69E-03	3.37E-03
Co-60	1.2839E+00	994.60	1,989.21	0.00E+00	1.28E+03	2.55E+03
Cs-134	9.0541E-02	994.60	1,989.21	0.00E+00	9.01E+01	1.80E+02
Cs-135	3.2195E-05	994.60	1,989.21	0.00E+00	3.20E-02	6.40E-02
Cs-137	2.7564E+00	994.60	1,989.21	0.00E+00	2.74E+03	5.48E+03
Eu-154	1.5368E-02	994.60	1,989.21	0.00E+00	1.53E+01	3.06E+01
Eu-155	2.9293E-02	994.60	1,989.21	0.00E+00	2.91E+01	5.83E+01
Fe-55	7.7158E-01	994.60	1,989.21	0.00E+00	7.67E+02	1.53E+03
H-3	1.1111E-02	994.60	1,989.21	0.00E+00	1.11E+01	2.21E+01
I-129	7.3684E-07	994.60	1,989.21	0.00E+00	7.33E-04	1.47E-03
Kr-85	2.5263E-01	994.60	1,989.21	0.00E+00	2.51E+02	5.03E+02
Np-237	1.2427E-06	994.60	1,989.21	0.00E+00	1.24E-03	2.47E-03
Pa-231	3.8511E-09	994.60	1,989.21	0.00E+00	3.83E-06	7.66E-06
Pb-210	7.3880E-15	994.60	1,989.21	0.00E+00	7.35E-12	1.47E-11
Pm-147	2.1023E+00	994.60	1,989.21	0.00E+00	2.09E+03	4.18E+03
Pu-238	1.0383E-03	994.60	1,989.21	0.00E+00	1.03E+00	2.07E+00
Pu-239	5.5293E-03	994.60	1,989.21	0.00E+00	5.50E+00	1.10E+01
Pu-240	2.1278E-03	994.60	1,989.21	0.00E+00	2.12E+00	4.23E+00
Pu-241	1.0195E-01	994.60	1,989.21	0.00E+00	1.01E+02	2.03E+02
Pu-242	2.3128E-07	994.60	1,989.21	0.00E+00	2.30E-04	4.60E-04
Ra-226	5.2782E-14	994.60	1,989.21	0.00E+00	5.25E-11	1.05E-10
Ra-228	1.9338E-10	994.60	1,989.21	0.00E+00	1.92E-07	3.85E-07
Ru-106	9.1684E-02	994.60	1,989.21	0.00E+00	9.12E+01	1.82E+02
Se-79	1.3018E-05	994.60	1,989.21	0.00E+00	1.29E-02	2.59E-02
Sn-126	1.2167E-05	994.60	1,989.21	0.00E+00	1.21E-02	2.42E-02
Sr-90	2.6045E+00	994.60	1,989.21	0.00E+00	2.59E+03	5.18E+03
Tc-99	4.4241E-04	994.60	1,989.21	0.00E+00	4.40E-01	8.80E-01
Th-229	1.3713E-10	994.60	1,989.21	0.00E+00	1.36E-07	2.73E-07
Th-230	1.8090E-11	994.60	1,989.21	0.00E+00	1.80E-08	3.60E-08
Th-232	2.5278E-10	994.60	1,989.21	0.00E+00	2.51E-07	5.03E-07
Tl-208	1.6947E-08	994.60	1,989.21	0.00E+00	1.69E-05	3.37E-05
U-232	4.8737E-08	994.60	1,989.21	0.00E+00	4.85E-05	9.69E-05
U-233	1.2203E-07	994.60	1,989.21	0.00E+00	1.21E-04	2.43E-04
U-234	1.5925E-07	994.60	1,989.21	0.00E+00	1.58E-04	3.17E-04
U-235	-2.6194E-06	994.60	0.00	1.27E-02	1.01E-02	1.27E-02
U-236	1.2693E-05	994.60	1,989.21	0.00E+00	1.26E-02	2.52E-02
U-238	-3.6331E-08	994.60	0.00	7.92E-03	7.88E-03	7.92E-03
Y-90	2.6060E+00	994.60	1,989.21	0.00E+00	2.59E+03	5.18E+03
Other Radionuclides					3.59E+03	7.17E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.215E+14
0.0250	7.074E+13
0.0375	6.024E+13
0.0575	6.184E+13
0.0850	3.831E+13
0.1250	2.782E+13
0.2250	3.250E+13
0.3750	1.649E+13
0.5750	2.192E+14
0.8500	9.410E+12
1.2500	1.911E+14
1.7500	1.274E+11
2.2500	2.053E+11
2.7500	1.629E+09
3.5000	1.896E+08
5.0000	1.061E+03
7.0000	1.201E+02
11.0000	1.368E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.79E+01	1.16E+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 %:	20.00000041	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		994.60
Bounding:		1,989.21

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 MNRC
SNF ID #: 254
Fuel Units & Descr: 96 - ELEMENT
Heavy Metal Mass: BOL=17.99kg; EOL=17.933kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.86

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	350.58	701.16	0.00E+00	2.99E-07	5.97E-07
Am-241	1.8331E-03	350.58	701.16	0.00E+00	6.43E-01	1.29E+00
Am-242m	1.4129E-06	350.58	701.16	0.00E+00	4.95E-04	9.91E-04
Am-243	1.4774E-07	350.58	701.16	0.00E+00	5.18E-05	1.04E-04
C-14	1.2871E-04	350.58	701.16	0.00E+00	4.51E-02	9.02E-02
Cl-36	2.8120E-06	350.58	701.16	0.00E+00	9.86E-04	1.97E-03
Cm-243	1.7940E-07	350.58	701.16	0.00E+00	6.29E-05	1.26E-04
Cm-244	1.6962E-06	350.58	701.16	0.00E+00	5.95E-04	1.19E-03
Co-60	1.2839E+00	350.58	701.16	0.00E+00	4.50E+02	9.00E+02
Cs-134	9.0541E-02	350.58	701.16	0.00E+00	3.17E+01	6.35E+01
Cs-135	3.2195E-05	350.58	701.16	0.00E+00	1.13E-02	2.26E-02
Cs-137	2.7564E+00	350.58	701.16	0.00E+00	9.66E+02	1.93E+03
Eu-154	1.5368E-02	350.58	701.16	0.00E+00	5.39E+00	1.08E+01
Eu-155	2.9293E-02	350.58	701.16	0.00E+00	1.03E+01	2.05E+01
Fe-55	7.7158E-01	350.58	701.16	0.00E+00	2.70E+02	5.41E+02
H-3	1.1111E-02	350.58	701.16	0.00E+00	3.90E+00	7.79E+00
I-129	7.3684E-07	350.58	701.16	0.00E+00	2.58E-04	5.17E-04
Kr-85	2.5263E-01	350.58	701.16	0.00E+00	8.86E+01	1.77E+02
Np-237	1.2427E-06	350.58	701.16	0.00E+00	4.36E-04	8.71E-04
Pa-231	3.8511E-09	350.58	701.16	0.00E+00	1.35E-06	2.70E-06
Pb-210	7.3880E-15	350.58	701.16	0.00E+00	2.59E-12	5.18E-12
Pm-147	2.1023E+00	350.58	701.16	0.00E+00	7.37E+02	1.47E+03
Pu-238	1.0383E-03	350.58	701.16	0.00E+00	3.64E-01	7.28E-01
Pu-239	5.5293E-03	350.58	701.16	0.00E+00	1.94E+00	3.88E+00
Pu-240	2.1278E-03	350.58	701.16	0.00E+00	7.46E-01	1.49E+00
Pu-241	1.0195E-01	350.58	701.16	0.00E+00	3.57E+01	7.15E+01
Pu-242	2.3128E-07	350.58	701.16	0.00E+00	8.11E-05	1.62E-04
Ra-226	5.2782E-14	350.58	701.16	0.00E+00	1.85E-11	3.70E-11
Ra-228	1.9338E-10	350.58	701.16	0.00E+00	6.78E-08	1.36E-07
Ru-106	9.1684E-02	350.58	701.16	0.00E+00	3.21E+01	6.43E+01
Se-79	1.3018E-05	350.58	701.16	0.00E+00	4.56E-03	9.13E-03
Sn-126	1.2167E-05	350.58	701.16	0.00E+00	4.27E-03	8.53E-03
Sr-90	2.6045E+00	350.58	701.16	0.00E+00	9.13E+02	1.83E+03
Tc-99	4.4241E-04	350.58	701.16	0.00E+00	1.55E-01	3.10E-01
Th-229	1.3713E-10	350.58	701.16	0.00E+00	4.81E-08	9.61E-08
Th-230	1.8090E-11	350.58	701.16	0.00E+00	6.34E-09	1.27E-08
Th-232	2.5278E-10	350.58	701.16	0.00E+00	8.86E-08	1.77E-07
Tl-208	1.6947E-08	350.58	701.16	0.00E+00	5.94E-06	1.19E-05
U-232	4.8737E-08	350.58	701.16	0.00E+00	1.71E-05	3.42E-05
U-233	1.2203E-07	350.58	701.16	0.00E+00	4.28E-05	8.56E-05
U-234	1.5925E-07	350.58	701.16	0.00E+00	5.58E-05	1.12E-04
U-235	-2.6194E-06	350.58	0.00	7.58E-03	6.66E-03	7.58E-03
U-236	1.2693E-05	350.58	701.16	0.00E+00	4.45E-03	8.90E-03
U-238	-3.6331E-08	350.58	0.00	4.87E-03	4.86E-03	4.87E-03
Y-90	2.6060E+00	350.58	701.16	0.00E+00	9.14E+02	1.83E+03
Other Radionuclides					1.26E+03	2.53E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.133E+14
0.0250	2.494E+13
0.0375	2.124E+13
0.0575	2.180E+13
0.0850	1.350E+13
0.1250	9.806E+12
0.2250	1.145E+13
0.3750	5.813E+12
0.5750	7.728E+13
0.8500	3.317E+12
1.2500	6.736E+13
1.7500	4.490E+10
2.2500	7.237E+10
2.7500	5.743E+08
3.5000	6.684E+07
5.0000	3.787E+02
7.0000	4.288E+01
11.0000	4.886E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.04E+01	4.08E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.48980681	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	350.58	54.99	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		701.16	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.57	0.16
Bounding:	1.14	

Estimated EOL HM/Given EOL HM: 0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 MSU
SNF ID #: 873
Fuel Units & Descr: 48 - ELEMENT
Heavy Metal Mass: BOL=9.36kg; EOL=8.29kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1982
Estimates as of: 2010
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' 0.43

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.1459E-09	1,021.81	2,043.62	0.00E+00	4.24E-06	8.47E-06
Am-241	3.5850E-03	1,021.81	2,043.62	0.00E+00	3.66E+00	7.33E+00
Am-242m	1.2899E-06	1,021.81	2,043.62	0.00E+00	1.32E-03	2.64E-03
Am-243	1.4747E-07	1,021.81	2,043.62	0.00E+00	1.51E-04	3.01E-04
C-14	1.2839E-04	1,021.81	2,043.62	0.00E+00	1.31E-01	2.62E-01
Cl-36	2.8120E-06	1,021.81	2,043.62	0.00E+00	2.87E-03	5.75E-03
Cm-243	1.1038E-07	1,021.81	2,043.62	0.00E+00	1.13E-04	2.26E-04
Cm-244	7.8917E-07	1,021.81	2,043.62	0.00E+00	8.06E-04	1.61E-03
Co-60	9.2647E-02	1,021.81	2,043.62	0.00E+00	9.47E+01	1.89E+02
Cs-134	1.0940E-04	1,021.81	2,043.62	0.00E+00	1.12E-01	2.24E-01
Cs-135	3.2195E-05	1,021.81	2,043.62	0.00E+00	3.29E-02	6.58E-02
Cs-137	1.7368E+00	1,021.81	2,043.62	0.00E+00	1.77E+03	3.55E+03
Eu-154	3.0677E-03	1,021.81	2,043.62	0.00E+00	3.13E+00	6.27E+00
Eu-155	1.7925E-03	1,021.81	2,043.62	0.00E+00	1.83E+00	3.66E+00
Fe-55	3.7444E-03	1,021.81	2,043.62	0.00E+00	3.83E+00	7.65E+00
H-3	3.6180E-03	1,021.81	2,043.62	0.00E+00	3.70E+00	7.39E+00
I-129	7.3684E-07	1,021.81	2,043.62	0.00E+00	7.53E-04	1.51E-03
Kr-85	6.9368E-02	1,021.81	2,043.62	0.00E+00	7.09E+01	1.42E+02
Np-237	1.2662E-06	1,021.81	2,043.62	0.00E+00	1.29E-03	2.59E-03
Pa-231	9.1654E-09	1,021.81	2,043.62	0.00E+00	9.37E-06	1.87E-05
Pb-210	1.3728E-13	1,021.81	2,043.62	0.00E+00	1.40E-10	2.81E-10
Pm-147	1.0702E-02	1,021.81	2,043.62	0.00E+00	1.09E+01	2.19E+01
Pu-238	8.8692E-04	1,021.81	2,043.62	0.00E+00	9.06E-01	1.81E+00
Pu-239	5.5263E-03	1,021.81	2,043.62	0.00E+00	5.65E+00	1.13E+01
Pu-240	2.1233E-03	1,021.81	2,043.62	0.00E+00	2.17E+00	4.34E+00
Pu-241	3.8962E-02	1,021.81	2,043.62	0.00E+00	3.98E+01	7.96E+01
Pu-242	2.3128E-07	1,021.81	2,043.62	0.00E+00	2.36E-04	4.73E-04
Ra-226	4.6752E-13	1,021.81	2,043.62	0.00E+00	4.78E-10	9.55E-10
Ra-228	2.4827E-10	1,021.81	2,043.62	0.00E+00	2.54E-07	5.07E-07
Ru-106	9.8526E-08	1,021.81	2,043.62	0.00E+00	1.01E-04	2.01E-04
Se-79	1.3015E-05	1,021.81	2,043.62	0.00E+00	1.33E-02	2.66E-02
Sn-126	1.2165E-05	1,021.81	2,043.62	0.00E+00	1.24E-02	2.49E-02
Sr-90	1.6195E+00	1,021.81	2,043.62	0.00E+00	1.65E+03	3.31E+03
Tc-99	4.4241E-04	1,021.81	2,043.62	0.00E+00	4.52E-01	9.04E-01
Th-229	4.2451E-10	1,021.81	2,043.62	0.00E+00	4.34E-07	8.68E-07
Th-230	6.1398E-11	1,021.81	2,043.62	0.00E+00	6.27E-08	1.25E-07
Th-232	2.5278E-10	1,021.81	2,043.62	0.00E+00	2.58E-07	5.17E-07
Tl-208	1.5098E-08	1,021.81	2,043.62	0.00E+00	1.54E-05	3.09E-05
U-232	4.0662E-08	1,021.81	2,043.62	0.00E+00	4.15E-05	8.31E-05
U-233	1.2217E-07	1,021.81	2,043.62	0.00E+00	1.25E-04	2.50E-04
U-234	2.2391E-07	1,021.81	2,043.62	0.00E+00	2.29E-04	4.58E-04
U-235	-2.6194E-06	1,021.81	0.00	4.05E-03	1.37E-03	4.05E-03
U-236	1.2695E-05	1,021.81	2,043.62	0.00E+00	1.30E-02	2.59E-02
U-238	-3.6331E-08	1,021.81	0.00	2.52E-03	2.48E-03	2.52E-03
Y-90	1.6195E+00	1,021.81	2,043.62	0.00E+00	1.65E+03	3.31E+03
Other Radionuclides					1.76E+03	3.52E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.814E+14
0.0250	3.771E+13
0.0375	3.272E+13
0.0575	3.523E+13
0.0850	2.124E+13
0.1250	1.386E+13
0.2250	1.827E+13
0.3750	7.977E+12
0.5750	1.322E+14
0.8500	1.420E+12
1.2500	1.458E+13
1.7500	3.695E+10
2.2500	7.793E+07
2.7500	1.318E+06
3.5000	2.740E+03
5.0000	1.066E+03
7.0000	1.203E+02
11.0000	1.368E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.17E+01	4.34E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,021.81	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,043.62	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	3.20		1.00
Bounding:	6.40		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 PENN. STATE UNIV.
SNF ID #: 237
Fuel Units & Descr: 203 - ELEMENT
Heavy Metal Mass: BOL=39.991kg; EOL=37.575kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10'
1.83

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	2,306.04	4,612.09	0.00E+00	1.96E-06	3.93E-06
Am-241	1.8331E-03	2,306.04	4,612.09	0.00E+00	4.23E+00	8.45E+00
Am-242m	1.4129E-06	2,306.04	4,612.09	0.00E+00	3.26E-03	6.52E-03
Am-243	1.4774E-07	2,306.04	4,612.09	0.00E+00	3.41E-04	6.81E-04
C-14	1.2871E-04	2,306.04	4,612.09	0.00E+00	2.97E-01	5.94E-01
Cl-36	2.8120E-06	2,306.04	4,612.09	0.00E+00	6.48E-03	1.30E-02
Cm-243	1.7940E-07	2,306.04	4,612.09	0.00E+00	4.14E-04	8.27E-04
Cm-244	1.6962E-06	2,306.04	4,612.09	0.00E+00	3.91E-03	7.82E-03
Co-60	1.2839E+00	2,306.04	4,612.09	0.00E+00	2.96E+03	5.92E+03
Cs-134	9.0541E-02	2,306.04	4,612.09	0.00E+00	2.09E+02	4.18E+02
Cs-135	3.2195E-05	2,306.04	4,612.09	0.00E+00	7.42E-02	1.48E-01
Cs-137	2.7564E+00	2,306.04	4,612.09	0.00E+00	6.36E+03	1.27E+04
Eu-154	1.5368E-02	2,306.04	4,612.09	0.00E+00	3.54E+01	7.09E+01
Eu-155	2.9293E-02	2,306.04	4,612.09	0.00E+00	6.76E+01	1.35E+02
Fe-55	7.7158E-01	2,306.04	4,612.09	0.00E+00	1.78E+03	3.56E+03
H-3	1.1111E-02	2,306.04	4,612.09	0.00E+00	2.56E+01	5.12E+01
I-129	7.3684E-07	2,306.04	4,612.09	0.00E+00	1.70E-03	3.40E-03
Kr-85	2.5263E-01	2,306.04	4,612.09	0.00E+00	5.83E+02	1.17E+03
Np-237	1.2427E-06	2,306.04	4,612.09	0.00E+00	2.87E-03	5.73E-03
Pa-231	3.8511E-09	2,306.04	4,612.09	0.00E+00	8.88E-06	1.78E-05
Pb-210	7.3880E-15	2,306.04	4,612.09	0.00E+00	1.70E-11	3.41E-11
Pm-147	2.1023E+00	2,306.04	4,612.09	0.00E+00	4.85E+03	9.70E+03
Pu-238	1.0383E-03	2,306.04	4,612.09	0.00E+00	2.39E+00	4.79E+00
Pu-239	5.5293E-03	2,306.04	4,612.09	0.00E+00	1.28E+01	2.55E+01
Pu-240	2.1278E-03	2,306.04	4,612.09	0.00E+00	4.91E+00	9.81E+00
Pu-241	1.0195E-01	2,306.04	4,612.09	0.00E+00	2.35E+02	4.70E+02
Pu-242	2.3128E-07	2,306.04	4,612.09	0.00E+00	5.33E-04	1.07E-03
Ra-226	5.2782E-14	2,306.04	4,612.09	0.00E+00	1.22E-10	2.43E-10
Ra-228	1.9338E-10	2,306.04	4,612.09	0.00E+00	4.46E-07	8.92E-07
Ru-106	9.1684E-02	2,306.04	4,612.09	0.00E+00	2.11E+02	4.23E+02
Se-79	1.3018E-05	2,306.04	4,612.09	0.00E+00	3.00E-02	6.00E-02
Sn-126	1.2167E-05	2,306.04	4,612.09	0.00E+00	2.81E-02	5.61E-02
Sr-90	2.6045E+00	2,306.04	4,612.09	0.00E+00	6.01E+03	1.20E+04
Tc-99	4.4241E-04	2,306.04	4,612.09	0.00E+00	1.02E+00	2.04E+00
Th-229	1.3713E-10	2,306.04	4,612.09	0.00E+00	3.16E-07	6.32E-07
Th-230	1.8090E-11	2,306.04	4,612.09	0.00E+00	4.17E-08	8.34E-08
Th-232	2.5278E-10	2,306.04	4,612.09	0.00E+00	5.83E-07	1.17E-06
Tl-208	1.6947E-08	2,306.04	4,612.09	0.00E+00	3.91E-05	7.82E-05
U-232	4.8737E-08	2,306.04	4,612.09	0.00E+00	1.12E-04	2.25E-04
U-233	1.2203E-07	2,306.04	4,612.09	0.00E+00	2.81E-04	5.63E-04
U-234	1.5925E-07	2,306.04	4,612.09	0.00E+00	3.67E-04	7.34E-04
U-235	-2.6194E-06	2,306.04	0.00	1.71E-02	1.11E-02	1.71E-02
U-236	1.2693E-05	2,306.04	4,612.09	0.00E+00	2.93E-02	5.85E-02
U-238	-3.6331E-06	2,306.04	0.00	1.08E-02	1.07E-02	1.08E-02
Y-90	2.6060E+00	2,306.04	4,612.09	0.00E+00	6.01E+03	1.20E+04
Other Radionuclides					8.31E+03	1.66E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.454E+14
0.0250	1.640E+14
0.0375	1.397E+14
0.0575	1.434E+14
0.0850	8.882E+13
0.1250	6.450E+13
0.2250	7.535E+13
0.3750	3.824E+13
0.5750	5.083E+14
0.8500	2.182E+13
1.2500	4.431E+14
1.7500	2.953E+11
2.2500	4.760E+11
2.7500	3.778E+09
3.5000	4.396E+08
5.0000	2.442E+03
7.0000	2.764E+02
11.0000	3.149E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.34E+02	2.68E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.79695431	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2,306.04
Bounding:		4,612.09

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.69	
Bounding:	3.38	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 REED COLLEGE
SNF ID #: 775
Fuel Units & Descr: 9 - ELEMENT
Heavy Metal Mass: BOL=1.719kg; EOL=1.706kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2026
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.12

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	12.89	25.77	0.00E+00	1.10E-08	2.20E-08
Am-241	1.8331E-03	12.89	25.77	0.00E+00	2.36E-02	4.72E-02
Am-242m	1.4129E-06	12.89	25.77	0.00E+00	1.82E-05	3.64E-05
Am-243	1.4774E-07	12.89	25.77	0.00E+00	1.90E-06	3.81E-06
C-14	1.2871E-04	12.89	25.77	0.00E+00	1.66E-03	3.32E-03
Cl-36	2.8120E-06	12.89	25.77	0.00E+00	3.62E-05	7.25E-05
Cm-243	1.7940E-07	12.89	25.77	0.00E+00	2.31E-06	4.62E-06
Cm-244	1.6962E-06	12.89	25.77	0.00E+00	2.19E-05	4.37E-05
Co-60	1.2839E+00	12.89	25.77	0.00E+00	1.65E+01	3.31E+01
Cs-134	9.0541E-02	12.89	25.77	0.00E+00	1.17E+00	2.33E+00
Cs-135	3.2195E-05	12.89	25.77	0.00E+00	4.15E-04	8.30E-04
Cs-137	2.7564E+00	12.89	25.77	0.00E+00	3.55E+01	7.10E+01
Eu-154	1.5368E-02	12.89	25.77	0.00E+00	1.98E-01	3.96E-01
Eu-155	2.9293E-02	12.89	25.77	0.00E+00	3.78E-01	7.55E-01
Fe-55	7.7158E-01	12.89	25.77	0.00E+00	9.94E+00	1.99E+01
H-3	1.1111E-02	12.89	25.77	0.00E+00	1.43E-01	2.86E-01
I-129	7.3684E-07	12.89	25.77	0.00E+00	9.50E-06	1.90E-05
Kr-85	2.5263E-01	12.89	25.77	0.00E+00	3.26E+00	6.51E+00
Np-237	1.2427E-06	12.89	25.77	0.00E+00	1.60E-05	3.20E-05
Pa-231	3.8511E-09	12.89	25.77	0.00E+00	4.96E-08	9.93E-08
Pb-210	7.3880E-15	12.89	25.77	0.00E+00	9.52E-14	1.90E-13
Pm-147	2.1023E+00	12.89	25.77	0.00E+00	2.71E+01	5.42E+01
Pu-238	1.0383E-03	12.89	25.77	0.00E+00	1.34E-02	2.68E-02
Pu-239	5.5293E-03	12.89	25.77	0.00E+00	7.13E-02	1.43E-01
Pu-240	2.1278E-03	12.89	25.77	0.00E+00	2.74E-02	5.48E-02
Pu-241	1.0195E-01	12.89	25.77	0.00E+00	1.31E+00	2.63E+00
Pu-242	2.3128E-07	12.89	25.77	0.00E+00	2.98E-06	5.96E-06
Ra-226	5.2782E-14	12.89	25.77	0.00E+00	6.80E-13	1.36E-12
Ra-228	1.9338E-10	12.89	25.77	0.00E+00	2.49E-09	4.98E-09
Ru-106	9.1684E-02	12.89	25.77	0.00E+00	1.18E+00	2.36E+00
Se-79	1.3018E-05	12.89	25.77	0.00E+00	1.68E-04	3.36E-04
Sn-126	1.2167E-05	12.89	25.77	0.00E+00	1.57E-04	3.14E-04
Sr-90	2.6045E+00	12.89	25.77	0.00E+00	3.36E+01	6.71E+01
Tc-99	4.4241E-04	12.89	25.77	0.00E+00	5.70E-03	1.14E-02
Th-229	1.3713E-10	12.89	25.77	0.00E+00	1.77E-09	3.53E-09
Th-230	1.8090E-11	12.89	25.77	0.00E+00	2.33E-10	4.66E-10
Th-232	2.5278E-10	12.89	25.77	0.00E+00	3.26E-09	6.52E-09
Tl-208	1.6947E-08	12.89	25.77	0.00E+00	2.18E-07	4.37E-07
U-232	4.8737E-08	12.89	25.77	0.00E+00	6.28E-07	1.26E-06
U-233	1.2203E-07	12.89	25.77	0.00E+00	1.57E-06	3.15E-06
U-234	1.5925E-07	12.89	25.77	0.00E+00	2.05E-06	4.10E-06
U-235	-2.6194E-06	12.89	0.00	7.49E-04	7.15E-04	7.49E-04
U-236	1.2693E-05	12.89	25.77	0.00E+00	1.64E-04	3.27E-04
U-238	-3.6331E-08	12.89	0.00	4.61E-04	4.61E-04	4.61E-04
Y-90	2.6060E+00	12.89	25.77	0.00E+00	3.36E+01	6.72E+01
Other Radionuclides					4.65E+01	9.29E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.166E+12
0.0250	9.166E+11
0.0375	7.806E+11
0.0575	8.012E+11
0.0850	4.964E+11
0.1250	3.605E+11
0.2250	4.211E+11
0.3750	2.137E+11
0.5750	2.841E+12
0.8500	1.219E+11
1.2500	2.476E+12
1.7500	1.650E+09
2.2500	2.660E+09
2.7500	2.111E+07
3.5000	2.457E+06
5.0000	1.457E+01
7.0000	1.651E+00
11.0000	1.882E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.80E-01	1.80E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.15706806	10 to 20.1

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (very close to 20%)

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		12.89
Bounding:		25.77

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.22	
Bounding:	0.44	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 SLOVENIA
SNF ID #: 488
Fuel Units & Descr: 122 - ELEMENT
Heavy Metal Mass: BOL=23.4kg; EOL=22.594kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.10

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	768.65	1,537.30	0.00E+00	6.55E-07	1.31E-06
Am-241	1.8331E-03	768.65	1,537.30	0.00E+00	1.41E+00	2.82E+00
Am-242m	1.4129E-06	768.65	1,537.30	0.00E+00	1.09E-03	2.17E-03
Am-243	1.4774E-07	768.65	1,537.30	0.00E+00	1.14E-04	2.27E-04
C-14	1.2871E-04	768.65	1,537.30	0.00E+00	9.89E-02	1.98E-01
Cl-36	2.8120E-06	768.65	1,537.30	0.00E+00	2.16E-03	4.32E-03
Cm-243	1.7940E-07	768.65	1,537.30	0.00E+00	1.38E-04	2.76E-04
Cm-244	1.6962E-06	768.65	1,537.30	0.00E+00	1.30E-03	2.61E-03
Co-60	1.2839E+00	768.65	1,537.30	0.00E+00	9.87E+02	1.97E+03
Cs-134	9.0541E-02	768.65	1,537.30	0.00E+00	6.96E+01	1.39E+02
Cs-135	3.2195E-05	768.65	1,537.30	0.00E+00	2.47E-02	4.95E-02
Cs-137	2.7564E+00	768.65	1,537.30	0.00E+00	2.12E+03	4.24E+03
Eu-154	1.5368E-02	768.65	1,537.30	0.00E+00	1.18E+01	2.36E+01
Eu-155	2.9293E-02	768.65	1,537.30	0.00E+00	2.25E+01	4.50E+01
Fe-55	7.7158E-01	768.65	1,537.30	0.00E+00	5.93E+02	1.19E+03
H-3	1.1111E-02	768.65	1,537.30	0.00E+00	8.54E+00	1.71E+01
I-129	7.3684E-07	768.65	1,537.30	0.00E+00	5.66E-04	1.13E-03
Kr-85	2.5263E-01	768.65	1,537.30	0.00E+00	1.94E+02	3.88E+02
Np-237	1.2427E-06	768.65	1,537.30	0.00E+00	9.55E-04	1.91E-03
Pa-231	3.8511E-09	768.65	1,537.30	0.00E+00	2.96E-06	5.92E-06
Pb-210	7.3880E-15	768.65	1,537.30	0.00E+00	5.68E-12	1.14E-11
Pm-147	2.1023E+00	768.65	1,537.30	0.00E+00	1.62E+03	3.23E+03
Pu-238	1.0383E-03	768.65	1,537.30	0.00E+00	7.98E-01	1.60E+00
Pu-239	5.5293E-03	768.65	1,537.30	0.00E+00	4.25E+00	8.50E+00
Pu-240	2.1278E-03	768.65	1,537.30	0.00E+00	1.64E+00	3.27E+00
Pu-241	1.0195E-01	768.65	1,537.30	0.00E+00	7.84E+01	1.57E+02
Pu-242	2.3128E-07	768.65	1,537.30	0.00E+00	1.78E-04	3.56E-04
Ra-226	5.2782E-14	768.65	1,537.30	0.00E+00	4.06E-11	8.11E-11
Ra-228	1.9338E-10	768.65	1,537.30	0.00E+00	1.49E-07	2.97E-07
Ru-106	9.1684E-02	768.65	1,537.30	0.00E+00	7.05E+01	1.41E+02
Se-79	1.3018E-05	768.65	1,537.30	0.00E+00	1.00E-02	2.00E-02
Sn-126	1.2167E-05	768.65	1,537.30	0.00E+00	9.35E-03	1.87E-02
Sr-90	2.6045E+00	768.65	1,537.30	0.00E+00	2.00E+03	4.00E+03
Tc-99	4.4241E-04	768.65	1,537.30	0.00E+00	3.40E-01	6.80E-01
Th-229	1.3713E-10	768.65	1,537.30	0.00E+00	1.05E-07	2.11E-07
Th-230	1.8090E-11	768.65	1,537.30	0.00E+00	1.39E-08	2.78E-08
Th-232	2.5278E-10	768.65	1,537.30	0.00E+00	1.94E-07	3.89E-07
Tl-208	1.6947E-08	768.65	1,537.30	0.00E+00	1.30E-05	2.61E-05
U-232	4.8737E-08	768.65	1,537.30	0.00E+00	3.75E-05	7.49E-05
U-233	1.2203E-07	768.65	1,537.30	0.00E+00	9.38E-05	1.88E-04
U-234	1.5925E-07	768.65	1,537.30	0.00E+00	1.22E-04	2.45E-04
U-235	-2.6194E-06	768.65	0.00	1.01E-02	8.04E-03	1.01E-02
U-236	1.2693E-05	768.65	1,537.30	0.00E+00	9.76E-03	1.95E-02
U-238	-3.6331E-08	768.65	0.00	6.30E-03	6.27E-03	6.30E-03
Y-90	2.6060E+00	768.65	1,537.30	0.00E+00	2.00E+03	4.01E+03
Other Radionuclides					2.77E+03	5.54E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.485E+14
0.0250	5.467E+13
0.0375	4.656E+13
0.0575	4.779E+13
0.0850	2.961E+13
0.1250	2.150E+13
0.2250	2.511E+13
0.3750	1.275E+13
0.5750	1.694E+14
0.8500	7.272E+12
1.2500	1.477E+14
1.7500	9.844E+10
2.2500	1.587E+11
2.7500	1.259E+09
3.5000	1.465E+08
5.0000	8.202E+02
7.0000	9.286E+01
11.0000	1.058E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.47E+01	8.95E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.8857762	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		768.65
Bounding:		1,537.30

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.96	
Bounding:	1.93	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 SLOVENIA
SNF ID #: 1079
Fuel Units & Descr: 149 - ELEMENT
Heavy Metal Mass: BOL=28.578kg; EOL=27.446kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.34

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	1,081.00	2,161.99	0.00E+00	9.21E-07	1.84E-06
Am-241	1.8331E-03	1,081.00	2,161.99	0.00E+00	1.98E+00	3.96E+00
Am-242m	1.4129E-06	1,081.00	2,161.99	0.00E+00	1.53E-03	3.05E-03
Am-243	1.4774E-07	1,081.00	2,161.99	0.00E+00	1.60E-04	3.19E-04
C-14	1.2871E-04	1,081.00	2,161.99	0.00E+00	1.39E-01	2.78E-01
Cl-36	2.8120E-06	1,081.00	2,161.99	0.00E+00	3.04E-03	6.08E-03
Cm-243	1.7940E-07	1,081.00	2,161.99	0.00E+00	1.94E-04	3.88E-04
Cm-244	1.6962E-06	1,081.00	2,161.99	0.00E+00	1.83E-03	3.67E-03
Co-60	1.2839E+00	1,081.00	2,161.99	0.00E+00	1.39E+03	2.78E+03
Cs-134	9.0541E-02	1,081.00	2,161.99	0.00E+00	9.79E+01	1.96E+02
Cs-135	3.2195E-05	1,081.00	2,161.99	0.00E+00	3.48E-02	6.96E-02
Cs-137	2.7564E+00	1,081.00	2,161.99	0.00E+00	2.98E+03	5.96E+03
Eu-154	1.5368E-02	1,081.00	2,161.99	0.00E+00	1.66E+01	3.32E+01
Eu-155	2.9293E-02	1,081.00	2,161.99	0.00E+00	3.17E+01	6.33E+01
Fe-55	7.7158E-01	1,081.00	2,161.99	0.00E+00	8.34E+02	1.67E+03
H-3	1.1111E-02	1,081.00	2,161.99	0.00E+00	1.20E+01	2.40E+01
I-129	7.3684E-07	1,081.00	2,161.99	0.00E+00	7.97E-04	1.59E-03
Kr-85	2.5263E-01	1,081.00	2,161.99	0.00E+00	2.73E+02	5.46E+02
Np-237	1.2427E-06	1,081.00	2,161.99	0.00E+00	1.34E-03	2.69E-03
Pa-231	3.8511E-09	1,081.00	2,161.99	0.00E+00	4.16E-06	8.33E-06
Pb-210	7.3880E-15	1,081.00	2,161.99	0.00E+00	7.99E-12	1.60E-11
Pm-147	2.1023E+00	1,081.00	2,161.99	0.00E+00	2.27E+03	4.55E+03
Pu-238	1.0383E-03	1,081.00	2,161.99	0.00E+00	1.12E+00	2.24E+00
Pu-239	5.5293E-03	1,081.00	2,161.99	0.00E+00	5.98E+00	1.20E+01
Pu-240	2.1278E-03	1,081.00	2,161.99	0.00E+00	2.30E+00	4.60E+00
Pu-241	1.0195E-01	1,081.00	2,161.99	0.00E+00	1.10E+02	2.20E+02
Pu-242	2.3128E-07	1,081.00	2,161.99	0.00E+00	2.50E-04	5.00E-04
Ra-226	5.2782E-14	1,081.00	2,161.99	0.00E+00	5.71E-11	1.14E-10
Ra-228	1.9338E-10	1,081.00	2,161.99	0.00E+00	2.09E-07	4.18E-07
Ru-106	9.1684E-02	1,081.00	2,161.99	0.00E+00	9.91E+01	1.98E+02
Se-79	1.3018E-05	1,081.00	2,161.99	0.00E+00	1.41E-02	2.81E-02
Sn-126	1.2167E-05	1,081.00	2,161.99	0.00E+00	1.32E-02	2.63E-02
Sr-90	2.6045E+00	1,081.00	2,161.99	0.00E+00	2.82E+03	5.63E+03
Tc-99	4.4241E-04	1,081.00	2,161.99	0.00E+00	4.78E-01	9.56E-01
Th-229	1.3713E-10	1,081.00	2,161.99	0.00E+00	1.48E-07	2.96E-07
Th-230	1.8090E-11	1,081.00	2,161.99	0.00E+00	1.96E-08	3.91E-08
Th-232	2.5278E-10	1,081.00	2,161.99	0.00E+00	2.73E-07	5.47E-07
Tl-208	1.6947E-06	1,081.00	2,161.99	0.00E+00	1.83E-05	3.66E-05
U-232	4.8737E-06	1,081.00	2,161.99	0.00E+00	5.27E-05	1.05E-04
U-233	1.2203E-07	1,081.00	2,161.99	0.00E+00	1.32E-04	2.64E-04
U-234	1.5925E-07	1,081.00	2,161.99	0.00E+00	1.72E-04	3.44E-04
U-235	-2.6194E-06	1,081.00	0.00	1.23E-02	9.45E-03	1.23E-02
U-236	1.2693E-05	1,081.00	2,161.99	0.00E+00	1.37E-02	2.74E-02
U-238	-3.6331E-08	1,081.00	0.00	7.70E-03	7.66E-03	7.70E-03
Y-90	2.6060E+00	1,081.00	2,161.99	0.00E+00	2.82E+03	5.63E+03
Other Radionuclides					3.90E+03	7.79E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.494E+14
0.0250	7.689E+13
0.0375	6.548E+13
0.0575	6.721E+13
0.0850	4.164E+13
0.1250	3.024E+13
0.2250	3.532E+13
0.3750	1.792E+13
0.5750	2.383E+14
0.8500	1.023E+13
1.2500	2.077E+14
1.7500	1.384E+11
2.2500	2.232E+11
2.7500	1.771E+09
3.5000	2.061E+08
5.0000	1.151E+03
7.0000	1.303E+02
11.0000	1.484E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.29E+01	1.26E+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:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.886	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,081.00
Bounding:		2,161.99

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.11	
Bounding:	2.22	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 SO. KOREA
SNF ID #: 484
Fuel Units & Descr: 104 - ELEMENT
Heavy Metal Mass: BOL=19.76kg; EOL=19.261kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1996
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 10 years

Estimated Canister usage: 18"x10' 0.94

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3731E-09	476.54	953.08	0.00E+00	6.54E-07	1.31E-06	Avg. MeV	
Am-241	2.3865E-03	476.54	953.08	0.00E+00	1.14E+00	2.27E+00	0.0150	1.231E+14
Am-242m	1.3812E-06	476.54	953.08	0.00E+00	6.58E-04	1.32E-03	0.0250	2.608E+13
Am-243	1.4767E-07	476.54	953.08	0.00E+00	7.04E-05	1.41E-04	0.0375	2.228E+13
C-14	1.2863E-04	476.54	953.08	0.00E+00	6.13E-02	1.23E-01	0.0575	2.375E+13
Cl-36	2.8120E-06	476.54	953.08	0.00E+00	1.34E-03	2.68E-03	0.0850	1.441E+13
Cm-243	1.5895E-07	476.54	953.08	0.00E+00	7.57E-05	1.51E-04	0.1250	9.470E+12
Cm-244	1.4008E-06	476.54	953.08	0.00E+00	6.68E-04	1.34E-03	0.2250	1.229E+13
Co-60	6.6541E-01	476.54	953.08	0.00E+00	3.17E+02	6.34E+02	0.3750	5.644E+12
Cs-134	1.6887E-02	476.54	953.08	0.00E+00	8.05E+00	1.61E+01	0.5750	8.842E+13
Cs-135	3.2195E-05	476.54	953.08	0.00E+00	1.53E-02	3.07E-02	0.8500	1.579E+12
Cs-137	2.4556E+00	476.54	953.08	0.00E+00	1.17E+03	2.34E+03	1.2500	4.746E+13
Eu-154	1.0268E-02	476.54	953.08	0.00E+00	4.89E+00	9.79E+00	1.7500	2.856E+10
Eu-155	1.4570E-02	476.54	953.08	0.00E+00	6.94E+00	1.39E+01	2.2500	1.492E+09
Fe-55	2.0361E-01	476.54	953.08	0.00E+00	9.70E+01	1.94E+02	2.7500	2.469E+07
H-3	8.3940E-03	476.54	953.08	0.00E+00	4.00E+00	8.00E+00	3.5000	2.926E+06
I-129	7.3684E-07	476.54	953.08	0.00E+00	3.51E-04	7.02E-04	5.0000	5.096E+02
Kr-85	1.8286E-01	476.54	953.08	0.00E+00	8.71E+01	1.74E+02	7.0000	5.765E+01
Np-237	1.2462E-06	476.54	953.08	0.00E+00	5.94E-04	1.19E-03	11.0000	6.564E+00
Pa-231	4.9143E-09	476.54	953.08	0.00E+00	2.34E-06	4.68E-06		
Pb-210	1.7173E-14	476.54	953.08	0.00E+00	8.18E-12	1.64E-11		
Pm-147	5.6165E-01	476.54	953.08	0.00E+00	2.68E+02	5.35E+02		
Pu-238	9.9820E-04	476.54	953.08	0.00E+00	4.76E-01	9.51E-01		
Pu-239	5.5293E-03	476.54	953.08	0.00E+00	2.63E+00	5.27E+00		
Pu-240	2.1263E-03	476.54	953.08	0.00E+00	1.01E+00	2.03E+00		
Pu-241	8.0165E-02	476.54	953.08	0.00E+00	3.82E+01	7.64E+01		
Pu-242	2.3128E-07	476.54	953.08	0.00E+00	1.10E-04	2.20E-04		
Ra-226	9.9774E-14	476.54	953.08	0.00E+00	4.75E-11	9.51E-11		
Ra-228	2.1729E-10	476.54	953.08	0.00E+00	1.04E-07	2.07E-07		
Ru-106	2.9519E-03	476.54	953.08	0.00E+00	1.41E+00	2.81E+00		
Se-79	1.3017E-05	476.54	953.08	0.00E+00	6.20E-03	1.24E-02		
Sn-126	1.2167E-05	476.54	953.08	0.00E+00	5.80E-03	1.16E-02		
Sr-90	2.3128E+00	476.54	953.08	0.00E+00	1.10E+03	2.20E+03		
Tc-99	4.4241E-04	476.54	953.08	0.00E+00	2.11E-01	4.22E-01		
Th-229	1.9459E-10	476.54	953.08	0.00E+00	9.27E-08	1.85E-07		
Th-230	2.5564E-11	476.54	953.08	0.00E+00	1.22E-08	2.44E-08		
Th-232	2.5278E-10	476.54	953.08	0.00E+00	1.20E-07	2.41E-07		
Tl-208	1.6947E-08	476.54	953.08	0.00E+00	8.08E-06	1.62E-05		
U-232	4.6812E-08	476.54	953.08	0.00E+00	2.23E-05	4.46E-05		
U-233	1.2206E-07	476.54	953.08	0.00E+00	5.82E-05	1.16E-04		
U-234	1.7323E-07	476.54	953.08	0.00E+00	8.26E-05	1.65E-04		
U-235	-2.6194E-06	476.54	0.00	8.54E-03	7.29E-03	8.54E-03		
U-236	1.2693E-05	476.54	953.08	0.00E+00	6.05E-03	1.21E-02		
U-238	-3.6331E-08	476.54	0.00	5.31E-03	5.30E-03	5.31E-03		
Y-90	2.3128E+00	476.54	953.08	0.00E+00	1.10E+03	2.20E+03		
Other Radionuclides					1.17E+03	2.34E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.87E+01	3.73E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		476.54
Bounding:		953.08

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.71	
Bounding:	1.41	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 TEXAS A&M
SNF ID #: 258
Fuel Units & Descr: 85 - ELEMENT
Heavy Metal Mass: BOL=14.875kg; EOL=14.34kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.77

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	511.19	1,022.38	0.00E+00	4.35E-07	8.71E-07
Am-241	1.8331E-03	511.19	1,022.38	0.00E+00	9.37E-01	1.87E+00
Am-242m	1.4129E-06	511.19	1,022.38	0.00E+00	7.22E-04	1.44E-03
Am-243	1.4774E-07	511.19	1,022.38	0.00E+00	7.55E-05	1.51E-04
C-14	1.2871E-04	511.19	1,022.38	0.00E+00	6.58E-02	1.32E-01
Cl-36	2.8120E-06	511.19	1,022.38	0.00E+00	1.44E-03	2.87E-03
Cm-243	1.7940E-07	511.19	1,022.38	0.00E+00	9.17E-05	1.83E-04
Cm-244	1.6962E-06	511.19	1,022.38	0.00E+00	8.67E-04	1.73E-03
Co-60	1.2839E+00	511.19	1,022.38	0.00E+00	6.56E+02	1.31E+03
Cs-134	9.0541E-02	511.19	1,022.38	0.00E+00	4.63E+01	9.26E+01
Cs-135	3.2195E-05	511.19	1,022.38	0.00E+00	1.65E-02	3.29E-02
Cs-137	2.7564E+00	511.19	1,022.38	0.00E+00	1.41E+03	2.82E+03
Eu-154	1.5368E-02	511.19	1,022.38	0.00E+00	7.86E+00	1.57E+01
Eu-155	2.9293E-02	511.19	1,022.38	0.00E+00	1.50E+01	2.99E+01
Fe-55	7.7158E-01	511.19	1,022.38	0.00E+00	3.94E+02	7.89E+02
H-3	1.1111E-02	511.19	1,022.38	0.00E+00	5.68E+00	1.14E+01
I-129	7.3684E-07	511.19	1,022.38	0.00E+00	3.77E-04	7.53E-04
Kr-85	2.5263E-01	511.19	1,022.38	0.00E+00	1.29E+02	2.58E+02
Np-237	1.2427E-06	511.19	1,022.38	0.00E+00	8.35E-04	1.27E-03
Pa-231	3.8511E-09	511.19	1,022.38	0.00E+00	1.97E-06	3.94E-06
Pb-210	7.3880E-15	511.19	1,022.38	0.00E+00	3.78E-12	7.55E-12
Pm-147	2.1023E+00	511.19	1,022.38	0.00E+00	1.07E+03	2.15E+03
Pu-238	1.0383E-03	511.19	1,022.38	0.00E+00	5.31E-01	1.06E+00
Pu-239	5.5293E-03	511.19	1,022.38	0.00E+00	2.83E+00	5.65E+00
Pu-240	2.1278E-03	511.19	1,022.38	0.00E+00	1.09E+00	2.18E+00
Pu-241	1.0195E-01	511.19	1,022.38	0.00E+00	5.21E+01	1.04E+02
Pu-242	2.3128E-07	511.19	1,022.38	0.00E+00	1.18E-04	2.36E-04
Ra-226	5.2782E-14	511.19	1,022.38	0.00E+00	2.70E-11	5.40E-11
Ra-228	1.9338E-10	511.19	1,022.38	0.00E+00	9.89E-08	1.98E-07
Ru-106	9.1684E-02	511.19	1,022.38	0.00E+00	4.69E+01	9.37E+01
Se-79	1.3018E-05	511.19	1,022.38	0.00E+00	6.65E-03	1.33E-02
Sn-126	1.2167E-05	511.19	1,022.38	0.00E+00	6.22E-03	1.24E-02
Sr-90	2.6045E+00	511.19	1,022.38	0.00E+00	1.33E+03	2.66E+03
Tc-99	4.4241E-04	511.19	1,022.38	0.00E+00	2.26E-01	4.52E-01
Th-229	1.3713E-10	511.19	1,022.38	0.00E+00	7.01E-08	1.40E-07
Th-230	1.8090E-11	511.19	1,022.38	0.00E+00	9.25E-09	1.85E-08
Th-232	2.5278E-10	511.19	1,022.38	0.00E+00	1.29E-07	2.58E-07
Tl-208	1.6947E-08	511.19	1,022.38	0.00E+00	8.66E-06	1.73E-05
U-232	4.8737E-08	511.19	1,022.38	0.00E+00	2.49E-05	4.98E-05
U-233	1.2203E-07	511.19	1,022.38	0.00E+00	6.24E-05	1.25E-04
U-234	1.5925E-07	511.19	1,022.38	0.00E+00	8.14E-05	1.63E-04
U-235	-2.6194E-06	511.19	0.00	6.43E-03	5.09E-03	6.43E-03
U-236	1.2693E-05	511.19	1,022.38	0.00E+00	6.49E-03	1.30E-02
U-238	-3.6331E-08	511.19	0.00	4.00E-03	3.98E-03	4.00E-03
Y-90	2.6060E+00	511.19	1,022.38	0.00E+00	1.33E+03	2.66E+03
Other Radionuclides					1.84E+03	3.69E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.652E+14
0.0250	3.636E+13
0.0375	3.096E+13
0.0575	3.178E+13
0.0850	1.969E+13
0.1250	1.430E+13
0.2250	1.670E+13
0.3750	8.476E+12
0.5750	1.127E+14
0.8500	4.836E+12
1.2500	9.822E+13
1.7500	6.547E+10
2.2500	1.055E+11
2.7500	8.374E+08
3.5000	9.746E+07
5.0000	5.450E+02
7.0000	6.170E+01
11.0000	7.029E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.98E+01	5.95E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		511.19
Bounding:		1,022.38

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.01	
Bounding:	2.02	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 THAILAND
SNF ID #: 489
Fuel Units & Descr: 100 - ELEMENT
Heavy Metal Mass: BOL=19.5kg; EOL=19.3kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' 0.90

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (CI)	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	190.92	381.84	0.00E+00	1.63E-07	3.25E-07	Avg. MeV	
Am-241	1.8331E-03	190.92	381.84	0.00E+00	3.50E-01	7.00E-01	0.0150	6.172E+13
Am-242m	1.4129E-06	190.92	381.84	0.00E+00	2.70E-04	5.40E-04	0.0250	1.358E+13
Am-243	1.4774E-07	190.92	381.84	0.00E+00	2.82E-05	5.64E-05	0.0375	1.156E+13
C-14	1.2871E-04	190.92	381.84	0.00E+00	2.46E-02	4.91E-02	0.0575	1.187E+13
Cl-36	2.8120E-06	190.92	381.84	0.00E+00	5.37E-04	1.07E-03	0.0850	7.354E+12
Cm-243	1.7940E-07	190.92	381.84	0.00E+00	3.43E-05	6.85E-05	0.1250	5.340E+12
Cm-244	1.6962E-06	190.92	381.84	0.00E+00	3.24E-04	6.48E-04	0.2250	6.238E+12
Co-60	1.2839E+00	190.92	381.84	0.00E+00	2.45E+02	4.90E+02	0.3750	3.168E+12
Cs-134	9.0541E-02	190.92	381.84	0.00E+00	1.73E+01	3.46E+01	0.5750	4.209E+13
Cs-135	3.2195E-05	190.92	381.84	0.00E+00	6.15E-03	1.23E-02	0.8500	1.806E+12
Cs-137	2.7564E+00	190.92	381.84	0.00E+00	5.26E+02	1.05E+03	1.2500	3.668E+13
Eu-154	1.5368E-02	190.92	381.84	0.00E+00	2.93E+00	5.87E+00	1.7500	2.445E+10
Eu-155	2.9293E-02	190.92	381.84	0.00E+00	5.59E+00	1.12E+01	2.2500	3.941E+10
Fe-55	7.7158E-01	190.92	381.84	0.00E+00	1.47E+02	2.95E+02	2.7500	3.128E+08
H-3	1.1111E-02	190.92	381.84	0.00E+00	2.12E+00	4.24E+00	3.5000	3.640E+07
I-129	7.3684E-07	190.92	381.84	0.00E+00	1.41E-04	2.81E-04	5.0000	2.122E+02
Kr-85	2.5263E-01	190.92	381.84	0.00E+00	4.82E+01	9.65E+01	7.0000	2.404E+01
Np-237	1.2427E-06	190.92	381.84	0.00E+00	2.37E-04	4.75E-04	11.0000	2.740E+00
Pa-231	3.8511E-09	190.92	381.84	0.00E+00	7.35E-07	1.47E-06		
Pb-210	7.3880E-15	190.92	381.84	0.00E+00	1.41E-12	2.82E-12		
Pm-147	2.1023E+00	190.92	381.84	0.00E+00	4.01E+02	8.03E+02		
Pu-238	1.0383E-03	190.92	381.84	0.00E+00	1.98E-01	3.96E-01		
Pu-239	5.5293E-03	190.92	381.84	0.00E+00	1.06E+00	2.11E+00		
Pu-240	2.1278E-03	190.92	381.84	0.00E+00	4.06E-01	8.12E-01		
Pu-241	1.0195E-01	190.92	381.84	0.00E+00	1.95E+01	3.89E+01		
Pu-242	2.3128E-07	190.92	381.84	0.00E+00	4.42E-05	8.83E-05		
Ra-226	5.2782E-14	190.92	381.84	0.00E+00	1.01E-11	2.02E-11		
Ra-228	1.9338E-10	190.92	381.84	0.00E+00	3.69E-08	7.38E-08		
Ru-106	9.1684E-02	190.92	381.84	0.00E+00	1.75E+01	3.50E+01		
Se-79	1.3018E-05	190.92	381.84	0.00E+00	2.49E-03	4.97E-03		
Sn-126	1.2167E-05	190.92	381.84	0.00E+00	2.32E-03	4.65E-03		
Sr-90	2.6045E+00	190.92	381.84	0.00E+00	4.97E+02	9.95E+02		
Tc-99	4.4241E-04	190.92	381.84	0.00E+00	8.45E-02	1.69E-01		
Th-229	1.3713E-10	190.92	381.84	0.00E+00	2.62E-08	5.24E-08		
Th-230	1.8090E-11	190.92	381.84	0.00E+00	3.45E-09	6.91E-09		
Th-232	2.5278E-10	190.92	381.84	0.00E+00	4.83E-08	9.65E-08		
Tl-208	1.6947E-08	190.92	381.84	0.00E+00	3.24E-06	6.47E-06		
U-232	4.8737E-08	190.92	381.84	0.00E+00	9.30E-06	1.86E-05		
U-233	1.2203E-07	190.92	381.84	0.00E+00	2.33E-05	4.66E-05		
U-234	1.5925E-07	190.92	381.84	0.00E+00	3.04E-05	6.08E-05		
U-235	-2.6194E-06	190.92	0.00	8.43E-03	7.93E-03	8.43E-03		
U-236	1.2693E-05	190.92	381.84	0.00E+00	2.42E-03	4.85E-03		
U-238	-3.6331E-08	190.92	0.00	5.24E-03	5.24E-03	5.24E-03		
Y-90	2.6060E+00	190.92	381.84	0.00E+00	4.98E+02	9.95E+02		
Other Radionuclides					6.88E+02	1.38E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.11E+01	2.22E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		190.92
Bounding:		381.84

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 TURKEY
SNF ID #: 490
Fuel Units & Descr: 79 - ELEMENT
Heavy Metal Mass: BOL=15.405kg; EOL=15.247kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' 0.71

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	150.83	301.66	0.00E+00	1.28E-07	2.57E-07
Am-241	1.8331E-03	150.83	301.66	0.00E+00	2.76E-01	5.53E-01
Am-242m	1.4129E-06	150.83	301.66	0.00E+00	2.13E-04	4.26E-04
Am-243	1.4774E-07	150.83	301.66	0.00E+00	2.23E-05	4.46E-05
C-14	1.2871E-04	150.83	301.66	0.00E+00	1.94E-02	3.88E-02
Cl-36	2.8120E-06	150.83	301.66	0.00E+00	4.24E-04	8.48E-04
Cm-243	1.7940E-07	150.83	301.66	0.00E+00	2.71E-05	5.41E-05
Cm-244	1.6962E-06	150.83	301.66	0.00E+00	2.56E-04	5.12E-04
Co-60	1.2839E+00	150.83	301.66	0.00E+00	1.94E+02	3.87E+02
Cs-134	9.0541E-02	150.83	301.66	0.00E+00	1.37E+01	2.73E+01
Cs-135	3.2195E-05	150.83	301.66	0.00E+00	4.86E-03	9.71E-03
Cs-137	2.7564E+00	150.83	301.66	0.00E+00	4.16E+02	8.31E+02
Eu-154	1.5368E-02	150.83	301.66	0.00E+00	2.32E+00	4.64E+00
Eu-155	2.9293E-02	150.83	301.66	0.00E+00	4.42E+00	8.84E+00
Fe-55	7.7158E-01	150.83	301.66	0.00E+00	1.16E+02	2.33E+02
H-3	1.1111E-02	150.83	301.66	0.00E+00	1.68E+00	3.35E+00
I-129	7.3684E-07	150.83	301.66	0.00E+00	1.11E-04	2.22E-04
Kr-85	2.5263E-01	150.83	301.66	0.00E+00	3.81E+01	7.62E+01
Np-237	1.2427E-06	150.83	301.66	0.00E+00	1.87E-04	3.75E-04
Pa-231	3.8511E-09	150.83	301.66	0.00E+00	5.81E-07	1.16E-06
Pb-210	7.3880E-15	150.83	301.66	0.00E+00	1.11E-12	2.23E-12
Pm-147	2.1023E+00	150.83	301.66	0.00E+00	3.17E+02	6.34E+02
Pu-238	1.0383E-03	150.83	301.66	0.00E+00	1.57E-01	3.13E-01
Pu-239	5.5293E-03	150.83	301.66	0.00E+00	8.34E-01	1.67E+00
Pu-240	2.1278E-03	150.83	301.66	0.00E+00	3.21E-01	6.42E-01
Pu-241	1.0195E-01	150.83	301.66	0.00E+00	1.54E+01	3.08E+01
Pu-242	2.3128E-07	150.83	301.66	0.00E+00	3.49E-05	6.98E-05
Ra-226	5.2782E-14	150.83	301.66	0.00E+00	7.96E-12	1.59E-11
Ra-228	1.9338E-10	150.83	301.66	0.00E+00	2.92E-08	5.83E-08
Ru-106	9.1684E-02	150.83	301.66	0.00E+00	1.38E+01	2.77E+01
Se-79	1.3018E-05	150.83	301.66	0.00E+00	1.96E-03	3.93E-03
Sn-126	1.2167E-05	150.83	301.66	0.00E+00	1.84E-03	3.67E-03
Sr-90	2.6045E+00	150.83	301.66	0.00E+00	3.93E+02	7.86E+02
Tc-99	4.4241E-04	150.83	301.66	0.00E+00	6.67E-02	1.33E-01
Th-229	1.3713E-10	150.83	301.66	0.00E+00	2.07E-08	4.14E-08
Th-230	1.8090E-11	150.83	301.66	0.00E+00	2.73E-09	5.46E-09
Th-232	2.5278E-10	150.83	301.66	0.00E+00	3.81E-08	7.63E-08
Tl-208	1.6947E-08	150.83	301.66	0.00E+00	2.56E-06	5.11E-06
U-232	4.8737E-08	150.83	301.66	0.00E+00	7.35E-06	1.47E-05
U-233	1.2203E-07	150.83	301.66	0.00E+00	1.84E-05	3.68E-05
U-234	1.5925E-07	150.83	301.66	0.00E+00	2.40E-05	4.80E-05
U-235	-2.6194E-06	150.83	0.00	6.66E-03	6.26E-03	6.66E-03
U-236	1.2693E-05	150.83	301.66	0.00E+00	1.91E-03	3.83E-03
U-238	-3.6331E-08	150.83	0.00	4.14E-03	4.14E-03	4.14E-03
Y-90	2.6060E+00	150.83	301.66	0.00E+00	3.93E+02	7.86E+02
Other Radionuclides					5.44E+02	1.09E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.876E+13
0.0250	1.073E+13
0.0375	9.136E+12
0.0575	9.377E+12
0.0850	5.809E+12
0.1250	4.219E+12
0.2250	4.928E+12
0.3750	2.501E+12
0.5750	3.325E+13
0.8500	1.427E+12
1.2500	2.898E+13
1.7500	1.932E+10
2.2500	3.114E+10
2.7500	2.471E+08
3.5000	2.876E+07
5.0000	1.677E+02
7.0000	1.899E+01
11.0000	2.165E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.78E+00	1.76E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		150.83
Bounding:		301.66

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 U OF AZ
SNF ID #: 59
Fuel Units & Descr: 84 - ELEMENT
Heavy Metal Mass: BOL=16.38kg; EOL=15.75kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10'
0.76

II. Estimates

Radionuclide	m Ci/MWd From Template	x_o Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_o Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	601.40	1,202.81	0.00E+00	5.12E-07	1.02E-06
Am-241	1.8331E-03	601.40	1,202.81	0.00E+00	1.10E+00	2.20E+00
Am-242m	1.4129E-06	601.40	1,202.81	0.00E+00	8.50E-04	1.70E-03
Am-243	1.4774E-07	601.40	1,202.81	0.00E+00	8.89E-05	1.78E-04
C-14	1.2871E-04	601.40	1,202.81	0.00E+00	7.74E-02	1.55E-01
Cl-36	2.8120E-06	601.40	1,202.81	0.00E+00	1.69E-03	3.38E-03
Cm-243	1.7940E-07	601.40	1,202.81	0.00E+00	1.08E-04	2.16E-04
Cm-244	1.6962E-06	601.40	1,202.81	0.00E+00	1.02E-03	2.04E-03
Co-60	1.2839E+00	601.40	1,202.81	0.00E+00	7.72E+02	1.54E+03
Cs-134	9.0541E-02	601.40	1,202.81	0.00E+00	5.45E+01	1.09E+02
Cs-135	3.2195E-05	601.40	1,202.81	0.00E+00	1.94E-02	3.87E-02
Cs-137	2.7564E+00	601.40	1,202.81	0.00E+00	1.66E+03	3.32E+03
Eu-154	1.5368E-02	601.40	1,202.81	0.00E+00	9.24E+00	1.85E+01
Eu-155	2.9293E-02	601.40	1,202.81	0.00E+00	1.76E+01	3.52E+01
Fe-55	7.7158E-01	601.40	1,202.81	0.00E+00	4.64E+02	9.28E+02
H-3	1.1111E-02	601.40	1,202.81	0.00E+00	6.68E+00	1.34E+01
I-129	7.3684E-07	601.40	1,202.81	0.00E+00	4.43E-04	8.86E-04
Kr-85	2.5263E-01	601.40	1,202.81	0.00E+00	1.52E+02	3.04E+02
Np-237	1.2427E-06	601.40	1,202.81	0.00E+00	7.47E-04	1.49E-03
Pa-231	3.8511E-09	601.40	1,202.81	0.00E+00	2.32E-06	4.63E-06
Pb-210	7.3880E-15	601.40	1,202.81	0.00E+00	4.44E-12	8.89E-12
Pm-147	2.1023E+00	601.40	1,202.81	0.00E+00	1.26E+03	2.53E+03
Pu-238	1.0383E-03	601.40	1,202.81	0.00E+00	6.24E-01	1.25E+00
Pu-239	5.5293E-03	601.40	1,202.81	0.00E+00	3.33E+00	6.65E+00
Pu-240	2.1278E-03	601.40	1,202.81	0.00E+00	1.28E+00	2.56E+00
Pu-241	1.0195E-01	601.40	1,202.81	0.00E+00	6.13E+01	1.23E+02
Pu-242	2.3128E-07	601.40	1,202.81	0.00E+00	1.39E-04	2.78E-04
Ra-226	5.2782E-14	601.40	1,202.81	0.00E+00	3.17E-11	6.35E-11
Ra-228	1.9338E-10	601.40	1,202.81	0.00E+00	1.16E-07	2.33E-07
Ru-106	9.1684E-02	601.40	1,202.81	0.00E+00	5.51E+01	1.10E+02
Se-79	1.3018E-05	601.40	1,202.81	0.00E+00	7.83E-03	1.57E-02
Sn-126	1.2167E-05	601.40	1,202.81	0.00E+00	7.32E-03	1.46E-02
Sr-90	2.6045E+00	601.40	1,202.81	0.00E+00	1.57E+03	3.13E+03
Tc-99	4.4241E-04	601.40	1,202.81	0.00E+00	2.66E-01	5.32E-01
Th-229	1.3713E-10	601.40	1,202.81	0.00E+00	8.25E-08	1.65E-07
Th-230	1.8090E-11	601.40	1,202.81	0.00E+00	1.09E-08	2.18E-08
Th-232	2.5278E-10	601.40	1,202.81	0.00E+00	1.52E-07	3.04E-07
Tl-208	1.6947E-08	601.40	1,202.81	0.00E+00	1.02E-05	2.04E-05
U-232	4.8737E-08	601.40	1,202.81	0.00E+00	2.93E-05	5.86E-05
U-233	1.2203E-07	601.40	1,202.81	0.00E+00	7.34E-05	1.47E-04
U-234	1.5925E-07	601.40	1,202.81	0.00E+00	9.58E-05	1.92E-04
U-235	-2.6194E-06	601.40	0.00	7.08E-03	5.50E-03	7.08E-03
U-236	1.2693E-05	601.40	1,202.81	0.00E+00	7.63E-03	1.53E-02
U-238	-3.6331E-08	601.40	0.00	4.40E-03	4.38E-03	4.40E-03
Y-90	2.6060E+00	601.40	1,202.81	0.00E+00	1.57E+03	3.13E+03
Other Radionuclides					2.17E+03	4.34E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.944E+14
0.0250	4.278E+13
0.0375	3.643E+13
0.0575	3.739E+13
0.0850	2.316E+13
0.1250	1.682E+13
0.2250	1.965E+13
0.3750	9.972E+12
0.5750	1.326E+14
0.8500	5.690E+12
1.2500	1.155E+14
1.7500	7.702E+10
2.2500	1.241E+11
2.7500	9.852E+08
3.5000	1.147E+08
5.0000	6.405E+02
7.0000	7.251E+01
11.0000	8.260E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.50E+01	7.00E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		601.40
Bounding:		1,202.81

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.08	
Bounding:	2.15	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 U OF AZ
SNF ID #: 975
Fuel Units & Descr: 8 - ELEMENT
Heavy Metal Mass: BOL=1.497kg; EOL=1.497kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage:

18"x10'
0.07

II. Estimates

Radionuclide	m CMWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	28.58	57.15	0.00E+00	2.43E-08	4.87E-08
Am-241	1.8331E-03	28.58	57.15	0.00E+00	5.24E-02	1.05E-01
Am-242m	1.4129E-06	28.58	57.15	0.00E+00	4.04E-05	8.08E-05
Am-243	1.4774E-07	28.58	57.15	0.00E+00	4.22E-06	8.44E-06
C-14	1.2871E-04	28.58	57.15	0.00E+00	3.68E-03	7.36E-03
Cl-36	2.8120E-06	28.58	57.15	0.00E+00	8.04E-05	1.61E-04
Cm-243	1.7940E-07	28.58	57.15	0.00E+00	5.13E-06	1.03E-05
Cm-244	1.6962E-06	28.58	57.15	0.00E+00	4.85E-05	9.69E-05
Co-60	1.2839E+00	28.58	57.15	0.00E+00	3.67E+01	7.34E+01
Cs-134	9.0541E-02	28.58	57.15	0.00E+00	2.59E+00	5.17E+00
Cs-135	3.2195E-05	28.58	57.15	0.00E+00	9.20E-04	1.84E-03
Cs-137	2.7564E+00	28.58	57.15	0.00E+00	7.88E+01	1.58E+02
Eu-154	1.5368E-02	28.58	57.15	0.00E+00	4.39E-01	8.78E-01
Eu-155	2.9293E-02	28.58	57.15	0.00E+00	8.37E-01	1.67E+00
Fe-55	7.7158E-01	28.58	57.15	0.00E+00	2.20E+01	4.41E+01
H-3	1.1111E-02	28.58	57.15	0.00E+00	3.18E-01	6.35E-01
I-129	7.3684E-07	28.58	57.15	0.00E+00	2.11E-05	4.21E-05
Kr-85	2.5263E-01	28.58	57.15	0.00E+00	7.22E+00	1.44E+01
Np-237	1.2427E-06	28.58	57.15	0.00E+00	3.55E-05	7.10E-05
Pa-231	3.8511E-09	28.58	57.15	0.00E+00	1.10E-07	2.20E-07
Pb-210	7.3880E-15	28.58	57.15	0.00E+00	2.11E-13	4.22E-13
Pm-147	2.1023E+00	28.58	57.15	0.00E+00	6.01E+01	1.20E+02
Pu-238	1.0383E-03	28.58	57.15	0.00E+00	2.97E-02	5.93E-02
Pu-239	5.5293E-03	28.58	57.15	0.00E+00	1.58E-01	3.16E-01
Pu-240	2.1278E-03	28.58	57.15	0.00E+00	6.08E-02	1.22E-01
Pu-241	1.0195E-01	28.58	57.15	0.00E+00	2.91E+00	5.83E+00
Pu-242	2.3128E-07	28.58	57.15	0.00E+00	6.61E-06	1.32E-05
Ra-226	5.2782E-14	28.58	57.15	0.00E+00	1.51E-12	3.02E-12
Ra-228	1.9338E-10	28.58	57.15	0.00E+00	5.53E-09	1.11E-08
Ru-106	9.1684E-02	28.58	57.15	0.00E+00	2.62E+00	5.24E+00
Se-79	1.3018E-05	28.58	57.15	0.00E+00	3.72E-04	7.44E-04
Sn-126	1.2167E-05	28.58	57.15	0.00E+00	3.48E-04	6.95E-04
Sr-90	2.6045E+00	28.58	57.15	0.00E+00	7.44E+01	1.49E+02
Tc-99	4.4241E-04	28.58	57.15	0.00E+00	1.26E-02	2.53E-02
Th-229	1.3713E-10	28.58	57.15	0.00E+00	3.92E-09	7.84E-09
Th-230	1.8090E-11	28.58	57.15	0.00E+00	5.17E-10	1.03E-09
Th-232	2.5278E-10	28.58	57.15	0.00E+00	7.22E-09	1.44E-08
Tl-208	1.6947E-08	28.58	57.15	0.00E+00	4.84E-07	9.69E-07
U-232	4.8737E-08	28.58	57.15	0.00E+00	1.39E-06	2.79E-06
U-233	1.2203E-07	28.58	57.15	0.00E+00	3.49E-06	6.97E-06
U-234	1.5925E-07	28.58	57.15	0.00E+00	4.55E-06	9.10E-06
U-235	-2.6194E-06	28.58	0.00	5.95E-04	5.20E-04	5.95E-04
U-236	1.2693E-05	28.58	57.15	0.00E+00	3.63E-04	7.25E-04
U-238	-3.6331E-08	28.58	0.00	4.11E-04	4.09E-04	4.11E-04
Y-90	2.6060E+00	28.58	57.15	0.00E+00	7.45E+01	1.49E+02
Other Radionuclides					1.03E+02	2.06E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.238E+12
0.0250	2.033E+12
0.0375	1.731E+12
0.0575	1.777E+12
0.0850	1.101E+12
0.1250	7.993E+11
0.2250	9.337E+11
0.3750	4.738E+11
0.5750	6.299E+12
0.8500	2.704E+11
1.2500	5.491E+12
1.7500	3.660E+09
2.2500	5.899E+09
2.7500	4.681E+07
3.5000	5.448E+06
5.0000	3.090E+01
7.0000	3.499E+00
11.0000	3.967E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.66E+00	3.33E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	18.3974873	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		28.58
Bounding:		57.15

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:	0.56	
Bounding:	1.12	

Estimated EOL HM/Given EOL HM: 0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 U OF IL
SNF ID #: 449
Fuel Units & Descr: 139 - ELEMENT
Heavy Metal Mass: BOL=27.8kg; EOL=26.41kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.25

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	1,326.90	2,653.81	0.00E+00	1.13E-06	2.26E-06	Avg. MeV	
Am-241	1.8331E-03	1,326.90	2,653.81	0.00E+00	2.43E+00	4.86E+00	0.0150	4.289E+14
Am-242m	1.4129E-06	1,326.90	2,653.81	0.00E+00	1.87E-03	3.75E-03	0.0250	9.438E+13
Am-243	1.4774E-07	1,326.90	2,653.81	0.00E+00	1.96E-04	3.92E-04	0.0375	8.037E+13
C-14	1.2871E-04	1,326.90	2,653.81	0.00E+00	1.71E-01	3.42E-01	0.0575	8.250E+13
Cl-36	2.8120E-06	1,326.90	2,653.81	0.00E+00	3.73E-03	7.46E-03	0.0850	5.111E+13
Cm-243	1.7940E-07	1,326.90	2,653.81	0.00E+00	2.38E-04	4.76E-04	0.1250	3.711E+13
Cm-244	1.6962E-06	1,326.90	2,653.81	0.00E+00	2.25E-03	4.50E-03	0.2250	4.336E+13
Co-60	1.2839E+00	1,326.90	2,653.81	0.00E+00	1.70E+03	3.41E+03	0.3750	2.200E+13
Cs-134	9.0541E-02	1,326.90	2,653.81	0.00E+00	1.20E+02	2.40E+02	0.5750	2.925E+14
Cs-135	3.2195E-05	1,326.90	2,653.81	0.00E+00	4.27E-02	8.54E-02	0.8500	1.255E+13
Cs-137	2.7564E+00	1,326.90	2,653.81	0.00E+00	3.66E+03	7.31E+03	1.2500	2.549E+14
Eu-154	1.5368E-02	1,326.90	2,653.81	0.00E+00	2.04E+01	4.08E+01	1.7500	1.699E+11
Eu-155	2.9293E-02	1,326.90	2,653.81	0.00E+00	3.89E+01	7.77E+01	2.2500	2.739E+11
Fe-55	7.7158E-01	1,326.90	2,653.81	0.00E+00	1.02E+03	2.05E+03	2.7500	2.174E+09
H-3	1.1111E-02	1,326.90	2,653.81	0.00E+00	1.47E+01	2.95E+01	3.5000	2.530E+08
I-129	7.3684E-07	1,326.90	2,653.81	0.00E+00	9.78E-04	1.96E-03	5.0000	1.408E+03
Kr-85	2.5263E-01	1,326.90	2,653.81	0.00E+00	3.35E+02	6.70E+02	7.0000	1.594E+02
Np-237	1.2427E-06	1,326.90	2,653.81	0.00E+00	1.65E-03	3.30E-03	11.0000	1.816E+01
Pa-231	3.8511E-09	1,326.90	2,653.81	0.00E+00	5.11E-06	1.02E-05		
Pb-210	7.3880E-15	1,326.90	2,653.81	0.00E+00	9.80E-12	1.96E-11		
Pm-147	2.1023E+00	1,326.90	2,653.81	0.00E+00	2.79E+03	5.58E+03		
Pu-238	1.0383E-03	1,326.90	2,653.81	0.00E+00	1.38E+00	2.76E+00		
Pu-239	5.5293E-03	1,326.90	2,653.81	0.00E+00	7.34E+00	1.47E+01		
Pu-240	2.1278E-03	1,326.90	2,653.81	0.00E+00	2.82E+00	5.65E+00		
Pu-241	1.0195E-01	1,326.90	2,653.81	0.00E+00	1.35E+02	2.71E+02		
Pu-242	2.3128E-07	1,326.90	2,653.81	0.00E+00	3.07E-04	6.14E-04		
Ra-226	5.2782E-14	1,326.90	2,653.81	0.00E+00	7.00E-11	1.40E-10		
Ra-228	1.9338E-10	1,326.90	2,653.81	0.00E+00	2.57E-07	5.13E-07		
Ru-106	9.1684E-02	1,326.90	2,653.81	0.00E+00	1.22E+02	2.43E+02		
Se-79	1.3018E-05	1,326.90	2,653.81	0.00E+00	1.73E-02	3.45E-02		
Sn-126	1.2167E-05	1,326.90	2,653.81	0.00E+00	1.61E-02	3.23E-02		
Sr-90	2.6045E+00	1,326.90	2,653.81	0.00E+00	3.46E+03	6.91E+03		
Tc-99	4.4241E-04	1,326.90	2,653.81	0.00E+00	5.87E-01	1.17E+00		
Th-229	1.3713E-10	1,326.90	2,653.81	0.00E+00	1.82E-07	3.64E-07		
Th-230	1.8090E-11	1,326.90	2,653.81	0.00E+00	2.40E-08	4.80E-08		
Th-232	2.5278E-10	1,326.90	2,653.81	0.00E+00	3.35E-07	6.71E-07		
Tl-208	1.6947E-08	1,326.90	2,653.81	0.00E+00	2.25E-05	4.50E-05		
U-232	4.8737E-08	1,326.90	2,653.81	0.00E+00	6.47E-05	1.29E-04		
U-233	1.2203E-07	1,326.90	2,653.81	0.00E+00	1.62E-04	3.24E-04		
U-234	1.5925E-07	1,326.90	2,653.81	0.00E+00	2.11E-04	4.23E-04		
U-235	-2.6194E-06	1,326.90	0.00	1.20E-02	8.54E-03	1.20E-02		
U-236	1.2693E-05	1,326.90	2,653.81	0.00E+00	1.68E-02	3.37E-02		
U-238	-3.6331E-08	1,326.90	0.00	7.47E-03	7.43E-03	7.47E-03		
Y-90	2.6060E+00	1,326.90	2,653.81	0.00E+00	3.46E+03	6.92E+03		
Other Radionuclides					4.78E+03	9.57E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.72E+01	1.54E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000115	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,326.90	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,653.81	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.40	
Bounding:	2.80	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 U OF TX AUSTIN
SNF ID #: 265
Fuel Units & Descr: 156 - ELEMENT
Heavy Metal Mass: BOL=30.124kg; EOL=29.765kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.41

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	342.51	685.03	0.00E+00	2.92E-07	5.83E-07	Avg. MeV	
Am-241	1.8331E-03	342.51	685.03	0.00E+00	6.28E-01	1.26E+00	0.0150	1.107E+14
Am-242m	1.4129E-06	342.51	685.03	0.00E+00	4.84E-04	9.68E-04	0.0250	2.436E+13
Am-243	1.4774E-07	342.51	685.03	0.00E+00	5.06E-05	1.01E-04	0.0375	2.075E+13
C-14	1.2871E-04	342.51	685.03	0.00E+00	4.41E-02	8.82E-02	0.0575	2.129E+13
Cl-36	2.8120E-06	342.51	685.03	0.00E+00	9.63E-04	1.93E-03	0.0850	1.319E+13
Cm-243	1.7940E-07	342.51	685.03	0.00E+00	6.14E-05	1.23E-04	0.1250	9.580E+12
Cm-244	1.6962E-06	342.51	685.03	0.00E+00	5.81E-04	1.16E-03	0.2250	1.119E+13
Co-60	1.2839E+00	342.51	685.03	0.00E+00	4.40E+02	8.80E+02	0.3750	5.679E+12
Cs-134	9.0541E-02	342.51	685.03	0.00E+00	3.10E+01	6.20E+01	0.5750	7.550E+13
Cs-135	3.2195E-05	342.51	685.03	0.00E+00	1.10E-02	2.21E-02	0.8500	3.240E+12
Cs-137	2.7564E+00	342.51	685.03	0.00E+00	9.44E+02	1.89E+03	1.2500	6.581E+13
Eu-154	1.5368E-02	342.51	685.03	0.00E+00	5.26E+00	1.05E+01	1.7500	4.387E+10
Eu-155	2.9293E-02	342.51	685.03	0.00E+00	1.00E+01	2.01E+01	2.2500	7.071E+10
Fe-55	7.7158E-01	342.51	685.03	0.00E+00	2.64E+02	5.29E+02	2.7500	5.611E+08
H-3	1.1111E-02	342.51	685.03	0.00E+00	3.81E+00	7.61E+00	3.5000	6.530E+07
I-129	7.3684E-07	342.51	685.03	0.00E+00	2.52E-04	5.05E-04	5.0000	3.778E+02
Kr-85	2.5263E-01	342.51	685.03	0.00E+00	8.65E+01	1.73E+02	7.0000	4.279E+01
Np-237	1.2427E-06	342.51	685.03	0.00E+00	4.26E-04	8.51E-04	11.0000	4.876E+00
Pa-231	3.8511E-09	342.51	685.03	0.00E+00	1.32E-06	2.64E-06		
Pb-210	7.3880E-15	342.51	685.03	0.00E+00	2.53E-12	5.06E-12		
Pm-147	2.1023E+00	342.51	685.03	0.00E+00	7.20E+02	1.44E+03		
Pu-238	1.0383E-03	342.51	685.03	0.00E+00	3.56E-01	7.11E-01		
Pu-239	5.5293E-03	342.51	685.03	0.00E+00	1.89E+00	3.79E+00		
Pu-240	2.1278E-03	342.51	685.03	0.00E+00	7.29E-01	1.46E+00		
Pu-241	1.0195E-01	342.51	685.03	0.00E+00	3.49E+01	6.98E+01		
Pu-242	2.3128E-07	342.51	685.03	0.00E+00	7.92E-05	1.58E-04		
Ra-226	5.2782E-14	342.51	685.03	0.00E+00	1.81E-11	3.62E-11		
Ra-228	1.9338E-10	342.51	685.03	0.00E+00	6.62E-08	1.32E-07		
Ru-106	9.1684E-02	342.51	685.03	0.00E+00	3.14E+01	6.28E+01		
Se-79	1.3018E-05	342.51	685.03	0.00E+00	4.46E-03	8.92E-03		
Sn-126	1.2167E-05	342.51	685.03	0.00E+00	4.17E-03	8.33E-03		
Sr-90	2.6045E+00	342.51	685.03	0.00E+00	8.92E+02	1.78E+03		
Tc-99	4.4241E-04	342.51	685.03	0.00E+00	1.52E-01	3.03E-01		
Th-229	1.3713E-10	342.51	685.03	0.00E+00	4.70E-08	9.39E-08		
Th-230	1.8090E-11	342.51	685.03	0.00E+00	6.20E-09	1.24E-08		
Th-232	2.5278E-10	342.51	685.03	0.00E+00	8.66E-08	1.73E-07		
Tl-208	1.6947E-08	342.51	685.03	0.00E+00	5.80E-06	1.16E-05		
U-232	4.8737E-08	342.51	685.03	0.00E+00	1.67E-05	3.34E-05		
U-233	1.2203E-07	342.51	685.03	0.00E+00	4.18E-05	8.36E-05		
U-234	1.5925E-07	342.51	685.03	0.00E+00	5.45E-05	1.09E-04		
U-235	-2.6194E-06	342.51	0.00	1.29E-02	1.20E-02	1.29E-02		
U-236	1.2693E-05	342.51	685.03	0.00E+00	4.35E-03	8.70E-03		
U-238	-3.6331E-08	342.51	0.00	8.12E-03	8.11E-03	8.12E-03		
Y-90	2.6060E+00	342.51	685.03	0.00E+00	8.93E+02	1.79E+03		
Other Radionuclides					1.23E+03	2.47E+03		

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

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.78958118	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		342.51
Bounding:		685.03

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.33	
Bounding:	0.67	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 U OF UTAH
SNF ID #: 261
Fuel Units & Descr: 85 - ELEMENT
Heavy Metal Mass: BOL=14.773kg; EOL=14.518kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 8.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.77

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	243.42	486.85	0.00E+00	2.07E-07	4.15E-07
Am-241	1.8331E-03	243.42	486.85	0.00E+00	4.46E-01	8.92E-01
Am-242m	1.4129E-06	243.42	486.85	0.00E+00	3.44E-04	6.88E-04
Am-243	1.4774E-07	243.42	486.85	0.00E+00	3.60E-05	7.19E-05
C-14	1.2871E-04	243.42	486.85	0.00E+00	3.13E-02	6.27E-02
Cl-36	2.8120E-06	243.42	486.85	0.00E+00	6.85E-04	1.37E-03
Cm-243	1.7940E-07	243.42	486.85	0.00E+00	4.37E-05	8.73E-05
Cm-244	1.6962E-06	243.42	486.85	0.00E+00	4.13E-04	8.26E-04
Co-60	1.2839E+00	243.42	486.85	0.00E+00	3.13E+02	6.25E+02
Cs-134	9.0541E-02	243.42	486.85	0.00E+00	2.20E+01	4.41E+01
Cs-135	3.2195E-05	243.42	486.85	0.00E+00	7.84E-03	1.57E-02
Cs-137	2.7564E+00	243.42	486.85	0.00E+00	6.71E+02	1.34E+03
Eu-154	1.5368E-02	243.42	486.85	0.00E+00	3.74E+00	7.48E+00
Eu-155	2.9293E-02	243.42	486.85	0.00E+00	7.13E+00	1.43E+01
Fe-55	7.7158E-01	243.42	486.85	0.00E+00	1.88E+02	3.76E+02
H-3	1.1111E-02	243.42	486.85	0.00E+00	2.70E+00	5.41E+00
I-129	7.3684E-07	243.42	486.85	0.00E+00	1.79E-04	3.59E-04
Kr-85	2.5263E-01	243.42	486.85	0.00E+00	6.15E+01	1.23E+02
Np-237	1.2427E-06	243.42	486.85	0.00E+00	3.03E-04	6.05E-04
Pa-231	3.8511E-09	243.42	486.85	0.00E+00	9.37E-07	1.87E-06
Pb-210	7.3880E-15	243.42	486.85	0.00E+00	1.80E-12	3.60E-12
Pm-147	2.1023E+00	243.42	486.85	0.00E+00	5.12E+02	1.02E+03
Pu-238	1.0383E-03	243.42	486.85	0.00E+00	2.53E-01	5.06E-01
Pu-239	5.5293E-03	243.42	486.85	0.00E+00	1.35E+00	2.69E+00
Pu-240	2.1278E-03	243.42	486.85	0.00E+00	5.18E-01	1.04E+00
Pu-241	1.0195E-01	243.42	486.85	0.00E+00	2.48E+01	4.96E+01
Pu-242	2.3128E-07	243.42	486.85	0.00E+00	5.63E-05	1.13E-04
Ra-226	5.2782E-14	243.42	486.85	0.00E+00	1.28E-11	2.57E-11
Ra-228	1.9338E-10	243.42	486.85	0.00E+00	4.71E-08	9.41E-08
Ru-106	9.1684E-02	243.42	486.85	0.00E+00	2.23E+01	4.46E+01
Se-79	1.3018E-05	243.42	486.85	0.00E+00	3.17E-03	6.34E-03
Sn-126	1.2167E-05	243.42	486.85	0.00E+00	2.96E-03	5.92E-03
Sr-90	2.6045E+00	243.42	486.85	0.00E+00	6.34E+02	1.27E+03
Tc-99	4.4241E-04	243.42	486.85	0.00E+00	1.08E-01	2.15E-01
Th-229	1.3713E-10	243.42	486.85	0.00E+00	3.34E-08	6.68E-08
Th-230	1.8090E-11	243.42	486.85	0.00E+00	4.40E-09	8.81E-09
Th-232	2.5278E-10	243.42	486.85	0.00E+00	6.15E-08	1.23E-07
Tl-208	1.6947E-08	243.42	486.85	0.00E+00	4.13E-06	8.25E-06
U-232	4.8737E-08	243.42	486.85	0.00E+00	1.19E-05	2.37E-05
U-233	1.2203E-07	243.42	486.85	0.00E+00	2.97E-05	5.94E-05
U-234	1.5925E-07	243.42	486.85	0.00E+00	3.88E-05	7.75E-05
U-235	-2.6194E-06	243.42	0.00	6.35E-03	5.72E-03	6.35E-03
U-236	1.2693E-05	243.42	486.85	0.00E+00	3.09E-03	6.18E-03
U-238	-3.6331E-06	243.42	0.00	3.98E-03	3.97E-03	3.98E-03
Y-90	2.6060E+00	243.42	486.85	0.00E+00	6.34E+02	1.27E+03
Other Radionuclides					8.78E+02	1.76E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.869E+13
0.0250	1.731E+13
0.0375	1.474E+13
0.0575	1.513E+13
0.0850	9.376E+12
0.1250	6.809E+12
0.2250	7.954E+12
0.3750	4.036E+12
0.5750	5.366E+13
0.8500	2.303E+12
1.2500	4.677E+13
1.7500	3.118E+10
2.2500	5.025E+10
2.7500	3.988E+08
3.5000	4.641E+07
5.0000	2.643E+02
7.0000	2.993E+01
11.0000	3.411E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.42E+01	2.83E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.8999888	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		243.42
Bounding:		486.85

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.48	
Bounding:	0.97	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 UC @ Berkeley
SNF ID #: 874
Fuel Units & Descr: 111 - ELEMENT
Heavy Metal Mass: BOL=21.645kg; EOL=19.17kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1982
Estimates as of: 2010
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' 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	4.1459E-09	2,362.94	4,725.88	0.00E+00	9.80E-06	1.96E-05
Am-241	3.5850E-03	2,362.94	4,725.88	0.00E+00	8.47E+00	1.69E+01
Am-242m	1.2899E-06	2,362.94	4,725.88	0.00E+00	3.05E-03	6.10E-03
Am-243	1.4747E-07	2,362.94	4,725.88	0.00E+00	3.48E-04	6.97E-04
C-14	1.2839E-04	2,362.94	4,725.88	0.00E+00	3.03E-01	6.07E-01
Cl-36	2.8120E-06	2,362.94	4,725.88	0.00E+00	6.64E-03	1.33E-02
Cm-243	1.1038E-07	2,362.94	4,725.88	0.00E+00	2.61E-04	5.22E-04
Cm-244	7.8917E-07	2,362.94	4,725.88	0.00E+00	1.86E-03	3.73E-03
Co-60	9.2647E-02	2,362.94	4,725.88	0.00E+00	2.19E+02	4.38E+02
Cs-134	1.0940E-04	2,362.94	4,725.88	0.00E+00	2.59E-01	5.17E-01
Cs-135	3.2195E-05	2,362.94	4,725.88	0.00E+00	7.61E-02	1.52E-01
Cs-137	1.7368E+00	2,362.94	4,725.88	0.00E+00	4.10E+03	8.21E+03
Eu-154	3.0677E-03	2,362.94	4,725.88	0.00E+00	7.25E+00	1.45E+01
Eu-155	1.7925E-03	2,362.94	4,725.88	0.00E+00	4.24E+00	8.47E+00
Fe-55	3.7444E-03	2,362.94	4,725.88	0.00E+00	8.85E+00	1.77E+01
H-3	3.6180E-03	2,362.94	4,725.88	0.00E+00	8.55E+00	1.71E+01
I-129	7.3684E-07	2,362.94	4,725.88	0.00E+00	1.74E-03	3.48E-03
Kr-85	6.9368E-02	2,362.94	4,725.88	0.00E+00	1.64E+02	3.28E+02
Np-237	1.2662E-06	2,362.94	4,725.88	0.00E+00	2.99E-03	5.98E-03
Pa-231	9.1654E-09	2,362.94	4,725.88	0.00E+00	2.17E-05	4.33E-05
Pb-210	1.3728E-13	2,362.94	4,725.88	0.00E+00	3.24E-10	6.49E-10
Pm-147	1.0702E-02	2,362.94	4,725.88	0.00E+00	2.53E+01	5.06E+01
Pu-238	8.8692E-04	2,362.94	4,725.88	0.00E+00	2.10E+00	4.19E+00
Pu-239	5.5263E-03	2,362.94	4,725.88	0.00E+00	1.31E+01	2.61E+01
Pu-240	2.1233E-03	2,362.94	4,725.88	0.00E+00	5.02E+00	1.00E+01
Pu-241	3.8962E-02	2,362.94	4,725.88	0.00E+00	9.21E+01	1.84E+02
Pu-242	2.3128E-07	2,362.94	4,725.88	0.00E+00	5.46E-04	1.09E-03
Ra-226	4.6752E-13	2,362.94	4,725.88	0.00E+00	1.10E-09	2.21E-09
Ra-228	2.4827E-10	2,362.94	4,725.88	0.00E+00	5.87E-07	1.17E-06
Ru-106	9.8526E-08	2,362.94	4,725.88	0.00E+00	2.33E-04	4.66E-04
Se-79	1.3015E-05	2,362.94	4,725.88	0.00E+00	3.08E-02	6.15E-02
Sn-126	1.2165E-05	2,362.94	4,725.88	0.00E+00	2.87E-02	5.75E-02
Sr-90	1.6195E+00	2,362.94	4,725.88	0.00E+00	3.83E+03	7.65E+03
Tc-99	4.4241E-04	2,362.94	4,725.88	0.00E+00	1.05E+00	2.09E+00
Th-229	4.2451E-10	2,362.94	4,725.88	0.00E+00	1.00E-06	2.01E-06
Th-230	6.1398E-11	2,362.94	4,725.88	0.00E+00	1.45E-07	2.90E-07
Th-232	2.5278E-10	2,362.94	4,725.88	0.00E+00	5.97E-07	1.19E-06
Tl-208	1.5098E-08	2,362.94	4,725.88	0.00E+00	3.57E-05	7.14E-05
U-232	4.0662E-08	2,362.94	4,725.88	0.00E+00	9.61E-05	1.92E-04
U-233	1.2217E-07	2,362.94	4,725.88	0.00E+00	2.89E-04	5.77E-04
U-234	2.2391E-07	2,362.94	4,725.88	0.00E+00	5.29E-04	1.06E-03
U-235	-2.6194E-06	2,362.94	0.00	9.35E-03	3.17E-03	9.35E-03
U-236	1.2695E-05	2,362.94	4,725.88	0.00E+00	3.00E-02	6.00E-02
U-238	-3.6331E-08	2,362.94	0.00	5.82E-03	5.73E-03	5.82E-03
Y-90	1.6195E+00	2,362.94	4,725.88	0.00E+00	3.83E+03	7.65E+03
Other Radionuclides					4.07E+03	8.13E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.195E+14
0.0250	8.721E+13
0.0375	7.566E+13
0.0575	8.148E+13
0.0850	4.911E+13
0.1250	3.204E+13
0.2250	4.224E+13
0.3750	1.845E+13
0.5750	3.058E+14
0.8500	3.283E+12
1.2500	3.371E+13
1.7500	8.546E+10
2.2500	1.802E+06
2.7500	3.047E+06
3.5000	6.336E+03
5.0000	2.465E+03
7.0000	2.782E+02
11.0000	3.163E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.01E+01	1.00E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2,362.94
Bounding:		4,725.88

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.20	
Bounding:	6.40	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 UNIV OF MARYLAND
SNF ID #: 260
Fuel Units & Descr: 93 - ELEMENT
Heavy Metal Mass: BOL=17.205kg; EOL=16.489kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.84

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	683.59	1,367.19	0.00E+00	5.82E-07	1.16E-06
Am-241	1.8331E-03	683.59	1,367.19	0.00E+00	1.25E+00	2.51E+00
Am-242m	1.4129E-06	683.59	1,367.19	0.00E+00	9.66E-04	1.93E-03
Am-243	1.4774E-07	683.59	1,367.19	0.00E+00	1.01E-04	2.02E-04
C-14	1.2871E-04	683.59	1,367.19	0.00E+00	8.80E-02	1.76E-01
Cl-36	2.8120E-06	683.59	1,367.19	0.00E+00	1.92E-03	3.84E-03
Cm-243	1.7940E-07	683.59	1,367.19	0.00E+00	1.23E-04	2.45E-04
Cm-244	1.6962E-06	683.59	1,367.19	0.00E+00	1.16E-03	2.32E-03
Co-60	1.2839E+00	683.59	1,367.19	0.00E+00	8.78E+02	1.76E+03
Cs-134	9.0541E-02	683.59	1,367.19	0.00E+00	6.19E+01	1.24E+02
Cs-135	3.2195E-05	683.59	1,367.19	0.00E+00	2.20E-02	4.40E-02
Cs-137	2.7564E+00	683.59	1,367.19	0.00E+00	1.88E+03	3.77E+03
Eu-154	1.5368E-02	683.59	1,367.19	0.00E+00	1.05E+01	2.10E+01
Eu-155	2.9293E-02	683.59	1,367.19	0.00E+00	2.00E+01	4.00E+01
Fe-55	7.7158E-01	683.59	1,367.19	0.00E+00	5.27E+02	1.05E+03
H-3	1.1111E-02	683.59	1,367.19	0.00E+00	7.60E+00	1.52E+01
I-129	7.3684E-07	683.59	1,367.19	0.00E+00	5.04E-04	1.01E-03
Kr-85	2.5263E-01	683.59	1,367.19	0.00E+00	1.73E+02	3.45E+02
Np-237	1.2427E-06	683.59	1,367.19	0.00E+00	8.50E-04	1.70E-03
Pa-231	3.8511E-09	683.59	1,367.19	0.00E+00	2.63E-06	5.27E-06
Pb-210	7.3880E-15	683.59	1,367.19	0.00E+00	5.05E-12	1.01E-11
Pm-147	2.1023E+00	683.59	1,367.19	0.00E+00	1.44E+03	2.87E+03
Pu-238	1.0383E-03	683.59	1,367.19	0.00E+00	7.10E-01	1.42E+00
Pu-239	5.5293E-03	683.59	1,367.19	0.00E+00	3.78E+00	7.56E+00
Pu-240	2.1278E-03	683.59	1,367.19	0.00E+00	1.45E+00	2.91E+00
Pu-241	1.0195E-01	683.59	1,367.19	0.00E+00	6.97E+01	1.39E+02
Pu-242	2.3128E-07	683.59	1,367.19	0.00E+00	1.58E-04	3.16E-04
Ra-226	5.2782E-14	683.59	1,367.19	0.00E+00	3.61E-11	7.22E-11
Ra-228	1.9338E-10	683.59	1,367.19	0.00E+00	1.32E-07	2.64E-07
Ru-106	9.1684E-02	683.59	1,367.19	0.00E+00	6.27E+01	1.25E+02
Se-79	1.3018E-05	683.59	1,367.19	0.00E+00	8.90E-03	1.78E-02
Sn-126	1.2167E-05	683.59	1,367.19	0.00E+00	8.32E-03	1.66E-02
Sr-90	2.6045E+00	683.59	1,367.19	0.00E+00	1.78E+03	3.56E+03
Tc-99	4.4241E-04	683.59	1,367.19	0.00E+00	3.02E-01	6.05E-01
Th-229	1.3713E-10	683.59	1,367.19	0.00E+00	9.37E-08	1.87E-07
Th-230	1.8090E-11	683.59	1,367.19	0.00E+00	1.24E-08	2.47E-08
Th-232	2.5278E-10	683.59	1,367.19	0.00E+00	1.73E-07	3.46E-07
Tl-208	1.6947E-08	683.59	1,367.19	0.00E+00	1.16E-05	2.32E-05
U-232	4.8737E-08	683.59	1,367.19	0.00E+00	3.33E-05	6.66E-05
U-233	1.2203E-07	683.59	1,367.19	0.00E+00	8.34E-05	1.67E-04
U-234	1.5925E-07	683.59	1,367.19	0.00E+00	1.09E-04	2.18E-04
U-235	-2.6194E-08	683.59	0.00	7.44E-03	5.65E-03	7.44E-03
U-238	1.2693E-05	683.59	1,367.19	0.00E+00	8.68E-03	1.74E-02
U-238	-3.6331E-08	683.59	0.00	4.63E-03	4.60E-03	4.63E-03
Y-90	2.6060E+00	683.59	1,367.19	0.00E+00	1.78E+03	3.56E+03
Other Radionuclides					2.46E+03	4.93E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.210E+14
0.0250	4.862E+13
0.0375	4.141E+13
0.0575	4.250E+13
0.0850	2.633E+13
0.1250	1.912E+13
0.2250	2.234E+13
0.3750	1.133E+13
0.5750	1.507E+14
0.8500	6.467E+12
1.2500	1.313E+14
1.7500	8.755E+10
2.2500	1.411E+11
2.7500	1.120E+09
3.5000	1.303E+08
5.0000	7.272E+02
7.0000	8.232E+01
11.0000	9.378E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.98E+01	7.96E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		683.59
Bounding:		1,367.19

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.17	
Bounding:	2.33	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 UNIV. OF CAL-IRVINE
SNF ID #: 264
Fuel Units & Descr: 104 - ELEMENT
Heavy Metal Mass: BOL=19.926kg; EOL=19.77kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.94

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	148.92	297.84	0.00E+00	1.27E-07	2.54E-07
Am-241	1.8331E-03	148.92	297.84	0.00E+00	2.73E-01	5.46E-01
Am-242m	1.4129E-06	148.92	297.84	0.00E+00	2.10E-04	4.21E-04
Am-243	1.4774E-07	148.92	297.84	0.00E+00	2.20E-05	4.40E-05
C-14	1.2871E-04	148.92	297.84	0.00E+00	1.92E-02	3.83E-02
Cl-36	2.8120E-06	148.92	297.84	0.00E+00	4.19E-04	8.38E-04
Cm-243	1.7940E-07	148.92	297.84	0.00E+00	2.67E-05	5.34E-05
Cm-244	1.6962E-06	148.92	297.84	0.00E+00	2.53E-04	5.05E-04
Co-60	1.2839E+00	148.92	297.84	0.00E+00	1.91E+02	3.82E+02
Cs-134	9.0541E-02	148.92	297.84	0.00E+00	1.35E+01	2.70E+01
Cs-135	3.2195E-05	148.92	297.84	0.00E+00	4.79E-03	9.59E-03
Cs-137	2.7564E+00	148.92	297.84	0.00E+00	4.10E+02	8.21E+02
Eu-154	1.5368E-02	148.92	297.84	0.00E+00	2.29E+00	4.58E+00
Eu-155	2.9293E-02	148.92	297.84	0.00E+00	4.36E+00	8.72E+00
Fe-55	7.7158E-01	148.92	297.84	0.00E+00	1.15E+02	2.30E+02
H-3	1.1111E-02	148.92	297.84	0.00E+00	1.65E+00	3.31E+00
I-129	7.3684E-07	148.92	297.84	0.00E+00	1.10E-04	2.19E-04
Kr-85	2.5263E-01	148.92	297.84	0.00E+00	3.76E+01	7.52E+01
Np-237	1.2427E-06	148.92	297.84	0.00E+00	1.85E-04	3.70E-04
Pa-231	3.8511E-09	148.92	297.84	0.00E+00	5.74E-07	1.15E-06
Pb-210	7.3880E-15	148.92	297.84	0.00E+00	1.10E-12	2.20E-12
Pm-147	2.1023E+00	148.92	297.84	0.00E+00	3.13E+02	6.26E+02
Pu-238	1.0383E-03	148.92	297.84	0.00E+00	1.55E-01	3.09E-01
Pu-239	5.5293E-03	148.92	297.84	0.00E+00	8.23E-01	1.65E+00
Pu-240	2.1278E-03	148.92	297.84	0.00E+00	3.17E-01	6.34E-01
Pu-241	1.0195E-01	148.92	297.84	0.00E+00	1.52E+01	3.04E+01
Pu-242	2.3128E-07	148.92	297.84	0.00E+00	3.44E-05	6.89E-05
Ra-226	5.2782E-14	148.92	297.84	0.00E+00	7.86E-12	1.57E-11
Ra-228	1.9338E-10	148.92	297.84	0.00E+00	2.88E-08	5.76E-08
Ru-106	9.1684E-02	148.92	297.84	0.00E+00	1.37E+01	2.73E+01
Se-79	1.3018E-05	148.92	297.84	0.00E+00	1.94E-03	3.88E-03
Sn-126	1.2167E-05	148.92	297.84	0.00E+00	1.81E-03	3.62E-03
Sr-90	2.6045E+00	148.92	297.84	0.00E+00	3.88E+02	7.76E+02
Tc-99	4.4241E-04	148.92	297.84	0.00E+00	6.59E-02	1.32E-01
Th-229	1.3713E-10	148.92	297.84	0.00E+00	2.04E-08	4.08E-08
Th-230	1.8090E-11	148.92	297.84	0.00E+00	2.69E-09	5.39E-09
Th-232	2.5278E-10	148.92	297.84	0.00E+00	3.76E-08	7.53E-08
Tl-208	1.6947E-08	148.92	297.84	0.00E+00	2.52E-06	5.05E-06
U-232	4.8737E-08	148.92	297.84	0.00E+00	7.26E-06	1.45E-05
U-233	1.2203E-07	148.92	297.84	0.00E+00	1.82E-05	3.63E-05
U-234	1.5925E-07	148.92	297.84	0.00E+00	2.37E-05	4.74E-05
U-235	-2.6194E-06	148.92	0.00	8.61E-03	8.22E-03	8.61E-03
U-236	1.2693E-05	148.92	297.84	0.00E+00	1.89E-03	3.78E-03
U-238	-3.6331E-08	148.92	0.00	5.36E-03	5.35E-03	5.36E-03
Y-90	2.6060E+00	148.92	297.84	0.00E+00	3.88E+02	7.76E+02
Other Radionuclides					5.37E+02	1.07E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.814E+13
0.0250	1.059E+13
0.0375	9.020E+12
0.0575	9.259E+12
0.0850	5.736E+12
0.1250	4.165E+12
0.2250	4.866E+12
0.3750	2.469E+12
0.5750	3.283E+13
0.8500	1.409E+12
1.2500	2.861E+13
1.7500	1.907E+10
2.2500	3.074E+10
2.7500	2.440E+08
3.5000	2.839E+07
5.0000	1.685E+02
7.0000	1.909E+01
11.0000	2.176E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.67E+00	1.73E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00002068	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		148.92	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		297.84	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.22		1.00
Bounding:	0.44		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 UNIV. OF WISCONSIN
SNF ID #: 262
Fuel Units & Descr: 128 - ELEMENT
Heavy Metal Mass: BOL=24.96kg; EOL=22.182kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.15

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5173E-10	2,651.52	5,303.03	0.00E+00	2.26E-06	4.52E-06	Avg. MeV	
Am-241	1.8331E-03	2,651.52	5,303.03	0.00E+00	4.86E+00	9.72E+00	0.0150	8.571E+14
Am-242m	1.4129E-06	2,651.52	5,303.03	0.00E+00	3.75E-03	7.49E-03	0.0250	1.886E+14
Am-243	1.4774E-07	2,651.52	5,303.03	0.00E+00	3.92E-04	7.83E-04	0.0375	1.606E+14
C-14	1.2871E-04	2,651.52	5,303.03	0.00E+00	3.41E-01	6.83E-01	0.0575	1.649E+14
Cl-36	2.8120E-06	2,651.52	5,303.03	0.00E+00	7.46E-03	1.49E-02	0.0850	1.021E+14
Cm-243	1.7940E-07	2,651.52	5,303.03	0.00E+00	4.76E-04	9.51E-04	0.1250	7.416E+13
Cm-244	1.6962E-06	2,651.52	5,303.03	0.00E+00	4.50E-03	9.00E-03	0.2250	8.664E+13
Co-60	1.2839E+00	2,651.52	5,303.03	0.00E+00	3.40E+03	6.81E+03	0.3750	4.397E+13
Cs-134	9.0541E-02	2,651.52	5,303.03	0.00E+00	2.40E+02	4.80E+02	0.5750	5.845E+14
Cs-135	3.2195E-05	2,651.52	5,303.03	0.00E+00	8.54E-02	1.71E-01	0.8500	2.509E+13
Cs-137	2.7564E+00	2,651.52	5,303.03	0.00E+00	7.31E+03	1.46E+04	1.2500	5.094E+14
Eu-154	1.5368E-02	2,651.52	5,303.03	0.00E+00	4.07E+01	8.15E+01	1.7500	3.396E+11
Eu-155	2.9293E-02	2,651.52	5,303.03	0.00E+00	7.77E+01	1.55E+02	2.2500	5.474E+11
Fe-55	7.7158E-01	2,651.52	5,303.03	0.00E+00	2.05E+03	4.09E+03	2.7500	4.344E+09
H-3	1.1111E-02	2,651.52	5,303.03	0.00E+00	2.95E+01	5.89E+01	3.5000	5.055E+08
I-129	7.3684E-07	2,651.52	5,303.03	0.00E+00	1.95E-03	3.91E-03	5.0000	2.795E+03
Kr-85	2.5263E-01	2,651.52	5,303.03	0.00E+00	6.70E+02	1.34E+03	7.0000	3.163E+02
Np-237	1.2427E-06	2,651.52	5,303.03	0.00E+00	3.30E-03	6.59E-03	11.0000	3.603E+01
Pa-231	3.8511E-09	2,651.52	5,303.03	0.00E+00	1.02E-05	2.04E-05		
Pb-210	7.3880E-15	2,651.52	5,303.03	0.00E+00	1.96E-11	3.92E-11		
Pm-147	2.1023E+00	2,651.52	5,303.03	0.00E+00	5.57E+03	1.11E+04		
Pu-238	1.0383E-03	2,651.52	5,303.03	0.00E+00	2.75E+00	5.51E+00		
Pu-239	5.5293E-03	2,651.52	5,303.03	0.00E+00	1.47E+01	2.93E+01		
Pu-240	2.1278E-03	2,651.52	5,303.03	0.00E+00	5.64E+00	1.13E+01		
Pu-241	1.0195E-01	2,651.52	5,303.03	0.00E+00	2.70E+02	5.41E+02		
Pu-242	2.3128E-07	2,651.52	5,303.03	0.00E+00	6.13E-04	1.23E-03		
Ra-226	5.2782E-14	2,651.52	5,303.03	0.00E+00	1.40E-10	2.80E-10		
Ra-228	1.9338E-10	2,651.52	5,303.03	0.00E+00	5.13E-07	1.03E-06		
Ru-106	9.1684E-02	2,651.52	5,303.03	0.00E+00	2.43E+02	4.86E+02		
Se-79	1.3018E-05	2,651.52	5,303.03	0.00E+00	3.45E-02	6.90E-02		
Sn-126	1.2167E-05	2,651.52	5,303.03	0.00E+00	3.23E-02	6.45E-02		
Sr-90	2.6045E+00	2,651.52	5,303.03	0.00E+00	6.91E+03	1.38E+04		
Tc-99	4.4241E-04	2,651.52	5,303.03	0.00E+00	1.17E+00	2.35E+00		
Th-229	1.3713E-10	2,651.52	5,303.03	0.00E+00	3.64E-07	7.27E-07		
Th-230	1.8090E-11	2,651.52	5,303.03	0.00E+00	4.80E-08	9.59E-08		
Th-232	2.5278E-10	2,651.52	5,303.03	0.00E+00	6.70E-07	1.34E-06		
Tl-208	1.6947E-08	2,651.52	5,303.03	0.00E+00	4.49E-05	8.99E-05		
U-232	4.8737E-08	2,651.52	5,303.03	0.00E+00	1.29E-04	2.58E-04		
U-233	1.2203E-07	2,651.52	5,303.03	0.00E+00	3.24E-04	6.47E-04		
U-234	1.5925E-07	2,651.52	5,303.03	0.00E+00	4.22E-04	8.44E-04		
U-235	-2.6194E-08	2,651.52	0.00	1.08E-02	3.84E-03	1.08E-02		
U-236	1.2693E-05	2,651.52	5,303.03	0.00E+00	3.37E-02	6.73E-02		
U-238	-3.6331E-08	2,651.52	0.00	6.71E-03	6.61E-03	6.71E-03		
Y-90	2.6060E+00	2,651.52	5,303.03	0.00E+00	6.91E+03	1.38E+04		
Other Radionuclides					9.56E+03	1.91E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.54E+02	3.09E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2,651.52
Bounding:		5,303.03

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.12	
Bounding:	6.23	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 USGS
SNF ID #: 964
Fuel Units & Descr: 1 - ELEMENT
Heavy Metal Mass: BOL=0.184kg; EOL=0.183kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
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	0.76	1.53	0.00E+00	6.50E-10	1.30E-09
Am-241	1.8331E-03	0.76	1.53	0.00E+00	1.40E-03	2.80E-03
Am-242m	1.4129E-06	0.76	1.53	0.00E+00	1.08E-06	2.16E-06
Am-243	1.4774E-07	0.76	1.53	0.00E+00	1.13E-07	2.26E-07
C-14	1.2871E-04	0.76	1.53	0.00E+00	9.83E-05	1.97E-04
Cl-36	2.8120E-06	0.76	1.53	0.00E+00	2.15E-06	4.30E-06
Cm-243	1.7940E-07	0.76	1.53	0.00E+00	1.37E-07	2.74E-07
Cm-244	1.6962E-06	0.76	1.53	0.00E+00	1.30E-06	2.59E-06
Co-60	1.2839E+00	0.76	1.53	0.00E+00	9.81E-01	1.96E+00
Cs-134	9.0541E-02	0.76	1.53	0.00E+00	6.91E-02	1.38E-01
Cs-135	3.2195E-05	0.76	1.53	0.00E+00	2.46E-05	4.92E-05
Cs-137	2.7564E+00	0.76	1.53	0.00E+00	2.11E+00	4.21E+00
Eu-154	1.5368E-02	0.76	1.53	0.00E+00	1.17E-02	2.35E-02
Eu-155	2.9293E-02	0.76	1.53	0.00E+00	2.24E-02	4.47E-02
Fe-55	7.7158E-01	0.76	1.53	0.00E+00	5.89E-01	1.18E+00
H-3	1.1111E-02	0.76	1.53	0.00E+00	8.49E-03	1.70E-02
I-129	7.3684E-07	0.76	1.53	0.00E+00	5.63E-07	1.13E-06
Kr-85	2.5263E-01	0.76	1.53	0.00E+00	1.93E-01	3.86E-01
Np-237	1.2427E-06	0.76	1.53	0.00E+00	9.49E-07	1.90E-06
Pa-231	3.8511E-09	0.76	1.53	0.00E+00	2.94E-09	5.88E-09
Pb-210	7.3880E-15	0.76	1.53	0.00E+00	5.64E-15	1.13E-14
Pm-147	2.1023E+00	0.76	1.53	0.00E+00	1.61E+00	3.21E+00
Pu-238	1.0383E-03	0.76	1.53	0.00E+00	7.93E-04	1.59E-03
Pu-239	5.5293E-03	0.76	1.53	0.00E+00	4.22E-03	8.45E-03
Pu-240	2.1278E-03	0.76	1.53	0.00E+00	1.62E-03	3.25E-03
Pu-241	1.0195E-01	0.76	1.53	0.00E+00	7.79E-02	1.56E-01
Pu-242	2.3128E-07	0.76	1.53	0.00E+00	1.77E-07	3.53E-07
Ra-226	5.2782E-14	0.76	1.53	0.00E+00	4.03E-14	8.06E-14
Ra-228	1.9338E-10	0.76	1.53	0.00E+00	1.48E-10	2.95E-10
Ru-106	9.1684E-02	0.76	1.53	0.00E+00	7.00E-02	1.40E-01
Se-79	1.3018E-05	0.76	1.53	0.00E+00	9.94E-06	1.99E-05
Sn-126	1.2167E-05	0.76	1.53	0.00E+00	9.29E-06	1.86E-05
Sr-90	2.6045E+00	0.76	1.53	0.00E+00	1.99E+00	3.98E+00
Tc-99	4.4241E-04	0.76	1.53	0.00E+00	3.38E-04	6.76E-04
Th-229	1.3713E-10	0.76	1.53	0.00E+00	1.05E-10	2.09E-10
Th-230	1.8090E-11	0.76	1.53	0.00E+00	1.38E-11	2.76E-11
Th-232	2.5278E-10	0.76	1.53	0.00E+00	1.93E-10	3.86E-10
Tl-208	1.6947E-08	0.76	1.53	0.00E+00	1.29E-08	2.59E-08
U-232	4.8737E-08	0.76	1.53	0.00E+00	3.72E-08	7.44E-08
U-233	1.2203E-07	0.76	1.53	0.00E+00	9.32E-08	1.86E-07
U-234	1.5925E-07	0.76	1.53	0.00E+00	1.22E-07	2.43E-07
U-235	-2.6194E-06	0.76	0.00	7.79E-05	7.59E-05	7.79E-05
U-236	1.2693E-05	0.76	1.53	0.00E+00	9.69E-06	1.94E-05
U-238	-3.6331E-08	0.76	0.00	4.97E-05	4.97E-05	4.97E-05
Y-90	2.6060E+00	0.76	1.53	0.00E+00	1.99E+00	3.98E+00
Other Radionuclides					2.75E+00	5.51E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.469E+11
0.0250	5.432E+10
0.0375	4.626E+10
0.0575	4.748E+10
0.0850	2.942E+10
0.1250	2.136E+10
0.2250	2.495E+10
0.3750	1.266E+10
0.5750	1.683E+11
0.8500	7.225E+09
1.2500	1.467E+11
1.7500	9.781E+07
2.2500	1.577E+08
2.7500	1.251E+06
3.5000	1.456E+05
5.0000	9.154E-01
7.0000	1.038E-01
11.0000	1.184E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.44E-02	8.89E-02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.58243102	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		0.76
Bounding:		1.53

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.12	
Bounding:	0.24	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 WSU
SNF ID #: 268
Fuel Units & Descr: 137 - ELEMENT
Heavy Metal Mass: BOL=26.715kg; EOL=23.482kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: TRIGA-SS (LW/U-Zrx, SST, 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.000195
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.23

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	3,086.44	6,172.87	0.00E+00	2.63E-06	5.26E-06
Am-241	1.8331E-03	3,086.44	6,172.87	0.00E+00	5.66E+00	1.13E+01
Am-242m	1.4129E-06	3,086.44	6,172.87	0.00E+00	4.36E-03	8.72E-03
Am-243	1.4774E-07	3,086.44	6,172.87	0.00E+00	4.56E-04	9.12E-04
C-14	1.2871E-04	3,086.44	6,172.87	0.00E+00	3.97E-01	7.94E-01
Cl-36	2.8120E-06	3,086.44	6,172.87	0.00E+00	8.68E-03	1.74E-02
Cm-243	1.7940E-07	3,086.44	6,172.87	0.00E+00	5.54E-04	1.11E-03
Cm-244	1.6962E-06	3,086.44	6,172.87	0.00E+00	5.24E-03	1.05E-02
Co-60	1.2839E+00	3,086.44	6,172.87	0.00E+00	3.96E+03	7.93E+03
Cs-134	9.0541E-02	3,086.44	6,172.87	0.00E+00	2.79E+02	5.59E+02
Cs-135	3.2195E-05	3,086.44	6,172.87	0.00E+00	9.94E-02	1.99E-01
Cs-137	2.7564E+00	3,086.44	6,172.87	0.00E+00	8.51E+03	1.70E+04
Eu-154	1.5368E-02	3,086.44	6,172.87	0.00E+00	4.74E+01	9.49E+01
Eu-155	2.9293E-02	3,086.44	6,172.87	0.00E+00	9.04E+01	1.81E+02
Fe-55	7.7158E-01	3,086.44	6,172.87	0.00E+00	2.38E+03	4.76E+03
H-3	1.1111E-02	3,086.44	6,172.87	0.00E+00	3.43E+01	6.86E+01
I-129	7.3684E-07	3,086.44	6,172.87	0.00E+00	2.27E-03	4.55E-03
Kr-85	2.5263E-01	3,086.44	6,172.87	0.00E+00	7.80E+02	1.56E+03
Np-237	1.2427E-06	3,086.44	6,172.87	0.00E+00	3.84E-03	7.67E-03
Pa-231	3.8511E-09	3,086.44	6,172.87	0.00E+00	1.19E-05	2.38E-05
Pb-210	7.3880E-15	3,086.44	6,172.87	0.00E+00	2.28E-11	4.56E-11
Pm-147	2.1023E+00	3,086.44	6,172.87	0.00E+00	6.49E+03	1.30E+04
Pu-238	1.0383E-03	3,086.44	6,172.87	0.00E+00	3.20E+00	6.41E+00
Pu-239	5.5293E-03	3,086.44	6,172.87	0.00E+00	1.71E+01	3.41E+01
Pu-240	2.1278E-03	3,086.44	6,172.87	0.00E+00	6.57E+00	1.31E+01
Pu-241	1.0195E-01	3,086.44	6,172.87	0.00E+00	3.15E+02	6.29E+02
Pu-242	2.3128E-07	3,086.44	6,172.87	0.00E+00	7.14E-04	1.43E-03
Ra-226	5.2782E-14	3,086.44	6,172.87	0.00E+00	1.63E-10	3.26E-10
Ra-228	1.9338E-10	3,086.44	6,172.87	0.00E+00	5.97E-07	1.19E-06
Ru-106	9.1684E-02	3,086.44	6,172.87	0.00E+00	2.83E+02	5.66E+02
Se-79	1.3018E-05	3,086.44	6,172.87	0.00E+00	4.02E-02	8.04E-02
Sn-126	1.2167E-05	3,086.44	6,172.87	0.00E+00	3.76E-02	7.51E-02
Sr-90	2.6045E+00	3,086.44	6,172.87	0.00E+00	8.04E+03	1.61E+04
Tc-99	4.4241E-04	3,086.44	6,172.87	0.00E+00	1.37E+00	2.73E+00
Th-229	1.3713E-10	3,086.44	6,172.87	0.00E+00	4.23E-07	8.46E-07
Th-230	1.8090E-11	3,086.44	6,172.87	0.00E+00	5.58E-08	1.12E-07
Th-232	2.5278E-10	3,086.44	6,172.87	0.00E+00	7.80E-07	1.56E-06
Tl-208	1.6947E-08	3,086.44	6,172.87	0.00E+00	5.23E-05	1.05E-04
U-232	4.8737E-08	3,086.44	6,172.87	0.00E+00	1.50E-04	3.01E-04
U-233	1.2203E-07	3,086.44	6,172.87	0.00E+00	3.77E-04	7.53E-04
U-234	1.5925E-07	3,086.44	6,172.87	0.00E+00	4.92E-04	9.83E-04
U-235	-2.6194E-06	3,086.44	0.00	1.14E-02	3.35E-03	1.14E-02
U-236	1.2693E-05	3,086.44	6,172.87	0.00E+00	3.92E-02	7.84E-02
U-238	-3.6331E-08	3,086.44	0.00	7.20E-03	7.09E-03	7.20E-03
Y-90	2.6060E+00	3,086.44	6,172.87	0.00E+00	8.04E+03	1.61E+04
Other Radionuclides					1.11E+04	2.23E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.977E+14
0.0250	2.195E+14
0.0375	1.869E+14
0.0575	1.919E+14
0.0850	1.189E+14
0.1250	8.633E+13
0.2250	1.008E+14
0.3750	5.118E+13
0.5750	6.804E+14
0.8500	2.920E+13
1.2500	5.930E+14
1.7500	3.953E+11
2.2500	6.371E+11
2.7500	5.056E+09
3.5000	5.884E+08
5.0000	3.252E+03
7.0000	3.690E+02
11.0000	4.192E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.80E+02	3.59E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	19.8	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3,086.44
Bounding:		6,172.87

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.39	
Bounding:	6.78	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRIGA STD 8.5/20 ZAIRE
SNF ID #: 486
Fuel Units & Descr: 80 - ELEMENT
Heavy Metal Mass: BOL=15.448kg; EOL=15.288kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' 0.72

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5173E-10	152.74	305.47	0.00E+00	1.30E-07	2.60E-07
Am-241	1.8331E-03	152.74	305.47	0.00E+00	2.80E-01	5.60E-01
Am-242m	1.4129E-06	152.74	305.47	0.00E+00	2.16E-04	4.32E-04
Am-243	1.4774E-07	152.74	305.47	0.00E+00	2.26E-05	4.51E-05
C-14	1.2871E-04	152.74	305.47	0.00E+00	1.97E-02	3.93E-02
Cl-36	2.8120E-06	152.74	305.47	0.00E+00	4.30E-04	8.59E-04
Cm-243	1.7940E-07	152.74	305.47	0.00E+00	2.74E-05	5.48E-05
Cm-244	1.6962E-06	152.74	305.47	0.00E+00	2.59E-04	5.18E-04
Co-60	1.2839E+00	152.74	305.47	0.00E+00	1.96E+02	3.92E+02
Cs-134	9.0541E-02	152.74	305.47	0.00E+00	1.38E+01	2.77E+01
Cs-135	3.2195E-05	152.74	305.47	0.00E+00	4.92E-03	9.83E-03
Cs-137	2.7564E+00	152.74	305.47	0.00E+00	4.21E+02	8.42E+02
Eu-154	1.5368E-02	152.74	305.47	0.00E+00	2.35E+00	4.69E+00
Eu-155	2.9293E-02	152.74	305.47	0.00E+00	4.47E+00	8.95E+00
Fe-55	7.7158E-01	152.74	305.47	0.00E+00	1.18E+02	2.36E+02
H-3	1.1111E-02	152.74	305.47	0.00E+00	1.70E+00	3.39E+00
I-129	7.3684E-07	152.74	305.47	0.00E+00	1.13E-04	2.25E-04
Kr-85	2.5263E-01	152.74	305.47	0.00E+00	3.86E+01	7.72E+01
Np-237	1.2427E-06	152.74	305.47	0.00E+00	1.90E-04	3.80E-04
Pa-231	3.8511E-09	152.74	305.47	0.00E+00	5.88E-07	1.18E-06
Pb-210	7.3880E-15	152.74	305.47	0.00E+00	1.13E-12	2.26E-12
Pm-147	2.1023E+00	152.74	305.47	0.00E+00	3.21E+02	6.42E+02
Pu-238	1.0383E-03	152.74	305.47	0.00E+00	1.59E-01	3.17E-01
Pu-239	5.5293E-03	152.74	305.47	0.00E+00	8.45E-01	1.69E+00
Pu-240	2.1278E-03	152.74	305.47	0.00E+00	3.25E-01	6.50E-01
Pu-241	1.0195E-01	152.74	305.47	0.00E+00	1.56E+01	3.11E+01
Pu-242	2.3128E-07	152.74	305.47	0.00E+00	3.53E-05	7.06E-05
Ra-226	5.2782E-14	152.74	305.47	0.00E+00	8.06E-12	1.61E-11
Ra-228	1.9338E-10	152.74	305.47	0.00E+00	2.95E-08	5.91E-08
Ru-106	9.1684E-02	152.74	305.47	0.00E+00	1.40E+01	2.80E+01
Se-79	1.3018E-05	152.74	305.47	0.00E+00	1.99E-03	3.98E-03
Sn-126	1.2167E-05	152.74	305.47	0.00E+00	1.86E-03	3.72E-03
Sr-90	2.6045E+00	152.74	305.47	0.00E+00	3.98E+02	7.96E+02
Tc-99	4.4241E-04	152.74	305.47	0.00E+00	6.76E-02	1.35E-01
Th-229	1.3713E-10	152.74	305.47	0.00E+00	2.09E-08	4.19E-08
Th-230	1.8090E-11	152.74	305.47	0.00E+00	2.76E-09	5.53E-09
Th-232	2.5278E-10	152.74	305.47	0.00E+00	3.86E-08	7.72E-08
Tl-208	1.6947E-08	152.74	305.47	0.00E+00	2.59E-06	5.18E-06
U-232	4.8737E-08	152.74	305.47	0.00E+00	7.44E-06	1.49E-05
U-233	1.2203E-07	152.74	305.47	0.00E+00	1.86E-05	3.73E-05
U-234	1.5925E-07	152.74	305.47	0.00E+00	2.43E-05	4.86E-05
U-235	-2.6194E-06	152.74	0.00	6.68E-03	6.28E-03	6.68E-03
U-236	1.2693E-05	152.74	305.47	0.00E+00	1.94E-03	3.88E-03
U-238	-3.6331E-08	152.74	0.00	4.15E-03	4.15E-03	4.15E-03
Y-90	2.6060E+00	152.74	305.47	0.00E+00	3.98E+02	7.96E+02
Other Radionuclides					5.51E+02	1.10E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.937E+13
0.0250	1.086E+13
0.0375	9.252E+12
0.0575	9.496E+12
0.0850	5.883E+12
0.1250	4.272E+12
0.2250	4.991E+12
0.3750	2.533E+12
0.5750	3.367E+13
0.8500	1.445E+12
1.2500	2.935E+13
1.7500	1.956E+10
2.2500	3.153E+10
2.7500	2.502E+08
3.5000	2.912E+07
5.0000	1.697E+02
7.0000	1.922E+01
11.0000	2.191E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.89E+00	1.78E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000041	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		152.74
Bounding:		305.47

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:	0.29	
Bounding:	0.58	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRU SCRAP SNF (MOX)
SNF ID #: 368
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=106.338kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1994
Estimates as of: 2010
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: 15 years

Estimated Canister usage: HIC 1.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.3735E-12	106,140.24	106,140.24	0.00E+00	1.46E-07	1.46E-07
Am-241	7.9527E-02	106,140.24	106,140.24	4.10E+02	8.85E+03	8.85E+03
Am-242m	2.1053E-03	106,140.24	106,140.24	0.00E+00	2.23E+02	2.23E+02
Am-243	1.0760E-04	106,140.24	106,140.24	0.00E+00	1.14E+01	1.14E+01
C-14	2.6141E-05	106,140.24	106,140.24	0.00E+00	2.77E+00	2.77E+00
Cl-36	3.4243E-10	106,140.24	106,140.24	0.00E+00	3.63E-05	3.63E-05
Cm-243	6.6092E-04	106,140.24	106,140.24	0.00E+00	7.02E+01	7.02E+01
Cm-244	2.9933E-03	106,140.24	106,140.24	0.00E+00	3.18E+02	3.18E+02
Co-60	1.5934E-02	106,140.24	106,140.24	0.00E+00	1.69E+03	1.69E+03
Cs-134	4.6356E-02	106,140.24	106,140.24	0.00E+00	4.92E+03	4.92E+03
Cs-135	4.7693E-05	106,140.24	106,140.24	0.00E+00	5.06E+00	5.06E+00
Cs-137	2.1113E+00	106,140.24	106,140.24	0.00E+00	2.24E+05	2.24E+05
Eu-154	4.8092E-02	106,140.24	106,140.24	0.00E+00	5.10E+03	5.10E+03
Eu-155	6.8447E-02	106,140.24	106,140.24	0.00E+00	7.26E+03	7.26E+03
Fe-55	5.8479E-03	106,140.24	106,140.24	0.00E+00	6.21E+02	6.21E+02
H-3	8.9300E-03	106,140.24	106,140.24	0.00E+00	9.48E+02	9.48E+02
I-129	1.2891E-06	106,140.24	106,140.24	0.00E+00	1.37E-01	1.37E-01
Kr-85	7.0941E-02	106,140.24	106,140.24	0.00E+00	7.53E+03	7.53E+03
Np-237	2.6541E-06	106,140.24	106,140.24	0.00E+00	2.82E-01	2.82E-01
Pa-231	4.8970E-12	106,140.24	106,140.24	0.00E+00	5.20E-07	5.20E-07
Pb-210	2.2170E-13	106,140.24	106,140.24	0.00E+00	2.35E-08	2.35E-08
Pm-147	2.3617E-01	106,140.24	106,140.24	0.00E+00	2.51E+04	2.51E+04
Pu-238	2.8636E-02	106,140.24	106,140.24	0.00E+00	3.04E+03	3.04E+03
Pu-239	-3.5520E-02	106,140.24	0.00	3.37E+03	0.00E+00	3.37E+03
Pu-240	2.0790E-02	106,140.24	106,140.24	1.71E+03	3.92E+03	3.92E+03
Pu-241	-4.8316E-01	106,140.24	0.00	7.68E+04	2.55E+04	7.68E+04
Pu-242	1.1052E-05	106,140.24	106,140.24	4.56E-01	1.63E+00	1.63E+00
Ra-226	5.7471E-13	106,140.24	106,140.24	0.00E+00	6.10E-08	6.10E-08
Ra-228	5.4957E-17	106,140.24	106,140.24	0.00E+00	5.83E-12	5.83E-12
Ru-106	1.4582E-02	106,140.24	106,140.24	0.00E+00	1.55E+03	1.55E+03
Se-79	1.0137E-05	106,140.24	106,140.24	0.00E+00	1.08E+00	1.08E+00
Sn-126	4.3922E-05	106,140.24	106,140.24	0.00E+00	4.66E+00	4.66E+00
Sr-90	7.6329E-01	106,140.24	106,140.24	0.00E+00	8.10E+04	8.10E+04
Tc-99	3.9412E-04	106,140.24	106,140.24	0.00E+00	4.18E+01	4.18E+01
Th-229	1.6457E-12	106,140.24	106,140.24	0.00E+00	1.75E-07	1.75E-07
Th-230	1.8822E-10	106,140.24	106,140.24	0.00E+00	2.00E-05	2.00E-05
Th-232	9.7601E-17	106,140.24	106,140.24	0.00E+00	1.04E-11	1.04E-11
Tl-208	5.2722E-07	106,140.24	106,140.24	0.00E+00	5.60E-02	5.60E-02
U-232	1.4925E-06	106,140.24	106,140.24	0.00E+00	1.58E-01	1.58E-01
U-233	2.1113E-10	106,140.24	106,140.24	0.00E+00	2.24E-05	2.24E-05
U-234	1.9528E-06	106,140.24	106,140.24	0.00E+00	2.07E-01	2.07E-01
U-235	-9.7920E-09	106,140.24	0.00	6.91E-04	0.00E+00	6.91E-04
U-236	1.1570E-07	106,140.24	106,140.24	0.00E+00	1.23E-02	1.23E-02
U-238	-1.7914E-07	106,140.24	0.00	5.03E-02	3.13E-02	5.03E-02
Y-90	7.6329E-01	106,140.24	106,140.24	0.00E+00	8.10E+04	8.10E+04
Other Radionuclides					2.30E+05	2.30E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.280E+15
0.0250	1.150E+15
0.0375	1.316E+15
0.0575	1.105E+15
0.0850	6.557E+14
0.1250	4.897E+14
0.2250	4.966E+14
0.3750	2.563E+14
0.5750	8.530E+15
0.8500	2.855E+14
1.2500	2.486E+14
1.7500	4.083E+12
2.2500	1.374E+11
2.7500	1.433E+10
3.5000	1.616E+09
5.0000	2.967E+08
7.0000	3.402E+05
11.0000	3.898E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.24E+03	2.44E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		106,140.24
Bounding:		106,140.24

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.28	
Bounding:	3.28	

Estimated EOL HM/Given EOL HM: 1.05

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRU SCRAP SNF (U METAL)
SNF ID #: 904
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=106.338kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1994
Estimates as of: 2010
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: 15 years

Estimated Canister usage: HIC = 4.00

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.1509E-08	93,768.99	93,768.99	0.00E+00	2.02E-03	2.02E-03
Am-241	4.6529E-07	93,768.99	93,768.99	0.00E+00	4.36E-02	4.36E-02
Am-242m	0.0000E+00	93,768.99	93,768.99	0.00E+00	0.00E+00	0.00E+00
Am-243	8.3923E-15	93,768.99	93,768.99	0.00E+00	7.87E-10	7.87E-10
C-14	2.1765E-05	93,768.99	93,768.99	0.00E+00	2.04E+00	2.04E+00
Cl-36	5.5188E-08	93,768.99	93,768.99	0.00E+00	5.17E-03	5.17E-03
Cm-243	2.5208E-14	93,768.99	93,768.99	0.00E+00	2.36E-09	2.36E-09
Cm-244	1.1259E-15	93,768.99	93,768.99	0.00E+00	1.06E-10	1.06E-10
Co-60	2.9094E-02	93,768.99	93,768.99	0.00E+00	2.73E+03	2.73E+03
Cs-134	5.1932E-04	93,768.99	93,768.99	0.00E+00	4.87E+01	4.87E+01
Cs-135	4.4996E-05	93,768.99	93,768.99	0.00E+00	4.22E+00	4.22E+00
Cs-137	2.1867E+00	93,768.99	93,768.99	0.00E+00	2.05E+05	2.05E+05
Eu-154	9.2837E-04	93,768.99	93,768.99	0.00E+00	8.71E+01	8.71E+01
Eu-155	2.3180E-02	93,768.99	93,768.99	0.00E+00	2.17E+03	2.17E+03
Fe-55	2.9332E-03	93,768.99	93,768.99	0.00E+00	2.75E+02	2.75E+02
H-3	1.0871E-02	93,768.99	93,768.99	0.00E+00	1.02E+03	1.02E+03
I-129	1.1426E-06	93,768.99	93,768.99	0.00E+00	1.07E-01	1.07E-01
Kr-85	1.4068E-01	93,768.99	93,768.99	0.00E+00	1.32E+04	1.32E+04
Np-237	3.3099E-06	93,768.99	93,768.99	0.00E+00	3.10E-01	3.10E-01
Pa-231	7.8640E-08	93,768.99	93,768.99	0.00E+00	7.37E-03	7.37E-03
Pb-210	7.4277E-13	93,768.99	93,768.99	0.00E+00	6.96E-08	6.96E-08
Pm-147	2.2856E-01	93,768.99	93,768.99	0.00E+00	2.14E+04	2.14E+04
Pu-238	2.0095E-04	93,768.99	93,768.99	0.00E+00	1.88E+01	1.88E+01
Pu-239	1.9481E-02	93,768.99	93,768.99	0.00E+00	1.83E+03	1.83E+03
Pu-240	6.8056E-05	93,768.99	93,768.99	0.00E+00	6.38E+00	6.38E+00
Pu-241	1.0939E-05	93,768.99	93,768.99	0.00E+00	1.03E+00	1.03E+00
Pu-242	4.3751E-13	93,768.99	93,768.99	0.00E+00	4.10E-08	4.10E-08
Ra-226	4.0428E-12	93,768.99	93,768.99	0.00E+00	3.79E-07	3.79E-07
Ra-228	2.1032E-11	93,768.99	93,768.99	0.00E+00	1.97E-06	1.97E-06
Ru-106	2.9077E-04	93,768.99	93,768.99	0.00E+00	2.73E+01	2.73E+01
Se-79	1.6492E-05	93,768.99	93,768.99	0.00E+00	1.55E+00	1.55E+00
Sn-126	3.7564E-05	93,768.99	93,768.99	0.00E+00	3.52E+00	3.52E+00
Sr-90	1.9396E+00	93,768.99	93,768.99	0.00E+00	1.82E+05	1.82E+05
Tc-99	4.4842E-04	93,768.99	93,768.99	0.00E+00	4.20E+01	4.20E+01
Th-229	1.8544E-11	93,768.99	93,768.99	0.00E+00	1.74E-06	1.74E-06
Th-230	9.0605E-10	93,768.99	93,768.99	0.00E+00	8.50E-05	8.50E-05
Th-232	2.3674E-11	93,768.99	93,768.99	0.00E+00	2.22E-06	2.22E-06
Tl-208	7.0323E-09	93,768.99	93,768.99	0.00E+00	6.59E-04	6.59E-04
U-232	1.9106E-08	93,768.99	93,768.99	0.00E+00	1.79E-03	1.79E-03
U-233	9.6774E-09	93,768.99	93,768.99	0.00E+00	9.07E-04	9.07E-04
U-234	4.8796E-06	93,768.99	93,768.99	0.00E+00	4.58E-01	4.58E-01
U-235	-2.3191E-06	93,768.99	0.00	1.18E-01	0.00E+00	1.18E-01
U-236	1.2633E-05	93,768.99	93,768.99	0.00E+00	1.18E+00	1.18E+00
U-238	-9.5407E-08	93,768.99	0.00	5.32E-02	4.42E-02	5.32E-02
Y-90	1.9396E+00	93,768.99	93,768.99	0.00E+00	1.82E+05	1.82E+05
Other Radionuclides					2.04E+05	2.04E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.005E+16
0.0250	2.131E+15
0.0375	1.852E+15
0.0575	1.945E+15
0.0850	1.196E+15
0.1250	7.729E+14
0.2250	1.009E+15
0.3750	4.620E+14
0.5750	7.659E+15
0.8500	7.397E+13
1.2500	2.271E+14
1.7500	1.880E+12
2.2500	5.378E+09
2.7500	2.457E+08
3.5000	2.636E+07
5.0000	5.353E+03
7.0000	4.351E+02
11.0000	3.798E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.35E+03	2.35E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		93,768.99
Bounding:		93,768.99

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	141.08	
Bounding:	141.08	

Estimated EOL HM/Given EOL HM: 1.69

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TURKEY POINT
SNF ID #: 271
Fuel Units & Descr: 5 - 15 X 15 ROD ARRAY
Heavy Metal Mass: BOL=2285kg; EOL=2221.6kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1977
Estimates as of: 2010
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: 25 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	6.6376E-10	63,036.30	63,666.96	0.00E+00	4.18E-05	4.23E-05
Am-241	1.3144E-01	63,036.30	63,666.96	0.00E+00	8.29E+03	8.37E+03
Am-242m	3.0039E-04	63,036.30	63,666.96	0.00E+00	1.89E+01	1.91E+01
Am-243	6.2629E-04	63,036.30	63,666.96	0.00E+00	3.95E+01	3.99E+01
C-14	4.7965E-05	63,036.30	63,666.96	0.00E+00	3.02E+00	3.05E+00
Cl-36	8.0297E-07	63,036.30	63,666.96	0.00E+00	5.06E-02	5.11E-02
Cm-243	3.1993E-04	63,036.30	63,666.96	0.00E+00	2.02E+01	2.04E+01
Cm-244	7.1851E-02	63,036.30	63,666.96	0.00E+00	4.53E+03	4.57E+03
Co-60	9.5220E-03	63,036.30	63,666.96	0.00E+00	6.00E+02	6.06E+02
Cs-134	1.1662E-03	63,036.30	63,666.96	0.00E+00	7.35E+01	7.42E+01
Cs-135	1.4433E-05	63,036.30	63,666.96	0.00E+00	9.10E-01	9.19E-01
Cs-137	1.7603E+00	63,036.30	63,666.96	0.00E+00	1.11E+05	1.12E+05
Eu-154	4.5203E-02	63,036.30	63,666.96	0.00E+00	2.85E+03	2.88E+03
Eu-155	7.1479E-03	63,036.30	63,666.96	0.00E+00	4.51E+02	4.55E+02
Fe-55	6.1919E-04	63,036.30	63,666.96	0.00E+00	3.90E+01	3.94E+01
H-3	3.6386E-02	63,036.30	63,666.96	0.00E+00	2.29E+03	2.32E+03
I-129	9.8288E-07	63,036.30	63,666.96	0.00E+00	6.20E-02	6.26E-02
Kr-85	5.3844E-02	63,036.30	63,666.96	0.00E+00	3.39E+03	3.43E+03
Np-237	1.0546E-05	63,036.30	63,666.96	0.00E+00	6.65E-01	6.71E-01
Pa-231	1.1370E-09	63,036.30	63,666.96	0.00E+00	7.17E-05	7.24E-05
Pb-210	3.3624E-11	63,036.30	63,666.96	0.00E+00	2.12E-06	2.14E-06
Pm-147	5.1211E-03	63,036.30	63,666.96	0.00E+00	3.23E+02	3.26E+02
Pu-238	8.0669E-02	63,036.30	63,666.96	0.00E+00	5.09E+03	5.14E+03
Pu-239	1.1626E-02	63,036.30	63,666.96	0.00E+00	7.33E+02	7.40E+02
Pu-240	1.5097E-02	63,036.30	63,666.96	0.00E+00	9.52E+02	9.61E+02
Pu-241	1.4567E+00	63,036.30	63,666.96	0.00E+00	9.18E+04	9.27E+04
Pu-242	6.4260E-05	63,036.30	63,666.96	0.00E+00	4.05E+00	4.09E+00
Ra-226	1.1392E-10	63,036.30	63,666.96	0.00E+00	7.18E-06	7.25E-06
Ra-228	5.1841E-12	63,036.30	63,666.96	0.00E+00	3.27E-07	3.30E-07
Ru-106	5.9012E-07	63,036.30	63,666.96	0.00E+00	3.72E-02	3.76E-02
Se-79	1.2379E-05	63,036.30	63,666.96	0.00E+00	7.80E-01	7.88E-01
Sn-126	2.5210E-05	63,036.30	63,666.96	0.00E+00	1.59E+00	1.61E+00
Sr-90	1.1630E+00	63,036.30	63,666.96	0.00E+00	7.33E+04	7.40E+04
Tc-99	3.9357E-04	63,036.30	63,666.96	0.00E+00	2.48E+01	2.51E+01
Th-229	8.5691E-11	63,036.30	63,666.96	0.00E+00	5.40E-06	5.46E-06
Th-230	1.4493E-08	63,036.30	63,666.96	0.00E+00	9.14E-04	9.23E-04
Th-232	5.2923E-12	63,036.30	63,666.96	0.00E+00	3.34E-07	3.37E-07
Tl-208	1.9202E-07	63,036.30	63,666.96	0.00E+00	1.21E-02	1.22E-02
U-232	5.2083E-07	63,036.30	63,666.96	0.00E+00	3.28E-02	3.32E-02
U-233	2.4386E-08	63,036.30	63,666.96	0.00E+00	1.54E-03	1.55E-03
U-234	4.7012E-05	63,036.30	63,666.96	0.00E+00	2.96E+00	2.99E+00
U-235	-1.4492E-06	63,036.30	0.00	1.26E-01	3.51E-02	1.26E-01
U-236	7.5759E-06	63,036.30	63,666.96	0.00E+00	4.78E-01	4.82E-01
U-238	-2.6129E-07	63,036.30	0.00	7.48E-01	7.32E-01	7.48E-01
Y-90	1.1631E+00	63,036.30	63,666.96	0.00E+00	7.33E+04	7.41E+04
Other Radionuclides					1.06E+05	1.08E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.330E+15
0.0250	8.769E+14
0.0375	8.486E+14
0.0575	9.258E+14
0.0850	4.906E+14
0.1250	3.584E+14
0.2250	4.211E+14
0.3750	1.807E+14
0.5750	4.152E+15
0.8500	8.196E+13
1.2500	1.107E+14
1.7500	2.426E+12
2.2500	4.480E+08
2.7500	5.036E+08
3.5000	6.598E+07
5.0000	2.820E+07
7.0000	3.251E+06
11.0000	3.734E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.73E+03	1.75E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.559999934	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	63,036.30	60,290.40	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	63,666.96	120,580.80	Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.79	0.96
Bounding:	0.80	1.89

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: US/UK FUEL PINS
SNF ID #: 356
Fuel Units & Descr: 66 - ROD
Heavy Metal Mass: BOL= ; EOL=8.039kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1994
Estimates as of: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 15 years

Estimated Canister usage: 18"x10' = 0.51

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	1.4157E-06	7,639.69	7,639.69	0.00E+00	1.08E-02	1.08E-02
Am-241	6.2608E+00	7,639.69	7,639.69	0.00E+00	4.78E+04	4.78E+04
Am-242m	1.8448E-02	7,639.69	7,639.69	0.00E+00	1.41E+02	1.41E+02
Am-243	1.6352E-02	7,639.69	7,639.69	0.00E+00	1.25E+02	1.25E+02
C-14	1.2112E-01	7,639.69	7,639.69	0.00E+00	9.25E+02	9.25E+02
Cl-36	2.2860E-03	7,639.69	7,639.69	0.00E+00	1.75E+01	1.75E+01
Cm-243	1.4088E-03	7,639.69	7,639.69	0.00E+00	1.08E+01	1.08E+01
Cm-244	3.6224E-01	7,639.69	7,639.69	0.00E+00	2.77E+03	2.77E+03
Co-60	3.8998E+02	7,639.69	7,639.69	0.00E+00	2.98E+06	2.98E+06
Cs-134	2.8276E-01	7,639.69	7,639.69	0.00E+00	2.16E+03	2.16E+03
Cs-135	4.3976E-04	7,639.69	7,639.69	0.00E+00	3.36E+00	3.36E+00
Cs-137	3.3405E+01	7,639.69	7,639.69	0.00E+00	2.55E+05	2.55E+05
Eu-154	6.2585E+00	7,639.69	7,639.69	0.00E+00	4.78E+04	4.78E+04
Eu-155	1.1271E+00	7,639.69	7,639.69	0.00E+00	8.61E+03	8.61E+03
Fe-55	6.0624E+01	7,639.69	7,639.69	0.00E+00	4.63E+05	4.63E+05
H-3	7.4678E-01	7,639.69	7,639.69	0.00E+00	5.71E+03	5.71E+03
I-129	1.0618E-05	7,639.69	7,639.69	0.00E+00	8.11E-02	8.11E-02
Kr-85	2.1802E+00	7,639.69	7,639.69	0.00E+00	1.67E+04	1.67E+04
Np-237	1.5626E-04	7,639.69	7,639.69	0.00E+00	1.19E+00	1.19E+00
Pa-231	2.8608E-06	7,639.69	7,639.69	0.00E+00	2.19E-02	2.19E-02
Pb-210	2.0448E-09	7,639.69	7,639.69	0.00E+00	1.56E-05	1.56E-05
Pm-147	3.3212E+00	7,639.69	7,639.69	0.00E+00	2.54E+04	2.54E+04
Pu-238	-3.5400E-01	7,639.69	0.00	2.07E+03	0.00E+00	2.07E+03
Pu-239	-4.8280E-02	7,639.69	0.00	2.50E+02	0.00E+00	2.50E+02
Pu-240	-3.0095E-01	7,639.69	0.00	3.19E+02	0.00E+00	3.19E+02
Pu-241	-2.5280E+01	7,639.69	0.00	8.22E+04	0.00E+00	8.22E+04
Pu-242	-1.1381E-04	7,639.69	0.00	1.38E+00	5.12E-01	1.38E+00
Ra-226	1.0977E-08	7,639.69	7,639.69	0.00E+00	8.39E-05	8.39E-05
Ra-228	5.4624E-07	7,639.69	7,639.69	0.00E+00	4.17E-03	4.17E-03
Ru-106	3.7939E-03	7,639.69	7,639.69	0.00E+00	2.90E+01	2.90E+01
Se-79	1.9186E-04	7,639.69	7,639.69	0.00E+00	1.47E+00	1.47E+00
Sn-126	1.6673E-04	7,639.69	7,639.69	0.00E+00	1.27E+00	1.27E+00
Sr-90	3.1860E+01	7,639.69	7,639.69	0.00E+00	2.43E+05	2.43E+05
Tc-99	6.7678E-03	7,639.69	7,639.69	0.00E+00	5.17E+01	5.17E+01
Th-229	7.2928E-07	7,639.69	7,639.69	0.00E+00	5.57E-03	5.57E-03
Th-230	2.4191E-06	7,639.69	7,639.69	0.00E+00	1.85E-02	1.85E-02
Th-232	6.0208E-07	7,639.69	7,639.69	0.00E+00	4.60E-03	4.60E-03
Tl-208	1.0599E-04	7,639.69	7,639.69	0.00E+00	8.10E-01	8.10E-01
U-232	2.8743E-04	7,639.69	7,639.69	0.00E+00	2.20E+00	2.20E+00
U-233	3.6128E-04	7,639.69	7,639.69	0.00E+00	2.76E+00	2.76E+00
U-234	1.2788E-02	7,639.69	7,639.69	0.00E+00	9.77E+01	9.77E+01
U-235	5.7486E-04	7,639.69	7,639.69	6.92E-03	4.40E+00	4.40E+00
U-236	2.3485E-04	7,639.69	7,639.69	0.00E+00	1.79E+00	1.79E+00
U-238	1.1581E-04	7,639.69	7,639.69	8.61E-04	8.86E-01	8.86E-01
Y-90	3.1860E+01	7,639.69	7,639.69	0.00E+00	2.43E+05	2.43E+05
Other Radionuclides					6.14E+05	6.14E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.005E+16
0.0250	3.913E+15
0.0375	3.495E+15
0.0575	4.034E+15
0.0850	1.943E+15
0.1250	1.890E+15
0.2250	1.528E+15
0.3750	6.379E+14
0.5750	9.797E+15
0.8500	1.021E+15
1.2500	2.214E+17
1.7500	3.044E+13
2.2500	1.174E+12
2.7500	3.233E+10
3.5000	6.992E+07
5.0000	1.698E+07
7.0000	1.953E+06
11.0000	2.241E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.18E+04	5.19E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:
This fuel didn't closely match any existing templates, therefore the worst case template was used.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		7,639.69
Bounding:		7,639.69

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: VBWR (GENEVA)
SNF ID #: 285
Fuel Units & Descr: 4 - 6 X 6 ROD ARRAY
Heavy Metal Mass: BOL=12.536kg; EOL=12.392kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1961
Estimates as of: 2010
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"x10" = 0.31

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3344E-08	135.65	271.30	0.00E+00	3.17E-06	6.33E-06	Avg. MeV	
Am-241	1.1135E-04	135.65	271.30	0.00E+00	1.51E-02	3.02E-02	0.0150	2.025E+13
Am-242m	8.5075E-09	135.65	271.30	0.00E+00	1.15E-06	2.31E-06	0.0250	4.208E+12
Am-243	9.8519E-10	135.65	271.30	0.00E+00	1.34E-07	2.67E-07	0.0375	3.640E+12
C-14	2.3012E-04	135.65	271.30	0.00E+00	3.12E-02	6.24E-02	0.0575	3.923E+12
Cl-36	1.2261E-08	135.65	271.30	0.00E+00	1.66E-04	3.33E-04	0.0850	2.370E+12
Cm-243	2.4875E-10	135.65	271.30	0.00E+00	3.37E-08	6.75E-08	0.1250	1.539E+12
Cm-244	2.3178E-09	135.65	271.30	0.00E+00	3.14E-07	6.29E-07	0.2250	2.040E+12
Co-60	7.0849E-02	135.65	271.30	0.00E+00	9.61E+00	1.92E+01	0.3750	8.900E+11
Cs-134	3.0266E-06	135.65	271.30	0.00E+00	4.11E-04	8.21E-04	0.5750	1.466E+13
Cs-135	3.0316E-05	135.65	271.30	0.00E+00	4.11E-03	8.22E-03	0.8500	1.484E+11
Cs-137	1.4511E+00	135.65	271.30	0.00E+00	1.97E+02	3.94E+02	1.2500	1.475E+12
Eu-154	6.6955E-04	135.65	271.30	0.00E+00	9.08E-02	1.82E-01	1.7500	3.828E+09
Eu-155	6.9850E-04	135.65	271.30	0.00E+00	9.48E-02	1.90E-01	2.2500	7.947E+08
Fe-55	1.2318E-03	135.65	271.30	0.00E+00	1.67E-01	3.34E-01	2.7500	2.297E+05
H-3	2.5141E-03	135.65	271.30	0.00E+00	3.41E-01	6.82E-01	3.5000	3.378E+01
I-129	7.3195E-07	135.65	271.30	0.00E+00	9.93E-05	1.99E-04	5.0000	1.421E+01
Kr-85	4.1281E-02	135.65	271.30	0.00E+00	5.60E+00	1.12E+01	7.0000	1.605E+00
Np-237	1.1489E-06	135.65	271.30	0.00E+00	1.56E-04	3.12E-04	11.0000	1.825E-01
Pa-231	4.5241E-08	135.65	271.30	0.00E+00	6.14E-06	1.23E-05		
Pb-210	6.4476E-13	135.65	271.30	0.00E+00	8.75E-11	1.75E-10		
Pm-147	1.1651E-03	135.65	271.30	0.00E+00	1.58E-01	3.16E-01		
Pu-238	2.9517E-04	135.65	271.30	0.00E+00	4.00E-02	8.01E-02		
Pu-239	6.6772E-04	135.65	271.30	0.00E+00	9.06E-02	1.81E-01		
Pu-240	8.6839E-05	135.65	271.30	0.00E+00	1.18E-02	2.36E-02		
Pu-241	7.1514E-04	135.65	271.30	0.00E+00	9.70E-02	1.94E-01		
Pu-242	1.9717E-09	135.65	271.30	0.00E+00	2.67E-07	5.35E-07		
Ra-226	1.7654E-12	135.65	271.30	0.00E+00	2.39E-10	4.79E-10		
Ra-228	8.2928E-12	135.65	271.30	0.00E+00	1.12E-09	2.25E-09		
Ru-106	1.8419E-10	135.65	271.30	0.00E+00	2.50E-08	5.00E-08		
Se-79	1.3223E-05	135.65	271.30	0.00E+00	1.79E-03	3.59E-03		
Sn-126	1.1493E-05	135.65	271.30	0.00E+00	1.56E-03	3.12E-03		
Sr-90	1.3649E+00	135.65	271.30	0.00E+00	1.85E+02	3.70E+02		
Tc-99	4.6656E-04	135.65	271.30	0.00E+00	6.33E-02	1.27E-01		
Th-229	1.4547E-11	135.65	271.30	0.00E+00	1.97E-09	3.95E-09		
Th-230	1.6617E-10	135.65	271.30	0.00E+00	2.25E-08	4.51E-08		
Th-232	8.3361E-12	135.65	271.30	0.00E+00	1.13E-09	2.26E-09		
Tl-208	2.1664E-08	135.65	271.30	0.00E+00	2.94E-06	5.88E-06		
U-232	5.8669E-08	135.65	271.30	0.00E+00	7.96E-06	1.59E-05	Thermal Power	
U-233	3.1847E-09	135.65	271.30	0.00E+00	4.32E-07	8.64E-07	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	3.8769E-07	135.65	271.30	0.00E+00	5.26E-05	1.05E-04		
U-235	-2.7761E-06	135.65	0.00	5.99E-03	5.62E-03	5.99E-03		
U-236	1.6190E-05	135.65	271.30	0.00E+00	2.20E-03	4.39E-03	2.37E+06	4.74E+06
U-238	-2.8547E-09	135.65	0.00	3.28E-03	3.28E-03	3.28E-03	Total	Total
Y-90	1.3652E+00	135.65	271.30	0.00E+00	1.85E+02	3.70E+02		
Other Radionuclides					2.24E+02	4.48E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	22.12897657	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:		135.65
Bounding:		271.30

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.23	
Bounding:	0.46	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VEPCO
SNF ID #: 286
Fuel Units & Descr: 20 - 15 X 15 ROD ARRAY
Heavy Metal Mass: BOL=9148.286kg; EOL=8832.178kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1983
Estimates as of: 2010
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: 25 years

Estimated Canister usage: Bare Fuel Transfer

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6376E-10	300,603.76	601,207.51	0.00E+00	2.00E-04	3.99E-04	Avg. MeV	
Am-241	1.3144E-01	300,603.76	601,207.51	0.00E+00	3.95E+04	7.90E+04	0.0150	4.088E+16
Am-242m	3.0039E-04	300,603.76	601,207.51	0.00E+00	9.03E+01	1.81E+02	0.0250	8.280E+15
Am-243	6.2629E-04	300,603.76	601,207.51	0.00E+00	1.88E+02	3.77E+02	0.0375	8.014E+15
C-14	4.7965E-05	300,603.76	601,207.51	0.00E+00	1.44E+01	2.88E+01	0.0575	8.742E+15
Cl-36	8.0297E-07	300,603.76	601,207.51	0.00E+00	2.41E-01	4.83E-01	0.0850	4.632E+15
Cm-243	3.1993E-04	300,603.76	601,207.51	0.00E+00	9.62E+01	1.92E+02	0.1250	3.384E+15
Cm-244	7.1851E-02	300,603.76	601,207.51	0.00E+00	2.16E+04	4.32E+04	0.2250	3.977E+15
Co-60	9.5220E-03	300,603.76	601,207.51	0.00E+00	2.86E+03	5.72E+03	0.3750	1.706E+15
Cs-134	1.1662E-03	300,603.76	601,207.51	0.00E+00	3.51E+02	7.01E+02	0.5750	3.921E+16
Cs-135	1.4433E-05	300,603.76	601,207.51	0.00E+00	4.34E+00	8.68E+00	0.8500	7.739E+14
Cs-137	1.7603E+00	300,603.76	601,207.51	0.00E+00	5.29E+05	1.06E+06	1.2500	1.045E+15
Eu-154	4.5203E-02	300,603.76	601,207.51	0.00E+00	1.36E+04	2.72E+04	1.7500	2.290E+13
Eu-155	7.1479E-03	300,603.76	601,207.51	0.00E+00	2.15E+03	4.30E+03	2.2500	4.231E+09
Fe-55	6.1919E-04	300,603.76	601,207.51	0.00E+00	1.86E+02	3.72E+02	2.7500	4.755E+09
H-3	3.6386E-02	300,603.76	601,207.51	0.00E+00	1.09E+04	2.19E+04	3.5000	6.231E+08
I-129	9.8288E-07	300,603.76	601,207.51	0.00E+00	2.95E-01	5.91E-01	5.0000	2.663E+08
Kr-85	5.3844E-02	300,603.76	601,207.51	0.00E+00	1.62E+04	3.24E+04	7.0000	3.070E+07
Np-237	1.0546E-05	300,603.76	601,207.51	0.00E+00	3.17E+00	6.34E+00	11.0000	3.526E+06
Pa-231	1.1370E-09	300,603.76	601,207.51	0.00E+00	3.42E-04	6.84E-04		
Pb-210	3.3624E-11	300,603.76	601,207.51	0.00E+00	1.01E-05	2.02E-05		
Pm-147	5.1211E-03	300,603.76	601,207.51	0.00E+00	1.54E+03	3.08E+03		
Pu-238	8.0669E-02	300,603.76	601,207.51	0.00E+00	2.42E+04	4.85E+04		
Pu-239	1.1626E-02	300,603.76	601,207.51	0.00E+00	3.49E+03	6.99E+03		
Pu-240	1.5097E-02	300,603.76	601,207.51	0.00E+00	4.54E+03	9.08E+03		
Pu-241	1.4567E+00	300,603.76	601,207.51	0.00E+00	4.38E+05	8.76E+05		
Pu-242	6.4260E-05	300,603.76	601,207.51	0.00E+00	1.93E+01	3.86E+01		
Ra-226	1.1392E-10	300,603.76	601,207.51	0.00E+00	3.42E-05	6.85E-05		
Ra-228	5.1841E-12	300,603.76	601,207.51	0.00E+00	1.56E-06	3.12E-06		
Ru-106	5.9012E-07	300,603.76	601,207.51	0.00E+00	1.77E-01	3.55E-01		
Se-79	1.2379E-05	300,603.76	601,207.51	0.00E+00	3.72E+00	7.44E+00		
Sn-126	2.5210E-05	300,603.76	601,207.51	0.00E+00	7.58E+00	1.52E+01		
Sr-90	1.1630E+00	300,603.76	601,207.51	0.00E+00	3.50E+05	6.99E+05		
Tc-99	3.9357E-04	300,603.76	601,207.51	0.00E+00	1.18E+02	2.37E+02		
Th-229	8.5691E-11	300,603.76	601,207.51	0.00E+00	2.58E-05	5.15E-05		
Th-230	1.4493E-08	300,603.76	601,207.51	0.00E+00	4.36E-03	8.71E-03		
Th-232	5.2923E-12	300,603.76	601,207.51	0.00E+00	1.59E-06	3.18E-06		
Tl-208	1.9202E-07	300,603.76	601,207.51	0.00E+00	5.77E-02	1.15E-01		
U-232	5.2083E-07	300,603.76	601,207.51	0.00E+00	1.57E-01	3.13E-01		
U-233	2.4386E-08	300,603.76	601,207.51	0.00E+00	7.33E-03	1.47E-02		
U-234	4.7012E-05	300,603.76	601,207.51	0.00E+00	1.41E+01	2.83E+01		
U-235	-1.4492E-06	300,603.76	0.00	5.90E-01	1.55E-01	5.90E-01		
U-236	7.5759E-06	300,603.76	601,207.51	0.00E+00	2.26E+00	4.55E+00		
U-238	-2.6129E-07	300,603.76	0.00	2.98E+00	2.90E+00	2.98E+00		
Y-90	1.1631E+00	300,603.76	601,207.51	0.00E+00	3.50E+05	6.99E+05		
Other Radionuclides					5.08E+05	1.02E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.24E+03	1.65E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.966167273	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	268,593.68	300,603.76	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	268,637.57	601,207.51	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.94	1.12
Bounding:	1.88	2.08

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VEPCO
SNF ID #: 700
Fuel Units & Descr: 12 - 15 X 15 ROD ARRAY
Heavy Metal Mass: BOL=5488.2kg; EOL=5313.52kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1981
Estimates as of: 2010
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: 25 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	6.6376E-10	166,112.80	332,225.60	0.00E+00	1.10E-04	2.21E-04
Am-241	1.3144E-01	166,112.80	332,225.60	0.00E+00	2.18E+04	4.37E+04
Am-242m	3.0039E-04	166,112.80	332,225.60	0.00E+00	4.99E+01	9.98E+01
Am-243	6.2629E-04	166,112.80	332,225.60	0.00E+00	1.04E+02	2.08E+02
C-14	4.7965E-05	166,112.80	332,225.60	0.00E+00	7.97E+00	1.59E+01
Cl-36	8.0297E-07	166,112.80	332,225.60	0.00E+00	1.33E-01	2.67E-01
Cm-243	3.1993E-04	166,112.80	332,225.60	0.00E+00	5.31E+01	1.06E+02
Cm-244	7.1851E-02	166,112.80	332,225.60	0.00E+00	1.19E+04	2.39E+04
Co-60	9.5220E-03	166,112.80	332,225.60	0.00E+00	1.58E+03	3.16E+03
Cs-134	1.1662E-03	166,112.80	332,225.60	0.00E+00	1.94E+02	3.87E+02
Cs-135	1.4433E-05	166,112.80	332,225.60	0.00E+00	2.40E+00	4.80E+00
Cs-137	1.7603E+00	166,112.80	332,225.60	0.00E+00	2.92E+05	5.85E+05
Eu-154	4.5203E-02	166,112.80	332,225.60	0.00E+00	7.51E+03	1.50E+04
Eu-155	7.1479E-03	166,112.80	332,225.60	0.00E+00	1.19E+03	2.37E+03
Fe-55	6.1919E-04	166,112.80	332,225.60	0.00E+00	1.03E+02	2.06E+02
H-3	3.6386E-02	166,112.80	332,225.60	0.00E+00	6.04E+03	1.21E+04
I-129	9.8288E-07	166,112.80	332,225.60	0.00E+00	1.63E-01	3.27E-01
Kr-85	5.3844E-02	166,112.80	332,225.60	0.00E+00	8.94E+03	1.79E+04
Np-237	1.0546E-05	166,112.80	332,225.60	0.00E+00	1.75E+00	3.50E+00
Pa-231	1.1370E-09	166,112.80	332,225.60	0.00E+00	1.89E-04	3.78E-04
Pb-210	3.3624E-11	166,112.80	332,225.60	0.00E+00	5.59E-06	1.12E-05
Pm-147	5.1211E-03	166,112.80	332,225.60	0.00E+00	8.51E+02	1.70E+03
Pu-238	8.0669E-02	166,112.80	332,225.60	0.00E+00	1.34E+04	2.68E+04
Pu-239	1.1626E-02	166,112.80	332,225.60	0.00E+00	1.93E+03	3.86E+03
Pu-240	1.5097E-02	166,112.80	332,225.60	0.00E+00	2.51E+03	5.02E+03
Pu-241	1.4567E+00	166,112.80	332,225.60	0.00E+00	2.42E+05	4.84E+05
Pu-242	6.4260E-05	166,112.80	332,225.60	0.00E+00	1.07E+01	2.13E+01
Ra-226	1.1392E-10	166,112.80	332,225.60	0.00E+00	1.89E-05	3.78E-05
Ra-228	5.1841E-12	166,112.80	332,225.60	0.00E+00	8.61E-07	1.72E-06
Ru-106	5.9012E-07	166,112.80	332,225.60	0.00E+00	9.80E-02	1.96E-01
Se-79	1.2379E-05	166,112.80	332,225.60	0.00E+00	2.06E+00	4.11E+00
Sn-126	2.5210E-05	166,112.80	332,225.60	0.00E+00	4.19E+00	8.38E+00
Sr-90	1.1630E+00	166,112.80	332,225.60	0.00E+00	1.93E+05	3.86E+05
Tc-99	3.9357E-04	166,112.80	332,225.60	0.00E+00	6.54E+01	1.31E+02
Th-229	8.5691E-11	166,112.80	332,225.60	0.00E+00	1.42E-05	2.85E-05
Th-230	1.4493E-08	166,112.80	332,225.60	0.00E+00	2.41E-03	4.81E-03
Th-232	5.2923E-12	166,112.80	332,225.60	0.00E+00	8.79E-07	1.76E-06
Tl-208	1.9202E-07	166,112.80	332,225.60	0.00E+00	3.19E-02	6.38E-02
U-232	5.2083E-07	166,112.80	332,225.60	0.00E+00	8.65E-02	1.73E-01
U-233	2.4386E-08	166,112.80	332,225.60	0.00E+00	4.05E-03	8.10E-03
U-234	4.7012E-05	166,112.80	332,225.60	0.00E+00	7.81E+00	1.56E+01
U-235	-1.4492E-06	166,112.80	0.00	3.36E-01	9.53E-02	3.36E-01
U-236	7.5759E-06	166,112.80	332,225.60	0.00E+00	1.26E+00	2.52E+00
U-238	-2.6129E-07	166,112.80	0.00	1.79E+00	1.75E+00	1.79E+00
Y-90	1.1631E+00	166,112.80	332,225.60	0.00E+00	1.93E+05	3.86E+05
Other Radionuclides					2.81E+05	5.61E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.259E+16
0.0250	4.576E+15
0.0375	4.428E+15
0.0575	4.831E+15
0.0850	2.560E+15
0.1250	1.870E+15
0.2250	2.198E+15
0.3750	9.429E+14
0.5750	2.167E+16
0.8500	4.277E+14
1.2500	5.777E+14
1.7500	1.266E+13
2.2500	2.338E+09
2.7500	2.628E+09
3.5000	3.443E+08
5.0000	1.472E+08
7.0000	1.696E+07
11.0000	1.949E+06

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.55E+03	9.11E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.833496228	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	161,133.55	166,112.80	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	173,158.20	332,225.60	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.86	1.03	1.00
Bounding:	1.73	1.92	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VEPCO (T-11 ASSEMBLY)
SNF ID #: 993
Fuel Units & Descr: 1 - 15 X 15 ROD ARRAY
Heavy Metal Mass: BOL=457.414kg; EOL=440kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1983
Estimates as of: 2010
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: 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	6.6376E-10	16,560.18	33,120.35	0.00E+00	1.10E-05	2.20E-05
Am-241	1.3144E-01	16,560.18	33,120.35	0.00E+00	2.18E+03	4.35E+03
Am-242m	3.0039E-04	16,560.18	33,120.35	0.00E+00	4.97E+00	9.95E+00
Am-243	6.2629E-04	16,560.18	33,120.35	0.00E+00	1.04E+01	2.07E+01
C-14	4.7965E-05	16,560.18	33,120.35	0.00E+00	7.94E-01	1.59E+00
Cl-36	8.0297E-07	16,560.18	33,120.35	0.00E+00	1.33E-02	2.66E-02
Cm-243	3.1993E-04	16,560.18	33,120.35	0.00E+00	5.30E+00	1.06E+01
Cm-244	7.1851E-02	16,560.18	33,120.35	0.00E+00	1.19E+03	2.38E+03
Co-60	9.5220E-03	16,560.18	33,120.35	0.00E+00	1.58E+02	3.15E+02
Cs-134	1.1662E-03	16,560.18	33,120.35	0.00E+00	1.93E+01	3.86E+01
Cs-135	1.4433E-05	16,560.18	33,120.35	0.00E+00	2.39E-01	4.78E-01
Cs-137	1.7603E+00	16,560.18	33,120.35	0.00E+00	2.92E+04	5.83E+04
Eu-154	4.5203E-02	16,560.18	33,120.35	0.00E+00	7.49E+02	1.50E+03
Eu-155	7.1479E-03	16,560.18	33,120.35	0.00E+00	1.18E+02	2.37E+02
Fe-55	6.1919E-04	16,560.18	33,120.35	0.00E+00	1.03E+01	2.05E+01
H-3	3.6386E-02	16,560.18	33,120.35	0.00E+00	6.03E+02	1.21E+03
I-129	9.8288E-07	16,560.18	33,120.35	0.00E+00	1.63E-02	3.26E-02
Kr-85	5.3844E-02	16,560.18	33,120.35	0.00E+00	8.92E+02	1.78E+03
Np-237	1.0546E-05	16,560.18	33,120.35	0.00E+00	1.75E-01	3.49E-01
Pa-231	1.1370E-09	16,560.18	33,120.35	0.00E+00	1.88E-05	3.77E-05
Pb-210	3.3624E-11	16,560.18	33,120.35	0.00E+00	5.57E-07	1.11E-06
Pm-147	5.1211E-03	16,560.18	33,120.35	0.00E+00	8.48E+01	1.70E+02
Pu-238	8.0669E-02	16,560.18	33,120.35	0.00E+00	1.34E+03	2.67E+03
Pu-239	1.1626E-02	16,560.18	33,120.35	0.00E+00	1.93E+02	3.85E+02
Pu-240	1.5097E-02	16,560.18	33,120.35	0.00E+00	2.50E+02	5.00E+02
Pu-241	1.4567E+00	16,560.18	33,120.35	0.00E+00	2.41E+04	4.82E+04
Pu-242	6.4260E-05	16,560.18	33,120.35	0.00E+00	1.06E+00	2.13E+00
Ra-226	1.1392E-10	16,560.18	33,120.35	0.00E+00	1.89E-06	3.77E-06
Ra-228	5.1841E-12	16,560.18	33,120.35	0.00E+00	8.58E-08	1.72E-07
Ru-106	5.9012E-07	16,560.18	33,120.35	0.00E+00	9.77E-03	1.95E-02
Se-79	1.2379E-05	16,560.18	33,120.35	0.00E+00	2.05E-01	4.10E-01
Sn-126	2.5210E-05	16,560.18	33,120.35	0.00E+00	4.17E-01	8.35E-01
Sr-90	1.1630E+00	16,560.18	33,120.35	0.00E+00	1.93E+04	3.85E+04
Tc-99	3.9357E-04	16,560.18	33,120.35	0.00E+00	6.52E+00	1.30E+01
Th-229	8.5691E-11	16,560.18	33,120.35	0.00E+00	1.42E-06	2.84E-06
Th-230	1.4493E-08	16,560.18	33,120.35	0.00E+00	2.40E-04	4.80E-04
Th-232	5.2923E-12	16,560.18	33,120.35	0.00E+00	8.76E-08	1.75E-07
Tl-208	1.9202E-07	16,560.18	33,120.35	0.00E+00	3.18E-03	6.36E-03
U-232	5.2083E-07	16,560.18	33,120.35	0.00E+00	8.63E-03	1.73E-02
U-233	2.4386E-08	16,560.18	33,120.35	0.00E+00	4.04E-04	8.08E-04
U-234	4.7012E-05	16,560.18	33,120.35	0.00E+00	7.79E-01	1.56E+00
U-235	-1.4492E-06	16,560.18	0.00	2.95E-02	5.52E-03	2.95E-02
U-236	7.5759E-06	16,560.18	33,120.35	0.00E+00	1.25E-01	2.51E-01
U-238	-2.6129E-07	16,560.18	0.00	1.49E-01	1.45E-01	1.49E-01
Y-90	1.1631E+00	16,560.18	33,120.35	0.00E+00	1.93E+04	3.85E+04
Other Radionuclides					2.80E+04	5.60E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.252E+15
0.0250	4.562E+14
0.0375	4.415E+14
0.0575	4.816E+14
0.0850	2.552E+14
0.1250	1.864E+14
0.2250	2.191E+14
0.3750	9.400E+13
0.5750	2.160E+15
0.8500	4.264E+13
1.2500	5.759E+13
1.7500	1.262E+12
2.2500	2.331E+08
2.7500	2.620E+08
3.5000	3.432E+07
5.0000	1.467E+07
7.0000	1.691E+06
11.0000	1.943E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.84E+02	9.08E+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:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.986167273	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	13,429.68	16,560.18
Bounding:	14,431.88	33,120.35

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.03	1.23
Bounding:	2.07	2.29

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VEPCO (T-11 RODS)
SNF ID #: 1049
Fuel Units & Descr: 9 - ROD
Heavy Metal Mass: BOL=20.18kg; EOL=19.678kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1983
Estimates as of: 2010
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: 25 years

Estimated Canister usage: 18"x10' 0.07

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6376E-10	592.48	636.69	0.00E+00	3.93E-07	4.23E-07
Am-241	1.3144E-01	592.48	636.69	0.00E+00	7.79E+01	8.37E+01
Am-242m	3.0039E-04	592.48	636.69	0.00E+00	1.78E-01	1.91E-01
Am-243	6.2629E-04	592.48	636.69	0.00E+00	3.71E-01	3.99E-01
C-14	4.7965E-05	592.48	636.69	0.00E+00	2.84E-02	3.05E-02
Cl-36	8.0297E-07	592.48	636.69	0.00E+00	4.76E-04	5.11E-04
Cm-243	3.1993E-04	592.48	636.69	0.00E+00	1.90E-01	2.04E-01
Cm-244	7.1851E-02	592.48	636.69	0.00E+00	4.26E+01	4.57E+01
Co-60	9.5220E-03	592.48	636.69	0.00E+00	5.64E+00	6.06E+00
Cs-134	1.1662E-03	592.48	636.69	0.00E+00	6.91E-01	7.42E-01
Cs-135	1.4433E-05	592.48	636.69	0.00E+00	8.55E-03	9.19E-03
Cs-137	1.7603E+00	592.48	636.69	0.00E+00	1.04E+03	1.12E+03
Eu-154	4.5203E-02	592.48	636.69	0.00E+00	2.68E+01	2.88E+01
Eu-155	7.1479E-03	592.48	636.69	0.00E+00	4.23E+00	4.55E+00
Fe-55	6.1919E-04	592.48	636.69	0.00E+00	3.67E-01	3.94E-01
H-3	3.6386E-02	592.48	636.69	0.00E+00	2.16E+01	2.32E+01
I-129	9.8288E-07	592.48	636.69	0.00E+00	5.82E-04	6.26E-04
Kr-85	5.3844E-02	592.48	636.69	0.00E+00	3.19E+01	3.43E+01
Np-237	1.0546E-05	592.48	636.69	0.00E+00	6.25E-03	6.71E-03
Pa-231	1.1370E-09	592.48	636.69	0.00E+00	6.74E-07	7.24E-07
Pb-210	3.3624E-11	592.48	636.69	0.00E+00	1.99E-08	2.14E-08
Pm-147	5.1211E-03	592.48	636.69	0.00E+00	3.03E+00	3.26E+00
Pu-238	8.0669E-02	592.48	636.69	0.00E+00	4.78E+01	5.14E+01
Pu-239	1.1626E-02	592.48	636.69	0.00E+00	6.89E+00	7.40E+00
Pu-240	1.5097E-02	592.48	636.69	0.00E+00	8.94E+00	9.61E+00
Pu-241	1.4567E+00	592.48	636.69	0.00E+00	8.63E+02	9.27E+02
Pu-242	6.4260E-05	592.48	636.69	0.00E+00	3.81E-02	4.09E-02
Ra-226	1.1392E-10	592.48	636.69	0.00E+00	6.75E-08	7.25E-08
Ra-228	5.1841E-12	592.48	636.69	0.00E+00	3.07E-09	3.30E-09
Ru-106	5.9012E-07	592.48	636.69	0.00E+00	3.50E-04	3.76E-04
Se-79	1.2379E-05	592.48	636.69	0.00E+00	7.33E-03	7.88E-03
Sn-126	2.5210E-05	592.48	636.69	0.00E+00	1.49E-02	1.61E-02
Sr-90	1.1630E+00	592.48	636.69	0.00E+00	6.89E+02	7.40E+02
Tc-99	3.9357E-04	592.48	636.69	0.00E+00	2.33E-01	2.51E-01
Th-229	8.5691E-11	592.48	636.69	0.00E+00	5.08E-08	5.46E-08
Th-230	1.4493E-08	592.48	636.69	0.00E+00	8.59E-06	9.23E-06
Th-232	5.2923E-12	592.48	636.69	0.00E+00	3.14E-09	3.37E-09
Tl-208	1.9202E-07	592.48	636.69	0.00E+00	1.14E-04	1.22E-04
U-232	5.2083E-07	592.48	636.69	0.00E+00	3.09E-04	3.32E-04
U-233	2.4386E-08	592.48	636.69	0.00E+00	1.44E-05	1.55E-05
U-234	4.7012E-05	592.48	636.69	0.00E+00	2.79E-02	2.99E-02
U-235	-1.4492E-06	592.48	0.00	1.30E-03	4.44E-04	1.30E-03
U-236	7.5759E-06	592.48	636.69	0.00E+00	4.49E-03	4.82E-03
U-238	-2.6129E-07	592.48	0.00	6.58E-03	6.43E-03	6.58E-03
Y-90	1.1631E+00	592.48	636.69	0.00E+00	6.89E+02	7.41E+02
Other Radionuclides					1.00E+03	1.08E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.330E+13
0.0250	8.769E+12
0.0375	8.487E+12
0.0575	9.258E+12
0.0850	4.908E+12
0.1250	3.584E+12
0.2250	4.212E+12
0.3750	1.807E+12
0.5750	4.152E+13
0.8500	8.196E+11
1.2500	1.107E+12
1.7500	2.426E+10
2.2500	4.480E+06
2.7500	5.036E+06
3.5000	6.598E+05
5.0000	2.820E+05
7.0000	3.251E+04
11.0000	3.734E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.62E+01	1.75E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.986165227	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	592.48	477.57
Bounding:	636.69	955.14

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.84	0.81
Bounding:	0.90	1.50

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VEPCO T-11
SNF ID #: 994
Fuel Units & Descr: 3 - ROD
Heavy Metal Mass: BOL=6.727kg; EOL=6.559kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1963
Estimates as of: 2010
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: 25 years

Estimated Canister usage: 18"x10'
0.02

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6376E-10	197.49	212.23	0.00E+00	1.31E-07	1.41E-07
Am-241	1.3144E-01	197.49	212.23	0.00E+00	2.60E+01	2.79E+01
Am-242m	3.0039E-04	197.49	212.23	0.00E+00	5.93E-02	6.38E-02
Am-243	6.2629E-04	197.49	212.23	0.00E+00	1.24E-01	1.33E-01
C-14	4.7965E-05	197.49	212.23	0.00E+00	9.47E-03	1.02E-02
Cl-36	8.0297E-07	197.49	212.23	0.00E+00	1.59E-04	1.70E-04
Cm-243	3.1993E-04	197.49	212.23	0.00E+00	6.32E-02	6.79E-02
Cm-244	7.1851E-02	197.49	212.23	0.00E+00	1.42E+01	1.52E+01
Co-60	9.5220E-03	197.49	212.23	0.00E+00	1.88E+00	2.02E+00
Cs-134	1.1662E-03	197.49	212.23	0.00E+00	2.30E-01	2.47E-01
Cs-135	1.4433E-05	197.49	212.23	0.00E+00	2.85E-03	3.06E-03
Cs-137	1.7603E+00	197.49	212.23	0.00E+00	3.48E+02	3.74E+02
Eu-154	4.5203E-02	197.49	212.23	0.00E+00	8.93E+00	9.59E+00
Eu-155	7.1479E-03	197.49	212.23	0.00E+00	1.41E+00	1.52E+00
Fe-55	6.1919E-04	197.49	212.23	0.00E+00	1.22E-01	1.31E-01
H-3	3.6386E-02	197.49	212.23	0.00E+00	7.19E+00	7.72E+00
I-129	9.8288E-07	197.49	212.23	0.00E+00	1.94E-04	2.09E-04
Kr-85	5.3844E-02	197.49	212.23	0.00E+00	1.06E+01	1.14E+01
Np-237	1.0546E-05	197.49	212.23	0.00E+00	2.08E-03	2.24E-03
Pa-231	1.1370E-09	197.49	212.23	0.00E+00	2.25E-07	2.41E-07
Pb-210	3.3624E-11	197.49	212.23	0.00E+00	6.64E-09	7.14E-09
Pm-147	5.1211E-03	197.49	212.23	0.00E+00	1.01E+00	1.09E+00
Pu-238	8.0669E-02	197.49	212.23	0.00E+00	1.59E+01	1.71E+01
Pu-239	1.1626E-02	197.49	212.23	0.00E+00	2.30E+00	2.47E+00
Pu-240	1.5097E-02	197.49	212.23	0.00E+00	2.98E+00	3.20E+00
Pu-241	1.4567E+00	197.49	212.23	0.00E+00	2.88E+02	3.09E+02
Pu-242	6.4260E-05	197.49	212.23	0.00E+00	1.27E-02	1.36E-02
Ra-226	1.1392E-10	197.49	212.23	0.00E+00	2.25E-08	2.42E-08
Ra-228	5.1841E-12	197.49	212.23	0.00E+00	1.02E-09	1.10E-09
Ru-106	5.9012E-07	197.49	212.23	0.00E+00	1.17E-04	1.25E-04
Se-79	1.2379E-05	197.49	212.23	0.00E+00	2.44E-03	2.63E-03
Sn-126	2.5210E-05	197.49	212.23	0.00E+00	4.98E-03	5.35E-03
Sr-90	1.1630E+00	197.49	212.23	0.00E+00	2.30E+02	2.47E+02
Tc-99	3.9357E-04	197.49	212.23	0.00E+00	7.77E-02	8.35E-02
Th-229	8.5691E-11	197.49	212.23	0.00E+00	1.69E-08	1.82E-08
Th-230	1.4493E-08	197.49	212.23	0.00E+00	2.86E-06	3.08E-06
Th-232	5.2923E-12	197.49	212.23	0.00E+00	1.05E-09	1.12E-09
Tl-208	1.9202E-07	197.49	212.23	0.00E+00	3.79E-05	4.08E-05
U-232	5.2083E-07	197.49	212.23	0.00E+00	1.03E-04	1.11E-04
U-233	2.4386E-08	197.49	212.23	0.00E+00	4.82E-06	5.18E-06
U-234	4.7012E-05	197.49	212.23	0.00E+00	9.28E-03	9.98E-03
U-235	-1.4492E-06	197.49	0.00	4.34E-04	1.48E-04	4.34E-04
U-236	7.5759E-06	197.49	212.23	0.00E+00	1.50E-03	1.61E-03
U-238	-2.6129E-07	197.49	0.00	2.19E-03	2.14E-03	2.19E-03
Y-90	1.1631E+00	197.49	212.23	0.00E+00	2.30E+02	2.47E+02
Other Radionuclides					3.34E+02	3.59E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.443E+13
0.0250	2.923E+12
0.0375	2.829E+12
0.0575	3.066E+12
0.0850	1.635E+12
0.1250	1.195E+12
0.2250	1.404E+12
0.3750	6.024E+11
0.5750	1.384E+13
0.8500	2.732E+11
1.2500	3.690E+11
1.7500	8.085E+09
2.2500	1.493E+06
2.7500	1.679E+06
3.5000	2.199E+05
5.0000	9.401E+04
7.0000	1.084E+04
11.0000	1.245E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.41E+00	5.82E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	2.966165227	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	197.49	159.19	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	212.23	318.36	Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.84	0.81
Bounding:	0.90	1.50

Estimated EOL HM/Given EOL HM: 0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ANLJ
SNF ID #: 5
Fuel Units & Descr: 19 - ELEMENT
Heavy Metal Mass: BOL=2.793kg; EOL=2.789kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1966
Estimates as of: 2010
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' = 0.79

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	3.60	7.20	0.00E+00	7.22E-09	1.44E-08
Am-241	2.5251E-03	3.60	7.20	0.00E+00	9.09E-03	1.82E-02
Am-242m	3.9624E-07	3.60	7.20	0.00E+00	1.43E-06	2.85E-06
Am-243	1.4880E-06	3.60	7.20	0.00E+00	5.35E-06	1.07E-05
C-14	5.7053E-09	3.60	7.20	0.00E+00	2.05E-08	4.11E-08
Cl-36	1.3124E-32	3.60	7.20	0.00E+00	4.72E-32	9.45E-32
Cm-243	1.1419E-07	3.60	7.20	0.00E+00	4.11E-07	8.22E-07
Cm-244	1.6522E-05	3.60	7.20	0.00E+00	5.95E-05	1.19E-04
Co-60	7.4047E-07	3.60	7.20	0.00E+00	2.66E-06	5.33E-06
Cs-134	2.0455E-05	3.60	7.20	0.00E+00	7.36E-05	1.47E-04
Cs-135	3.4477E-06	3.60	7.20	0.00E+00	1.24E-05	2.48E-05
Cs-137	1.4365E+00	3.60	7.20	0.00E+00	5.17E+00	1.03E+01
Eu-154	7.3230E-03	3.60	7.20	0.00E+00	2.64E-02	5.27E-02
Eu-155	5.9259E-04	3.60	7.20	0.00E+00	2.13E-03	4.27E-03
Fe-55	2.2791E-06	3.60	7.20	0.00E+00	8.20E-06	1.64E-05
H-3	1.9698E-03	3.60	7.20	0.00E+00	7.09E-03	1.42E-02
I-129	7.5300E-07	3.60	7.20	0.00E+00	2.71E-06	5.42E-06
Kr-85	4.1176E-02	3.60	7.20	0.00E+00	1.48E-01	2.96E-01
Np-237	9.5752E-06	3.60	7.20	0.00E+00	3.45E-05	6.89E-05
Pa-231	3.9379E-09	3.60	7.20	0.00E+00	1.42E-08	2.83E-08
Pb-210	3.3115E-10	3.60	7.20	0.00E+00	1.19E-09	2.38E-09
Pm-147	9.2402E-04	3.60	7.20	0.00E+00	3.33E-03	6.65E-03
Pu-238	1.6217E-02	3.60	7.20	0.00E+00	5.84E-02	1.17E-01
Pu-239	4.2810E-04	3.60	7.20	0.00E+00	1.54E-03	3.08E-03
Pu-240	2.4333E-04	3.60	7.20	0.00E+00	8.76E-04	1.75E-03
Pu-241	1.6242E-02	3.60	7.20	0.00E+00	5.84E-02	1.17E-01
Pu-242	3.6329E-07	3.60	7.20	0.00E+00	1.31E-06	2.61E-06
Ra-226	9.0114E-10	3.60	7.20	0.00E+00	3.24E-09	6.49E-09
Ra-228	3.1019E-14	3.60	7.20	0.00E+00	1.12E-13	2.23E-13
Ru-106	2.1225E-10	3.60	7.20	0.00E+00	7.64E-10	1.53E-09
Se-79	1.2930E-05	3.60	7.20	0.00E+00	4.65E-05	9.31E-05
Sn-126	1.1571E-05	3.60	7.20	0.00E+00	4.16E-05	8.33E-05
Sr-90	1.3472E+00	3.60	7.20	0.00E+00	4.85E+00	9.70E+00
Tc-99	4.2239E-04	3.60	7.20	0.00E+00	1.52E-03	3.04E-03
Th-229	1.2407E-11	3.60	7.20	0.00E+00	4.47E-11	8.93E-11
Th-230	8.3497E-08	3.60	7.20	0.00E+00	3.00E-07	6.01E-07
Th-232	3.8371E-14	3.60	7.20	0.00E+00	1.38E-13	2.76E-13
Tl-208	4.0414E-08	3.60	7.20	0.00E+00	1.45E-07	2.91E-07
U-232	1.0948E-07	3.60	7.20	0.00E+00	3.94E-07	7.88E-07
U-233	3.6275E-09	3.60	7.20	0.00E+00	1.31E-08	2.61E-08
U-234	1.8562E-04	3.60	7.20	0.00E+00	6.68E-04	1.34E-03
U-235	-2.7235E-06	3.60	0.00	5.63E-03	5.62E-03	5.63E-03
U-236	1.5493E-05	3.60	7.20	0.00E+00	5.58E-05	1.12E-04
U-238	-4.2851E-09	3.60	0.00	6.39E-05	6.38E-05	6.39E-05
Y-90	1.3475E+00	3.60	7.20	0.00E+00	4.85E+00	9.70E+00
Other Radionuclides					4.92E+00	9.85E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.302E+11
0.0250	1.101E+11
0.0375	9.568E+10
0.0575	1.030E+11
0.0850	6.207E+10
0.1250	4.102E+10
0.2250	5.368E+10
0.3750	2.331E+10
0.5750	3.852E+11
0.8500	4.705E+09
1.2500	2.275E+09
1.7500	1.281E+08
2.2500	1.071E+04
2.7500	1.022E+04
3.5000	6.449E+00
5.0000	2.641E+00
7.0000	2.838E-01
11.0000	3.236E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.04E-02	1.21E-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 %:	93.197	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3.60
Bounding:		7.20

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	
Bounding:	0.01	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ASTRA-(AUSTRIA)(LEU U308)
SNF ID #: 1058
Fuel Units & Descr: 3 - 19 FLAT PLATES
Heavy Metal Mass: BOL=5.379kg; EOL=4.818kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1985
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated Canister usage: 18"x10'
0.08

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	530.99	1,061.99	0.00E+00	6.09E-07	1.22E-06
Am-241	2.3056E-03	530.99	1,061.99	0.00E+00	1.22E+00	2.45E+00
Am-242m	4.1476E-07	530.99	1,061.99	0.00E+00	2.20E-04	4.40E-04
Am-243	1.4894E-06	530.99	1,061.99	0.00E+00	7.91E-04	1.58E-03
C-14	5.7108E-09	530.99	1,061.99	0.00E+00	3.03E-06	6.06E-06
Cl-36	1.3124E-32	530.99	1,061.99	0.00E+00	6.97E-30	1.39E-29
Cm-243	1.4562E-07	530.99	1,061.99	0.00E+00	7.73E-05	1.55E-04
Cm-244	2.4221E-05	530.99	1,061.99	0.00E+00	1.29E-02	2.57E-02
Co-60	2.7560E-06	530.99	1,061.99	0.00E+00	1.46E-03	2.93E-03
Cs-134	5.8851E-04	530.99	1,061.99	0.00E+00	3.12E-01	6.25E-01
Cs-135	3.4477E-06	530.99	1,061.99	0.00E+00	1.83E-03	3.66E-03
Cs-137	1.8099E+00	530.99	1,061.99	0.00E+00	9.61E+02	1.92E+03
Eu-154	1.6386E-02	530.99	1,061.99	0.00E+00	8.70E+00	1.74E+01
Eu-155	2.3957E-03	530.99	1,061.99	0.00E+00	1.27E+00	2.54E+00
Fe-55	3.2707E-05	530.99	1,061.99	0.00E+00	1.74E-02	3.47E-02
H-3	3.4504E-03	530.99	1,061.99	0.00E+00	1.83E+00	3.66E+00
I-129	7.5300E-07	530.99	1,061.99	0.00E+00	4.00E-04	8.00E-04
Kr-85	7.8540E-02	530.99	1,061.99	0.00E+00	4.17E+01	8.34E+01
Np-237	9.5615E-06	530.99	1,061.99	0.00E+00	5.08E-03	1.02E-02
Pa-231	2.7968E-09	530.99	1,061.99	0.00E+00	1.49E-06	2.97E-06
Pb-210	1.2612E-10	530.99	1,061.99	0.00E+00	6.70E-08	1.34E-07
Pm-147	1.2952E-02	530.99	1,061.99	0.00E+00	6.88E+00	1.38E+01
Pu-238	1.7549E-02	530.99	1,061.99	0.00E+00	9.32E+00	1.86E+01
Pu-239	4.2810E-04	530.99	1,061.99	0.00E+00	2.27E-01	4.55E-01
Pu-240	2.4357E-04	530.99	1,061.99	0.00E+00	1.29E-01	2.59E-01
Pu-241	2.6277E-02	530.99	1,061.99	0.00E+00	1.40E+01	2.79E+01
Pu-242	3.6329E-07	530.99	1,061.99	0.00E+00	1.93E-04	3.86E-04
Ra-226	4.4444E-10	530.99	1,061.99	0.00E+00	2.36E-07	4.72E-07
Ra-228	1.9714E-14	530.99	1,061.99	0.00E+00	1.05E-11	2.09E-11
Ru-106	2.0477E-07	530.99	1,061.99	0.00E+00	1.09E-04	2.17E-04
Se-79	1.2933E-05	530.99	1,061.99	0.00E+00	6.87E-03	1.37E-02
Sn-126	1.1574E-05	530.99	1,061.99	0.00E+00	6.15E-03	1.23E-02
Sr-90	1.7092E+00	530.99	1,061.99	0.00E+00	9.08E+02	1.82E+03
Tc-99	4.2239E-04	530.99	1,061.99	0.00E+00	2.24E-01	4.49E-01
Th-229	7.7260E-12	530.99	1,061.99	0.00E+00	4.10E-09	8.20E-09
Th-230	5.8497E-08	530.99	1,061.99	0.00E+00	3.11E-05	6.21E-05
Th-232	2.6906E-14	530.99	1,061.99	0.00E+00	1.43E-11	2.86E-11
Tl-208	4.4336E-08	530.99	1,061.99	0.00E+00	2.35E-05	4.71E-05
U-232	1.2037E-07	530.99	1,061.99	0.00E+00	6.39E-05	1.28E-04
U-233	3.0011E-09	530.99	1,061.99	0.00E+00	1.59E-06	3.19E-06
U-234	1.8497E-04	530.99	1,061.99	0.00E+00	9.82E-02	1.96E-01
U-235	-2.7235E-06	530.99	0.00	2.27E-03	8.21E-04	2.27E-03
U-236	1.5493E-05	530.99	1,061.99	0.00E+00	8.23E-03	1.65E-02
U-238	-4.2851E-09	530.99	0.00	1.46E-03	1.45E-03	1.46E-03
Y-90	1.7094E+00	530.99	1,061.99	0.00E+00	9.08E+02	1.82E+03
Other Radionuclides					9.15E+02	1.83E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.937E+13
0.0250	2.064E+13
0.0375	1.798E+13
0.0575	1.931E+13
0.0850	1.165E+13
0.1250	7.803E+12
0.2250	1.006E+13
0.3750	4.372E+12
0.5750	7.168E+13
0.8500	1.033E+12
1.2500	5.744E+11
1.7500	2.838E+10
2.2500	2.023E+06
2.7500	1.656E+06
3.5000	1.257E+03
5.0000	4.236E+02
7.0000	4.663E+01
11.0000	5.217E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.12E+01	2.25E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.50065847	60 to 100

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		530.99
Bounding:		1,061.99

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.31	
Bounding:	0.63	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ASTRA-(AUSTRIA)(LEU U3Si2)
SNF ID #: 712
Fuel Units & Descr: 39 - 19 FLAT PLATES
Heavy Metal Mass: BOL=72.236kg; EOL=66.183kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1985
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated Canister usage: 18"x10' 1.08

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	5,732.12	11,464.24	0.00E+00	6.57E-06	1.31E-05	Avg. MeV	
Am-241	2.3056E-03	5,732.12	11,464.24	0.00E+00	1.32E+01	2.64E+01	0.0150	1.073E+15
Am-242m	4.1476E-07	5,732.12	11,464.24	0.00E+00	2.38E-03	4.75E-03	0.0250	2.229E+14
Am-243	1.4894E-06	5,732.12	11,464.24	0.00E+00	8.54E-03	1.71E-02	0.0375	1.941E+14
C-14	5.7108E-09	5,732.12	11,464.24	0.00E+00	3.27E-05	6.55E-05	0.0575	2.084E+14
Cl-36	1.3124E-32	5,732.12	11,464.24	0.00E+00	7.52E-29	1.50E-28	0.0850	1.258E+14
Cm-243	1.4562E-07	5,732.12	11,464.24	0.00E+00	8.35E-04	1.67E-03	0.1250	8.423E+13
Cm-244	2.4221E-05	5,732.12	11,464.24	0.00E+00	1.39E-01	2.78E-01	0.2250	1.066E+14
Co-60	2.7560E-06	5,732.12	11,464.24	0.00E+00	1.58E-02	3.16E-02	0.3750	4.720E+13
Cs-134	5.8851E-04	5,732.12	11,464.24	0.00E+00	3.37E+00	6.75E+00	0.5750	7.738E+14
Cs-135	3.4477E-06	5,732.12	11,464.24	0.00E+00	1.98E-02	3.95E-02	0.8500	1.115E+13
Cs-137	1.8099E+00	5,732.12	11,464.24	0.00E+00	1.04E+04	2.07E+04	1.2500	6.201E+12
Eu-154	1.6386E-02	5,732.12	11,464.24	0.00E+00	9.39E+01	1.88E+02	1.7500	3.063E+11
Eu-155	2.3957E-03	5,732.12	11,464.24	0.00E+00	1.37E+01	2.75E+01	2.2500	2.183E+07
Fe-55	3.2707E-05	5,732.12	11,464.24	0.00E+00	1.87E-01	3.75E-01	2.7500	1.788E+07
H-3	3.4504E-03	5,732.12	11,464.24	0.00E+00	1.98E+01	3.96E+01	3.5000	1.359E+04
I-129	7.5300E-07	5,732.12	11,464.24	0.00E+00	4.32E-03	8.63E-03	5.0000	4.581E+03
Kr-85	7.8540E-02	5,732.12	11,464.24	0.00E+00	4.50E+02	9.00E+02	7.0000	5.043E+02
Np-237	9.5615E-06	5,732.12	11,464.24	0.00E+00	5.48E-02	1.10E-01	11.0000	5.643E+01
Pa-231	2.7968E-09	5,732.12	11,464.24	0.00E+00	1.60E-05	3.21E-05		
Pb-210	1.2612E-10	5,732.12	11,464.24	0.00E+00	7.23E-07	1.45E-06		
Pm-147	1.2952E-02	5,732.12	11,464.24	0.00E+00	7.42E+01	1.48E+02		
Pu-238	1.7549E-02	5,732.12	11,464.24	0.00E+00	1.01E+02	2.01E+02		
Pu-239	4.2810E-04	5,732.12	11,464.24	0.00E+00	2.45E+00	4.91E+00		
Pu-240	2.4357E-04	5,732.12	11,464.24	0.00E+00	1.40E+00	2.79E+00		
Pu-241	2.6277E-02	5,732.12	11,464.24	0.00E+00	1.51E+02	3.01E+02		
Pu-242	3.6329E-07	5,732.12	11,464.24	0.00E+00	2.08E-03	4.16E-03		
Ra-226	4.4444E-10	5,732.12	11,464.24	0.00E+00	2.55E-06	5.10E-06		
Ra-228	1.9714E-14	5,732.12	11,464.24	0.00E+00	1.13E-10	2.26E-10		
Ru-106	2.0477E-07	5,732.12	11,464.24	0.00E+00	1.17E-03	2.35E-03		
Se-79	1.2933E-05	5,732.12	11,464.24	0.00E+00	7.41E-02	1.48E-01		
Sn-126	1.1574E-05	5,732.12	11,464.24	0.00E+00	6.63E-02	1.33E-01		
Sr-90	1.7092E+00	5,732.12	11,464.24	0.00E+00	9.80E+03	1.96E+04		
Tc-99	4.2239E-04	5,732.12	11,464.24	0.00E+00	2.42E+00	4.84E+00		
Th-229	7.7260E-12	5,732.12	11,464.24	0.00E+00	4.43E-08	8.86E-08		
Th-230	5.8497E-08	5,732.12	11,464.24	0.00E+00	3.35E-04	6.71E-04		
Th-232	2.6906E-14	5,732.12	11,464.24	0.00E+00	1.54E-10	3.08E-10		
Tl-208	4.4336E-08	5,732.12	11,464.24	0.00E+00	2.54E-04	5.08E-04		
U-232	1.2037E-07	5,732.12	11,464.24	0.00E+00	6.90E-04	1.38E-03		
U-233	3.0011E-09	5,732.12	11,464.24	0.00E+00	1.72E-05	3.44E-05		
U-234	1.8497E-04	5,732.12	11,464.24	0.00E+00	1.06E+00	2.12E+00		
U-235	-2.7235E-06	5,732.12	0.00	3.10E-02	1.54E-02	3.10E-02		
U-236	1.5493E-05	5,732.12	11,464.24	0.00E+00	8.88E-02	1.78E-01		
U-238	-4.2851E-09	5,732.12	0.00	1.95E-02	1.94E-02	1.95E-02		
Y-90	1.7094E+00	5,732.12	11,464.24	0.00E+00	9.80E+03	1.96E+04		
Other Radionuclides					9.88E+03	1.98E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.21E+02	2.42E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.83900556	60 to 100

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		5,732.12
Bounding:		11,464.24

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.25	
Bounding:	0.50	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ASTRA-AUSTRIA (UALX-HEU)
SNF ID #: 646
Fuel Units & Descr: 33 - MTR TYPE
Heavy Metal Mass: BOL=9.026kg; EOL=4.359kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1985
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated Canister usage: 18"x10" 0.92

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	1.1465E-09	4,418.98	8,547.32	0.00E+00	5.07E-06	9.80E-06
Am-241	2.3056E-03	4,418.98	8,547.32	0.00E+00	1.02E+01	1.97E+01
Am-242m	4.1476E-07	4,418.98	8,547.32	0.00E+00	1.83E-03	3.55E-03
Am-243	1.4894E-06	4,418.98	8,547.32	0.00E+00	6.58E-03	1.27E-02
C-14	5.7108E-09	4,418.98	8,547.32	0.00E+00	2.52E-05	4.88E-05
Cl-36	1.3124E-32	4,418.98	8,547.32	0.00E+00	5.80E-29	1.12E-28
Cm-243	1.4562E-07	4,418.98	8,547.32	0.00E+00	6.43E-04	1.24E-03
Cm-244	2.4221E-05	4,418.98	8,547.32	0.00E+00	1.07E-01	2.07E-01
Co-60	2.7560E-06	4,418.98	8,547.32	0.00E+00	1.22E-02	2.36E-02
Cs-134	5.8851E-04	4,418.98	8,547.32	0.00E+00	2.60E+00	5.03E+00
Cs-135	3.4477E-06	4,418.98	8,547.32	0.00E+00	1.52E-02	2.95E-02
Cs-137	1.8099E+00	4,418.98	8,547.32	0.00E+00	8.00E+03	1.55E+04
Eu-154	1.6386E-02	4,418.98	8,547.32	0.00E+00	7.24E+01	1.40E+02
Eu-155	2.3957E-03	4,418.98	8,547.32	0.00E+00	1.06E+01	2.05E+01
Fe-55	3.2707E-05	4,418.98	8,547.32	0.00E+00	1.45E-01	2.80E-01
H-3	3.4504E-03	4,418.98	8,547.32	0.00E+00	1.52E+01	2.95E+01
I-129	7.5300E-07	4,418.98	8,547.32	0.00E+00	3.33E-03	6.44E-03
Kr-85	7.8540E-02	4,418.98	8,547.32	0.00E+00	3.47E+02	6.71E+02
Np-237	9.5615E-06	4,418.98	8,547.32	0.00E+00	4.23E-02	8.17E-02
Pa-231	2.7968E-09	4,418.98	8,547.32	0.00E+00	1.24E-05	2.39E-05
Pb-210	1.2612E-10	4,418.98	8,547.32	0.00E+00	5.57E-07	1.08E-06
Pm-147	1.2952E-02	4,418.98	8,547.32	0.00E+00	5.72E+01	1.11E+02
Pu-238	1.7549E-02	4,418.98	8,547.32	0.00E+00	7.75E+01	1.50E+02
Pu-239	4.2810E-04	4,418.98	8,547.32	0.00E+00	1.89E+00	3.66E+00
Pu-240	2.4357E-04	4,418.98	8,547.32	0.00E+00	1.08E+00	2.08E+00
Pu-241	2.6277E-02	4,418.98	8,547.32	0.00E+00	1.16E+02	2.25E+02
Pu-242	3.6329E-07	4,418.98	8,547.32	0.00E+00	1.61E-03	3.11E-03
Ra-226	4.4444E-10	4,418.98	8,547.32	0.00E+00	1.96E-06	3.80E-06
Ra-228	1.9714E-14	4,418.98	8,547.32	0.00E+00	8.71E-11	1.69E-10
Ru-106	2.0477E-07	4,418.98	8,547.32	0.00E+00	9.05E-04	1.75E-03
Se-79	1.2933E-05	4,418.98	8,547.32	0.00E+00	5.72E-02	1.11E-01
Sn-126	1.1574E-05	4,418.98	8,547.32	0.00E+00	5.11E-02	9.89E-02
Sr-90	1.7092E+00	4,418.98	8,547.32	0.00E+00	7.55E+03	1.46E+04
Tc-99	4.2239E-04	4,418.98	8,547.32	0.00E+00	1.87E+00	3.61E+00
Th-229	7.7260E-12	4,418.98	8,547.32	0.00E+00	3.41E-08	6.60E-08
Th-230	5.8497E-08	4,418.98	8,547.32	0.00E+00	2.58E-04	5.00E-04
Th-232	2.6906E-14	4,418.98	8,547.32	0.00E+00	1.19E-10	2.30E-10
Tl-208	4.4336E-08	4,418.98	8,547.32	0.00E+00	1.96E-04	3.79E-04
U-232	1.2037E-07	4,418.98	8,547.32	0.00E+00	5.32E-04	1.03E-03
U-233	3.0011E-09	4,418.98	8,547.32	0.00E+00	1.33E-05	2.57E-05
U-234	1.8497E-04	4,418.98	8,547.32	0.00E+00	8.17E-01	1.58E+00
U-235	-2.7235E-06	4,418.98	0.00	1.82E-02	6.12E-03	1.82E-02
U-236	1.5493E-05	4,418.98	8,547.32	0.00E+00	6.85E-02	1.32E-01
U-238	-4.2851E-09	4,418.98	0.00	2.10E-04	1.91E-04	2.10E-04
Y-90	1.7094E+00	4,418.98	8,547.32	0.00E+00	7.55E+03	1.46E+04
Other Radionuclides					7.61E+03	1.47E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.998E+14
0.0250	1.862E+14
0.0375	1.447E+14
0.0575	1.554E+14
0.0850	9.376E+13
0.1250	6.280E+13
0.2250	8.094E+13
0.3750	3.519E+13
0.5750	5.769E+14
0.8500	8.313E+12
1.2500	4.623E+12
1.7500	2.284E+11
2.2500	1.628E+07
2.7500	1.333E+07
3.5000	1.006E+04
5.0000	3.383E+03
7.0000	3.722E+02
11.0000	4.164E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.35E+01	1.61E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.07350223	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		4,418.98
Bounding:		8,547.32

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.56	
Bounding:	3.01	

Estimated EOL HM/Given EOL HM: 1.06

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ASTRA-AUSTRIA (UALX-MEU)
SNF ID #: 566
Fuel Units & Descr: 5 - MTR TYPE
Heavy Metal Mass: BOL=3.62kg; EOL=2.766kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1965
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated Canister usage: 18"x10' = 0.14

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	807.81	1,615.62	0.00E+00	9.26E-07	1.85E-06	Avg. MeV	
Am-241	2.3056E-03	807.81	1,615.62	0.00E+00	1.86E+00	3.72E+00	0.0150	1.512E+14
Am-242m	4.1476E-07	807.81	1,615.62	0.00E+00	3.35E-04	6.70E-04	0.0250	3.141E+13
Am-243	1.4894E-06	807.81	1,615.62	0.00E+00	1.20E-03	2.41E-03	0.0375	2.735E+13
C-14	5.7108E-09	807.81	1,615.62	0.00E+00	4.61E-06	9.23E-06	0.0575	2.937E+13
Cl-36	1.3124E-32	807.81	1,615.62	0.00E+00	1.06E-29	2.12E-29	0.0850	1.772E+13
Cm-243	1.4562E-07	807.81	1,615.62	0.00E+00	1.18E-04	2.35E-04	0.1250	1.187E+13
Cm-244	2.4221E-05	807.81	1,615.62	0.00E+00	1.96E-02	3.91E-02	0.2250	1.530E+13
Co-60	2.7560E-06	807.81	1,615.62	0.00E+00	2.23E-03	4.45E-03	0.3750	6.652E+12
Cs-134	5.8851E-04	807.81	1,615.62	0.00E+00	4.75E-01	9.51E-01	0.5750	1.091E+14
Cs-135	3.4477E-06	807.81	1,615.62	0.00E+00	2.79E-03	5.57E-03	0.8500	1.571E+12
Cs-137	1.8099E+00	807.81	1,615.62	0.00E+00	1.46E+03	2.92E+03	1.2500	8.739E+11
Eu-154	1.6386E-02	807.81	1,615.62	0.00E+00	1.32E+01	2.65E+01	1.7500	4.317E+10
Eu-155	2.3957E-03	807.81	1,615.62	0.00E+00	1.94E+00	3.87E+00	2.2500	3.077E+06
Fe-55	3.2707E-05	807.81	1,615.62	0.00E+00	2.64E-02	5.28E-02	2.7500	2.520E+06
H-3	3.4504E-03	807.81	1,615.62	0.00E+00	2.79E+00	5.57E+00	3.5000	1.905E+03
I-129	7.5300E-07	807.81	1,615.62	0.00E+00	6.08E-04	1.22E-03	5.0000	6.409E+02
Kr-85	7.8540E-02	807.81	1,615.62	0.00E+00	6.34E+01	1.27E+02	7.0000	7.053E+01
Np-237	9.5615E-06	807.81	1,615.62	0.00E+00	7.72E-03	1.54E-02	11.0000	7.890E+00
Pa-231	2.7968E-09	807.81	1,615.62	0.00E+00	2.26E-06	4.52E-06		
Pb-210	1.2612E-10	807.81	1,615.62	0.00E+00	1.02E-07	2.04E-07		
Pm-147	1.2952E-02	807.81	1,615.62	0.00E+00	1.05E+01	2.09E+01		
Pu-238	1.7549E-02	807.81	1,615.62	0.00E+00	1.42E+01	2.84E+01		
Pu-239	4.2810E-04	807.81	1,615.62	0.00E+00	3.46E-01	6.92E-01		
Pu-240	2.4357E-04	807.81	1,615.62	0.00E+00	1.97E-01	3.94E-01		
Pu-241	2.6277E-02	807.81	1,615.62	0.00E+00	2.12E+01	4.25E+01		
Pu-242	3.6329E-07	807.81	1,615.62	0.00E+00	2.93E-04	5.87E-04		
Ra-226	4.4444E-10	807.81	1,615.62	0.00E+00	3.59E-07	7.18E-07		
Ra-228	1.9714E-14	807.81	1,615.62	0.00E+00	1.59E-11	3.19E-11		
Ru-106	2.0477E-07	807.81	1,615.62	0.00E+00	1.65E-04	3.31E-04		
Se-79	1.2933E-05	807.81	1,615.62	0.00E+00	1.04E-02	2.09E-02		
Sn-126	1.1574E-05	807.81	1,615.62	0.00E+00	9.35E-03	1.87E-02		
Sr-90	1.7092E+00	807.81	1,615.62	0.00E+00	1.38E+03	2.76E+03		
Tc-99	4.2239E-04	807.81	1,615.62	0.00E+00	3.41E-01	6.82E-01		
Th-229	7.7260E-12	807.81	1,615.62	0.00E+00	6.24E-09	1.25E-08		
Th-230	5.8497E-08	807.81	1,615.62	0.00E+00	4.73E-05	9.45E-05		
Th-232	2.6906E-14	807.81	1,615.62	0.00E+00	2.17E-11	4.35E-11		
Tl-208	4.4336E-08	807.81	1,615.62	0.00E+00	3.58E-05	7.16E-05		
U-232	1.2037E-07	807.81	1,615.62	0.00E+00	9.72E-05	1.94E-04		
U-233	3.0011E-09	807.81	1,615.62	0.00E+00	2.42E-06	4.85E-06		
U-234	1.8497E-04	807.81	1,615.62	0.00E+00	1.49E-01	2.99E-01		
U-235	-2.7235E-06	807.81	0.00	3.48E-03	1.28E-03	3.48E-03		
U-236	1.5493E-05	807.81	1,615.62	0.00E+00	1.25E-02	2.50E-02		
U-238	-4.2851E-09	807.81	0.00	6.76E-04	6.72E-04	6.76E-04		
Y-90	1.7094E+00	807.81	1,615.62	0.00E+00	1.38E+03	2.76E+03		
Other Radionuclides					1.39E+03	2.78E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.71E+01	3.42E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	44.43904151	60 to 100

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		807.81
Bounding:		1,615.62

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.71	
Bounding:	1.42	

Estimated EOL HM/Given EOL HM: 1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ATSR
SNF ID #: 17
Fuel Units & Descr: 20 - 19 FLAT PLATES
Heavy Metal Mass: BOL= ; EOL=3.21kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1988
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 0.56

II. Estimates

Radionuclide	m: CiMWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	3,039.93	3,039.93	0.00E+00	2.02E-06	2.02E-06
Am-241	2.0060E-03	3,039.93	3,039.93	0.00E+00	6.10E+00	6.10E+00
Am-242m	4.2429E-07	3,039.93	3,039.93	0.00E+00	1.29E-03	1.29E-03
Am-243	1.4899E-06	3,039.93	3,039.93	0.00E+00	4.53E-03	4.53E-03
C-14	5.7135E-09	3,039.93	3,039.93	0.00E+00	1.74E-05	1.74E-05
Cl-36	1.3124E-32	3,039.93	3,039.93	0.00E+00	3.99E-29	3.99E-29
Cm-243	1.6443E-07	3,039.93	3,039.93	0.00E+00	5.00E-04	5.00E-04
Cm-244	2.9330E-05	3,039.93	3,039.93	0.00E+00	8.92E-02	8.92E-02
Co-60	5.3186E-06	3,039.93	3,039.93	0.00E+00	1.62E-02	1.62E-02
Cs-134	3.1563E-03	3,039.93	3,039.93	0.00E+00	9.59E+00	9.59E+00
Cs-135	3.4477E-06	3,039.93	3,039.93	0.00E+00	1.05E-02	1.05E-02
Cs-137	2.0313E+00	3,039.93	3,039.93	0.00E+00	6.18E+03	6.18E+03
Eu-154	2.4513E-02	3,039.93	3,039.93	0.00E+00	7.45E+01	7.45E+01
Eu-155	4.8175E-03	3,039.93	3,039.93	0.00E+00	1.46E+01	1.46E+01
Fe-55	1.2397E-04	3,039.93	3,039.93	0.00E+00	3.77E-01	3.77E-01
H-3	4.5697E-03	3,039.93	3,039.93	0.00E+00	1.39E+01	1.39E+01
I-129	7.5300E-07	3,039.93	3,039.93	0.00E+00	2.29E-03	2.29E-03
Kr-85	1.0850E-01	3,039.93	3,039.93	0.00E+00	3.30E+02	3.30E+02
Np-237	9.5561E-06	3,039.93	3,039.93	0.00E+00	2.90E-02	2.90E-02
Pa-231	2.0359E-09	3,039.93	3,039.93	0.00E+00	6.19E-06	6.19E-06
Pb-210	4.9728E-11	3,039.93	3,039.93	0.00E+00	1.51E-07	1.51E-07
Pm-147	4.8502E-02	3,039.93	3,039.93	0.00E+00	1.47E+02	1.47E+02
Pu-238	1.8254E-02	3,039.93	3,039.93	0.00E+00	5.55E+01	5.55E+01
Pu-239	4.2810E-04	3,039.93	3,039.93	0.00E+00	1.30E+00	1.30E+00
Pu-240	2.4368E-04	3,039.93	3,039.93	0.00E+00	7.41E-01	7.41E-01
Pu-241	3.3415E-02	3,039.93	3,039.93	0.00E+00	1.02E+02	1.02E+02
Pu-242	3.6329E-07	3,039.93	3,039.93	0.00E+00	1.10E-03	1.10E-03
Ra-226	2.2854E-10	3,039.93	3,039.93	0.00E+00	6.95E-07	6.95E-07
Ra-228	1.2426E-14	3,039.93	3,039.93	0.00E+00	3.78E-11	3.78E-11
Ru-106	6.3589E-06	3,039.93	3,039.93	0.00E+00	1.93E-02	1.93E-02
Se-79	1.2933E-05	3,039.93	3,039.93	0.00E+00	3.93E-02	3.93E-02
Sn-126	1.1574E-05	3,039.93	3,039.93	0.00E+00	3.52E-02	3.52E-02
Sr-90	1.9248E+00	3,039.93	3,039.93	0.00E+00	5.85E+03	5.85E+03
Tc-99	4.2239E-04	3,039.93	3,039.93	0.00E+00	1.28E+00	1.28E+00
Th-229	5.0953E-12	3,039.93	3,039.93	0.00E+00	1.55E-08	1.55E-08
Th-230	4.1885E-08	3,039.93	3,039.93	0.00E+00	1.27E-04	1.27E-04
Th-232	1.9270E-14	3,039.93	3,039.93	0.00E+00	5.86E-11	5.86E-11
Tl-208	4.6024E-08	3,039.93	3,039.93	0.00E+00	1.40E-04	1.40E-04
U-232	1.2582E-07	3,039.93	3,039.93	0.00E+00	3.82E-04	3.82E-04
U-233	2.5825E-09	3,039.93	3,039.93	0.00E+00	7.85E-06	7.85E-06
U-234	1.8450E-04	3,039.93	3,039.93	0.00E+00	5.61E-01	5.61E-01
U-235	-2.7235E-06	3,039.93	0.00	1.28E-02	4.50E-03	1.28E-02
U-236	1.5493E-05	3,039.93	3,039.93	0.00E+00	4.71E-02	4.71E-02
U-238	-4.2851E-09	3,039.93	0.00	1.29E-04	1.16E-04	1.29E-04
Y-90	1.9254E+00	3,039.93	3,039.93	0.00E+00	5.85E+03	5.85E+03
Other Radionuclides					5.88E+03	5.88E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.209E+14
0.0250	6.673E+13
0.0375	5.820E+13
0.0575	6.234E+13
0.0850	3.767E+13
0.1250	2.549E+13
0.2250	3.250E+13
0.3750	1.415E+13
0.5750	2.308E+14
0.8500	3.902E+12
1.2500	2.228E+12
1.7500	1.023E+11
2.2500	8.970E+06
2.7500	5.071E+06
3.5000	2.330E+04
5.0000	1.317E+03
7.0000	1.454E+02
11.0000	1.630E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.25E+01	7.25E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3,039.93
Bounding:		3,039.93

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.50	
Bounding:	1.50	

Estimated EOL HM/Given EOL HM: 1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BABCOCK & WILCOX SCRAP
SNF ID #: 18
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=0.07kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1969
Estimates as of: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186965
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	2.3072E-06	66.52	66.52	0.00E+00	1.53E-04	1.53E-04
Am-241	8.4448E+00	66.52	66.52	0.00E+00	5.62E+02	5.62E+02
Am-242m	1.6848E-02	66.52	66.52	0.00E+00	1.12E+00	1.12E+00
Am-243	1.6320E-02	66.52	66.52	0.00E+00	1.09E+00	1.09E+00
C-14	1.2090E-01	66.52	66.52	0.00E+00	8.04E+00	8.04E+00
Cl-36	2.2849E-03	66.52	66.52	0.00E+00	1.52E-01	1.52E-01
Cm-243	8.6624E-04	66.52	66.52	0.00E+00	5.76E-02	5.76E-02
Cm-244	1.6848E-01	66.52	66.52	0.00E+00	1.12E+01	1.12E+01
Co-60	2.8086E+01	66.52	66.52	0.00E+00	1.87E+03	1.87E+03
Cs-134	3.4148E-04	66.52	66.52	0.00E+00	2.27E-02	2.27E-02
Cs-135	4.3976E-04	66.52	66.52	0.00E+00	2.93E-02	2.93E-02
Cs-137	2.1049E+01	66.52	66.52	0.00E+00	1.40E+03	1.40E+03
Eu-154	1.2500E+00	66.52	66.52	0.00E+00	8.32E+01	8.32E+01
Eu-155	6.8986E-02	66.52	66.52	0.00E+00	4.59E+00	4.59E+00
Fe-55	2.9308E-01	66.52	66.52	0.00E+00	1.95E+01	1.95E+01
H-3	2.4311E-01	66.52	66.52	0.00E+00	1.62E+01	1.62E+01
I-129	1.0618E-05	66.52	66.52	0.00E+00	7.06E-04	7.06E-04
Kr-85	5.9882E-01	66.52	66.52	0.00E+00	3.98E+01	3.98E+01
Np-237	1.5668E-04	66.52	66.52	0.00E+00	1.04E-02	1.04E-02
Pa-231	2.8656E-06	66.52	66.52	0.00E+00	1.91E-04	1.91E-04
Pb-210	2.3918E-06	66.52	66.52	0.00E+00	1.59E-06	1.59E-06
Pm-147	1.6900E-02	66.52	66.52	0.00E+00	1.12E+00	1.12E+00
Pu-238	-8.6120E-01	66.52	0.00	1.80E+01	0.00E+00	1.80E+01
Pu-239	-4.8440E-02	66.52	0.00	2.18E+00	0.00E+00	2.18E+00
Pu-240	-3.0095E-01	66.52	0.00	2.78E+00	0.00E+00	2.78E+00
Pu-241	-1.0411E+02	66.52	0.00	7.16E+02	0.00E+00	7.16E+02
Pu-242	-1.1381E-04	66.52	0.00	1.20E-02	4.46E-03	1.20E-02
Ra-226	6.4400E-08	66.52	66.52	0.00E+00	4.28E-06	4.28E-06
Ra-228	5.9952E-07	66.52	66.52	0.00E+00	3.99E-05	3.99E-05
Ru-106	8.5526E-07	66.52	66.52	0.00E+00	5.69E-05	5.69E-05
Se-79	1.9181E-04	66.52	66.52	0.00E+00	1.28E-02	1.28E-02
Sn-126	1.6671E-04	66.52	66.52	0.00E+00	1.11E-02	1.11E-02
Sr-90	1.9799E+01	66.52	66.52	0.00E+00	1.32E+03	1.32E+03
Tc-99	6.7678E-03	66.52	66.52	0.00E+00	4.50E-01	4.50E-01
Th-229	1.7488E-06	66.52	66.52	0.00E+00	1.16E-04	1.16E-04
Th-230	5.8704E-06	66.52	66.52	0.00E+00	3.91E-04	3.91E-04
Th-232	6.0208E-07	66.52	66.52	0.00E+00	4.01E-05	4.01E-05
Tl-208	8.7573E-05	66.52	66.52	0.00E+00	5.83E-03	5.83E-03
U-232	2.3706E-04	66.52	66.52	0.00E+00	1.58E-02	1.58E-02
U-233	3.6128E-04	66.52	66.52	0.00E+00	2.40E-02	2.40E-02
U-234	1.2788E-02	66.52	66.52	0.00E+00	8.51E-01	8.51E-01
U-235	5.7486E-04	66.52	66.52	6.02E-05	3.83E-02	3.83E-02
U-236	2.3485E-04	66.52	66.52	0.00E+00	1.56E-02	1.56E-02
U-238	1.1581E-04	66.52	66.52	7.49E-06	7.71E-03	7.71E-03
Y-90	1.9804E+01	66.52	66.52	0.00E+00	1.32E+03	1.32E+03
Other Radionuclides					4.10E+03	4.10E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.152E+13
0.0250	1.622E+13
0.0375	1.417E+13
0.0575	2.230E+13
0.0850	8.703E+12
0.1250	6.821E+12
0.2250	7.539E+12
0.3750	3.225E+12
0.5750	5.244E+13
0.8500	2.004E+12
1.2500	1.401E+14
1.7500	6.196E+10
2.2500	7.346E+08
2.7500	2.070E+08
3.5000	1.657E+05
5.0000	7.036E+04
7.0000	8.057E+03
11.0000	9.219E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.56E+01	6.63E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:
This fuel didn't closely match any existing templates, therefore the worst case template was used.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		66.52
Bounding:		66.52

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	14.21	
Bounding:	14.21	

Estimated EOL HM/Given EOL HM: 591.64

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BER-II [HMI] (END BOXES) GERMANY
SNF ID #: 892
Fuel Units & Descr: 6 - MTR TYPE
Heavy Metal Mass: BOL=0kg; EOL=0kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2010
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: 10 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	2.8404E-10	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-241	1.4935E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-242m	4.4390E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Am-243	1.4913E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
C-14	5.7217E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cl-36	1.3124E-32	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-243	2.0967E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cm-244	4.3001E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Co-60	1.9798E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-134	9.0795E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-135	3.4477E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Cs-137	2.5588E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-154	5.4847E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Eu-155	1.9469E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Fe-55	1.7797E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
H-3	8.0065E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
I-129	7.5300E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Kr-85	2.0705E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Np-237	9.5507E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pa-231	1.2740E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pb-210	1.1838E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pm-147	6.7974E-01	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-238	1.9755E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-239	4.2838E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-240	2.4390E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-241	5.4058E-02	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Pu-242	3.6329E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ra-226	8.3742E-11	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ra-228	5.7734E-15	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Ru-106	6.1356E-03	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Se-79	1.2936E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Sn-126	1.1574E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Sr-90	2.4417E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Tc-99	4.2239E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-229	2.8568E-12	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-230	2.5310E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Th-232	1.1631E-14	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Tl-208	4.6705E-08	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-232	1.3151E-07	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-233	2.1650E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-234	1.8399E-04	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-235	-2.7235E-06	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-236	1.5493E-05	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
U-238	-4.2851E-09	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Y-90	2.4423E+00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00
Other Radionuclides					0.00E+00	0.00E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	0.000E+00
0.0250	0.000E+00
0.0375	0.000E+00
0.0575	0.000E+00
0.0850	0.000E+00
0.1250	0.000E+00
0.2250	0.000E+00
0.3750	0.000E+00
0.5750	0.000E+00
0.8500	0.000E+00
1.2500	0.000E+00
1.7500	0.000E+00
2.2500	0.000E+00
2.7500	0.000E+00
3.5000	0.000E+00
5.0000	0.000E+00
7.0000	0.000E+00
11.0000	0.000E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
0.00E+00	0.00E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		
Bounding:		

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:		
Bounding:		

Estimated EOL HM/Given EOL HM

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BER-II [HMI] (UALX HEU) GERMANY
SNF ID #: 758
Fuel Units & Descr: 112 - 17 FLAT PLATES
Heavy Metal Mass: BOL=20.653kg; EOL=12.074kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10" 4.67

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.8404E-10	8,124.67	16,249.34	0.00E+00	2.31E-06	4.62E-06
Am-241	1.4935E-03	8,124.67	16,249.34	0.00E+00	1.21E+01	2.43E+01
Am-242m	4.4390E-07	8,124.67	16,249.34	0.00E+00	3.61E-03	7.21E-03
Am-243	1.4913E-06	8,124.67	16,249.34	0.00E+00	1.21E-02	2.42E-02
C-14	5.7217E-09	8,124.67	16,249.34	0.00E+00	4.65E-05	9.30E-05
Cl-36	1.3124E-32	8,124.67	16,249.34	0.00E+00	1.07E-28	2.13E-28
Cm-243	2.0967E-07	8,124.67	16,249.34	0.00E+00	1.70E-03	3.41E-03
Cm-244	4.3001E-05	8,124.67	16,249.34	0.00E+00	3.49E-01	6.99E-01
Co-60	1.9798E-05	8,124.67	16,249.34	0.00E+00	1.61E-01	3.22E-01
Cs-134	9.0795E-02	8,124.67	16,249.34	0.00E+00	7.38E+02	1.48E+03
Cs-135	3.4477E-06	8,124.67	16,249.34	0.00E+00	2.80E-02	5.60E-02
Cs-137	2.5588E+00	8,124.67	16,249.34	0.00E+00	2.08E+04	4.16E+04
Eu-154	5.4847E-02	8,124.67	16,249.34	0.00E+00	4.46E+02	8.91E+02
Eu-155	1.9469E-02	8,124.67	16,249.34	0.00E+00	1.58E+02	3.16E+02
Fe-55	1.7797E-03	8,124.67	16,249.34	0.00E+00	1.45E+01	2.89E+01
H-3	8.0065E-03	8,124.67	16,249.34	0.00E+00	6.51E+01	1.30E+02
I-129	7.5300E-07	8,124.67	16,249.34	0.00E+00	6.12E-03	1.22E-02
Kr-85	2.0705E-01	8,124.67	16,249.34	0.00E+00	1.68E+03	3.36E+03
Np-237	9.5507E-06	8,124.67	16,249.34	0.00E+00	7.76E-02	1.55E-01
Pa-231	1.2740E-09	8,124.67	16,249.34	0.00E+00	1.04E-05	2.07E-05
Pb-210	1.1838E-11	8,124.67	16,249.34	0.00E+00	9.62E-08	1.92E-07
Pm-147	6.7974E-01	8,124.67	16,249.34	0.00E+00	5.52E+03	1.10E+04
Pu-238	1.9755E-02	8,124.67	16,249.34	0.00E+00	1.61E+02	3.21E+02
Pu-239	4.2838E-04	8,124.67	16,249.34	0.00E+00	3.48E+00	6.96E+00
Pu-240	2.4390E-04	8,124.67	16,249.34	0.00E+00	1.98E+00	3.96E+00
Pu-241	5.4058E-02	8,124.67	16,249.34	0.00E+00	4.39E+02	8.78E+02
Pu-242	3.6329E-07	8,124.67	16,249.34	0.00E+00	2.95E-03	5.90E-03
Ra-226	8.3742E-11	8,124.67	16,249.34	0.00E+00	6.80E-07	1.36E-06
Ra-228	5.7734E-15	8,124.67	16,249.34	0.00E+00	4.69E-11	9.38E-11
Ru-106	6.1356E-03	8,124.67	16,249.34	0.00E+00	4.98E+01	9.97E+01
Se-79	1.2936E-05	8,124.67	16,249.34	0.00E+00	1.05E-01	2.10E-01
Sn-126	1.1574E-05	8,124.67	16,249.34	0.00E+00	9.40E-02	1.88E-01
Sr-90	2.4417E+00	8,124.67	16,249.34	0.00E+00	1.98E+04	3.97E+04
Tc-99	4.2239E-04	8,124.67	16,249.34	0.00E+00	3.43E+00	6.86E+00
Th-229	2.8568E-12	8,124.67	16,249.34	0.00E+00	2.32E-08	4.64E-08
Th-230	2.5310E-08	8,124.67	16,249.34	0.00E+00	2.06E-04	4.11E-04
Th-232	1.1631E-14	8,124.67	16,249.34	0.00E+00	9.45E-11	1.89E-10
Tl-208	4.6705E-08	8,124.67	16,249.34	0.00E+00	3.79E-04	7.59E-04
U-232	1.3151E-07	8,124.67	16,249.34	0.00E+00	1.07E-03	2.14E-03
U-233	2.1650E-09	8,124.67	16,249.34	0.00E+00	1.76E-05	3.52E-05
U-234	1.8399E-04	8,124.67	16,249.34	0.00E+00	1.49E+00	2.99E+00
U-235	-2.7235E-08	8,124.67	0.00	4.15E-02	1.94E-02	4.15E-02
U-236	1.5493E-05	8,124.67	16,249.34	0.00E+00	1.26E-01	2.52E-01
U-238	-4.2851E-09	8,124.67	0.00	4.84E-04	4.49E-04	4.84E-04
Y-90	2.4423E+00	8,124.67	16,249.34	0.00E+00	1.98E+04	3.97E+04
Other Radionuclides					2.02E+04	4.04E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.210E+15
0.0250	4.651E+14
0.0375	4.055E+14
0.0575	4.284E+14
0.0850	2.606E+14
0.1250	1.823E+14
0.2250	2.238E+14
0.3750	1.003E+14
0.5750	1.628E+15
0.8500	7.944E+13
1.2500	2.585E+13
1.7500	9.440E+11
2.2500	6.241E+10
2.7500	8.708E+08
3.5000	1.037E+08
5.0000	8.613E+03
7.0000	9.570E+02
11.0000	1.077E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.57E+02	5.14E+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 %:	93.03245367	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		8,124.67
Bounding:		16,249.34

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.25	
Bounding:	2.50	

Estimated EOL HM/Given EOL HM: 1.04

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BNL MEDICAL RX (BMRR)
SNF ID #: 21
Fuel Units & Descr: 40 - CYLINDRICAL SECTIONS
Heavy Metal Mass: BOL=6.188kg; EOL=5.124kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1969
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 1.11

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	1,007.63	2,015.26	0.00E+00	6.68E-07	1.34E-06
Am-241	2.0060E-03	1,007.63	2,015.26	0.00E+00	2.02E+00	4.04E+00
Am-242m	4.2429E-07	1,007.63	2,015.26	0.00E+00	4.28E-04	8.55E-04
Am-243	1.4899E-06	1,007.63	2,015.26	0.00E+00	1.50E-03	3.00E-03
C-14	5.7135E-09	1,007.63	2,015.26	0.00E+00	5.76E-06	1.15E-05
Cl-36	1.3124E-32	1,007.63	2,015.26	0.00E+00	1.32E-29	2.64E-29
Cm-243	1.6443E-07	1,007.63	2,015.26	0.00E+00	1.66E-04	3.31E-04
Cm-244	2.9330E-05	1,007.63	2,015.26	0.00E+00	2.96E-02	5.91E-02
Co-60	5.3186E-06	1,007.63	2,015.26	0.00E+00	5.36E-03	1.07E-02
Cs-134	3.1563E-03	1,007.63	2,015.26	0.00E+00	3.18E+00	6.36E+00
Cs-135	3.4477E-06	1,007.63	2,015.26	0.00E+00	3.47E-03	6.95E-03
Cs-137	2.0313E+00	1,007.63	2,015.26	0.00E+00	2.05E+03	4.09E+03
Eu-154	2.4513E-02	1,007.63	2,015.26	0.00E+00	2.47E+01	4.94E+01
Eu-155	4.8175E-03	1,007.63	2,015.26	0.00E+00	4.85E+00	9.71E+00
Fe-55	1.2397E-04	1,007.63	2,015.26	0.00E+00	1.25E-01	2.50E-01
H-3	4.5697E-03	1,007.63	2,015.26	0.00E+00	4.60E+00	9.21E+00
I-129	7.5300E-07	1,007.63	2,015.26	0.00E+00	7.59E-04	1.52E-03
Kr-85	1.0850E-01	1,007.63	2,015.26	0.00E+00	1.09E+02	2.19E+02
Np-237	9.5561E-06	1,007.63	2,015.26	0.00E+00	9.63E-03	1.93E-02
Pa-231	2.0359E-09	1,007.63	2,015.26	0.00E+00	2.05E-06	4.10E-06
Pb-210	4.9728E-11	1,007.63	2,015.26	0.00E+00	5.01E-08	1.00E-07
Pm-147	4.8502E-02	1,007.63	2,015.26	0.00E+00	4.89E+01	9.77E+01
Pu-238	1.8254E-02	1,007.63	2,015.26	0.00E+00	1.84E+01	3.68E+01
Pu-239	4.2810E-04	1,007.63	2,015.26	0.00E+00	4.31E-01	8.63E-01
Pu-240	2.4368E-04	1,007.63	2,015.26	0.00E+00	2.46E-01	4.91E-01
Pu-241	3.3415E-02	1,007.63	2,015.26	0.00E+00	3.37E+01	6.73E+01
Pu-242	3.6329E-07	1,007.63	2,015.26	0.00E+00	3.66E-04	7.32E-04
Ra-226	2.2854E-10	1,007.63	2,015.26	0.00E+00	2.30E-07	4.61E-07
Ra-228	1.2426E-14	1,007.63	2,015.26	0.00E+00	1.25E-11	2.50E-11
Ru-106	6.3589E-06	1,007.63	2,015.26	0.00E+00	6.41E-03	1.28E-02
Se-79	1.2933E-05	1,007.63	2,015.26	0.00E+00	1.30E-02	2.61E-02
Sn-126	1.1574E-05	1,007.63	2,015.26	0.00E+00	1.17E-02	2.33E-02
Sr-90	1.9248E+00	1,007.63	2,015.26	0.00E+00	1.94E+03	3.88E+03
Tc-99	4.2239E-04	1,007.63	2,015.26	0.00E+00	4.26E-01	8.51E-01
Th-229	5.0953E-12	1,007.63	2,015.26	0.00E+00	5.13E-09	1.03E-08
Th-230	4.1885E-08	1,007.63	2,015.26	0.00E+00	4.22E-05	8.44E-05
Th-232	1.9270E-14	1,007.63	2,015.26	0.00E+00	1.94E-11	3.88E-11
Tl-208	4.6024E-08	1,007.63	2,015.26	0.00E+00	4.64E-05	9.28E-05
U-232	1.2582E-07	1,007.63	2,015.26	0.00E+00	1.27E-04	2.54E-04
U-233	2.5825E-09	1,007.63	2,015.26	0.00E+00	2.60E-06	5.20E-06
U-234	1.8450E-04	1,007.63	2,015.26	0.00E+00	1.86E-01	3.72E-01
U-235	-2.7235E-06	1,007.63	0.00	1.24E-02	9.65E-03	1.24E-02
U-236	1.5493E-05	1,007.63	2,015.26	0.00E+00	1.56E-02	3.12E-02
U-238	-4.2851E-09	1,007.63	0.00	1.53E-04	1.49E-04	1.53E-04
Y-90	1.9254E+00	1,007.63	2,015.26	0.00E+00	1.94E+03	3.88E+03
Other Radionuclides					1.95E+03	3.90E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.127E+14
0.0250	4.424E+13
0.0375	3.858E+13
0.0575	4.132E+13
0.0850	2.497E+13
0.1250	1.690E+13
0.2250	2.155E+13
0.3750	9.380E+12
0.5750	1.530E+14
0.8500	2.587E+12
1.2500	1.477E+12
1.7500	6.779E+10
2.2500	5.947E+06
2.7500	3.362E+06
3.5000	1.544E+04
5.0000	8.734E+02
7.0000	9.642E+01
11.0000	1.081E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.40E+01	4.80E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.65152255	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,007.63
Bounding:		2,015.26

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.52	
Bounding:	1.03	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: BSR
SNF ID #: 31
Fuel Units & Descr: 41 - 19 PLATE MTR ASS'Y
Heavy Metal Mass: BOL=7.856kg; EOL=6.941kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1991
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' = 1.71

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	865.86	1,731.72	0.00E+00	3.97E-07	7.94E-07	Avg. MeV	
Am-241	1.7832E-03	865.86	1,731.72	0.00E+00	1.54E+00	3.09E+00	0.0150	2.068E+14
Am-242m	4.3410E-07	865.86	1,731.72	0.00E+00	3.76E-04	7.52E-04	0.0250	4.308E+13
Am-243	1.4907E-06	865.86	1,731.72	0.00E+00	1.29E-03	2.58E-03	0.0375	3.762E+13
C-14	5.7162E-09	865.86	1,731.72	0.00E+00	4.95E-06	9.90E-06	0.0575	4.011E+13
Cl-36	1.3124E-32	865.86	1,731.72	0.00E+00	1.14E-29	2.27E-29	0.0850	2.430E+13
Cm-243	1.8568E-07	865.86	1,731.72	0.00E+00	1.61E-04	3.22E-04	0.1250	1.666E+13
Cm-244	3.5512E-05	865.86	1,731.72	0.00E+00	3.07E-02	6.15E-02	0.2250	2.093E+13
Co-60	1.0261E-05	865.86	1,731.72	0.00E+00	8.88E-03	1.78E-02	0.3750	9.171E+12
Cs-134	1.6931E-02	865.86	1,731.72	0.00E+00	1.47E+01	2.93E+01	0.5750	1.489E+14
Cs-135	3.4477E-06	865.86	1,731.72	0.00E+00	2.99E-03	5.97E-03	0.8500	3.536E+12
Cs-137	2.2800E+00	865.86	1,731.72	0.00E+00	1.97E+03	3.95E+03	1.2500	1.786E+12
Eu-154	3.6656E-02	865.86	1,731.72	0.00E+00	3.17E+01	6.35E+01	1.7500	7.484E+10
Eu-155	9.6841E-03	865.86	1,731.72	0.00E+00	8.39E+00	1.68E+01	2.2500	9.363E+07
Fe-55	4.6977E-04	865.86	1,731.72	0.00E+00	4.07E-01	8.14E-01	2.7500	5.627E+06
H-3	6.0485E-03	865.86	1,731.72	0.00E+00	5.24E+00	1.05E+01	3.5000	3.576E+05
I-129	7.5300E-07	865.86	1,731.72	0.00E+00	6.52E-04	1.30E-03	5.0000	8.276E+02
Kr-85	1.4989E-01	865.86	1,731.72	0.00E+00	1.30E+02	2.60E+02	7.0000	9.165E+01
Np-237	9.5534E-06	865.86	1,731.72	0.00E+00	8.27E-03	1.65E-02	11.0000	1.029E+01
Pa-231	1.6550E-09	865.86	1,731.72	0.00E+00	1.43E-06	2.87E-06		
Pb-210	2.6631E-11	865.86	1,731.72	0.00E+00	2.31E-08	4.61E-08		
Pm-147	1.8156E-01	865.86	1,731.72	0.00E+00	1.57E+02	3.14E+02		
Pu-238	1.8990E-02	865.86	1,731.72	0.00E+00	1.64E+01	3.29E+01		
Pu-239	4.2838E-04	865.86	1,731.72	0.00E+00	3.71E-01	7.42E-01		
Pu-240	2.4379E-04	865.86	1,731.72	0.00E+00	2.11E-01	4.22E-01		
Pu-241	4.2511E-02	865.86	1,731.72	0.00E+00	3.68E+01	7.36E+01		
Pu-242	3.6329E-07	865.86	1,731.72	0.00E+00	3.15E-04	6.29E-04		
Ra-226	1.4725E-10	865.86	1,731.72	0.00E+00	1.27E-07	2.55E-07		
Ra-228	8.9760E-15	865.86	1,731.72	0.00E+00	7.77E-12	1.55E-11		
Ru-106	1.9752E-04	865.86	1,731.72	0.00E+00	1.71E-01	3.42E-01		
Se-79	1.2933E-05	865.86	1,731.72	0.00E+00	1.12E-02	2.24E-02		
Sn-126	1.1574E-05	865.86	1,731.72	0.00E+00	1.00E-02	2.00E-02		
Sr-90	2.1680E+00	865.86	1,731.72	0.00E+00	1.88E+03	3.75E+03		
Tc-99	4.2239E-04	865.86	1,731.72	0.00E+00	3.66E-01	7.31E-01		
Th-229	3.9270E-12	865.86	1,731.72	0.00E+00	3.40E-09	6.80E-09		
Th-230	3.3578E-06	865.86	1,731.72	0.00E+00	2.91E-03	5.81E-03		
Th-232	1.5452E-14	865.86	1,731.72	0.00E+00	1.34E-11	2.68E-11		
Tl-208	4.6705E-08	865.86	1,731.72	0.00E+00	4.04E-05	8.09E-05		
U-232	1.3045E-07	865.86	1,731.72	0.00E+00	1.13E-04	2.26E-04		
U-233	2.3739E-09	865.86	1,731.72	0.00E+00	2.06E-06	4.11E-06		
U-234	1.8423E-04	865.86	1,731.72	0.00E+00	1.60E-01	3.19E-01		
U-235	-2.7235E-06	865.86	0.00	1.58E-02	1.35E-02	1.58E-02		
U-236	1.5493E-05	865.86	1,731.72	0.00E+00	1.34E-02	2.68E-02		
U-238	-4.2851E-09	865.86	0.00	1.79E-04	1.75E-04	1.79E-04		
Y-90	2.1686E+00	865.86	1,731.72	0.00E+00	1.88E+03	3.76E+03		
Other Radionuclides					1.88E+03	3.77E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.34E+01	4.69E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.23369049	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		865.86
Bounding:		1,731.72

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.35	
Bounding:	0.70	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: CANDU
SNF ID #: 979
Fuel Units & Descr: 4 - ROD
Heavy Metal Mass: BOL= ; EOL=49.32kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2010
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: 35 years

Estimated Canister usage: 18"x15' = 0.14

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.6920E-09	47,275.85	47,275.85	0.00E+00	2.22E-04	2.22E-04
Am-241	2.2880E-02	47,275.85	47,275.85	0.00E+00	1.08E+03	1.08E+03
Am-242m	3.5400E-06	47,275.85	47,275.85	0.00E+00	1.67E-01	1.67E-01
Am-243	2.0580E-06	47,275.85	47,275.85	0.00E+00	9.73E-02	9.73E-02
C-14	1.1264E-03	47,275.85	47,275.85	0.00E+00	5.33E+01	5.33E+01
Cl-36	8.3760E-11	47,275.85	47,275.85	0.00E+00	3.96E-06	3.96E-06
Cm-243	5.0340E-07	47,275.85	47,275.85	0.00E+00	2.38E-02	2.38E-02
Cm-244	1.0450E-05	47,275.85	47,275.85	0.00E+00	4.94E-01	4.94E-01
Co-60	6.4420E-02	47,275.85	47,275.85	0.00E+00	3.05E+03	3.05E+03
Cs-134	7.9240E-06	47,275.85	47,275.85	0.00E+00	3.75E-01	3.75E-01
Cs-135	7.9140E-06	47,275.85	47,275.85	0.00E+00	3.74E-01	3.74E-01
Cs-137	1.4316E+00	47,275.85	47,275.85	0.00E+00	6.77E+04	6.77E+04
Eu-154	6.7900E-03	47,275.85	47,275.85	0.00E+00	3.21E+02	3.21E+02
Eu-155	6.2800E-04	47,275.85	47,275.85	0.00E+00	2.97E+01	2.97E+01
Fe-55	5.7480E-05	47,275.85	47,275.85	0.00E+00	2.72E+00	2.72E+00
H-3	2.3800E-02	47,275.85	47,275.85	0.00E+00	1.13E+03	1.13E+03
I-129	7.5020E-07	47,275.85	47,275.85	0.00E+00	3.55E-02	3.55E-02
Kr-85	3.8220E-02	47,275.85	47,275.85	0.00E+00	1.81E+03	1.81E+03
Np-237	5.5780E-06	47,275.85	47,275.85	0.00E+00	2.64E-01	2.64E-01
Pa-231	7.8820E-09	47,275.85	47,275.85	0.00E+00	3.73E-04	3.73E-04
Pb-210	4.3840E-09	47,275.85	47,275.85	0.00E+00	2.07E-04	2.07E-04
Pm-147	9.9500E-04	47,275.85	47,275.85	0.00E+00	4.70E+01	4.70E+01
Pu-238	6.4240E-03	47,275.85	47,275.85	0.00E+00	3.04E+02	3.04E+02
Pu-239	1.8744E-02	47,275.85	47,275.85	0.00E+00	8.86E+02	8.86E+02
Pu-240	8.3540E-03	47,275.85	47,275.85	0.00E+00	3.95E+02	3.95E+02
Pu-241	1.4606E-01	47,275.85	47,275.85	0.00E+00	6.91E+03	6.91E+03
Pu-242	2.0400E-06	47,275.85	47,275.85	0.00E+00	9.64E-02	9.64E-02
Ra-226	1.1804E-08	47,275.85	47,275.85	0.00E+00	5.58E-04	5.58E-04
Ra-228	1.1864E-09	47,275.85	47,275.85	0.00E+00	5.61E-05	5.61E-05
Ru-106	3.2580E-10	47,275.85	47,275.85	0.00E+00	1.54E-05	1.54E-05
Se-79	1.2524E-05	47,275.85	47,275.85	0.00E+00	5.92E-01	5.92E-01
Sn-126	1.2052E-05	47,275.85	47,275.85	0.00E+00	5.70E-01	5.70E-01
Sr-90	1.2638E+00	47,275.85	47,275.85	0.00E+00	5.97E+04	5.97E+04
Tc-99	4.4140E-04	47,275.85	47,275.85	0.00E+00	2.09E+01	2.09E+01
Th-229	4.3480E-09	47,275.85	47,275.85	0.00E+00	2.06E-04	2.06E-04
Th-230	1.0760E-06	47,275.85	47,275.85	0.00E+00	5.09E-02	5.09E-02
Th-232	1.1926E-09	47,275.85	47,275.85	0.00E+00	5.64E-05	5.64E-05
Tl-208	4.6200E-08	47,275.85	47,275.85	0.00E+00	2.18E-03	2.18E-03
U-232	1.2406E-07	47,275.85	47,275.85	0.00E+00	5.87E-03	5.87E-03
U-233	9.1620E-07	47,275.85	47,275.85	0.00E+00	4.33E-02	4.33E-02
U-234	2.3440E-03	47,275.85	47,275.85	0.00E+00	1.11E+02	1.11E+02
U-235	-2.3296E-06	47,275.85	0.00	1.07E-02	0.00E+00	1.07E-02
U-236	2.6620E-05	47,275.85	47,275.85	0.00E+00	1.26E+00	1.26E+00
U-238	-1.3291E-07	47,275.85	0.00	3.12E-02	2.49E-02	3.12E-02
Y-90	1.2642E+00	47,275.85	47,275.85	0.00E+00	5.98E+04	5.98E+04
Other Radionuclides					6.45E+04	6.45E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.298E+15
0.0250	6.832E+14
0.0375	6.010E+14
0.0575	6.508E+14
0.0850	3.837E+14
0.1250	2.532E+14
0.2250	3.306E+14
0.3750	1.438E+14
0.5750	2.516E+15
0.8500	2.904E+13
1.2500	2.393E+14
1.7500	7.871E+11
2.2500	1.261E+09
2.7500	8.066E+07
3.5000	2.433E+05
5.0000	1.021E+05
7.0000	1.149E+04
11.0000	1.303E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.89E+02	8.89E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		47,275.85
Bounding:		47,275.85

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	32.83	
Bounding:	32.83	

Estimated EOL HM/Given EOL HM: 2.59

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: CVTR FUEL
SNF ID #: 37
Fuel Units & Descr: 34 - ROD
Heavy Metal Mass: BOL=68.656kg; EOL=67.47kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1967
Estimates as of: 2010
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: 35 years

Estimated Canister usage: 18"x15' 0.45

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.6920E-09	1,137.42	2,274.84	0.00E+00	5.34E-06	1.07E-05	Avg. MeV	
Am-241	2.2880E-02	1,137.42	2,274.84	0.00E+00	2.60E+01	5.20E+01	0.0150	1.587E+14
Am-242m	3.5400E-06	1,137.42	2,274.84	0.00E+00	4.03E-03	8.05E-03	0.0250	3.287E+13
Am-243	2.0580E-06	1,137.42	2,274.84	0.00E+00	2.34E-03	4.68E-03	0.0375	2.892E+13
C-14	1.1264E-03	1,137.42	2,274.84	0.00E+00	1.28E+00	2.56E+00	0.0575	3.131E+13
Cl-36	8.3760E-11	1,137.42	2,274.84	0.00E+00	9.53E-08	1.91E-07	0.0850	1.847E+13
Cm-243	5.0340E-07	1,137.42	2,274.84	0.00E+00	5.73E-04	1.15E-03	0.1250	1.218E+13
Cm-244	1.0450E-05	1,137.42	2,274.84	0.00E+00	1.19E-02	2.38E-02	0.2250	1.591E+13
Co-60	6.4420E-02	1,137.42	2,274.84	0.00E+00	7.33E+01	1.47E+02	0.3750	6.919E+12
Cs-134	7.9240E-06	1,137.42	2,274.84	0.00E+00	9.01E-03	1.80E-02	0.5750	1.211E+14
Cs-135	7.9140E-06	1,137.42	2,274.84	0.00E+00	9.00E-03	1.80E-02	0.8500	1.398E+12
Cs-137	1.4316E+00	1,137.42	2,274.84	0.00E+00	1.63E+03	3.26E+03	1.2500	1.152E+13
Eu-154	6.7900E-03	1,137.42	2,274.84	0.00E+00	7.72E+00	1.54E+01	1.7500	3.787E+10
Eu-155	6.2800E-04	1,137.42	2,274.84	0.00E+00	7.14E-01	1.43E+00	2.2500	6.067E+07
Fe-55	5.7480E-05	1,137.42	2,274.84	0.00E+00	6.54E-02	1.31E-01	2.7500	3.882E+06
H-3	2.3800E-02	1,137.42	2,274.84	0.00E+00	2.71E+01	5.41E+01	3.5000	1.182E+04
I-129	7.5020E-07	1,137.42	2,274.84	0.00E+00	8.53E-04	1.71E-03	5.0000	4.962E+03
Kr-85	3.8220E-02	1,137.42	2,274.84	0.00E+00	4.35E+01	8.69E+01	7.0000	5.583E+02
Np-237	5.5780E-06	1,137.42	2,274.84	0.00E+00	6.34E-03	1.27E-02	11.0000	6.336E+01
Pa-231	7.8820E-09	1,137.42	2,274.84	0.00E+00	8.97E-06	1.79E-05		
Pb-210	4.3840E-09	1,137.42	2,274.84	0.00E+00	4.99E-06	9.97E-06		
Pm-147	9.9500E-04	1,137.42	2,274.84	0.00E+00	1.13E+00	2.26E+00		
Pu-238	6.4240E-03	1,137.42	2,274.84	0.00E+00	7.31E+00	1.46E+01		
Pu-239	1.8744E-02	1,137.42	2,274.84	0.00E+00	2.13E+01	4.26E+01		
Pu-240	8.3540E-03	1,137.42	2,274.84	0.00E+00	9.50E+00	1.90E+01		
Pu-241	1.4606E-01	1,137.42	2,274.84	0.00E+00	1.66E+02	3.32E+02		
Pu-242	2.0400E-06	1,137.42	2,274.84	0.00E+00	2.32E-03	4.64E-03		
Ra-226	1.1804E-08	1,137.42	2,274.84	0.00E+00	1.34E-05	2.69E-05		
Ra-228	1.1864E-09	1,137.42	2,274.84	0.00E+00	1.35E-06	2.70E-06		
Ru-106	3.2580E-10	1,137.42	2,274.84	0.00E+00	3.71E-07	7.41E-07		
Se-79	1.2524E-05	1,137.42	2,274.84	0.00E+00	1.42E-02	2.85E-02		
Sn-126	1.2052E-05	1,137.42	2,274.84	0.00E+00	1.37E-02	2.74E-02		
Sr-90	1.2638E+00	1,137.42	2,274.84	0.00E+00	1.44E+03	2.87E+03		
Tc-99	4.4140E-04	1,137.42	2,274.84	0.00E+00	5.02E-01	1.00E+00		
Th-229	4.3480E-09	1,137.42	2,274.84	0.00E+00	4.95E-06	9.89E-06		
Th-230	1.0760E-06	1,137.42	2,274.84	0.00E+00	1.22E-03	2.45E-03		
Th-232	1.1926E-09	1,137.42	2,274.84	0.00E+00	1.36E-06	2.71E-06		
Tl-208	4.6200E-08	1,137.42	2,274.84	0.00E+00	5.25E-05	1.05E-04		
U-232	1.2406E-07	1,137.42	2,274.84	0.00E+00	1.41E-04	2.82E-04	Thermal Power	
U-233	9.1620E-07	1,137.42	2,274.84	0.00E+00	1.04E-03	2.08E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	2.3440E-03	1,137.42	2,274.84	0.00E+00	2.67E+00	5.33E+00		
U-235	-2.3296E-06	1,137.42	0.00	2.67E-03	2.09E-05	2.67E-03		
U-236	2.6620E-05	1,137.42	2,274.84	0.00E+00	3.03E-02	6.06E-02	2.09E+01	4.18E+01
U-238	-1.3291E-07	1,137.42	0.00	2.27E-02	2.25E-02	2.27E-02	Total	Total
Y-90	1.2642E+00	1,137.42	2,274.84	0.00E+00	1.44E+03	2.88E+03		
Other Radionuclides					1.55E+03	3.10E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,137.42
Bounding:		2,274.84

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.13	
Bounding:	2.27	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: DR-3 (U3O8 LEU)(DENMARK)
SNF ID #: 1059
Fuel Units & Descr: 3 - 4 CONCENTRIC TUBES
Heavy Metal Mass: BOL=2.752kg; EOL=2.517kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1997
Estimates as of: 2010
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: 10 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	3.5433E-10	224.12	448.24	0.00E+00	7.94E-08	1.59E-07
Am-241	1.6993E-02	224.12	448.24	0.00E+00	3.81E+00	7.62E+00
Am-242m	9.3333E-06	224.12	448.24	0.00E+00	2.09E-03	4.18E-03
Am-243	6.4067E-06	224.12	448.24	0.00E+00	1.44E-03	2.87E-03
C-14	2.9653E-08	224.12	448.24	0.00E+00	6.65E-06	1.33E-05
Cl-36	5.9513E-35	224.12	448.24	0.00E+00	1.33E-32	2.67E-32
Cm-243	2.8167E-06	224.12	448.24	0.00E+00	6.31E-04	1.26E-03
Cm-244	1.6140E-04	224.12	448.24	0.00E+00	3.62E-02	7.23E-02
Co-60	6.0893E-05	224.12	448.24	0.00E+00	1.36E-02	2.73E-02
Cs-134	6.1567E-02	224.12	448.24	0.00E+00	1.38E+01	2.76E+01
Cs-135	4.8607E-06	224.12	448.24	0.00E+00	1.09E-03	2.18E-03
Cs-137	2.5487E+00	224.12	448.24	0.00E+00	5.71E+02	1.14E+03
Eu-154	4.6760E-02	224.12	448.24	0.00E+00	1.05E+01	2.10E+01
Eu-155	1.8533E-02	224.12	448.24	0.00E+00	3.71E+00	7.41E+00
Fe-55	2.0373E-02	224.12	448.24	0.00E+00	4.57E+00	9.13E+00
H-3	8.1800E-03	224.12	448.24	0.00E+00	1.83E+00	3.67E+00
I-129	7.1600E-07	224.12	448.24	0.00E+00	1.60E-04	3.21E-04
Kr-85	1.9547E-01	224.12	448.24	0.00E+00	4.38E+01	8.76E+01
Np-237	3.6573E-06	224.12	448.24	0.00E+00	8.20E-04	1.64E-03
Pa-231	1.6420E-09	224.12	448.24	0.00E+00	3.68E-07	7.36E-07
Pb-210	7.4600E-15	224.12	448.24	0.00E+00	1.67E-12	3.34E-12
Pm-147	6.5033E-01	224.12	448.24	0.00E+00	1.46E+02	2.92E+02
Pu-238	5.9807E-03	224.12	448.24	0.00E+00	1.34E+00	2.68E+00
Pu-239	1.0320E-02	224.12	448.24	0.00E+00	2.31E+00	4.63E+00
Pu-240	5.4233E-03	224.12	448.24	0.00E+00	1.22E+00	2.43E+00
Pu-241	6.0807E-01	224.12	448.24	0.00E+00	1.36E+02	2.73E+02
Pu-242	3.0713E-06	224.12	448.24	0.00E+00	6.88E-04	1.38E-03
Ra-226	6.1580E-14	224.12	448.24	0.00E+00	1.38E-11	2.76E-11
Ra-228	4.9953E-15	224.12	448.24	0.00E+00	1.12E-12	2.24E-12
Ru-106	8.2133E-03	224.12	448.24	0.00E+00	1.84E+00	3.68E+00
Se-79	1.2540E-05	224.12	448.24	0.00E+00	2.81E-03	5.62E-03
Sn-126	1.1393E-05	224.12	448.24	0.00E+00	2.55E-03	5.11E-03
Sr-90	2.3340E+00	224.12	448.24	0.00E+00	5.23E+02	1.05E+03
Tc-99	4.3540E-04	224.12	448.24	0.00E+00	9.76E-02	1.95E-01
Th-229	2.4973E-13	224.12	448.24	0.00E+00	5.60E-11	1.12E-10
Th-230	2.4613E-11	224.12	448.24	0.00E+00	5.52E-09	1.10E-08
Th-232	9.9467E-15	224.12	448.24	0.00E+00	2.23E-12	4.46E-12
Tl-208	7.7667E-09	224.12	448.24	0.00E+00	1.74E-06	3.48E-06
U-232	2.1927E-08	224.12	448.24	0.00E+00	4.91E-06	9.83E-06
U-233	2.7887E-10	224.12	448.24	0.00E+00	6.25E-08	1.25E-07
U-234	3.0807E-07	224.12	448.24	0.00E+00	6.90E-05	1.38E-04
U-235	-2.5341E-06	224.12	0.00	1.16E-03	5.97E-04	1.16E-03
U-236	1.3000E-05	224.12	448.24	0.00E+00	2.91E-03	5.83E-03
U-238	-1.4207E-08	224.12	0.00	7.44E-04	7.41E-04	7.44E-04
Y-90	2.3347E+00	224.12	448.24	0.00E+00	5.23E+02	1.05E+03
Other Radionuclides					5.53E+02	1.11E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.845E+13
0.0250	1.229E+13
0.0375	1.077E+13
0.0575	1.140E+13
0.0850	6.869E+12
0.1250	4.764E+12
0.2250	5.896E+12
0.3750	2.644E+12
0.5750	4.406E+13
0.8500	1.681E+12
1.2500	6.099E+11
1.7500	2.355E+10
2.2500	1.424E+09
2.7500	3.051E+07
3.5000	3.830E+06
5.0000	1.075E+03
7.0000	1.222E+02
11.0000	1.394E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.96E+00	1.39E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.58291238	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		224.12
Bounding:		448.24

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.86	
Bounding:	3.72	

Estimated EOL HM/Given EOL HM: 1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: DR-3 (U3Si2 LEU)(DENMARK)
SNF ID #: 759
Fuel Units & Descr: 375 - 4 CONCENTRIC TUBES
Heavy Metal Mass: BOL=341.662kg; EOL=309.112kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1997
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10" = 10.42

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.5433E-10	30,937.63	61,875.26	0.00E+00	1.10E-05	2.19E-05	Avg. MeV	
Am-241	1.6993E-02	30,937.63	61,875.26	0.00E+00	5.26E+02	1.05E+03	0.0150	8.068E+15
Am-242m	9.3333E-06	30,937.63	61,875.26	0.00E+00	2.89E-01	5.78E-01	0.0250	1.697E+15
Am-243	6.4067E-06	30,937.63	61,875.26	0.00E+00	1.98E-01	3.96E-01	0.0375	1.487E+15
C-14	2.9653E-08	30,937.63	61,875.26	0.00E+00	9.17E-04	1.83E-03	0.0575	1.574E+15
Cl-36	5.9513E-35	30,937.63	61,875.26	0.00E+00	1.84E-30	3.68E-30	0.0850	9.482E+14
Cm-243	2.8167E-06	30,937.63	61,875.26	0.00E+00	8.71E-02	1.74E-01	0.1250	8.576E+14
Cm-244	1.6140E-04	30,937.63	61,875.26	0.00E+00	4.99E+00	9.99E+00	0.2250	8.142E+14
Co-60	6.0893E-05	30,937.63	61,875.26	0.00E+00	1.88E+00	3.77E+00	0.3750	3.650E+14
Cs-134	6.1567E-02	30,937.63	61,875.26	0.00E+00	1.90E+03	3.81E+03	0.5750	6.082E+15
Cs-135	4.8607E-06	30,937.63	61,875.26	0.00E+00	1.50E-01	3.01E-01	0.8500	2.321E+14
Cs-137	2.5487E+00	30,937.63	61,875.26	0.00E+00	7.88E+04	1.58E+05	1.2500	8.419E+13
Eu-154	4.6760E-02	30,937.63	61,875.26	0.00E+00	1.45E+03	2.89E+03	1.7500	3.252E+12
Eu-155	1.6533E-02	30,937.63	61,875.26	0.00E+00	5.12E+02	1.02E+03	2.2500	1.966E+11
Fe-55	2.0373E-02	30,937.63	61,875.26	0.00E+00	6.30E+02	1.26E+03	2.7500	4.211E+09
H-3	8.1800E-03	30,937.63	61,875.26	0.00E+00	2.53E+02	5.06E+02	3.5000	5.287E+08
I-129	7.1600E-07	30,937.63	61,875.26	0.00E+00	2.22E-02	4.43E-02	5.0000	1.484E+05
Kr-85	1.9547E-01	30,937.63	61,875.26	0.00E+00	6.05E+03	1.21E+04	7.0000	1.687E+04
Np-237	3.6573E-06	30,937.63	61,875.26	0.00E+00	1.13E-01	2.26E-01	11.0000	1.924E+03
Pa-231	1.6420E-09	30,937.63	61,875.26	0.00E+00	5.08E-05	1.02E-04		
Pb-210	7.4600E-15	30,937.63	61,875.26	0.00E+00	2.31E-10	4.62E-10		
Pm-147	6.5033E-01	30,937.63	61,875.26	0.00E+00	2.01E+04	4.02E+04		
Pu-238	5.9807E-03	30,937.63	61,875.26	0.00E+00	1.85E+02	3.70E+02		
Pu-239	1.0320E-02	30,937.63	61,875.26	0.00E+00	3.19E+02	6.39E+02		
Pu-240	5.4233E-03	30,937.63	61,875.26	0.00E+00	1.68E+02	3.36E+02		
Pu-241	6.0807E-01	30,937.63	61,875.26	0.00E+00	1.88E+04	3.76E+04		
Pu-242	3.0713E-06	30,937.63	61,875.26	0.00E+00	9.50E-02	1.90E-01		
Ra-226	6.1580E-14	30,937.63	61,875.26	0.00E+00	1.91E-09	3.81E-09		
Ra-228	4.9953E-15	30,937.63	61,875.26	0.00E+00	1.55E-10	3.09E-10		
Ru-106	8.2133E-03	30,937.63	61,875.26	0.00E+00	2.54E+02	5.08E+02		
Se-79	1.2540E-05	30,937.63	61,875.26	0.00E+00	3.88E-01	7.76E-01		
Sn-126	1.1393E-05	30,937.63	61,875.26	0.00E+00	3.52E-01	7.05E-01		
Sr-90	2.3340E+00	30,937.63	61,875.26	0.00E+00	7.22E+04	1.44E+05		
Tc-99	4.3540E-04	30,937.63	61,875.26	0.00E+00	1.35E+01	2.69E+01		
Th-229	2.4973E-13	30,937.63	61,875.26	0.00E+00	7.73E-09	1.55E-08		
Th-230	2.4613E-11	30,937.63	61,875.26	0.00E+00	7.61E-07	1.52E-06		
Th-232	9.9467E-15	30,937.63	61,875.26	0.00E+00	3.08E-10	6.15E-10		
Tl-208	7.7667E-09	30,937.63	61,875.26	0.00E+00	2.40E-04	4.81E-04		
U-232	2.1927E-06	30,937.63	61,875.26	0.00E+00	6.78E-04	1.36E-03		
U-233	2.7887E-10	30,937.63	61,875.26	0.00E+00	8.63E-06	1.73E-05		
U-234	3.0807E-07	30,937.63	61,875.26	0.00E+00	9.53E-03	1.91E-02		
U-235	-2.5341E-06	30,937.63	0.00	1.46E-01	6.75E-02	1.46E-01		
U-236	1.3000E-05	30,937.63	61,875.26	0.00E+00	4.02E-01	8.04E-01		
U-238	-1.4207E-06	30,937.63	0.00	9.21E-02	9.17E-02	9.21E-02		
Y-90	2.3347E+00	30,937.63	61,875.26	0.00E+00	7.22E+04	1.44E+05		
Other Radionuclides					7.63E+04	1.53E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.60E+02	1.92E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.7578539	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		30,937.63	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		61,875.26	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	2.07	
Bounding:	4.14	

Estimated EOL HM/Given EOL HM: 1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: DR-3 (UALX HEU)(DENMARK)
SNF ID #: 714
Fuel Units & Descr: 88 - 4 CONCENTRIC TUBES
Heavy Metal Mass: BOL=14.529kg; EOL=8.8kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1997
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' = 2.44

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.3262E-10	5,276.81	10,553.63	0.00E+00	7.00E-07	1.40E-06
Am-241	5.9611E-03	5,276.81	10,553.63	0.00E+00	3.15E+01	6.29E+01
Am-242m	1.4332E-06	5,276.81	10,553.63	0.00E+00	7.56E-03	1.51E-02
Am-243	3.7132E-05	5,276.81	10,553.63	0.00E+00	1.96E-01	3.92E-01
C-14	2.6501E-08	5,276.81	10,553.63	0.00E+00	1.40E-04	2.80E-04
Cl-36	4.4441E-31	5,276.81	10,553.63	0.00E+00	2.35E-27	4.69E-27
Cm-243	7.2722E-06	5,276.81	10,553.63	0.00E+00	3.84E-02	7.67E-02
Cm-244	6.8226E-03	5,276.81	10,553.63	0.00E+00	3.60E+01	7.20E+01
Co-60	1.8117E-04	5,276.81	10,553.63	0.00E+00	9.56E-01	1.91E+00
Cs-134	3.0595E-01	5,276.81	10,553.63	0.00E+00	1.61E+03	3.23E+03
Cs-135	4.2564E-06	5,276.81	10,553.63	0.00E+00	2.25E-02	4.49E-02
Cs-137	2.5650E+00	5,276.81	10,553.63	0.00E+00	1.35E+04	2.71E+04
Eu-154	1.1628E-01	5,276.81	10,553.63	0.00E+00	6.14E+02	1.23E+03
Eu-155	5.7776E-02	5,276.81	10,553.63	0.00E+00	3.05E+02	6.10E+02
Fe-55	1.9465E-02	5,276.81	10,553.63	0.00E+00	1.03E+02	2.05E+02
H-3	8.1045E-03	5,276.81	10,553.63	0.00E+00	4.28E+01	8.55E+01
I-129	6.6403E-07	5,276.81	10,553.63	0.00E+00	3.50E-03	7.01E-03
Kr-85	2.0620E-01	5,276.81	10,553.63	0.00E+00	1.09E+03	2.18E+03
Np-237	3.1513E-05	5,276.81	10,553.63	0.00E+00	1.66E-01	3.33E-01
Pa-231	6.0304E-10	5,276.81	10,553.63	0.00E+00	3.18E-06	6.36E-06
Pb-210	2.7017E-12	5,276.81	10,553.63	0.00E+00	1.43E-08	2.85E-08
Pm-147	3.4210E-01	5,276.81	10,553.63	0.00E+00	1.81E+03	3.61E+03
Pu-238	1.6622E-01	5,276.81	10,553.63	0.00E+00	8.77E+02	1.75E+03
Pu-239	6.9563E-04	5,276.81	10,553.63	0.00E+00	3.67E+00	7.34E+00
Pu-240	3.7169E-04	5,276.81	10,553.63	0.00E+00	1.96E+00	3.92E+00
Pu-241	2.1731E-01	5,276.81	10,553.63	0.00E+00	1.15E+03	2.29E+03
Pu-242	3.0911E-06	5,276.81	10,553.63	0.00E+00	1.63E-02	3.26E-02
Ra-226	1.9435E-11	5,276.81	10,553.63	0.00E+00	1.03E-07	2.05E-07
Ra-228	6.1725E-15	5,276.81	10,553.63	0.00E+00	3.26E-11	6.51E-11
Ru-106	7.0778E-03	5,276.81	10,553.63	0.00E+00	3.73E+01	7.47E+01
Se-79	1.2339E-05	5,276.81	10,553.63	0.00E+00	6.51E-02	1.30E-01
Sn-126	1.0194E-05	5,276.81	10,553.63	0.00E+00	5.38E-02	1.08E-01
Sr-90	2.4186E+00	5,276.81	10,553.63	0.00E+00	1.28E+04	2.55E+04
Tc-99	3.8056E-04	5,276.81	10,553.63	0.00E+00	2.01E+00	4.02E+00
Th-229	2.0097E-12	5,276.81	10,553.63	0.00E+00	1.06E-08	2.12E-08
Th-230	6.0577E-09	5,276.81	10,553.63	0.00E+00	3.20E-05	6.39E-05
Th-232	1.2473E-14	5,276.81	10,553.63	0.00E+00	6.58E-11	1.32E-10
Tl-208	4.8791E-08	5,276.81	10,553.63	0.00E+00	2.57E-04	5.15E-04
U-232	1.3821E-07	5,276.81	10,553.63	0.00E+00	7.29E-04	1.46E-03
U-233	2.3906E-09	5,276.81	10,553.63	0.00E+00	1.26E-05	2.52E-05
U-234	4.7697E-05	5,276.81	10,553.63	0.00E+00	2.52E-01	5.03E-01
U-235	-2.8661E-06	5,276.81	0.00	2.79E-02	1.28E-02	2.79E-02
U-236	1.6701E-05	5,276.81	10,553.63	0.00E+00	8.81E-02	1.76E-01
U-238	-9.4194E-09	5,276.81	0.00	5.43E-04	4.94E-04	5.43E-04
Y-90	2.4192E+00	5,276.81	10,553.63	0.00E+00	1.28E+04	2.55E+04
Other Radionuclides					1.32E+04	2.64E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.442E+15
0.0250	3.006E+14
0.0375	2.720E+14
0.0575	2.799E+14
0.0850	1.734E+14
0.1250	1.302E+14
0.2250	1.464E+14
0.3750	6.467E+13
0.5750	1.168E+15
0.8500	1.370E+14
1.2500	3.443E+13
1.7500	9.917E+11
2.2500	4.341E+10
2.7500	6.487E+08
3.5000	7.873E+07
5.0000	4.568E+05
7.0000	5.250E+04
11.0000	6.020E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.08E+02	4.16E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	88.87461392	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		5,276.81
Bounding:		10,553.63

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.83	
Bounding:	1.66	

Estimated EOL HM/Given EOL HM: 1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: DRESDEN I THO2/UO2 (LEU)
SNF ID #: 44
Fuel Units & Descr: 1000 - ROD
Heavy Metal Mass: BOL= ; EOL=2382.5kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
Template: LWBR (Light Water, Zirc, 60 to 100%, Th and U)
[2]Template Burnup(MWd): 10269.14
Template BOL Heavy Metal Mass (MT): 0.45991251
Template Decay Time: 35 years

Estimated Canister usage: 18"x15' 5.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9.7360E-05	2,318,560.61	2,318,560.61	0.00E+00	2.26E+02	2.26E+02	Avg. MeV	
Am-241	2.4345E-04	2,318,560.61	2,318,560.61	0.00E+00	5.64E+02	5.64E+02	0.0150	1.911E+17
Am-242m	1.4821E-06	2,318,560.61	2,318,560.61	0.00E+00	3.44E+00	3.44E+00	0.0250	3.939E+16
Am-243	3.1152E-07	2,318,560.61	2,318,560.61	0.00E+00	7.22E-01	7.22E-01	0.0375	3.366E+16
C-14	9.2432E-05	2,318,560.61	2,318,560.61	0.00E+00	2.14E+02	2.14E+02	0.0575	3.680E+16
Cl-36	1.8103E-06	2,318,560.61	2,318,560.61	0.00E+00	4.20E+00	4.20E+00	0.0850	2.350E+16
Cm-243	3.0597E-07	2,318,560.61	2,318,560.61	0.00E+00	7.09E-01	7.09E-01	0.1250	1.473E+16
Cm-244	1.4149E-05	2,318,560.61	2,318,560.61	0.00E+00	3.28E+01	3.28E+01	0.2250	2.108E+16
Co-60	8.7369E-04	2,318,560.61	2,318,560.61	0.00E+00	2.03E+03	2.03E+03	0.3750	8.463E+15
Cs-134	2.5601E-05	2,318,560.61	2,318,560.61	0.00E+00	5.94E+01	5.94E+01	0.5750	1.292E+17
Cs-135	2.8639E-05	2,318,560.61	2,318,560.61	0.00E+00	6.64E+01	6.64E+01	0.8500	2.309E+15
Cs-137	1.4772E+00	2,318,560.61	2,318,560.61	0.00E+00	3.43E+06	3.43E+06	1.2500	1.020E+15
Eu-154	8.6025E-03	2,318,560.61	2,318,560.61	0.00E+00	1.99E+04	1.99E+04	1.7500	1.591E+14
Eu-155	6.6062E-04	2,318,560.61	2,318,560.61	0.00E+00	1.53E+03	1.53E+03	2.2500	4.622E+09
Fe-55	2.3011E-06	2,318,560.61	2,318,560.61	0.00E+00	5.34E+00	5.34E+00	2.7500	1.137E+15
H-3	2.1277E-03	2,318,560.61	2,318,560.61	0.00E+00	4.93E+03	4.93E+03	3.5000	4.061E+06
I-129	1.5853E-06	2,318,560.61	2,318,560.61	0.00E+00	3.68E+00	3.68E+00	5.0000	1.276E+06
Kr-85	6.2625E-02	2,318,560.61	2,318,560.61	0.00E+00	1.45E+05	1.45E+05	7.0000	9.385E+04
Np-237	1.2620E-07	2,318,560.61	2,318,560.61	0.00E+00	2.93E-01	2.93E-01	11.0000	7.240E+03
Pa-231	1.2017E-04	2,318,560.61	2,318,560.61	0.00E+00	2.79E+02	2.79E+02		
Pb-210	1.4247E-06	2,318,560.61	2,318,560.61	0.00E+00	3.30E-02	3.30E-02		
Pm-147	2.6224E-04	2,318,560.61	2,318,560.61	0.00E+00	6.08E+02	6.08E+02		
Pu-238	4.2477E-04	2,318,560.61	2,318,560.61	0.00E+00	9.85E+02	9.85E+02		
Pu-239	2.7519E-05	2,318,560.61	2,318,560.61	0.00E+00	6.38E+01	6.38E+01		
Pu-240	1.6184E-05	2,318,560.61	2,318,560.61	0.00E+00	3.75E+01	3.75E+01		
Pu-241	1.4695E-03	2,318,560.61	2,318,560.61	0.00E+00	3.41E+03	3.41E+03		
Pu-242	4.0831E-08	2,318,560.61	2,318,560.61	0.00E+00	9.47E-02	9.47E-02		
Ra-226	2.1423E-08	2,318,560.61	2,318,560.61	0.00E+00	4.97E-02	4.97E-02		
Ra-228	4.6236E-06	2,318,560.61	2,318,560.61	0.00E+00	1.07E+01	1.07E+01		
Ru-106	4.0208E-11	2,318,560.61	2,318,560.61	0.00E+00	9.32E-05	9.32E-05		
Se-79	3.5417E-05	2,318,560.61	2,318,560.61	0.00E+00	8.21E+01	8.21E+01		
Sn-126	3.9848E-05	2,318,560.61	2,318,560.61	0.00E+00	9.24E+01	9.24E+01		
Sr-90	1.4928E+00	2,318,560.61	2,318,560.61	0.00E+00	3.46E+06	3.46E+06		
Tc-99	3.2525E-04	2,318,560.61	2,318,560.61	0.00E+00	7.54E+02	7.54E+02		
Th-229	6.4582E-05	2,318,560.61	2,318,560.61	0.00E+00	1.50E+02	1.50E+02		
Th-230	1.1432E-06	2,318,560.61	2,318,560.61	0.00E+00	2.65E+00	2.65E+00		
Th-232	-9.0328E-08	2,318,560.61	0.00	5.03E-01	2.94E-01	5.03E-01		
Tl-208	1.3964E-02	2,318,560.61	2,318,560.61	0.00E+00	3.24E+04	3.24E+04		
U-232	3.7822E-02	2,318,560.61	2,318,560.61	0.00E+00	8.77E+04	8.77E+04		
U-233	-3.3244E-03	2,318,560.61	0.00	1.69E+03	0.00E+00	1.69E+03		
U-234	8.1769E-04	2,318,560.61	2,318,560.61	0.00E+00	1.90E+03	1.90E+03		
U-235	5.7813E-08	2,318,560.61	2,318,560.61	3.46E-04	1.34E-01	1.34E-01		
U-236	1.3273E-07	2,318,560.61	2,318,560.61	0.00E+00	3.08E-01	3.08E-01		
U-238	-3.1121E-10	2,318,560.61	0.00	2.21E-04	0.00E+00	2.21E-04		
Y-90	1.4928E+00	2,318,560.61	2,318,560.61	0.00E+00	3.46E+06	3.46E+06		
Other Radionuclides					3.87E+06	3.87E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.15E+04	6.19E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2,318,560.61
Bounding:		2,318,560.61

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	21.79	
Bounding:	21.79	

Estimated EOL HM/Given EOL HM: 1.28

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: DRESDEN UO2 (LEU)
SNF ID #: 49
Fuel Units & Descr: 72 - ROD
Heavy Metal Mass: BOL= ; EOL=162.382kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
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" 0.36

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	2.3344E-08	153,393.39	153,393.39	0.00E+00	3.58E-03	3.58E-03
Am-241	1.1135E-04	153,393.39	153,393.39	0.00E+00	1.71E+01	1.71E+01
Am-242m	8.5075E-09	153,393.39	153,393.39	0.00E+00	1.30E-03	1.30E-03
Am-243	9.8519E-10	153,393.39	153,393.39	0.00E+00	1.51E-04	1.51E-04
C-14	2.3012E-04	153,393.39	153,393.39	0.00E+00	3.53E+01	3.53E+01
Cl-36	1.2261E-06	153,393.39	153,393.39	0.00E+00	1.88E-01	1.88E-01
Cm-243	2.4875E-10	153,393.39	153,393.39	0.00E+00	3.82E-05	3.82E-05
Cm-244	2.3178E-09	153,393.39	153,393.39	0.00E+00	3.56E-04	3.56E-04
Co-60	7.0849E-02	153,393.39	153,393.39	0.00E+00	1.09E+04	1.09E+04
Cs-134	3.0266E-06	153,393.39	153,393.39	0.00E+00	4.64E-01	4.64E-01
Cs-135	3.0316E-05	153,393.39	153,393.39	0.00E+00	4.65E+00	4.65E+00
Cs-137	1.4511E+00	153,393.39	153,393.39	0.00E+00	2.23E+05	2.23E+05
Eu-154	6.6955E-04	153,393.39	153,393.39	0.00E+00	1.03E+02	1.03E+02
Eu-155	6.9850E-04	153,393.39	153,393.39	0.00E+00	1.07E+02	1.07E+02
Fe-55	1.2318E-03	153,393.39	153,393.39	0.00E+00	1.89E+02	1.89E+02
H-3	2.5141E-03	153,393.39	153,393.39	0.00E+00	3.86E+02	3.86E+02
I-129	7.3195E-07	153,393.39	153,393.39	0.00E+00	1.12E-01	1.12E-01
Kr-85	4.1281E-02	153,393.39	153,393.39	0.00E+00	6.33E+03	6.33E+03
Np-237	1.1489E-06	153,393.39	153,393.39	0.00E+00	1.76E-01	1.76E-01
Pa-231	4.5241E-08	153,393.39	153,393.39	0.00E+00	6.94E-03	6.94E-03
Pb-210	6.4476E-13	153,393.39	153,393.39	0.00E+00	9.89E-08	9.89E-08
Pm-147	1.1651E-03	153,393.39	153,393.39	0.00E+00	1.79E+02	1.79E+02
Pu-238	2.9517E-04	153,393.39	153,393.39	0.00E+00	4.53E+01	4.53E+01
Pu-239	6.6772E-04	153,393.39	153,393.39	0.00E+00	1.02E+02	1.02E+02
Pu-240	8.6839E-05	153,393.39	153,393.39	0.00E+00	1.33E+01	1.33E+01
Pu-241	7.1514E-04	153,393.39	153,393.39	0.00E+00	1.10E+02	1.10E+02
Pu-242	1.9717E-09	153,393.39	153,393.39	0.00E+00	3.02E-04	3.02E-04
Ra-226	1.7654E-12	153,393.39	153,393.39	0.00E+00	2.71E-07	2.71E-07
Ra-228	8.2928E-12	153,393.39	153,393.39	0.00E+00	1.27E-06	1.27E-06
Ru-106	1.8419E-10	153,393.39	153,393.39	0.00E+00	2.83E-05	2.83E-05
Se-79	1.3223E-05	153,393.39	153,393.39	0.00E+00	2.03E+00	2.03E+00
Sn-126	1.1493E-05	153,393.39	153,393.39	0.00E+00	1.76E+00	1.76E+00
Sr-90	1.3649E+00	153,393.39	153,393.39	0.00E+00	2.09E+05	2.09E+05
Tc-99	4.6656E-04	153,393.39	153,393.39	0.00E+00	7.16E+01	7.16E+01
Th-229	1.4547E-11	153,393.39	153,393.39	0.00E+00	2.23E-06	2.23E-06
Th-230	1.6617E-10	153,393.39	153,393.39	0.00E+00	2.55E-05	2.55E-05
Th-232	8.3361E-12	153,393.39	153,393.39	0.00E+00	1.28E-06	1.28E-06
Tl-208	2.1664E-06	153,393.39	153,393.39	0.00E+00	3.32E-03	3.32E-03
U-232	5.8669E-06	153,393.39	153,393.39	0.00E+00	9.00E-03	9.00E-03
U-233	3.1847E-09	153,393.39	153,393.39	0.00E+00	4.89E-04	4.89E-04
U-234	3.8769E-07	153,393.39	153,393.39	0.00E+00	5.95E-02	5.95E-02
U-235	-2.7761E-06	153,393.39	0.00	6.56E-01	2.30E-01	6.56E-01
U-236	1.6190E-05	153,393.39	153,393.39	0.00E+00	2.48E+00	2.48E+00
U-238	-2.8547E-09	153,393.39	0.00	7.09E-03	6.65E-03	7.09E-03
Y-90	1.3652E+00	153,393.39	153,393.39	0.00E+00	2.09E+05	2.09E+05
Other Radionuclides					2.53E+05	2.53E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.145E+16
0.0250	2.379E+15
0.0375	2.058E+15
0.0575	2.218E+15
0.0850	1.340E+15
0.1250	8.702E+14
0.2250	1.154E+15
0.3750	5.032E+14
0.5750	8.289E+15
0.8500	8.390E+13
1.2500	8.339E+14
1.7500	2.164E+12
2.2500	4.493E+09
2.7500	1.299E+08
3.5000	9.159E+03
5.0000	3.767E+03
7.0000	4.159E+02
11.0000	4.667E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.68E+03	2.68E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		153,393.39
Bounding:		153,393.39

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

Checks

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

Estimated EOL HM/Given EOL HM: 1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (6% UO2) LEU
SNF ID #: 65
Fuel Units & Descr: 61 - 6 FLAT PLATES
Heavy Metal Mass: BOL=1636.02kg; EOL=1603.519kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
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' 5.08

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	30,906.72	61,813.45	0.00E+00	2.71E-05	5.42E-05
Am-241	1.4352E-01	30,906.72	61,813.45	0.00E+00	4.44E+03	8.87E+03
Am-242m	2.8698E-04	30,906.72	61,813.45	0.00E+00	8.87E+00	1.77E+01
Am-243	6.2565E-04	30,906.72	61,813.45	0.00E+00	1.93E+01	3.87E+01
C-14	4.7901E-05	30,906.72	61,813.45	0.00E+00	1.48E+00	2.96E+00
Cl-36	8.0297E-07	30,906.72	61,813.45	0.00E+00	2.48E-02	4.96E-02
Cm-243	2.5081E-04	30,906.72	61,813.45	0.00E+00	7.75E+00	1.55E+01
Cm-244	4.9015E-02	30,906.72	61,813.45	0.00E+00	1.51E+03	3.03E+03
Co-60	2.5581E-03	30,906.72	61,813.45	0.00E+00	7.91E+01	1.58E+02
Cs-134	4.0536E-05	30,906.72	61,813.45	0.00E+00	1.25E+00	2.51E+00
Cs-135	1.4433E-05	30,906.72	61,813.45	0.00E+00	4.46E-01	8.92E-01
Cs-137	1.3979E+00	30,906.72	61,813.45	0.00E+00	4.32E+04	8.64E+04
Eu-154	2.0203E-02	30,906.72	61,813.45	0.00E+00	6.24E+02	1.25E+03
Eu-155	1.7684E-03	30,906.72	61,813.45	0.00E+00	5.47E+01	1.09E+02
Fe-55	4.3136E-05	30,906.72	61,813.45	0.00E+00	1.33E+00	2.67E+00
H-3	2.0769E-02	30,906.72	61,813.45	0.00E+00	6.42E+02	1.28E+03
I-129	9.8288E-07	30,906.72	61,813.45	0.00E+00	3.04E-02	6.08E-02
Kr-85	2.8214E-02	30,906.72	61,813.45	0.00E+00	8.72E+02	1.74E+03
Np-237	1.1218E-05	30,906.72	61,813.45	0.00E+00	3.47E-01	6.93E-01
Pa-231	1.3036E-09	30,906.72	61,813.45	0.00E+00	4.03E-05	8.06E-05
Pb-210	8.5078E-11	30,906.72	61,813.45	0.00E+00	2.63E-06	5.26E-06
Pm-147	3.6531E-04	30,906.72	61,813.45	0.00E+00	1.13E+01	2.26E+01
Pu-238	7.4564E-02	30,906.72	61,813.45	0.00E+00	2.30E+03	4.61E+03
Pu-239	1.1623E-02	30,906.72	61,813.45	0.00E+00	3.59E+02	7.18E+02
Pu-240	1.5132E-02	30,906.72	61,813.45	0.00E+00	4.68E+02	9.35E+02
Pu-241	9.0036E-01	30,906.72	61,813.45	0.00E+00	2.78E+04	5.57E+04
Pu-242	6.4260E-05	30,906.72	61,813.45	0.00E+00	1.99E+00	3.97E+00
Ra-226	2.2804E-10	30,906.72	61,813.45	0.00E+00	7.05E-06	1.41E-05
Ra-228	5.2713E-12	30,906.72	61,813.45	0.00E+00	1.63E-07	3.26E-07
Ru-106	6.1160E-10	30,906.72	61,813.45	0.00E+00	1.89E-05	3.78E-05
Se-79	1.2377E-05	30,906.72	61,813.45	0.00E+00	3.83E-01	7.65E-01
Sn-126	2.5210E-05	30,906.72	61,813.45	0.00E+00	7.79E-01	1.56E+00
Sr-90	9.1667E-01	30,906.72	61,813.45	0.00E+00	2.83E+04	5.67E+04
Tc-99	3.9357E-04	30,906.72	61,813.45	0.00E+00	1.22E+01	2.43E+01
Th-229	1.2057E-10	30,906.72	61,813.45	0.00E+00	3.73E-06	7.45E-06
Th-230	2.1043E-08	30,906.72	61,813.45	0.00E+00	6.50E-04	1.30E-03
Th-232	5.2972E-12	30,906.72	61,813.45	0.00E+00	1.64E-07	3.27E-07
Tl-208	1.7474E-07	30,906.72	61,813.45	0.00E+00	5.40E-03	1.08E-02
U-232	4.7368E-07	30,906.72	61,813.45	0.00E+00	1.46E-02	2.93E-02
U-233	2.5097E-08	30,906.72	61,813.45	0.00E+00	7.76E-04	1.55E-03
U-234	5.0000E-05	30,906.72	61,813.45	0.00E+00	1.55E+00	3.09E+00
U-235	-1.4489E-06	30,906.72	0.00	2.11E-01	1.66E-01	2.11E-01
U-236	7.5824E-06	30,906.72	61,813.45	0.00E+00	2.34E-01	4.69E-01
U-238	-2.6129E-07	30,906.72	0.00	5.17E-01	5.09E-01	5.17E-01
Y-90	9.1699E-01	30,906.72	61,813.45	0.00E+00	2.83E+04	5.67E+04
Other Radionuclides					4.15E+04	8.30E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.326E+15
0.0250	6.707E+14
0.0375	6.397E+14
0.0575	7.391E+14
0.0850	3.722E+14
0.1250	2.582E+14
0.2250	3.191E+14
0.3750	1.372E+14
0.5750	3.192E+15
0.8500	4.415E+13
1.2500	4.337E+13
1.7500	1.299E+12
2.2500	2.091E+08
2.7500	4.285E+08
3.5000	4.412E+07
5.0000	1.886E+07
7.0000	2.174E+06
11.0000	2.497E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.11E+02	1.42E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	5.973154429	0 to 5

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		30,908.72
Bounding:	2,617.63	61,813.45

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.54	
Bounding:	1.08	23.81

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (FUEL FOLLOWER) HEU
SNF ID #: 740
Fuel Units & Descr: 4 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=1.76kg; EOL=1.728kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
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	29.85	59.70	0.00E+00	6.97E-07	1.39E-06
Am-241	1.1135E-04	29.85	59.70	0.00E+00	3.32E-03	6.65E-03
Am-242m	8.5075E-09	29.85	59.70	0.00E+00	2.54E-07	5.08E-07
Am-243	9.8519E-10	29.85	59.70	0.00E+00	2.94E-08	5.88E-08
C-14	2.3012E-04	29.85	59.70	0.00E+00	6.87E-03	1.37E-02
Cl-36	1.2261E-06	29.85	59.70	0.00E+00	3.66E-05	7.32E-05
Cm-243	2.4875E-10	29.85	59.70	0.00E+00	7.43E-09	1.49E-08
Cm-244	2.3178E-09	29.85	59.70	0.00E+00	6.92E-08	1.38E-07
Co-60	7.0849E-02	29.85	59.70	0.00E+00	2.11E+00	4.23E+00
Cs-134	3.0266E-06	29.85	59.70	0.00E+00	9.03E-05	1.81E-04
Cs-135	3.0316E-05	29.85	59.70	0.00E+00	9.05E-04	1.81E-03
Cs-137	1.4511E+00	29.85	59.70	0.00E+00	4.33E+01	8.66E+01
Eu-154	6.6955E-04	29.85	59.70	0.00E+00	2.00E-02	4.00E-02
Eu-155	6.9850E-04	29.85	59.70	0.00E+00	2.09E-02	4.17E-02
Fe-55	1.2318E-03	29.85	59.70	0.00E+00	3.68E-02	7.35E-02
H-3	2.5141E-03	29.85	59.70	0.00E+00	7.50E-02	1.50E-01
I-129	7.3195E-07	29.85	59.70	0.00E+00	2.18E-05	4.37E-05
Kr-85	4.1281E-02	29.85	59.70	0.00E+00	1.23E+00	2.46E+00
Np-237	1.1489E-06	29.85	59.70	0.00E+00	3.43E-05	6.86E-05
Pa-231	4.5241E-08	29.85	59.70	0.00E+00	1.35E-06	2.70E-06
Pb-210	6.4476E-13	29.85	59.70	0.00E+00	1.92E-11	3.85E-11
Pm-147	1.1651E-03	29.85	59.70	0.00E+00	3.48E-02	6.96E-02
Pu-238	2.9517E-04	29.85	59.70	0.00E+00	8.81E-03	1.76E-02
Pu-239	6.6772E-04	29.85	59.70	0.00E+00	1.99E-02	3.99E-02
Pu-240	8.6839E-05	29.85	59.70	0.00E+00	2.59E-03	5.18E-03
Pu-241	7.1514E-04	29.85	59.70	0.00E+00	2.13E-02	4.27E-02
Pu-242	1.9717E-09	29.85	59.70	0.00E+00	5.89E-08	1.18E-07
Ra-226	1.7654E-12	29.85	59.70	0.00E+00	5.27E-11	1.05E-10
Ra-228	8.2928E-12	29.85	59.70	0.00E+00	2.48E-10	4.95E-10
Ru-106	1.8419E-10	29.85	59.70	0.00E+00	5.50E-09	1.10E-08
Se-79	1.3223E-05	29.85	59.70	0.00E+00	3.95E-04	7.89E-04
Sn-126	1.1493E-05	29.85	59.70	0.00E+00	3.43E-04	6.86E-04
Sr-90	1.3649E+00	29.85	59.70	0.00E+00	4.07E+01	8.15E+01
Tc-99	4.6656E-04	29.85	59.70	0.00E+00	1.39E-02	2.79E-02
Th-229	1.4547E-11	29.85	59.70	0.00E+00	4.34E-10	8.69E-10
Th-230	1.6617E-10	29.85	59.70	0.00E+00	4.96E-09	9.92E-09
Th-232	8.3361E-12	29.85	59.70	0.00E+00	2.49E-10	4.98E-10
Tl-208	2.1664E-08	29.85	59.70	0.00E+00	6.47E-07	1.29E-06
U-232	5.8669E-08	29.85	59.70	0.00E+00	1.75E-06	3.50E-06
U-233	3.1847E-09	29.85	59.70	0.00E+00	9.51E-08	1.90E-07
U-234	3.8769E-07	29.85	59.70	0.00E+00	1.16E-05	2.31E-05
U-235	-2.7761E-06	29.85	0.00	3.56E-03	3.48E-03	3.56E-03
U-236	1.6190E-05	29.85	59.70	0.00E+00	4.83E-04	9.67E-04
U-238	-2.8547E-09	29.85	0.00	3.76E-05	3.76E-05	3.76E-05
Y-90	1.3652E+00	29.85	59.70	0.00E+00	4.08E+01	8.15E+01
Other Radionuclides					4.93E+01	9.86E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.456E+12
0.0250	9.260E+11
0.0375	8.009E+11
0.0575	8.633E+11
0.0850	5.216E+11
0.1250	3.387E+11
0.2250	4.491E+11
0.3750	1.959E+11
0.5750	3.226E+12
0.8500	3.266E+10
1.2500	3.246E+11
1.7500	8.423E+08
2.2500	1.749E+06
2.7500	5.055E+04
3.5000	3.862E+00
5.0000	1.591E+00
7.0000	1.759E-01
11.0000	1.976E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.21E-01	1.64E+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	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.636	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches Pathfinder Template on all but one parameter (cladding, but substituting Stainless Steel is a good conservative assumption).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		29.85
Bounding:		59.70

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.36	
Bounding:	0.73	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (MOX)
SNF ID #: 63
Fuel Units & Descr: 25 - 6 FLAT PLATES
Heavy Metal Mass: BOL=986kg; EOL=932.562kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
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' 2.08

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	50,784.46	101,568.92	0.00E+00	1.17E-01	2.34E-01	Avg. MeV	
Am-241	8.4448E+00	50,784.46	101,568.92	0.00E+00	4.29E+05	8.58E+05	0.0150	1.253E+17
Am-242m	1.6848E-02	50,784.46	101,568.92	0.00E+00	8.56E+02	1.71E+03	0.0250	2.477E+16
Am-243	1.6320E-02	50,784.46	101,568.92	0.00E+00	8.29E+02	1.66E+03	0.0375	2.164E+16
C-14	1.2090E-01	50,784.46	101,568.92	0.00E+00	6.14E+03	1.23E+04	0.0575	3.404E+16
Cl-36	2.2849E-03	50,784.46	101,568.92	0.00E+00	1.16E+02	2.32E+02	0.0850	1.329E+16
Cm-243	8.6624E-04	50,784.46	101,568.92	0.00E+00	4.40E+01	8.80E+01	0.1250	1.041E+16
Cm-244	1.6848E-01	50,784.46	101,568.92	0.00E+00	8.56E+03	1.71E+04	0.2250	1.151E+16
Co-60	2.8086E+01	50,784.46	101,568.92	0.00E+00	1.43E+06	2.85E+06	0.3750	4.924E+15
Cs-134	3.4148E-04	50,784.46	101,568.92	0.00E+00	1.73E+01	3.47E+01	0.5750	8.006E+16
Cs-135	4.3976E-04	50,784.46	101,568.92	0.00E+00	2.23E+01	4.47E+01	0.8500	3.060E+15
Cs-137	2.1049E+01	50,784.46	101,568.92	0.00E+00	1.07E+06	2.14E+06	1.2500	2.139E+17
Eu-154	1.2500E+00	50,784.46	101,568.92	0.00E+00	6.35E+04	1.27E+05	1.7500	9.460E+13
Eu-155	6.8986E-02	50,784.46	101,568.92	0.00E+00	3.50E+03	7.01E+03	2.2500	1.122E+12
Fe-55	2.9308E-01	50,784.46	101,568.92	0.00E+00	1.49E+04	2.98E+04	2.7500	3.161E+11
H-3	2.4311E-01	50,784.46	101,568.92	0.00E+00	1.23E+04	2.47E+04	3.5000	2.675E+08
I-129	1.0618E-05	50,784.46	101,568.92	0.00E+00	5.39E-01	1.08E+00	5.0000	1.136E+08
Kr-85	5.9882E-01	50,784.46	101,568.92	0.00E+00	3.04E+04	6.08E+04	7.0000	1.300E+07
Np-237	1.5668E-04	50,784.46	101,568.92	0.00E+00	7.96E+00	1.59E+01	11.0000	1.487E+06
Pa-231	2.8656E-06	50,784.46	101,568.92	0.00E+00	1.46E-01	2.91E-01		
Pb-210	2.3918E-08	50,784.46	101,568.92	0.00E+00	1.21E-03	2.43E-03		
Pm-147	1.6900E-02	50,784.46	101,568.92	0.00E+00	8.58E+02	1.72E+03		
Pu-238	-8.6120E-01	50,784.46	0.00	1.27E+05	8.30E+04	1.27E+05		
Pu-239	-4.8440E-02	50,784.46	0.00	1.53E+04	1.29E+04	1.53E+04		
Pu-240	-3.0095E-01	50,784.46	0.00	1.96E+04	4.29E+03	1.96E+04		
Pu-241	-1.0411E+02	50,784.46	0.00	5.04E+06	0.00E+00	5.04E+06		
Pu-242	-1.1381E-04	50,784.46	0.00	8.47E+01	7.90E+01	8.47E+01		
Ra-226	6.4400E-08	50,784.46	101,568.92	0.00E+00	3.27E-03	6.54E-03		
Ra-228	5.9952E-07	50,784.46	101,568.92	0.00E+00	3.04E-02	6.09E-02		
Ru-106	8.5526E-07	50,784.46	101,568.92	0.00E+00	4.34E-02	8.69E-02		
Se-79	1.9181E-04	50,784.46	101,568.92	0.00E+00	9.74E+00	1.95E+01		
Sn-126	1.6671E-04	50,784.46	101,568.92	0.00E+00	8.47E+00	1.69E+01		
Sr-90	1.9799E+01	50,784.46	101,568.92	0.00E+00	1.01E+06	2.01E+06		
Tc-99	6.7678E-03	50,784.46	101,568.92	0.00E+00	3.44E+02	6.87E+02		
Th-229	1.7488E-06	50,784.46	101,568.92	0.00E+00	8.88E-02	1.78E-01		
Th-230	5.8704E-06	50,784.46	101,568.92	0.00E+00	2.98E-01	5.96E-01		
Th-232	6.0208E-07	50,784.46	101,568.92	0.00E+00	3.06E-02	6.12E-02		
Tl-208	8.7573E-05	50,784.46	101,568.92	0.00E+00	4.45E+00	8.89E+00		
U-232	2.3706E-04	50,784.46	101,568.92	0.00E+00	1.20E+01	2.41E+01		
U-233	3.6128E-04	50,784.46	101,568.92	0.00E+00	1.83E+01	3.67E+01		
U-234	1.2788E-02	50,784.46	101,568.92	0.00E+00	6.49E+02	1.30E+03		
U-235	5.7486E-04	50,784.46	101,568.92	4.24E-01	2.96E+01	5.88E+01		
U-236	2.3485E-04	50,784.46	101,568.92	0.00E+00	1.19E+01	2.39E+01		
U-238	1.1581E-04	50,784.46	101,568.92	5.28E-02	5.93E+00	1.18E+01		
Y-90	1.9804E+01	50,784.46	101,568.92	0.00E+00	1.01E+06	2.01E+06		
Other Radionuclides					3.13E+06	6.26E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.33E+04	1.06E+05
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	(Worst Case)
Fuel Cladding:	ZIRC	SST/Inconel
BOL HM Constituents:	Pu and U	U, Th, & Pu
BOL Enrichment %:	0.222222216	0 to 100

Basis for Parameter Differences:

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		50,784.46
Bounding:		101,568.92

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.54	
Bounding:	3.08	

Estimated EOL HM/Given EOL HM: 34.51

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (NORMAL UO2)
SNF ID #: 60
Fuel Units & Descr: 51 - 6 FLAT PLATES
Heavy Metal Mass: BOL=1358.64kg; EOL=1357.824kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
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' = 4.25

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	775.98	1,551.95	0.00E+00	6.81E-07	1.36E-06
Am-241	1.4352E-01	775.98	1,551.95	0.00E+00	1.11E+02	2.23E+02
Am-242m	2.8698E-04	775.98	1,551.95	0.00E+00	2.23E-01	4.45E-01
Am-243	6.2565E-04	775.98	1,551.95	0.00E+00	4.85E-01	9.71E-01
C-14	4.7901E-05	775.98	1,551.95	0.00E+00	3.72E-02	7.43E-02
Cl-36	8.0297E-07	775.98	1,551.95	0.00E+00	6.23E-04	1.25E-03
Cm-243	2.5081E-04	775.98	1,551.95	0.00E+00	1.95E-01	3.89E-01
Cm-244	4.9015E-02	775.98	1,551.95	0.00E+00	3.80E+01	7.61E+01
Co-60	2.5581E-03	775.98	1,551.95	0.00E+00	1.99E+00	3.97E+00
Cs-134	4.0536E-05	775.98	1,551.95	0.00E+00	3.15E-02	6.29E-02
Cs-135	1.4433E-05	775.98	1,551.95	0.00E+00	1.12E-02	2.24E-02
Cs-137	1.3979E+00	775.98	1,551.95	0.00E+00	1.08E+03	2.17E+03
Eu-154	2.0203E-02	775.98	1,551.95	0.00E+00	1.57E+01	3.14E+01
Eu-155	1.7684E-03	775.98	1,551.95	0.00E+00	1.37E+00	2.74E+00
Fe-55	4.3136E-05	775.98	1,551.95	0.00E+00	3.35E-02	6.69E-02
H-3	2.0769E-02	775.98	1,551.95	0.00E+00	1.61E+01	3.22E+01
I-129	9.8288E-07	775.98	1,551.95	0.00E+00	7.63E-04	1.53E-03
Kr-85	2.8214E-02	775.98	1,551.95	0.00E+00	2.19E+01	4.38E+01
Np-237	1.1218E-05	775.98	1,551.95	0.00E+00	8.70E-03	1.74E-02
Pa-231	1.3036E-09	775.98	1,551.95	0.00E+00	1.01E-06	2.02E-06
Pb-210	8.5078E-11	775.98	1,551.95	0.00E+00	6.60E-08	1.32E-07
Pm-147	3.6531E-04	775.98	1,551.95	0.00E+00	2.83E-01	5.67E-01
Pu-238	7.4564E-02	775.98	1,551.95	0.00E+00	5.79E+01	1.16E+02
Pu-239	1.1623E-02	775.98	1,551.95	0.00E+00	9.02E+00	1.80E+01
Pu-240	1.5132E-02	775.98	1,551.95	0.00E+00	1.17E+01	2.35E+01
Pu-241	9.0036E-01	775.98	1,551.95	0.00E+00	6.99E+02	1.40E+03
Pu-242	6.4260E-05	775.98	1,551.95	0.00E+00	4.99E-02	9.97E-02
Ra-226	2.2804E-10	775.98	1,551.95	0.00E+00	1.77E-07	3.54E-07
Ra-228	5.2713E-12	775.98	1,551.95	0.00E+00	4.09E-09	8.18E-09
Ru-106	6.1160E-10	775.98	1,551.95	0.00E+00	4.75E-07	9.49E-07
Se-79	1.2377E-05	775.98	1,551.95	0.00E+00	9.60E-03	1.92E-02
Sn-126	2.5210E-05	775.98	1,551.95	0.00E+00	1.96E-02	3.91E-02
Sr-90	9.1667E-01	775.98	1,551.95	0.00E+00	7.11E+02	1.42E+03
Tc-99	3.9357E-04	775.98	1,551.95	0.00E+00	3.05E-01	6.11E-01
Th-229	1.2057E-10	775.98	1,551.95	0.00E+00	9.36E-08	1.87E-07
Th-230	2.1043E-08	775.98	1,551.95	0.00E+00	1.63E-05	3.27E-05
Th-232	5.2972E-12	775.98	1,551.95	0.00E+00	4.11E-09	8.22E-09
Tl-208	1.7474E-07	775.98	1,551.95	0.00E+00	1.36E-04	2.71E-04
U-232	4.7368E-07	775.98	1,551.95	0.00E+00	3.68E-04	7.35E-04
U-233	2.5097E-08	775.98	1,551.95	0.00E+00	1.95E-05	3.89E-05
U-234	5.0000E-05	775.98	1,551.95	0.00E+00	3.88E-02	7.76E-02
U-235	-1.4489E-06	775.98	0.00	2.09E-02	1.98E-02	2.09E-02
U-236	7.5824E-06	775.98	1,551.95	0.00E+00	5.88E-03	1.18E-02
U-238	-2.6129E-07	775.98	0.00	4.53E-01	4.53E-01	4.53E-01
Y-90	9.1699E-01	775.98	1,551.95	0.00E+00	7.12E+02	1.42E+03
Other Radionuclides					1.04E+03	2.08E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.351E+13
0.0250	1.684E+13
0.0375	1.606E+13
0.0575	1.856E+13
0.0850	9.344E+12
0.1250	6.484E+12
0.2250	8.012E+12
0.3750	3.445E+12
0.5750	8.013E+13
0.8500	1.109E+12
1.2500	1.089E+12
1.7500	3.261E+10
2.2500	5.255E+06
2.7500	1.076E+07
3.5000	1.110E+06
5.0000	4.746E+05
7.0000	5.470E+04
11.0000	6.283E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.79E+01	3.57E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	0.711000016	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		775.98
Bounding:		1,551.95

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.02	
Bounding:	0.03	

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (SPIKES)
SNF ID #: 891
Fuel Units & Descr: 31 - 7 X 7 ROD ARRAY
Heavy Metal Mass: BOL=29.205kg; EOL=26.969kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
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"x10' 2.58

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.3344E-08	2,093.81	4,187.62	0.00E+00	4.89E-05	9.78E-05
Am-241	1.1135E-04	2,093.81	4,187.62	0.00E+00	2.33E-01	4.66E-01
Am-242m	8.5075E-09	2,093.81	4,187.62	0.00E+00	1.78E-05	3.56E-05
Am-243	9.8519E-10	2,093.81	4,187.62	0.00E+00	2.06E-06	4.13E-06
C-14	2.3012E-04	2,093.81	4,187.62	0.00E+00	4.82E-01	9.64E-01
Cl-36	1.2261E-06	2,093.81	4,187.62	0.00E+00	2.57E-03	5.13E-03
Cm-243	2.4875E-10	2,093.81	4,187.62	0.00E+00	5.21E-07	1.04E-06
Cm-244	2.3178E-09	2,093.81	4,187.62	0.00E+00	4.85E-06	9.71E-06
Co-60	7.0849E-02	2,093.81	4,187.62	0.00E+00	1.48E+02	2.97E+02
Cs-134	3.0266E-06	2,093.81	4,187.62	0.00E+00	6.34E-03	1.27E-02
Cs-135	3.0316E-05	2,093.81	4,187.62	0.00E+00	6.35E-02	1.27E-01
Cs-137	1.4511E+00	2,093.81	4,187.62	0.00E+00	3.04E+03	6.08E+03
Eu-154	6.6955E-04	2,093.81	4,187.62	0.00E+00	1.40E+00	2.80E+00
Eu-155	6.9850E-04	2,093.81	4,187.62	0.00E+00	1.46E+00	2.93E+00
Fe-55	1.2318E-03	2,093.81	4,187.62	0.00E+00	2.58E+00	5.16E+00
H-3	2.5141E-03	2,093.81	4,187.62	0.00E+00	5.26E+00	1.05E+01
I-129	7.3195E-07	2,093.81	4,187.62	0.00E+00	1.53E-03	3.07E-03
Kr-85	4.1281E-02	2,093.81	4,187.62	0.00E+00	8.64E+01	1.73E+02
Np-237	1.1489E-06	2,093.81	4,187.62	0.00E+00	2.41E-03	4.81E-03
Pa-231	4.5241E-06	2,093.81	4,187.62	0.00E+00	9.47E-05	1.89E-04
Pb-210	6.4476E-13	2,093.81	4,187.62	0.00E+00	1.35E-09	2.70E-09
Pm-147	1.1651E-03	2,093.81	4,187.62	0.00E+00	2.44E+00	4.88E+00
Pu-238	2.9517E-04	2,093.81	4,187.62	0.00E+00	6.18E-01	1.24E+00
Pu-239	6.6772E-04	2,093.81	4,187.62	0.00E+00	1.40E+00	2.80E+00
Pu-240	8.6839E-05	2,093.81	4,187.62	0.00E+00	1.82E-01	3.64E-01
Pu-241	7.1514E-04	2,093.81	4,187.62	0.00E+00	1.50E+00	2.99E+00
Pu-242	1.9717E-09	2,093.81	4,187.62	0.00E+00	4.13E-06	8.26E-06
Ra-226	1.7654E-12	2,093.81	4,187.62	0.00E+00	3.70E-09	7.39E-09
Ra-228	8.2928E-12	2,093.81	4,187.62	0.00E+00	1.74E-08	3.47E-08
Ru-106	1.8419E-10	2,093.81	4,187.62	0.00E+00	3.86E-07	7.71E-07
Se-79	1.3223E-05	2,093.81	4,187.62	0.00E+00	2.77E-02	5.54E-02
Sn-126	1.1493E-05	2,093.81	4,187.62	0.00E+00	2.41E-02	4.81E-02
Sr-90	1.3649E+00	2,093.81	4,187.62	0.00E+00	2.86E+03	5.72E+03
Tc-99	4.6656E-04	2,093.81	4,187.62	0.00E+00	9.77E-01	1.95E+00
Th-229	1.4547E-11	2,093.81	4,187.62	0.00E+00	3.05E-08	6.09E-08
Th-230	1.6617E-10	2,093.81	4,187.62	0.00E+00	3.48E-07	6.96E-07
Th-232	8.3361E-12	2,093.81	4,187.62	0.00E+00	1.75E-08	3.49E-08
Tl-208	2.1664E-08	2,093.81	4,187.62	0.00E+00	4.54E-05	9.07E-05
U-232	5.8669E-08	2,093.81	4,187.62	0.00E+00	1.23E-04	2.46E-04
U-233	3.1847E-09	2,093.81	4,187.62	0.00E+00	6.67E-06	1.33E-05
U-234	3.8769E-07	2,093.81	4,187.62	0.00E+00	8.12E-04	1.62E-03
U-235	-2.7761E-06	2,093.81	0.00	5.88E-02	5.30E-02	5.88E-02
U-238	1.6190E-05	2,093.81	4,187.62	0.00E+00	3.39E-02	6.78E-02
U-238	-2.8547E-09	2,093.81	0.00	6.68E-04	6.62E-04	6.68E-04
Y-90	1.3652E+00	2,093.81	4,187.62	0.00E+00	2.86E+03	5.72E+03
Other Radionuclides					3.46E+03	6.91E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.126E+14
0.0250	6.495E+13
0.0375	5.618E+13
0.0575	6.056E+13
0.0850	3.659E+13
0.1250	2.376E+13
0.2250	3.149E+13
0.3750	1.374E+13
0.5750	2.263E+14
0.8500	2.291E+12
1.2500	2.277E+13
1.7500	5.908E+10
2.2500	1.227E+08
2.7500	3.546E+06
3.5000	2.539E+02
5.0000	1.045E+02
7.0000	1.154E+01
11.0000	1.295E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.65E+01	7.31E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.18999022	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches Pathfinder Template on all but one parameter (cladding, but substituting Stainless Steel is a good conservative assumption).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	1,233.24	2,093.81
Bounding:	1,767.05	4,187.62

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.54	1.70
Bounding:	3.07	2.37

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (U METAL) ENRICHED HEAVY
SNF ID #: 64
Fuel Units & Descr: 53 - 6 FLAT PLATES
Heavy Metal Mass: BOL=2989.2kg; EOL=2982.962kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
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' = 4.42

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	5,932.14	11,864.28	0.00E+00	5.21E-06	1.04E-05
Am-241	1.4352E-01	5,932.14	11,864.28	0.00E+00	8.51E+02	1.70E+03
Am-242m	2.8698E-04	5,932.14	11,864.28	0.00E+00	1.70E+00	3.40E+00
Am-243	6.2565E-04	5,932.14	11,864.28	0.00E+00	3.71E+00	7.42E+00
C-14	4.7901E-05	5,932.14	11,864.28	0.00E+00	2.84E-01	5.68E-01
Cl-36	8.0297E-07	5,932.14	11,864.28	0.00E+00	4.76E-03	9.53E-03
Cm-243	2.5081E-04	5,932.14	11,864.28	0.00E+00	1.49E+00	2.98E+00
Cm-244	4.9015E-02	5,932.14	11,864.28	0.00E+00	2.91E+02	5.82E+02
Co-60	2.5581E-03	5,932.14	11,864.28	0.00E+00	1.52E+01	3.04E+01
Cs-134	4.0536E-05	5,932.14	11,864.28	0.00E+00	2.40E-01	4.81E-01
Cs-135	1.4433E-05	5,932.14	11,864.28	0.00E+00	8.56E-02	1.71E-01
Cs-137	1.3979E+00	5,932.14	11,864.28	0.00E+00	8.29E+03	1.66E+04
Eu-154	2.0203E-02	5,932.14	11,864.28	0.00E+00	1.20E+02	2.40E+02
Eu-155	1.7684E-03	5,932.14	11,864.28	0.00E+00	1.05E+01	2.10E+01
Fe-55	4.3136E-05	5,932.14	11,864.28	0.00E+00	2.56E-01	5.12E-01
H-3	2.0769E-02	5,932.14	11,864.28	0.00E+00	1.23E+02	2.46E+02
I-129	9.8288E-07	5,932.14	11,864.28	0.00E+00	5.83E-03	1.17E-02
Kr-85	2.8214E-02	5,932.14	11,864.28	0.00E+00	1.67E+02	3.35E+02
Np-237	1.1218E-05	5,932.14	11,864.28	0.00E+00	6.65E-02	1.33E-01
Pa-231	1.3036E-09	5,932.14	11,864.28	0.00E+00	7.73E-06	1.55E-05
Pb-210	8.5078E-11	5,932.14	11,864.28	0.00E+00	5.05E-07	1.01E-06
Pm-147	3.6531E-04	5,932.14	11,864.28	0.00E+00	2.17E+00	4.33E+00
Pu-238	7.4564E-02	5,932.14	11,864.28	0.00E+00	4.42E+02	8.85E+02
Pu-239	1.1623E-02	5,932.14	11,864.28	0.00E+00	6.89E+01	1.38E+02
Pu-240	1.5132E-02	5,932.14	11,864.28	0.00E+00	8.98E+01	1.80E+02
Pu-241	9.0036E-01	5,932.14	11,864.28	0.00E+00	5.34E+03	1.07E+04
Pu-242	6.4260E-05	5,932.14	11,864.28	0.00E+00	3.81E-01	7.62E-01
Ra-226	2.2804E-10	5,932.14	11,864.28	0.00E+00	1.35E-06	2.71E-06
Ra-228	5.2713E-12	5,932.14	11,864.28	0.00E+00	3.13E-08	6.25E-08
Ru-106	6.1160E-10	5,932.14	11,864.28	0.00E+00	3.63E-06	7.26E-06
Se-79	1.2377E-05	5,932.14	11,864.28	0.00E+00	7.34E-02	1.47E-01
Sn-126	2.5210E-05	5,932.14	11,864.28	0.00E+00	1.50E-01	2.99E-01
Sr-90	9.1667E-01	5,932.14	11,864.28	0.00E+00	5.44E+03	1.09E+04
Tc-99	3.9357E-04	5,932.14	11,864.28	0.00E+00	2.33E+00	4.67E+00
Th-229	1.2057E-10	5,932.14	11,864.28	0.00E+00	7.15E-07	1.43E-06
Th-230	2.1043E-08	5,932.14	11,864.28	0.00E+00	1.25E-04	2.50E-04
Th-232	5.2972E-12	5,932.14	11,864.28	0.00E+00	3.14E-06	6.28E-06
Tl-208	1.7474E-07	5,932.14	11,864.28	0.00E+00	1.04E-03	2.07E-03
U-232	4.7368E-07	5,932.14	11,864.28	0.00E+00	2.81E-03	5.62E-03
U-233	2.5097E-08	5,932.14	11,864.28	0.00E+00	1.49E-04	2.98E-04
U-234	5.0000E-05	5,932.14	11,864.28	0.00E+00	2.97E-01	5.93E-01
U-235	-1.4489E-06	5,932.14	0.00	9.28E-02	8.42E-02	9.28E-02
U-236	7.5824E-06	5,932.14	11,864.28	0.00E+00	4.50E-02	9.00E-02
U-238	-2.6129E-07	5,932.14	0.00	9.90E-01	9.89E-01	9.90E-01
Y-90	9.1699E-01	5,932.14	11,864.28	0.00E+00	5.44E+03	1.09E+04
Other Radionuclides					7.96E+03	1.59E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.384E+14
0.0250	1.287E+14
0.0375	1.228E+14
0.0575	1.419E+14
0.0850	7.143E+13
0.1250	4.957E+13
0.2250	6.125E+13
0.3750	2.634E+13
0.5750	6.126E+14
0.8500	8.475E+12
1.2500	6.324E+12
1.7500	2.493E+11
2.2500	4.015E+07
2.7500	8.225E+07
3.5000	8.473E+06
5.0000	3.623E+06
7.0000	4.175E+05
11.0000	4.796E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.36E+02	2.73E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	1.436170175	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		5,932.14
Bounding:	4,782.72	11,864.28

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.11	2.48

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (U METAL) ENRICHED THIN
SNF ID #: 887
Fuel Units & Descr: 54 - 6 FLAT PLATES
Heavy Metal Mass: BOL= ; EOL=2194.101kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
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' 4.50

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	3,516.48	3,516.48	0.00E+00	3.09E-06	3.09E-06
Am-241	1.4352E-01	3,516.48	3,516.48	0.00E+00	5.05E+02	5.05E+02
Am-242m	2.8698E-04	3,516.48	3,516.48	0.00E+00	1.01E+00	1.01E+00
Am-243	6.2565E-04	3,516.48	3,516.48	0.00E+00	2.20E+00	2.20E+00
C-14	4.7901E-05	3,516.48	3,516.48	0.00E+00	1.68E-01	1.68E-01
Cl-36	8.0297E-07	3,516.48	3,516.48	0.00E+00	2.82E-03	2.82E-03
Cm-243	2.5081E-04	3,516.48	3,516.48	0.00E+00	8.82E-01	8.82E-01
Cm-244	4.9015E-02	3,516.48	3,516.48	0.00E+00	1.72E+02	1.72E+02
Co-60	2.5581E-03	3,516.48	3,516.48	0.00E+00	9.00E+00	9.00E+00
Cs-134	4.0536E-05	3,516.48	3,516.48	0.00E+00	1.43E-01	1.43E-01
Cs-135	1.4433E-05	3,516.48	3,516.48	0.00E+00	5.08E-02	5.08E-02
Cs-137	1.3979E+00	3,516.48	3,516.48	0.00E+00	4.92E+03	4.92E+03
Eu-154	2.0203E-02	3,516.48	3,516.48	0.00E+00	7.10E+01	7.10E+01
Eu-155	1.7684E-03	3,516.48	3,516.48	0.00E+00	6.22E+00	6.22E+00
Fe-55	4.3136E-05	3,516.48	3,516.48	0.00E+00	1.52E-01	1.52E-01
H-3	2.0769E-02	3,516.48	3,516.48	0.00E+00	7.30E+01	7.30E+01
I-129	9.8288E-07	3,516.48	3,516.48	0.00E+00	3.46E-03	3.46E-03
Kr-85	2.8214E-02	3,516.48	3,516.48	0.00E+00	9.92E+01	9.92E+01
Np-237	1.1218E-05	3,516.48	3,516.48	0.00E+00	3.94E-02	3.94E-02
Pa-231	1.3036E-09	3,516.48	3,516.48	0.00E+00	4.58E-06	4.58E-06
Pb-210	8.5078E-11	3,516.48	3,516.48	0.00E+00	2.99E-07	2.99E-07
Pm-147	3.6531E-04	3,516.48	3,516.48	0.00E+00	1.28E+00	1.28E+00
Pu-238	7.4564E-02	3,516.48	3,516.48	0.00E+00	2.62E+02	2.62E+02
Pu-239	1.1623E-02	3,516.48	3,516.48	0.00E+00	4.09E+01	4.09E+01
Pu-240	1.5132E-02	3,516.48	3,516.48	0.00E+00	5.32E+01	5.32E+01
Pu-241	9.0036E-01	3,516.48	3,516.48	0.00E+00	3.17E+03	3.17E+03
Pu-242	6.4260E-05	3,516.48	3,516.48	0.00E+00	2.26E-01	2.26E-01
Ra-226	2.2804E-10	3,516.48	3,516.48	0.00E+00	8.02E-07	8.02E-07
Ra-228	5.2713E-12	3,516.48	3,516.48	0.00E+00	1.85E-08	1.85E-08
Ru-106	6.1160E-10	3,516.48	3,516.48	0.00E+00	2.15E-06	2.15E-06
Se-79	1.2377E-05	3,516.48	3,516.48	0.00E+00	4.35E-02	4.35E-02
Sn-126	2.5210E-05	3,516.48	3,516.48	0.00E+00	8.87E-02	8.87E-02
Sr-90	9.1667E-01	3,516.48	3,516.48	0.00E+00	3.22E+03	3.22E+03
Tc-99	3.9357E-04	3,516.48	3,516.48	0.00E+00	1.38E+00	1.38E+00
Th-229	1.2057E-10	3,516.48	3,516.48	0.00E+00	4.24E-07	4.24E-07
Th-230	2.1043E-08	3,516.48	3,516.48	0.00E+00	7.40E-05	7.40E-05
Th-232	5.2972E-12	3,516.48	3,516.48	0.00E+00	1.86E-08	1.86E-08
Tl-208	1.7474E-07	3,516.48	3,516.48	0.00E+00	6.14E-04	6.14E-04
U-232	4.7368E-07	3,516.48	3,516.48	0.00E+00	1.67E-03	1.67E-03
U-233	2.5097E-08	3,516.48	3,516.48	0.00E+00	8.83E-05	8.83E-05
U-234	5.0000E-05	3,516.48	3,516.48	0.00E+00	1.76E-01	1.76E-01
U-235	-1.4489E-06	3,516.48	0.00	1.52E-01	1.47E-01	1.52E-01
U-236	7.5824E-06	3,516.48	3,516.48	0.00E+00	2.67E-02	2.67E-02
U-238	-2.6129E-07	3,516.48	0.00	7.15E-01	7.14E-01	7.15E-01
Y-90	9.1699E-01	3,516.48	3,516.48	0.00E+00	3.22E+03	3.22E+03
Other Radionuclides					4.72E+03	4.72E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.892E+14
0.0250	3.815E+13
0.0375	3.639E+13
0.0575	4.205E+13
0.0850	2.117E+13
0.1250	1.469E+13
0.2250	1.816E+13
0.3750	7.807E+12
0.5750	1.816E+14
0.8500	2.512E+12
1.2500	2.467E+12
1.7500	7.389E+10
2.2500	1.190E+07
2.7500	2.438E+07
3.5000	2.514E+06
5.0000	1.075E+06
7.0000	1.239E+05
11.0000	1.423E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.09E+01	8.09E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3,516.48
Bounding:		3,516.48

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup
Bounding burnup assumed to be twice nominal burnup.

Checks

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

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (U METAL) ET-11
SNF ID #: 888
Fuel Units & Descr: 1 - 6 FLAT PLATES
Heavy Metal Mass: BOL=40.2kg; EOL=38.365kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
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' 0.08

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	8.7758E-10	1,745.00	3,490.00	0.00E+00	1.53E-06	3.06E-06
Am-241	1.4352E-01	1,745.00	3,490.00	0.00E+00	2.50E+02	5.01E+02
Am-242m	2.8698E-04	1,745.00	3,490.00	0.00E+00	5.01E-01	1.00E+00
Am-243	6.2565E-04	1,745.00	3,490.00	0.00E+00	1.09E+00	2.18E+00
C-14	4.7901E-05	1,745.00	3,490.00	0.00E+00	8.36E-02	1.67E-01
Cl-36	8.0297E-07	1,745.00	3,490.00	0.00E+00	1.40E-03	2.80E-03
Cm-243	2.5081E-04	1,745.00	3,490.00	0.00E+00	4.38E-01	8.75E-01
Cm-244	4.9015E-02	1,745.00	3,490.00	0.00E+00	8.55E+01	1.71E+02
Co-60	2.5581E-03	1,745.00	3,490.00	0.00E+00	4.46E+00	8.93E+00
Cs-134	4.0536E-05	1,745.00	3,490.00	0.00E+00	7.07E-02	1.41E-01
Cs-135	1.4433E-05	1,745.00	3,490.00	0.00E+00	2.52E-02	5.04E-02
Cs-137	1.3979E+00	1,745.00	3,490.00	0.00E+00	2.44E+03	4.88E+03
Eu-154	2.0203E-02	1,745.00	3,490.00	0.00E+00	3.53E+01	7.05E+01
Eu-155	1.7684E-03	1,745.00	3,490.00	0.00E+00	3.09E+00	6.17E+00
Fe-55	4.3136E-05	1,745.00	3,490.00	0.00E+00	7.53E-02	1.51E-01
H-3	2.0769E-02	1,745.00	3,490.00	0.00E+00	3.62E+01	7.25E+01
I-129	9.8288E-07	1,745.00	3,490.00	0.00E+00	1.72E-03	3.43E-03
Kr-85	2.8214E-02	1,745.00	3,490.00	0.00E+00	4.92E+01	9.85E+01
Np-237	1.1218E-05	1,745.00	3,490.00	0.00E+00	1.96E-02	3.91E-02
Pa-231	1.3036E-09	1,745.00	3,490.00	0.00E+00	2.27E-06	4.55E-06
Pb-210	8.5078E-11	1,745.00	3,490.00	0.00E+00	1.48E-07	2.97E-07
Pm-147	3.6531E-04	1,745.00	3,490.00	0.00E+00	6.37E-01	1.27E+00
Pu-238	7.4564E-02	1,745.00	3,490.00	0.00E+00	1.30E+02	2.60E+02
Pu-239	1.1623E-02	1,745.00	3,490.00	0.00E+00	2.03E+01	4.06E+01
Pu-240	1.5132E-02	1,745.00	3,490.00	0.00E+00	2.64E+01	5.28E+01
Pu-241	9.0036E-01	1,745.00	3,490.00	0.00E+00	1.57E+03	3.14E+03
Pu-242	6.4260E-05	1,745.00	3,490.00	0.00E+00	1.12E-01	2.24E-01
Ra-226	2.2804E-10	1,745.00	3,490.00	0.00E+00	3.98E-07	7.96E-07
Ra-228	5.2713E-12	1,745.00	3,490.00	0.00E+00	9.20E-09	1.84E-08
Ru-106	6.1160E-10	1,745.00	3,490.00	0.00E+00	1.07E-06	2.13E-06
Se-79	1.2377E-05	1,745.00	3,490.00	0.00E+00	2.16E-02	4.32E-02
Sn-126	2.5210E-05	1,745.00	3,490.00	0.00E+00	4.40E-02	8.80E-02
Sr-90	9.1667E-01	1,745.00	3,490.00	0.00E+00	1.60E+03	3.20E+03
Tc-99	3.9357E-04	1,745.00	3,490.00	0.00E+00	6.87E-01	1.37E+00
Th-229	1.2057E-10	1,745.00	3,490.00	0.00E+00	2.10E-07	4.21E-07
Th-230	2.1043E-08	1,745.00	3,490.00	0.00E+00	3.67E-05	7.34E-05
Th-232	5.2972E-12	1,745.00	3,490.00	0.00E+00	9.24E-09	1.85E-08
Tl-208	1.7474E-07	1,745.00	3,490.00	0.00E+00	3.05E-04	6.10E-04
U-232	4.7368E-07	1,745.00	3,490.00	0.00E+00	8.27E-04	1.65E-03
U-233	2.5097E-06	1,745.00	3,490.00	0.00E+00	4.38E-05	8.76E-05
U-234	5.0000E-05	1,745.00	3,490.00	0.00E+00	8.72E-02	1.74E-01
U-235	-1.4489E-06	1,745.00	0.00	1.26E-03	0.00E+00	1.26E-03
U-236	7.5824E-06	1,745.00	3,490.00	0.00E+00	1.32E-02	2.65E-02
U-238	-2.6129E-07	1,745.00	0.00	1.33E-02	1.29E-02	1.33E-02
Y-90	9.1699E-01	1,745.00	3,490.00	0.00E+00	1.60E+03	3.20E+03
Other Radionuclides					2.34E+03	4.68E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.878E+14
0.0250	3.787E+13
0.0375	3.612E+13
0.0575	4.173E+13
0.0850	2.101E+13
0.1250	1.458E+13
0.2250	1.802E+13
0.3750	7.748E+12
0.5750	1.802E+14
0.8500	2.493E+12
1.2500	2.449E+12
1.7500	7.333E+10
2.2500	1.181E+07
2.7500	2.419E+07
3.5000	2.491E+08
5.0000	1.065E+06
7.0000	1.227E+05
11.0000	1.410E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.01E+01	8.03E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	1.447761165	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,745.00
Bounding:	64.32	3,490.00

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.24	
Bounding:	2.48	54.26

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (U METAL) NORMAL HEAVY
SNF ID #: 889
Fuel Units & Descr: 11 - 6 FLAT PLATES
Heavy Metal Mass: BOL=620.4kg; EOL=566.145kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
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' 0.92

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	51,594.22	103,188.45	0.00E+00	4.53E-05	9.06E-05	Avg. MeV	
Am-241	1.4352E-01	51,594.22	103,188.45	0.00E+00	7.41E+03	1.48E+04	0.0150	5.552E+15
Am-242m	2.8698E-04	51,594.22	103,188.45	0.00E+00	1.48E+01	2.96E+01	0.0250	1.120E+15
Am-243	6.2565E-04	51,594.22	103,188.45	0.00E+00	3.23E+01	6.46E+01	0.0375	1.068E+15
C-14	4.7901E-05	51,594.22	103,188.45	0.00E+00	2.47E+00	4.94E+00	0.0575	1.234E+15
Cl-36	8.0297E-07	51,594.22	103,188.45	0.00E+00	4.14E-02	8.29E-02	0.0850	6.213E+14
Cm-243	2.5081E-04	51,594.22	103,188.45	0.00E+00	1.29E+01	2.59E+01	0.1250	4.311E+14
Cm-244	4.9015E-02	51,594.22	103,188.45	0.00E+00	2.53E+03	5.06E+03	0.2250	5.327E+14
Co-60	2.5581E-03	51,594.22	103,188.45	0.00E+00	1.32E+02	2.64E+02	0.3750	2.291E+14
Cs-134	4.0536E-05	51,594.22	103,188.45	0.00E+00	2.09E+00	4.18E+00	0.5750	5.328E+15
Cs-135	1.4433E-05	51,594.22	103,188.45	0.00E+00	7.45E-01	1.49E+00	0.8500	7.371E+13
Cs-137	1.3979E+00	51,594.22	103,188.45	0.00E+00	7.21E+04	1.44E+05	1.2500	7.240E+13
Eu-154	2.0203E-02	51,594.22	103,188.45	0.00E+00	1.04E+03	2.08E+03	1.7500	2.168E+12
Eu-155	1.7684E-03	51,594.22	103,188.45	0.00E+00	9.12E+01	1.82E+02	2.2500	3.491E+08
Fe-55	4.3136E-05	51,594.22	103,188.45	0.00E+00	2.23E+00	4.45E+00	2.7500	7.153E+08
H-3	2.0769E-02	51,594.22	103,188.45	0.00E+00	1.07E+03	2.14E+03	3.5000	7.365E+07
I-129	9.8288E-07	51,594.22	103,188.45	0.00E+00	5.07E-02	1.01E-01	5.0000	3.149E+07
Kr-85	2.8214E-02	51,594.22	103,188.45	0.00E+00	1.46E+03	2.91E+03	7.0000	3.629E+06
Np-237	1.1218E-05	51,594.22	103,188.45	0.00E+00	5.79E-01	1.16E+00	11.0000	4.168E+05
Pa-231	1.3036E-09	51,594.22	103,188.45	0.00E+00	6.73E-05	1.35E-04		
Pb-210	8.5078E-11	51,594.22	103,188.45	0.00E+00	4.39E-06	8.78E-06		
Pm-147	3.6531E-04	51,594.22	103,188.45	0.00E+00	1.88E+01	3.77E+01		
Pu-238	7.4564E-02	51,594.22	103,188.45	0.00E+00	3.85E+03	7.69E+03		
Pu-239	1.1623E-02	51,594.22	103,188.45	0.00E+00	6.00E+02	1.20E+03		
Pu-240	1.5132E-02	51,594.22	103,188.45	0.00E+00	7.81E+02	1.56E+03		
Pu-241	9.0036E-01	51,594.22	103,188.45	0.00E+00	4.65E+04	9.29E+04		
Pu-242	6.4260E-05	51,594.22	103,188.45	0.00E+00	3.32E+00	6.63E+00		
Ra-226	2.2804E-10	51,594.22	103,188.45	0.00E+00	1.18E-05	2.35E-05		
Ra-228	5.2713E-12	51,594.22	103,188.45	0.00E+00	2.72E-07	5.44E-07		
Ru-106	6.1160E-10	51,594.22	103,188.45	0.00E+00	3.16E-05	6.31E-05		
Se-79	1.2377E-05	51,594.22	103,188.45	0.00E+00	6.39E-01	1.28E+00		
Sn-126	2.5210E-05	51,594.22	103,188.45	0.00E+00	1.30E+00	2.60E+00		
Sr-90	9.1667E-01	51,594.22	103,188.45	0.00E+00	4.73E+04	9.46E+04		
Tc-99	3.9357E-04	51,594.22	103,188.45	0.00E+00	2.03E+01	4.06E+01		
Th-229	1.2057E-10	51,594.22	103,188.45	0.00E+00	6.22E-06	1.24E-05		
Th-230	2.1043E-08	51,594.22	103,188.45	0.00E+00	1.09E-03	2.17E-03		
Th-232	5.2972E-12	51,594.22	103,188.45	0.00E+00	2.73E-07	5.47E-07		
Tl-208	1.7474E-07	51,594.22	103,188.45	0.00E+00	9.02E-03	1.80E-02		
U-232	4.7368E-07	51,594.22	103,188.45	0.00E+00	2.44E-02	4.89E-02		
U-233	2.5097E-08	51,594.22	103,188.45	0.00E+00	1.29E-03	2.59E-03		
U-234	5.0000E-05	51,594.22	103,188.45	0.00E+00	2.58E+00	5.16E+00		
U-235	-1.4489E-06	51,594.22	0.00	9.56E-03	0.00E+00	9.56E-03		
U-236	7.5824E-06	51,594.22	103,188.45	0.00E+00	3.91E-01	7.82E-01		
U-238	-2.6129E-07	51,594.22	0.00	2.07E-01	1.94E-01	2.07E-01		
Y-90	9.1699E-01	51,594.22	103,188.45	0.00E+00	4.73E+04	9.46E+04		
Other Radionuclides					6.93E+04	1.39E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.19E+03	2.37E+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 %:	0.712765938	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		51,594.22	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	992.64	103,188.45	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	2.38	
Bounding:	4.75	103.95

Estimated EOL HM/Given EOL HM: 1.05

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EBWR (U METAL) NORMAL THIN
SNF ID #: 890
Fuel Units & Descr: 7 - 6 FLAT PLATES
Heavy Metal Mass: BOL=281.4kg; EOL=279.076kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
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' 0.58

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	2,210.01	4,420.01	0.00E+00	1.94E-06	3.88E-06
Am-241	1.4352E-01	2,210.01	4,420.01	0.00E+00	3.17E+02	6.34E+02
Am-242m	2.8698E-04	2,210.01	4,420.01	0.00E+00	6.34E-01	1.27E+00
Am-243	6.2565E-04	2,210.01	4,420.01	0.00E+00	1.38E+00	2.77E+00
C-14	4.7901E-05	2,210.01	4,420.01	0.00E+00	1.06E-01	2.12E-01
Cl-36	8.0297E-07	2,210.01	4,420.01	0.00E+00	1.77E-03	3.55E-03
Cm-243	2.5081E-04	2,210.01	4,420.01	0.00E+00	5.54E-01	1.11E+00
Cm-244	4.9015E-02	2,210.01	4,420.01	0.00E+00	1.08E+02	2.17E+02
Co-60	2.5581E-03	2,210.01	4,420.01	0.00E+00	5.65E+00	1.13E+01
Cs-134	4.0536E-05	2,210.01	4,420.01	0.00E+00	8.96E-02	1.79E-01
Cs-135	1.4433E-05	2,210.01	4,420.01	0.00E+00	3.19E-02	6.38E-02
Cs-137	1.3979E+00	2,210.01	4,420.01	0.00E+00	3.09E+03	6.18E+03
Eu-154	2.0203E-02	2,210.01	4,420.01	0.00E+00	4.46E+01	8.93E+01
Eu-155	1.7684E-03	2,210.01	4,420.01	0.00E+00	3.91E+00	7.82E+00
Fe-55	4.3136E-05	2,210.01	4,420.01	0.00E+00	9.53E-02	1.91E-01
H-3	2.0769E-02	2,210.01	4,420.01	0.00E+00	4.59E+01	9.18E+01
I-129	9.8288E-07	2,210.01	4,420.01	0.00E+00	2.17E-03	4.34E-03
Kr-85	2.8214E-02	2,210.01	4,420.01	0.00E+00	6.24E+01	1.25E+02
Np-237	1.1218E-05	2,210.01	4,420.01	0.00E+00	2.48E-02	4.96E-02
Pa-231	1.3036E-09	2,210.01	4,420.01	0.00E+00	2.88E-06	5.76E-06
Pb-210	8.5078E-11	2,210.01	4,420.01	0.00E+00	1.88E-07	3.76E-07
Pm-147	3.6531E-04	2,210.01	4,420.01	0.00E+00	8.07E-01	1.61E+00
Pu-238	7.4564E-02	2,210.01	4,420.01	0.00E+00	1.65E+02	3.30E+02
Pu-239	1.1623E-02	2,210.01	4,420.01	0.00E+00	2.57E+01	5.14E+01
Pu-240	1.5132E-02	2,210.01	4,420.01	0.00E+00	3.34E+01	6.69E+01
Pu-241	9.0036E-01	2,210.01	4,420.01	0.00E+00	1.99E+03	3.98E+03
Pu-242	6.4260E-05	2,210.01	4,420.01	0.00E+00	1.42E-01	2.84E-01
Ra-226	2.2804E-10	2,210.01	4,420.01	0.00E+00	5.04E-07	1.01E-06
Ra-228	5.2713E-12	2,210.01	4,420.01	0.00E+00	1.16E-08	2.33E-08
Ru-106	6.1160E-10	2,210.01	4,420.01	0.00E+00	1.35E-06	2.70E-06
Se-79	1.2377E-05	2,210.01	4,420.01	0.00E+00	2.74E-02	5.47E-02
Sn-126	2.5210E-05	2,210.01	4,420.01	0.00E+00	5.57E-02	1.11E-01
Sr-90	9.1667E-01	2,210.01	4,420.01	0.00E+00	2.03E+03	4.05E+03
Tc-99	3.9357E-04	2,210.01	4,420.01	0.00E+00	8.70E-01	1.74E+00
Th-229	1.2057E-10	2,210.01	4,420.01	0.00E+00	2.66E-07	5.33E-07
Th-230	2.1043E-06	2,210.01	4,420.01	0.00E+00	4.65E-05	9.30E-05
Th-232	5.2972E-12	2,210.01	4,420.01	0.00E+00	1.17E-08	2.34E-08
Tl-208	1.7474E-07	2,210.01	4,420.01	0.00E+00	3.86E-04	7.72E-04
U-232	4.7368E-07	2,210.01	4,420.01	0.00E+00	1.05E-03	2.09E-03
U-233	2.5097E-08	2,210.01	4,420.01	0.00E+00	5.55E-05	1.11E-04
U-234	5.0000E-05	2,210.01	4,420.01	0.00E+00	1.11E-01	2.21E-01
U-235	-1.4489E-06	2,210.01	0.00	4.36E-03	1.15E-03	4.36E-03
U-236	7.5824E-06	2,210.01	4,420.01	0.00E+00	1.68E-02	3.35E-02
U-238	-2.6129E-07	2,210.01	0.00	9.39E-02	9.33E-02	9.39E-02
Y-90	9.1699E-01	2,210.01	4,420.01	0.00E+00	2.03E+03	4.05E+03
Other Radionuclides					2.97E+03	5.93E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.378E+14
0.0250	4.796E+13
0.0375	4.574E+13
0.0575	5.285E+13
0.0850	2.661E+13
0.1250	1.847E+13
0.2250	2.282E+13
0.3750	9.812E+12
0.5750	2.282E+14
0.8500	3.157E+12
1.2500	3.101E+12
1.7500	9.287E+10
2.2500	1.496E+07
2.7500	3.064E+07
3.5000	3.155E+06
5.0000	1.349E+06
7.0000	1.555E+05
11.0000	1.786E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.08E+01	1.02E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	0.716417866	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2,210.01
Bounding:	450.24	4,420.01

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.22	
Bounding:	0.45	9.82

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ENEA (LEU UALX) SALUGGIA ITALY
SNF ID #: 760
Fuel Units & Descr: 32 - MTR TYPE
Heavy Metal Mass: BOL=22.4kg; EOL=21.568kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' 0.89

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.8404E-10	787.92	1,575.84	0.00E+00	2.24E-07	4.48E-07
Am-241	1.4935E-03	787.92	1,575.84	0.00E+00	1.18E+00	2.35E+00
Am-242m	4.4390E-07	787.92	1,575.84	0.00E+00	3.50E-04	7.00E-04
Am-243	1.4913E-06	787.92	1,575.84	0.00E+00	1.18E-03	2.35E-03
C-14	5.7217E-09	787.92	1,575.84	0.00E+00	4.51E-06	9.02E-06
Cl-36	1.3124E-32	787.92	1,575.84	0.00E+00	1.03E-29	2.07E-29
Cm-243	2.0967E-07	787.92	1,575.84	0.00E+00	1.65E-04	3.30E-04
Cm-244	4.3001E-05	787.92	1,575.84	0.00E+00	3.39E-02	6.78E-02
Co-60	1.9798E-05	787.92	1,575.84	0.00E+00	1.56E-02	3.12E-02
Cs-134	9.0795E-02	787.92	1,575.84	0.00E+00	7.15E+01	1.43E+02
Cs-135	3.4477E-06	787.92	1,575.84	0.00E+00	2.72E-03	5.43E-03
Cs-137	2.5588E+00	787.92	1,575.84	0.00E+00	2.02E+03	4.03E+03
Eu-154	5.4847E-02	787.92	1,575.84	0.00E+00	4.32E+01	8.64E+01
Eu-155	1.9469E-02	787.92	1,575.84	0.00E+00	1.53E+01	3.07E+01
Fe-55	1.7797E-03	787.92	1,575.84	0.00E+00	1.40E+00	2.80E+00
H-3	8.0065E-03	787.92	1,575.84	0.00E+00	6.31E+00	1.26E+01
I-129	7.5300E-07	787.92	1,575.84	0.00E+00	5.93E-04	1.19E-03
Kr-85	2.0705E-01	787.92	1,575.84	0.00E+00	1.63E+02	3.26E+02
Np-237	9.5507E-06	787.92	1,575.84	0.00E+00	7.53E-03	1.51E-02
Pa-231	1.2740E-09	787.92	1,575.84	0.00E+00	1.00E-06	2.01E-06
Pb-210	1.1838E-11	787.92	1,575.84	0.00E+00	9.33E-09	1.87E-08
Pm-147	6.7974E-01	787.92	1,575.84	0.00E+00	5.36E+02	1.07E+03
Pu-238	1.9755E-02	787.92	1,575.84	0.00E+00	1.56E+01	3.11E+01
Pu-239	4.2838E-04	787.92	1,575.84	0.00E+00	3.38E-01	6.75E-01
Pu-240	2.4390E-04	787.92	1,575.84	0.00E+00	1.92E-01	3.84E-01
Pu-241	5.4058E-02	787.92	1,575.84	0.00E+00	4.26E+01	8.52E+01
Pu-242	3.6329E-07	787.92	1,575.84	0.00E+00	2.86E-04	5.72E-04
Ra-226	8.3742E-11	787.92	1,575.84	0.00E+00	6.60E-08	1.32E-07
Ra-228	5.7734E-15	787.92	1,575.84	0.00E+00	4.55E-12	9.10E-12
Ru-106	6.1356E-03	787.92	1,575.84	0.00E+00	4.83E+00	9.67E+00
Se-79	1.2936E-05	787.92	1,575.84	0.00E+00	1.02E-02	2.04E-02
Sn-126	1.1574E-05	787.92	1,575.84	0.00E+00	9.12E-03	1.82E-02
Sr-90	2.4417E+00	787.92	1,575.84	0.00E+00	1.92E+03	3.85E+03
Tc-99	4.2239E-04	787.92	1,575.84	0.00E+00	3.33E-01	6.66E-01
Th-229	2.8568E-12	787.92	1,575.84	0.00E+00	2.25E-09	4.50E-09
Th-230	2.5310E-08	787.92	1,575.84	0.00E+00	1.99E-05	3.99E-05
Th-232	1.1631E-14	787.92	1,575.84	0.00E+00	9.16E-12	1.83E-11
Tl-208	4.6705E-08	787.92	1,575.84	0.00E+00	3.68E-05	7.36E-05
U-232	1.3151E-07	787.92	1,575.84	0.00E+00	1.04E-04	2.07E-04
U-233	2.1650E-09	787.92	1,575.84	0.00E+00	1.71E-06	3.41E-06
U-234	1.8399E-04	787.92	1,575.84	0.00E+00	1.45E-01	2.90E-01
U-235	-2.7235E-06	787.92	0.00	9.68E-03	7.54E-03	9.68E-03
U-236	1.5493E-05	787.92	1,575.84	0.00E+00	1.22E-02	2.44E-02
U-238	-4.2851E-09	787.92	0.00	6.02E-03	6.02E-03	6.02E-03
Y-90	2.4423E+00	787.92	1,575.84	0.00E+00	1.92E+03	3.85E+03
Other Radionuclides					1.96E+03	3.92E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.143E+14
0.0250	4.510E+13
0.0375	3.932E+13
0.0575	4.154E+13
0.0850	2.527E+13
0.1250	1.768E+13
0.2250	2.170E+13
0.3750	9.728E+12
0.5750	1.579E+14
0.8500	7.704E+12
1.2500	2.507E+12
1.7500	9.154E+10
2.2500	6.052E+09
2.7500	8.445E+07
3.5000	1.005E+07
5.0000	8.491E+02
7.0000	9.439E+01
11.0000	1.062E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.49E+01	4.99E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		787.92
Bounding:		1,575.84

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.11	
Bounding:	0.22	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ENEA (UALX HEU) SALUGGIA ITALY
SNF ID #: 574
Fuel Units & Descr: 116 - MTR TYPE
Heavy Metal Mass: BOL=18.56kg; EOL=17.226kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' = 3.22

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.8404E-10	1,263.32	2,526.65	0.00E+00	3.59E-07	7.18E-07
Am-241	1.4935E-03	1,263.32	2,526.65	0.00E+00	1.89E+00	3.77E+00
Am-242m	4.4390E-07	1,263.32	2,526.65	0.00E+00	5.61E-04	1.12E-03
Am-243	1.4913E-06	1,263.32	2,526.65	0.00E+00	1.88E-03	3.77E-03
C-14	5.7217E-09	1,263.32	2,526.65	0.00E+00	7.23E-06	1.45E-05
Cl-36	1.3124E-32	1,263.32	2,526.65	0.00E+00	1.66E-29	3.32E-29
Cm-243	2.0967E-07	1,263.32	2,526.65	0.00E+00	2.65E-04	5.30E-04
Cm-244	4.3001E-05	1,263.32	2,526.65	0.00E+00	5.43E-02	1.09E-01
Co-60	1.9798E-05	1,263.32	2,526.65	0.00E+00	2.50E-02	5.00E-02
Cs-134	9.0795E-02	1,263.32	2,526.65	0.00E+00	1.15E+02	2.29E+02
Cs-135	3.4477E-06	1,263.32	2,526.65	0.00E+00	4.36E-03	8.71E-03
Cs-137	2.5588E+00	1,263.32	2,526.65	0.00E+00	3.23E+03	6.47E+03
Eu-154	5.4847E-02	1,263.32	2,526.65	0.00E+00	6.93E+01	1.39E+02
Eu-155	1.9469E-02	1,263.32	2,526.65	0.00E+00	2.46E+01	4.92E+01
Fe-55	1.7797E-03	1,263.32	2,526.65	0.00E+00	2.25E+00	4.50E+00
H-3	8.0065E-03	1,263.32	2,526.65	0.00E+00	1.01E+01	2.02E+01
I-129	7.5300E-07	1,263.32	2,526.65	0.00E+00	9.51E-04	1.90E-03
Kr-85	2.0705E-01	1,263.32	2,526.65	0.00E+00	2.62E+02	5.23E+02
Np-237	9.5507E-06	1,263.32	2,526.65	0.00E+00	1.21E-02	2.41E-02
Pa-231	1.2740E-09	1,263.32	2,526.65	0.00E+00	1.61E-06	3.22E-06
Pb-210	1.1838E-11	1,263.32	2,526.65	0.00E+00	1.50E-08	2.99E-08
Pm-147	6.7974E-01	1,263.32	2,526.65	0.00E+00	8.59E+02	1.72E+03
Pu-238	1.9755E-02	1,263.32	2,526.65	0.00E+00	2.50E+01	4.99E+01
Pu-239	4.2838E-04	1,263.32	2,526.65	0.00E+00	5.41E-01	1.08E+00
Pu-240	2.4390E-04	1,263.32	2,526.65	0.00E+00	3.08E-01	6.16E-01
Pu-241	5.4058E-02	1,263.32	2,526.65	0.00E+00	6.83E+01	1.37E+02
Pu-242	3.6329E-07	1,263.32	2,526.65	0.00E+00	4.59E-04	9.18E-04
Ra-226	8.3742E-11	1,263.32	2,526.65	0.00E+00	1.06E-07	2.12E-07
Ra-228	5.7734E-15	1,263.32	2,526.65	0.00E+00	7.29E-12	1.46E-11
Ru-106	6.1356E-03	1,263.32	2,526.65	0.00E+00	7.75E+00	1.55E+01
Se-79	1.2936E-05	1,263.32	2,526.65	0.00E+00	1.63E-02	3.27E-02
Sn-126	1.1574E-05	1,263.32	2,526.65	0.00E+00	1.46E-02	2.92E-02
Sr-90	2.4417E+00	1,263.32	2,526.65	0.00E+00	3.08E+03	6.17E+03
Tc-99	4.2239E-04	1,263.32	2,526.65	0.00E+00	5.34E-01	1.07E+00
Th-229	2.8568E-12	1,263.32	2,526.65	0.00E+00	3.61E-09	7.22E-09
Th-230	2.5310E-08	1,263.32	2,526.65	0.00E+00	3.20E-05	6.40E-05
Th-232	1.1631E-14	1,263.32	2,526.65	0.00E+00	1.47E-11	2.94E-11
Tl-208	4.6705E-08	1,263.32	2,526.65	0.00E+00	5.90E-05	1.18E-04
U-232	1.3151E-07	1,263.32	2,526.65	0.00E+00	1.66E-04	3.32E-04
U-233	2.1650E-09	1,263.32	2,526.65	0.00E+00	2.74E-06	5.47E-06
U-234	1.8399E-04	1,263.32	2,526.65	0.00E+00	2.32E-01	4.65E-01
U-235	-2.7235E-06	1,263.32	0.00	3.74E-02	3.39E-02	3.74E-02
U-236	1.5493E-05	1,263.32	2,526.65	0.00E+00	1.96E-02	3.91E-02
U-238	-4.2851E-09	1,263.32	0.00	4.29E-04	4.23E-04	4.29E-04
Y-90	2.4423E+00	1,263.32	2,526.65	0.00E+00	3.09E+03	6.17E+03
Other Radionuclides					3.14E+03	6.28E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.436E+14
0.0250	7.232E+13
0.0375	6.305E+13
0.0575	6.661E+13
0.0850	4.052E+13
0.1250	2.835E+13
0.2250	3.480E+13
0.3750	1.560E+13
0.5750	2.532E+14
0.8500	1.235E+13
1.2500	4.020E+12
1.7500	1.468E+11
2.2500	9.704E+09
2.7500	1.354E+08
3.5000	1.612E+07
5.0000	1.341E+03
7.0000	1.489E+02
11.0000	1.676E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.80E+01	8.00E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.125	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,263.32
Bounding:		2,526.65

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.22	
Bounding:	0.43	

Estimated EOL HM/Given EOL HM: 1.00

[1]*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.*

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: EPRI
SNF ID #: 67
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=0.02kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
Template: (Worst Case)
[2]Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00136865
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 0.03

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.3072E-06	19.01	19.01	0.00E+00	4.39E-05	4.39E-05
Am-241	8.4448E+00	19.01	19.01	0.00E+00	1.61E+02	1.61E+02
Am-242m	1.6848E-02	19.01	19.01	0.00E+00	3.20E-01	3.20E-01
Am-243	1.6320E-02	19.01	19.01	0.00E+00	3.10E-01	3.10E-01
C-14	1.2090E-01	19.01	19.01	0.00E+00	2.30E+00	2.30E+00
Cl-36	2.2849E-03	19.01	19.01	0.00E+00	4.34E-02	4.34E-02
Cm-243	8.6624E-04	19.01	19.01	0.00E+00	1.65E-02	1.65E-02
Cm-244	1.6848E-01	19.01	19.01	0.00E+00	3.20E+00	3.20E+00
Co-60	2.8086E+01	19.01	19.01	0.00E+00	5.34E+02	5.34E+02
Cs-134	3.4148E-04	19.01	19.01	0.00E+00	6.49E-03	6.49E-03
Cs-135	4.3976E-04	19.01	19.01	0.00E+00	8.36E-03	8.36E-03
Cs-137	2.1049E+01	19.01	19.01	0.00E+00	4.00E+02	4.00E+02
Eu-154	1.2500E+00	19.01	19.01	0.00E+00	2.38E+01	2.38E+01
Eu-155	6.8986E-02	19.01	19.01	0.00E+00	1.31E+00	1.31E+00
Fe-55	2.9308E-01	19.01	19.01	0.00E+00	5.57E+00	5.57E+00
H-3	2.4311E-01	19.01	19.01	0.00E+00	4.62E+00	4.62E+00
I-129	1.0618E-05	19.01	19.01	0.00E+00	2.02E-04	2.02E-04
Kr-85	5.9882E-01	19.01	19.01	0.00E+00	1.14E+01	1.14E+01
Np-237	1.5668E-04	19.01	19.01	0.00E+00	2.98E-03	2.98E-03
Pa-231	2.8656E-06	19.01	19.01	0.00E+00	5.45E-05	5.45E-05
Pb-210	2.3918E-08	19.01	19.01	0.00E+00	4.55E-07	4.55E-07
Pm-147	1.6900E-02	19.01	19.01	0.00E+00	3.21E-01	3.21E-01
Pu-238	-8.6120E-01	19.01	0.00	5.14E+00	0.00E+00	5.14E+00
Pu-239	-4.8440E-02	19.01	0.00	6.22E-01	0.00E+00	6.22E-01
Pu-240	-3.0095E-01	19.01	0.00	7.94E-01	0.00E+00	7.94E-01
Pu-241	-1.0411E+02	19.01	0.00	2.04E+02	0.00E+00	2.04E+02
Pu-242	-1.1381E-04	19.01	0.00	3.44E-03	1.27E-03	3.44E-03
Ra-226	6.4400E-06	19.01	19.01	0.00E+00	1.22E-06	1.22E-06
Ra-228	5.9952E-07	19.01	19.01	0.00E+00	1.14E-05	1.14E-05
Ru-106	8.5526E-07	19.01	19.01	0.00E+00	1.63E-05	1.63E-05
Se-79	1.9181E-04	19.01	19.01	0.00E+00	3.65E-03	3.65E-03
Sn-126	1.6671E-04	19.01	19.01	0.00E+00	3.17E-03	3.17E-03
Sr-90	1.9799E+01	19.01	19.01	0.00E+00	3.76E+02	3.76E+02
Tc-99	6.7678E-03	19.01	19.01	0.00E+00	1.29E-01	1.29E-01
Th-229	1.7488E-06	19.01	19.01	0.00E+00	3.32E-05	3.32E-05
Th-230	5.8704E-06	19.01	19.01	0.00E+00	1.12E-04	1.12E-04
Th-232	6.0208E-07	19.01	19.01	0.00E+00	1.14E-05	1.14E-05
Tl-208	8.7573E-05	19.01	19.01	0.00E+00	1.66E-03	1.66E-03
U-232	2.3706E-04	19.01	19.01	0.00E+00	4.51E-03	4.51E-03
U-233	3.6128E-04	19.01	19.01	0.00E+00	6.87E-03	6.87E-03
U-234	1.2788E-02	19.01	19.01	0.00E+00	2.43E-01	2.43E-01
U-235	5.8772E-04	19.01	19.01	0.00E+00	1.12E-02	1.12E-02
U-236	2.3485E-04	19.01	19.01	0.00E+00	4.46E-03	4.46E-03
U-238	1.1741E-04	19.01	19.01	0.00E+00	2.23E-03	2.23E-03
Y-90	1.9804E+01	19.01	19.01	0.00E+00	3.76E+02	3.76E+02
Other Radionuclides					1.17E+03	1.17E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.329E+13
0.0250	4.635E+12
0.0375	4.049E+12
0.0575	6.371E+12
0.0850	2.487E+12
0.1250	1.949E+12
0.2250	2.154E+12
0.3750	9.214E+11
0.5750	1.498E+13
0.8500	5.726E+11
1.2500	4.002E+13
1.7500	1.770E+10
2.2500	2.099E+08
2.7500	5.915E+07
3.5000	4.733E+04
5.0000	2.010E+04
7.0000	2.302E+03
11.0000	2.634E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.87E+01	1.90E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	(Worst Case)
Fuel Cladding:	SST	SST/Inconel
BOL HM Constituents:	Pu	U, Th, & Pu
BOL Enrichment %:		0 to 100

Basis for Parameter Differences:
This fuel didn't closely match any existing templates, therefore the worst case template was used.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		19.01
Bounding:		19.01

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	14.21	
Bounding:	14.21	

Estimated EOL HM/Given EOL HM: 601.11

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ERR (ASSEMBLIES)
SNF ID #: 68
Fuel Units & Descr: 190 - 5 X 5 ROD ARRAY
Heavy Metal Mass: BOL=5056.66kg; EOL=5041.023kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
Template: LWBR (Light Water, Zirc, 60 to 100%, Th and U)
[2]Template Burnup(MWd): 10269.14
Template BOL Heavy Metal Mass (MT): 0.45991251
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 10.56

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9.7360E-05	27,366.64	65,736.58	0.00E+00	2.66E+00	6.40E+00	Avg. MeV	
Am-241	2.4345E-04	27,366.64	65,736.58	0.00E+00	6.66E+00	1.60E+01	0.0150	5.424E+15
Am-242m	1.4821E-06	27,366.64	65,736.58	0.00E+00	4.06E-02	9.74E-02	0.0250	1.117E+15
Am-243	3.1152E-07	27,366.64	65,736.58	0.00E+00	8.53E-03	2.05E-02	0.0375	9.545E+14
C-14	9.2432E-05	27,366.64	65,736.58	0.00E+00	2.53E+00	6.08E+00	0.0575	1.043E+15
Cl-36	1.6103E-06	27,366.64	65,736.58	0.00E+00	4.95E-02	1.19E-01	0.0850	6.664E+14
Cm-243	3.0597E-07	27,366.64	65,736.58	0.00E+00	8.37E-03	2.01E-02	0.1250	4.176E+14
Cm-244	1.4149E-05	27,366.64	65,736.58	0.00E+00	3.87E-01	9.30E-01	0.2250	5.976E+14
Co-60	8.7369E-04	27,366.64	65,736.58	0.00E+00	2.39E+01	5.74E+01	0.3750	2.400E+14
Cs-134	2.5601E-05	27,366.64	65,736.58	0.00E+00	7.01E-01	1.68E+00	0.5750	3.664E+15
Cs-135	2.8639E-05	27,366.64	65,736.58	0.00E+00	7.84E-01	1.88E+00	0.8500	6.547E+13
Cs-137	1.4772E+00	27,366.64	65,736.58	0.00E+00	4.04E+04	9.71E+04	1.2500	2.892E+13
Eu-154	8.6025E-03	27,366.64	65,736.58	0.00E+00	2.35E+02	5.65E+02	1.7500	4.511E+12
Eu-155	6.6062E-04	27,366.64	65,736.58	0.00E+00	1.81E+01	4.34E+01	2.2500	1.311E+08
Fe-55	2.3011E-06	27,366.64	65,736.58	0.00E+00	6.30E-02	1.51E-01	2.7500	3.223E+13
H-3	2.1277E-03	27,366.64	65,736.58	0.00E+00	5.82E+01	1.40E+02	3.5000	1.265E+05
I-129	1.5853E-06	27,366.64	65,736.58	0.00E+00	4.34E-02	1.04E-01	5.0000	3.959E+04
Kr-85	6.2625E-02	27,366.64	65,736.58	0.00E+00	1.71E+03	4.12E+03	7.0000	2.882E+03
Np-237	1.2620E-07	27,366.64	65,736.58	0.00E+00	3.45E-03	8.30E-03	11.0000	2.193E+02
Pa-231	1.2017E-04	27,366.64	65,736.58	0.00E+00	3.29E+00	7.90E+00		
Pb-210	1.4247E-08	27,366.64	65,736.58	0.00E+00	3.90E-04	9.37E-04		
Pm-147	2.6224E-04	27,366.64	65,736.58	0.00E+00	7.18E+00	1.72E+01		
Pu-238	4.2477E-04	27,366.64	65,736.58	0.00E+00	1.16E+01	2.79E+01		
Pu-239	2.7519E-05	27,366.64	65,736.58	0.00E+00	7.53E-01	1.81E+00		
Pu-240	1.6184E-05	27,366.64	65,736.58	0.00E+00	4.43E-01	1.06E+00		
Pu-241	1.4695E-03	27,366.64	65,736.58	0.00E+00	4.02E+01	9.66E+01		
Pu-242	4.0831E-08	27,366.64	65,736.58	0.00E+00	1.12E-03	2.68E-03		
Ra-226	2.1423E-08	27,366.64	65,736.58	0.00E+00	5.86E-04	1.41E-03		
Ra-228	4.6236E-06	27,366.64	65,736.58	0.00E+00	1.27E-01	3.04E-01		
Ru-106	4.0208E-11	27,366.64	65,736.58	0.00E+00	1.10E-06	2.64E-06		
Se-79	3.5417E-05	27,366.64	65,736.58	0.00E+00	9.69E-01	2.33E+00		
Sn-126	3.9848E-05	27,366.64	65,736.58	0.00E+00	1.09E+00	2.62E+00		
Sr-90	1.4928E+00	27,366.64	65,736.58	0.00E+00	4.09E+04	9.81E+04		
Tc-99	3.2525E-04	27,366.64	65,736.58	0.00E+00	8.90E+00	2.14E+01		
Th-229	6.4582E-05	27,366.64	65,736.58	0.00E+00	1.77E+00	4.25E+00		
Th-230	1.1432E-06	27,366.64	65,736.58	0.00E+00	3.13E-02	7.52E-02		
Th-232	-9.0328E-08	27,366.64	0.00	5.34E-01	5.32E-01	5.34E-01		
Tl-208	1.3964E-02	27,366.64	65,736.58	0.00E+00	3.82E+02	9.18E+02		
U-232	3.7822E-02	27,366.64	65,736.58	0.00E+00	1.04E+03	2.49E+03		
U-233	-3.3244E-03	27,366.64	0.00	1.80E+03	1.70E+03	1.80E+03		
U-234	8.1769E-04	27,366.64	65,736.58	0.00E+00	2.24E+01	5.38E+01		
U-235	5.7813E-08	27,366.64	65,736.58	3.67E-04	1.95E-03	4.17E-03		
U-236	1.3273E-07	27,366.64	65,736.58	0.00E+00	3.63E-03	8.73E-03		
U-238	-3.1121E-10	27,366.64	0.00	2.35E-04	2.26E-04	2.35E-04		
Y-90	1.4928E+00	27,366.64	65,736.58	0.00E+00	4.09E+04	9.81E+04		
Other Radionuclides					4.57E+04	1.10E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.79E+02	1.80E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	SST	ZIRC
BOL HM Constituents:	Th and U	Th and U
BOL Enrichment %:	92.94902719	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches LWBR Template on all but one parameter (cladding) making LWBR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	27,366.64	15,217.35
Bounding:	65,736.58	30,434.70

Basis for burnup used in estimate:
Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.24	0.56
Bounding:	0.58	0.46

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ERR (RODS)
SNF ID #: 1057
Fuel Units & Descr: 4 - ROD
Heavy Metal Mass: BOL=4.293kg; EOL=4.242kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
Template: LWBR (Light Water, Zirc, 60 to 100%, Th and U)
[2]Template Burnup(MWd): 10269.14
Template BOL Heavy Metal Mass (MT): 0.45991251
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 0.17

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	9.7360E-05	49.83	99.65	0.00E+00	4.85E-03	9.70E-03	Avg. MeV	
Am-241	2.4345E-04	49.83	99.65	0.00E+00	1.21E-02	2.43E-02	0.0150	8.219E+12
Am-242m	1.4821E-06	49.83	99.65	0.00E+00	7.38E-05	1.48E-04	0.0250	1.693E+12
Am-243	3.1152E-07	49.83	99.65	0.00E+00	1.55E-05	3.10E-05	0.0375	1.447E+12
C-14	9.2432E-05	49.83	99.65	0.00E+00	4.61E-03	9.21E-03	0.0575	1.582E+12
Cl-36	1.8103E-06	49.83	99.65	0.00E+00	9.02E-05	1.80E-04	0.0850	1.010E+12
Cm-243	3.0597E-07	49.83	99.65	0.00E+00	1.52E-05	3.05E-05	0.1250	6.330E+11
Cm-244	1.4149E-05	49.83	99.65	0.00E+00	7.05E-04	1.41E-03	0.2250	9.059E+11
Co-60	8.7369E-04	49.83	99.65	0.00E+00	4.35E-02	8.71E-02	0.3750	3.638E+11
Cs-134	2.5601E-05	49.83	99.65	0.00E+00	1.28E-03	2.55E-03	0.5750	5.554E+12
Cs-135	2.8639E-05	49.83	99.65	0.00E+00	1.43E-03	2.85E-03	0.8500	9.925E+10
Cs-137	1.4772E+00	49.83	99.65	0.00E+00	7.36E+01	1.47E+02	1.2500	4.384E+10
Eu-154	8.6025E-03	49.83	99.65	0.00E+00	4.29E-01	8.57E-01	1.7500	6.838E+09
Eu-155	6.6062E-04	49.83	99.65	0.00E+00	3.29E-02	6.58E-02	2.2500	1.987E+05
Fe-55	2.3011E-06	49.83	99.65	0.00E+00	1.15E-04	2.29E-04	2.7500	4.886E+10
H-3	2.1277E-03	49.83	99.65	0.00E+00	1.06E-01	2.12E-01	3.5000	1.840E+02
I-129	1.5853E-06	49.83	99.65	0.00E+00	7.90E-05	1.58E-04	5.0000	5.768E+01
Kr-85	6.2625E-02	49.83	99.65	0.00E+00	3.12E+00	6.24E+00	7.0000	4.217E+00
Np-237	1.2620E-07	49.83	99.65	0.00E+00	6.29E-06	1.26E-05	11.0000	3.229E-01
Pa-231	1.2017E-04	49.83	99.65	0.00E+00	5.99E-03	1.20E-02		
Pb-210	1.4247E-08	49.83	99.65	0.00E+00	7.10E-07	1.42E-06		
Pm-147	2.6224E-04	49.83	99.65	0.00E+00	1.31E-02	2.61E-02		
Pu-238	4.2477E-04	49.83	99.65	0.00E+00	2.12E-02	4.23E-02		
Pu-239	2.7519E-05	49.83	99.65	0.00E+00	1.37E-03	2.74E-03		
Pu-240	1.6184E-05	49.83	99.65	0.00E+00	8.06E-04	1.61E-03		
Pu-241	1.4695E-03	49.83	99.65	0.00E+00	7.32E-02	1.46E-01		
Pu-242	4.0831E-08	49.83	99.65	0.00E+00	2.03E-06	4.07E-06		
Ra-226	2.1423E-06	49.83	99.65	0.00E+00	1.07E-06	2.13E-06		
Ra-228	4.6236E-06	49.83	99.65	0.00E+00	2.30E-04	4.61E-04		
Ru-106	4.0208E-11	49.83	99.65	0.00E+00	2.00E-09	4.01E-09		
Se-79	3.5417E-05	49.83	99.65	0.00E+00	1.76E-03	3.53E-03		
Sn-126	3.9848E-05	49.83	99.65	0.00E+00	1.99E-03	3.97E-03		
Sr-90	1.4928E+00	49.83	99.65	0.00E+00	7.44E+01	1.49E+02		
Tc-99	3.2525E-04	49.83	99.65	0.00E+00	1.62E-02	3.24E-02		
Th-229	6.4582E-05	49.83	99.65	0.00E+00	3.22E-03	6.44E-03		
Th-230	1.1432E-06	49.83	99.65	0.00E+00	5.70E-05	1.14E-04		
Th-232	-9.0328E-08	49.83	0.00	4.53E-04	4.49E-04	4.53E-04		
Tl-208	1.3964E-02	49.83	99.65	0.00E+00	6.96E-01	1.39E+00		
U-232	3.7822E-02	49.83	99.65	0.00E+00	1.88E+00	3.77E+00		
U-233	-3.3244E-03	49.83	0.00	1.52E+00	1.36E+00	1.52E+00		
U-234	8.1769E-04	49.83	99.65	0.00E+00	4.07E-02	8.15E-02		
U-235	5.7813E-08	49.83	99.65	3.12E-07	3.19E-06	6.07E-06		
U-236	1.3273E-07	49.83	99.65	0.00E+00	6.61E-06	1.32E-05		
U-238	-3.1121E-10	49.83	0.00	1.99E-07	1.84E-07	1.99E-07		
Y-90	1.4928E+00	49.83	99.65	0.00E+00	7.44E+01	1.49E+02		
Other Radionuclides					8.31E+01	1.66E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.37E+00	2.70E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	SST	ZIRC
BOL HM Constituents:	Th and U	Th and U
BOL Enrichment %:	93.0868939	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches LWBR Template on all but one parameter (cladding) making LWBR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	28.26	49.83
Bounding:	45.49	99.65

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.52	1.76
Bounding:	1.04	2.19

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ESSOR (UALX-HEU) ITALY
SNF ID #: 762
Fuel Units & Descr: 12 - 18 CURVED PLATES
Heavy Metal Mass: BOL=7.8kg; EOL=5.73kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2006
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 1.00

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	1.4545E-10	1,960.33	3,920.66	0.00E+00	2.85E-07	5.70E-07
Am-241	1.1190E-03	1,960.33	3,920.66	0.00E+00	2.19E+00	4.39E+00
Am-242m	4.5425E-07	1,960.33	3,920.66	0.00E+00	8.90E-04	1.78E-03
Am-243	1.4921E-06	1,960.33	3,920.66	0.00E+00	2.93E-03	5.85E-03
C-14	5.7244E-09	1,960.33	3,920.66	0.00E+00	1.12E-05	2.24E-05
Cl-36	1.3124E-32	1,960.33	3,920.66	0.00E+00	2.57E-29	5.15E-29
Cm-243	2.3676E-07	1,960.33	3,920.66	0.00E+00	4.64E-04	9.28E-04
Cm-244	5.2042E-05	1,960.33	3,920.66	0.00E+00	1.02E-01	2.04E-01
Co-60	3.8208E-05	1,960.33	3,920.66	0.00E+00	7.49E-02	1.50E-01
Cs-134	4.8693E-01	1,960.33	3,920.66	0.00E+00	9.55E+02	1.91E+03
Cs-135	3.4477E-06	1,960.33	3,920.66	0.00E+00	6.76E-03	1.35E-02
Cs-137	2.8731E+00	1,960.33	3,920.66	0.00E+00	5.63E+03	1.13E+04
Eu-154	8.2053E-02	1,960.33	3,920.66	0.00E+00	1.61E+02	3.22E+02
Eu-155	3.9134E-02	1,960.33	3,920.66	0.00E+00	7.67E+01	1.53E+02
Fe-55	6.7429E-03	1,960.33	3,920.66	0.00E+00	1.32E+01	2.64E+01
H-3	1.0599E-02	1,960.33	3,920.66	0.00E+00	2.08E+01	4.16E+01
I-129	7.5300E-07	1,960.33	3,920.66	0.00E+00	1.48E-03	2.95E-03
Kr-85	2.8595E-01	1,960.33	3,920.66	0.00E+00	5.61E+02	1.12E+03
Np-237	9.5479E-06	1,960.33	3,920.66	0.00E+00	1.87E-02	3.74E-02
Pa-231	8.9297E-10	1,960.33	3,920.66	0.00E+00	1.75E-06	3.50E-06
Pb-210	3.7609E-12	1,960.33	3,920.66	0.00E+00	7.37E-09	1.47E-08
Pm-147	2.5452E+00	1,960.33	3,920.66	0.00E+00	4.99E+03	9.98E+03
Pu-238	2.0550E-02	1,960.33	3,920.66	0.00E+00	4.03E+01	8.06E+01
Pu-239	4.2838E-04	1,960.33	3,920.66	0.00E+00	8.40E-01	1.68E+00
Pu-240	2.4401E-04	1,960.33	3,920.66	0.00E+00	4.78E-01	9.57E-01
Pu-241	6.8764E-02	1,960.33	3,920.66	0.00E+00	1.35E+02	2.70E+02
Pu-242	3.6329E-07	1,960.33	3,920.66	0.00E+00	7.12E-04	1.42E-03
Ra-226	3.8045E-11	1,960.33	3,920.66	0.00E+00	7.46E-08	1.49E-07
Ra-228	2.9902E-15	1,960.33	3,920.66	0.00E+00	5.86E-12	1.17E-11
Ru-106	1.9055E-01	1,960.33	3,920.66	0.00E+00	3.74E+02	7.47E+02
Se-79	1.2936E-05	1,960.33	3,920.66	0.00E+00	2.54E-02	5.07E-02
Sn-126	1.1574E-05	1,960.33	3,920.66	0.00E+00	2.27E-02	4.54E-02
Sr-90	2.7505E+00	1,960.33	3,920.66	0.00E+00	5.39E+03	1.08E+04
Tc-99	4.2239E-04	1,960.33	3,920.66	0.00E+00	8.28E-01	1.66E+00
Th-229	1.8848E-12	1,960.33	3,920.66	0.00E+00	3.69E-09	7.39E-09
Th-230	1.7042E-06	1,960.33	3,920.66	0.00E+00	3.34E-05	6.68E-05
Th-232	7.8132E-15	1,960.33	3,920.66	0.00E+00	1.53E-11	3.06E-11
Tl-208	4.4063E-06	1,960.33	3,920.66	0.00E+00	8.64E-05	1.73E-04
U-232	1.3151E-07	1,960.33	3,920.66	0.00E+00	2.58E-04	5.16E-04
U-233	1.9564E-09	1,960.33	3,920.66	0.00E+00	3.84E-06	7.67E-06
U-234	1.8371E-04	1,960.33	3,920.66	0.00E+00	3.60E-01	7.20E-01
U-235	-2.7235E-06	1,960.33	0.00	1.56E-02	1.03E-02	1.56E-02
U-236	1.5493E-05	1,960.33	3,920.66	0.00E+00	3.04E-02	6.07E-02
U-238	-4.2851E-09	1,960.33	0.00	1.96E-04	1.87E-04	1.96E-04
Y-90	2.7505E+00	1,960.33	3,920.66	0.00E+00	5.39E+03	1.08E+04
Other Radionuclides					1.01E+04	2.02E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.564E+14
0.0250	1.630E+14
0.0375	1.504E+14
0.0575	1.479E+14
0.0850	9.426E+13
0.1250	8.163E+13
0.2250	7.989E+13
0.3750	3.867E+13
0.5750	5.312E+14
0.8500	7.439E+13
1.2500	1.384E+13
1.7500	5.804E+11
2.2500	1.217E+12
2.7500	7.004E+09
3.5000	7.767E+08
5.0000	2.323E+03
7.0000	2.589E+02
11.0000	2.918E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.94E+01	1.99E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.52828863	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,960.33
Bounding:		3,920.66

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.80	
Bounding:	1.60	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FMRB (GERMANY)
SNF ID #: 577
Fuel Units & Descr: 92 - MTR TYPE
Heavy Metal Mass: BOL=13.138kg; EOL=11.666kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1994
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 3.83

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.5861E-10	1,394.01	2,788.03	0.00E+00	6.39E-07	1.28E-06
Am-241	1.7832E-03	1,394.01	2,788.03	0.00E+00	2.49E+00	4.97E+00
Am-242m	4.3410E-07	1,394.01	2,788.03	0.00E+00	6.05E-04	1.21E-03
Am-243	1.4907E-06	1,394.01	2,788.03	0.00E+00	2.08E-03	4.16E-03
C-14	5.7162E-09	1,394.01	2,788.03	0.00E+00	7.97E-06	1.59E-05
Cl-36	1.3124E-32	1,394.01	2,788.03	0.00E+00	1.83E-29	3.66E-29
Cm-243	1.8568E-07	1,394.01	2,788.03	0.00E+00	2.59E-04	5.18E-04
Cm-244	3.5512E-05	1,394.01	2,788.03	0.00E+00	4.95E-02	9.90E-02
Co-60	1.0261E-05	1,394.01	2,788.03	0.00E+00	1.43E-02	2.86E-02
Cs-134	1.6931E-02	1,394.01	2,788.03	0.00E+00	2.36E+01	4.72E+01
Cs-135	3.4477E-06	1,394.01	2,788.03	0.00E+00	4.81E-03	9.61E-03
Cs-137	2.2800E+00	1,394.01	2,788.03	0.00E+00	3.18E+03	6.36E+03
Eu-154	3.6656E-02	1,394.01	2,788.03	0.00E+00	5.11E+01	1.02E+02
Eu-155	9.6841E-03	1,394.01	2,788.03	0.00E+00	1.35E+01	2.70E+01
Fe-55	4.6977E-04	1,394.01	2,788.03	0.00E+00	6.55E-01	1.31E+00
H-3	6.0485E-03	1,394.01	2,788.03	0.00E+00	8.43E+00	1.69E+01
I-129	7.5300E-07	1,394.01	2,788.03	0.00E+00	1.05E-03	2.10E-03
Kr-85	1.4989E-01	1,394.01	2,788.03	0.00E+00	2.09E+02	4.18E+02
Np-237	9.5534E-06	1,394.01	2,788.03	0.00E+00	1.33E-02	2.66E-02
Pa-231	1.6550E-09	1,394.01	2,788.03	0.00E+00	2.31E-06	4.61E-06
Pb-210	2.6631E-11	1,394.01	2,788.03	0.00E+00	3.71E-08	7.42E-08
Pm-147	1.8156E-01	1,394.01	2,788.03	0.00E+00	2.53E+02	5.06E+02
Pu-238	1.8990E-02	1,394.01	2,788.03	0.00E+00	2.65E+01	5.29E+01
Pu-239	4.2838E-04	1,394.01	2,788.03	0.00E+00	5.97E-01	1.19E+00
Pu-240	2.4379E-04	1,394.01	2,788.03	0.00E+00	3.40E-01	6.80E-01
Pu-241	4.2511E-02	1,394.01	2,788.03	0.00E+00	5.93E+01	1.19E+02
Pu-242	3.6329E-07	1,394.01	2,788.03	0.00E+00	5.06E-04	1.01E-03
Ra-226	1.4725E-10	1,394.01	2,788.03	0.00E+00	2.05E-07	4.11E-07
Ra-228	8.9760E-15	1,394.01	2,788.03	0.00E+00	1.25E-11	2.50E-11
Ru-106	1.9752E-04	1,394.01	2,788.03	0.00E+00	2.75E-01	5.51E-01
Se-79	1.2933E-05	1,394.01	2,788.03	0.00E+00	1.80E-02	3.61E-02
Sn-126	1.1574E-05	1,394.01	2,788.03	0.00E+00	1.61E-02	3.23E-02
Sr-90	2.1680E+00	1,394.01	2,788.03	0.00E+00	3.02E+03	6.04E+03
Tc-99	4.2239E-04	1,394.01	2,788.03	0.00E+00	5.89E-01	1.18E+00
Th-229	3.9270E-12	1,394.01	2,788.03	0.00E+00	5.47E-09	1.09E-08
Th-230	3.3578E-06	1,394.01	2,788.03	0.00E+00	4.68E-05	9.36E-05
Th-232	1.5452E-14	1,394.01	2,788.03	0.00E+00	2.15E-11	4.31E-11
Tl-208	4.6705E-06	1,394.01	2,788.03	0.00E+00	6.51E-05	1.30E-04
U-232	1.3045E-07	1,394.01	2,788.03	0.00E+00	1.82E-04	3.64E-04
U-233	2.3739E-09	1,394.01	2,788.03	0.00E+00	3.31E-06	6.62E-06
U-234	1.8423E-04	1,394.01	2,788.03	0.00E+00	2.57E-01	5.14E-01
U-235	-2.7235E-06	1,394.01	0.00	2.59E-02	2.21E-02	2.59E-02
U-236	1.5493E-05	1,394.01	2,788.03	0.00E+00	2.16E-02	4.32E-02
U-238	-4.2851E-09	1,394.01	0.00	3.86E-04	3.80E-04	3.86E-04
Y-90	2.1686E+00	1,394.01	2,788.03	0.00E+00	3.02E+03	6.05E+03
Other Radionuclides					3.03E+03	6.06E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.326E+14
0.0250	6.936E+13
0.0375	6.057E+13
0.0575	6.458E+13
0.0850	3.912E+13
0.1250	2.682E+13
0.2250	3.370E+13
0.3750	1.476E+13
0.5750	2.396E+14
0.8500	5.693E+12
1.2500	2.678E+12
1.7500	1.205E+11
2.2500	1.507E+08
2.7500	9.059E+06
3.5000	5.758E+05
5.0000	1.333E+03
7.0000	1.476E+02
11.0000	1.657E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.77E+01	7.55E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	91.25787542	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,394.01
Bounding:		2,788.03

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.34	
Bounding:	0.67	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRG-1 (U3O8 LEU) GERMANY
SNF ID #: 581
Fuel Units & Descr: 7 - MTR TYPE
Heavy Metal Mass: BOL=9.566kg; EOL=8.635kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1994
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10" 0.29

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.5861E-10	881.01	1,762.02	0.00E+00	4.04E-07	8.08E-07
Am-241	1.7832E-03	881.01	1,762.02	0.00E+00	1.57E+00	3.14E+00
Am-242m	4.3410E-07	881.01	1,762.02	0.00E+00	3.82E-04	7.65E-04
Am-243	1.4907E-06	881.01	1,762.02	0.00E+00	1.31E-03	2.63E-03
C-14	5.7162E-09	881.01	1,762.02	0.00E+00	5.04E-06	1.01E-05
Cl-36	1.3124E-32	881.01	1,762.02	0.00E+00	1.16E-29	2.31E-29
Cm-243	1.8568E-07	881.01	1,762.02	0.00E+00	1.64E-04	3.27E-04
Cm-244	3.5512E-05	881.01	1,762.02	0.00E+00	3.13E-02	6.26E-02
Co-60	1.0261E-05	881.01	1,762.02	0.00E+00	9.04E-03	1.81E-02
Cs-134	1.6931E-02	881.01	1,762.02	0.00E+00	1.49E+01	2.98E+01
Cs-135	3.4477E-06	881.01	1,762.02	0.00E+00	3.04E-03	6.07E-03
Cs-137	2.2800E+00	881.01	1,762.02	0.00E+00	2.01E+03	4.02E+03
Eu-154	3.6656E-02	881.01	1,762.02	0.00E+00	3.23E+01	6.46E+01
Eu-155	9.6841E-03	881.01	1,762.02	0.00E+00	8.53E+00	1.71E+01
Fe-55	4.6977E-04	881.01	1,762.02	0.00E+00	4.14E-01	8.28E-01
H-3	6.0485E-03	881.01	1,762.02	0.00E+00	5.33E+00	1.07E+01
I-129	7.5300E-07	881.01	1,762.02	0.00E+00	6.63E-04	1.33E-03
Kr-85	1.4989E-01	881.01	1,762.02	0.00E+00	1.32E+02	2.64E+02
Np-237	9.5534E-06	881.01	1,762.02	0.00E+00	8.42E-03	1.68E-02
Pa-231	1.6550E-09	881.01	1,762.02	0.00E+00	1.46E-06	2.92E-06
Pb-210	2.6631E-11	881.01	1,762.02	0.00E+00	2.35E-08	4.69E-08
Pm-147	1.8156E-01	881.01	1,762.02	0.00E+00	1.60E+02	3.20E+02
Pu-238	1.8990E-02	881.01	1,762.02	0.00E+00	1.67E+01	3.35E+01
Pu-239	4.2838E-04	881.01	1,762.02	0.00E+00	3.77E-01	7.55E-01
Pu-240	2.4379E-04	881.01	1,762.02	0.00E+00	2.15E-01	4.30E-01
Pu-241	4.2511E-02	881.01	1,762.02	0.00E+00	3.75E+01	7.49E+01
Pu-242	3.6329E-07	881.01	1,762.02	0.00E+00	3.20E-04	6.40E-04
Ra-226	1.4725E-10	881.01	1,762.02	0.00E+00	1.30E-07	2.59E-07
Ra-228	8.9760E-15	881.01	1,762.02	0.00E+00	7.91E-12	1.58E-11
Ru-106	1.9752E-04	881.01	1,762.02	0.00E+00	1.74E-01	3.48E-01
Se-79	1.2933E-05	881.01	1,762.02	0.00E+00	1.14E-02	2.28E-02
Sn-126	1.1574E-05	881.01	1,762.02	0.00E+00	1.02E-02	2.04E-02
Sr-90	2.1680E+00	881.01	1,762.02	0.00E+00	1.91E+03	3.82E+03
Tc-99	4.2239E-04	881.01	1,762.02	0.00E+00	3.72E-01	7.44E-01
Th-229	3.9270E-12	881.01	1,762.02	0.00E+00	3.46E-09	6.92E-09
Th-230	3.3578E-08	881.01	1,762.02	0.00E+00	2.96E-05	5.92E-05
Th-232	1.5452E-14	881.01	1,762.02	0.00E+00	1.36E-11	2.72E-11
Tl-208	4.6705E-08	881.01	1,762.02	0.00E+00	4.11E-05	8.23E-05
U-232	1.3045E-07	881.01	1,762.02	0.00E+00	1.15E-04	2.30E-04
U-233	2.3739E-09	881.01	1,762.02	0.00E+00	2.09E-06	4.18E-06
U-234	1.8423E-04	881.01	1,762.02	0.00E+00	1.62E-01	3.25E-01
U-235	-2.7235E-06	881.01	0.00	4.08E-03	1.68E-03	4.08E-03
U-236	1.5493E-05	881.01	1,762.02	0.00E+00	1.36E-02	2.73E-02
U-238	-4.2851E-09	881.01	0.00	2.58E-03	2.58E-03	2.58E-03
Y-90	2.1686E+00	881.01	1,762.02	0.00E+00	1.91E+03	3.82E+03
Other Radionuclides					1.92E+03	3.83E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.102E+14
0.0250	4.384E+13
0.0375	3.828E+13
0.0575	4.082E+13
0.0850	2.472E+13
0.1250	1.695E+13
0.2250	2.130E+13
0.3750	9.331E+12
0.5750	1.515E+14
0.8500	3.598E+12
1.2500	1.817E+12
1.7500	7.615E+10
2.2500	9.526E+07
2.7500	5.725E+06
3.5000	3.639E+05
5.0000	8.474E+02
7.0000	9.387E+01
11.0000	1.054E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.38E+01	4.77E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.73077542	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		881.01
Bounding:		1,762.02

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.29	
Bounding:	0.59	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRG-1 (U3Si2 LEU) GERMANY
SNF ID #: 741
Fuel Units & Descr: 109 - MTR TYPE
Heavy Metal Mass: BOL=161.56kg; EOL=150.932kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1994
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 4.54

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	10,064.45	20,128.90	0.00E+00	4.62E-06	9.23E-06	Avg. MeV	
Am-241	1.7832E-03	10,064.45	20,128.90	0.00E+00	1.79E+01	3.59E+01	0.0150	2.401E+15
Am-242m	4.3410E-07	10,064.45	20,128.90	0.00E+00	4.37E-03	8.74E-03	0.0250	5.008E+14
Am-243	1.4907E-06	10,064.45	20,128.90	0.00E+00	1.50E-02	3.00E-02	0.0375	4.373E+14
C-14	5.7162E-09	10,064.45	20,128.90	0.00E+00	5.75E-05	1.15E-04	0.0575	4.863E+14
Cl-36	1.3124E-32	10,064.45	20,128.90	0.00E+00	1.32E-28	2.64E-28	0.0850	2.824E+14
Cm-243	1.8568E-07	10,064.45	20,128.90	0.00E+00	1.87E-03	3.74E-03	0.1250	1.936E+14
Cm-244	3.5512E-05	10,064.45	20,128.90	0.00E+00	3.57E-01	7.15E-01	0.2250	2.433E+14
Co-60	1.0261E-05	10,064.45	20,128.90	0.00E+00	1.03E-01	2.07E-01	0.3750	1.066E+14
Cs-134	1.6931E-02	10,064.45	20,128.90	0.00E+00	1.70E+02	3.41E+02	0.5750	1.730E+15
Cs-135	3.4477E-06	10,064.45	20,128.90	0.00E+00	3.47E-02	6.94E-02	0.8500	4.110E+13
Cs-137	2.2800E+00	10,064.45	20,128.90	0.00E+00	2.29E+04	4.59E+04	1.2500	2.076E+13
Eu-154	3.6656E-02	10,064.45	20,128.90	0.00E+00	3.69E+02	7.38E+02	1.7500	8.699E+11
Eu-155	9.6841E-03	10,064.45	20,128.90	0.00E+00	9.75E+01	1.95E+02	2.2500	1.088E+09
Fe-55	4.6977E-04	10,064.45	20,128.90	0.00E+00	4.73E+00	9.46E+00	2.7500	6.540E+07
H-3	6.0485E-03	10,064.45	20,128.90	0.00E+00	6.09E+01	1.22E+02	3.5000	4.157E+06
I-129	7.5300E-07	10,064.45	20,128.90	0.00E+00	7.58E-03	1.52E-02	5.0000	9.713E+03
Kr-85	1.4989E-01	10,064.45	20,128.90	0.00E+00	1.51E+03	3.02E+03	7.0000	1.076E+03
Np-237	9.5534E-06	10,064.45	20,128.90	0.00E+00	9.61E-02	1.92E-01	11.0000	1.209E+02
Pa-231	1.6550E-09	10,064.45	20,128.90	0.00E+00	1.67E-05	3.33E-05		
Pb-210	2.6631E-11	10,064.45	20,128.90	0.00E+00	2.68E-07	5.36E-07		
Pm-147	1.8156E-01	10,064.45	20,128.90	0.00E+00	1.83E+03	3.65E+03		
Pu-238	1.8990E-02	10,064.45	20,128.90	0.00E+00	1.91E+02	3.82E+02		
Pu-239	4.2838E-04	10,064.45	20,128.90	0.00E+00	4.31E+00	8.62E+00		
Pu-240	2.4379E-04	10,064.45	20,128.90	0.00E+00	2.45E+00	4.91E+00		
Pu-241	4.2511E-02	10,064.45	20,128.90	0.00E+00	4.28E+02	8.56E+02		
Pu-242	3.6329E-07	10,064.45	20,128.90	0.00E+00	3.66E-03	7.31E-03		
Ra-226	1.4725E-10	10,064.45	20,128.90	0.00E+00	1.48E-06	2.96E-06		
Ra-228	8.9760E-15	10,064.45	20,128.90	0.00E+00	9.03E-11	1.81E-10		
Ru-106	1.9752E-04	10,064.45	20,128.90	0.00E+00	1.99E+00	3.98E+00		
Se-79	1.2933E-05	10,064.45	20,128.90	0.00E+00	1.30E-01	2.60E-01		
Sn-126	1.1574E-05	10,064.45	20,128.90	0.00E+00	1.16E-01	2.33E-01		
Sr-90	2.1680E+00	10,064.45	20,128.90	0.00E+00	2.18E+04	4.36E+04		
Tc-99	4.2239E-04	10,064.45	20,128.90	0.00E+00	4.25E+00	8.50E+00		
Th-229	3.9270E-12	10,064.45	20,128.90	0.00E+00	3.95E-08	7.90E-08		
Th-230	3.3578E-08	10,064.45	20,128.90	0.00E+00	3.38E-04	6.76E-04		
Th-232	1.5452E-14	10,064.45	20,128.90	0.00E+00	1.56E-10	3.11E-10		
Tl-208	4.6705E-08	10,064.45	20,128.90	0.00E+00	4.70E-04	9.40E-04		
U-232	1.3045E-07	10,064.45	20,128.90	0.00E+00	1.31E-03	2.63E-03		
U-233	2.3739E-09	10,064.45	20,128.90	0.00E+00	2.39E-05	4.78E-05		
U-234	1.8423E-04	10,064.45	20,128.90	0.00E+00	1.85E+00	3.71E+00		
U-235	-2.7235E-06	10,064.45	0.00	6.92E-02	4.18E-02	6.92E-02		
U-236	1.5493E-05	10,064.45	20,128.90	0.00E+00	1.56E-01	3.12E-01		
U-238	-4.2851E-09	10,064.45	0.00	4.35E-02	4.35E-02	4.35E-02		
Y-90	2.1686E+00	10,064.45	20,128.90	0.00E+00	2.18E+04	4.37E+04		
Other Radionuclides					2.19E+04	4.38E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.72E+02	5.45E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.81106509	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		10,064.45
Bounding:		20,128.90

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.20	
Bounding:	0.40	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRG-1 (UALX HEU) GERMANY
SNF ID #: 742
Fuel Units & Descr: 141 - MTR TYPE
Heavy Metal Mass: BOL=23.42kg; EOL=16.539kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1995
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 5.88

II. Estimates	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.5861E-10	6,516.25	13,032.50	0.00E+00	2.99E-06	5.98E-06
Am-241	1.7832E-03	6,516.25	13,032.50	0.00E+00	1.16E+01	2.32E+01
Am-242m	4.3410E-07	6,516.25	13,032.50	0.00E+00	2.83E-03	5.66E-03
Am-243	1.4907E-06	6,516.25	13,032.50	0.00E+00	9.71E-03	1.94E-02
C-14	5.7162E-09	6,516.25	13,032.50	0.00E+00	3.72E-05	7.45E-05
Cl-36	1.3124E-32	6,516.25	13,032.50	0.00E+00	8.55E-29	1.71E-28
Cm-243	1.8568E-07	6,516.25	13,032.50	0.00E+00	1.21E-03	2.42E-03
Cm-244	3.5512E-05	6,516.25	13,032.50	0.00E+00	2.31E-01	4.63E-01
Co-60	1.0261E-05	6,516.25	13,032.50	0.00E+00	6.69E-02	1.34E-01
Cs-134	1.6931E-02	6,516.25	13,032.50	0.00E+00	1.10E+02	2.21E+02
Cs-135	3.4477E-06	6,516.25	13,032.50	0.00E+00	2.25E-02	4.49E-02
Cs-137	2.2800E+00	6,516.25	13,032.50	0.00E+00	1.49E+04	2.97E+04
Eu-154	3.6656E-02	6,516.25	13,032.50	0.00E+00	2.39E+02	4.78E+02
Eu-155	9.6841E-03	6,516.25	13,032.50	0.00E+00	6.31E+01	1.26E+02
Fe-55	4.6977E-04	6,516.25	13,032.50	0.00E+00	3.06E+00	6.12E+00
H-3	6.0485E-03	6,516.25	13,032.50	0.00E+00	3.94E+01	7.88E+01
I-129	7.5300E-07	6,516.25	13,032.50	0.00E+00	4.91E-03	9.81E-03
Kr-85	1.4989E-01	6,516.25	13,032.50	0.00E+00	9.77E+02	1.95E+03
Np-237	9.5534E-06	6,516.25	13,032.50	0.00E+00	6.23E-02	1.25E-01
Pa-231	1.6550E-09	6,516.25	13,032.50	0.00E+00	1.08E-05	2.16E-05
Pb-210	2.6631E-11	6,516.25	13,032.50	0.00E+00	1.74E-07	3.47E-07
Pm-147	1.8156E-01	6,516.25	13,032.50	0.00E+00	1.18E+03	2.37E+03
Pu-238	1.8990E-02	6,516.25	13,032.50	0.00E+00	1.24E+02	2.47E+02
Pu-239	4.2838E-04	6,516.25	13,032.50	0.00E+00	2.79E+00	5.58E+00
Pu-240	2.4379E-04	6,516.25	13,032.50	0.00E+00	1.59E+00	3.18E+00
Pu-241	4.2511E-02	6,516.25	13,032.50	0.00E+00	2.77E+02	5.54E+02
Pu-242	3.6329E-07	6,516.25	13,032.50	0.00E+00	2.37E-03	4.73E-03
Ra-226	1.4725E-10	6,516.25	13,032.50	0.00E+00	9.60E-07	1.92E-06
Ra-228	8.9760E-15	6,516.25	13,032.50	0.00E+00	5.85E-11	1.17E-10
Ru-106	1.9752E-04	6,516.25	13,032.50	0.00E+00	1.29E+00	2.57E+00
Se-79	1.2933E-05	6,516.25	13,032.50	0.00E+00	8.43E-02	1.69E-01
Sn-126	1.1574E-05	6,516.25	13,032.50	0.00E+00	7.54E-02	1.51E-01
Sr-90	2.1680E+00	6,516.25	13,032.50	0.00E+00	1.41E+04	2.83E+04
Tc-99	4.2239E-04	6,516.25	13,032.50	0.00E+00	2.75E+00	5.50E+00
Th-229	3.9270E-12	6,516.25	13,032.50	0.00E+00	2.56E-08	5.12E-08
Th-230	3.3578E-08	6,516.25	13,032.50	0.00E+00	2.19E-04	4.38E-04
Th-232	1.5452E-14	6,516.25	13,032.50	0.00E+00	1.01E-10	2.01E-10
Tl-208	4.6705E-08	6,516.25	13,032.50	0.00E+00	3.04E-04	6.09E-04
U-232	1.3045E-07	6,516.25	13,032.50	0.00E+00	8.50E-04	1.70E-03
U-233	2.3739E-09	6,516.25	13,032.50	0.00E+00	1.55E-05	3.09E-05
U-234	1.8423E-04	6,516.25	13,032.50	0.00E+00	1.20E+00	2.40E+00
U-235	-2.7235E-06	6,516.25	0.00	4.70E-02	2.92E-02	4.70E-02
U-236	1.5493E-05	6,516.25	13,032.50	0.00E+00	1.01E-01	2.02E-01
U-238	-4.2851E-09	6,516.25	0.00	5.63E-04	5.35E-04	5.63E-04
Y-90	2.1686E+00	6,516.25	13,032.50	0.00E+00	1.41E+04	2.83E+04
Other Radionuclides					1.42E+04	2.83E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.555E+15
0.0250	3.242E+14
0.0375	2.831E+14
0.0575	3.019E+14
0.0850	1.829E+14
0.1250	1.254E+14
0.2250	1.575E+14
0.3750	6.902E+13
0.5750	1.120E+15
0.8500	2.661E+13
1.2500	1.344E+13
1.7500	5.632E+11
2.2500	7.046E+08
2.7500	4.235E+07
3.5000	2.691E+06
5.0000	6.225E+03
7.0000	6.894E+02
11.0000	7.741E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.76E+02	3.83E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.84381755	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		6,516.25
Bounding:		13,032.50

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:	0.88	
Bounding:	1.77	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRJ (UALX-HEU) GERMANY
SNF ID #: 933
Fuel Units & Descr: 195 - CONCENTRIC TUBES
Heavy Metal Mass: BOL=39.312kg; EOL=26.871kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1995
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 5.42

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.1567E-10	11,459.44	22,918.88	0.00E+00	2.47E-06	4.94E-06
Am-241	7.1264E-03	11,459.44	22,918.88	0.00E+00	8.17E+01	1.63E+02
Am-242m	1.4010E-06	11,459.44	22,918.88	0.00E+00	1.61E-02	3.21E-02
Am-243	3.7114E-05	11,459.44	22,918.88	0.00E+00	4.25E-01	8.51E-01
C-14	2.6476E-08	11,459.44	22,918.88	0.00E+00	3.03E-04	6.07E-04
Cl-36	4.4441E-31	11,459.44	22,918.88	0.00E+00	5.09E-27	1.02E-26
Cm-243	6.4399E-06	11,459.44	22,918.88	0.00E+00	7.38E-02	1.48E-01
Cm-244	5.6367E-03	11,459.44	22,918.88	0.00E+00	6.46E+01	1.29E+02
Co-60	9.3864E-05	11,459.44	22,918.88	0.00E+00	1.08E+00	2.15E+00
Cs-134	5.7047E-02	11,459.44	22,918.88	0.00E+00	6.54E+02	1.31E+03
Cs-135	4.2564E-06	11,459.44	22,918.88	0.00E+00	4.88E-02	9.76E-02
Cs-137	2.2855E+00	11,459.44	22,918.88	0.00E+00	2.62E+04	5.24E+04
Eu-154	7.7704E-02	11,459.44	22,918.88	0.00E+00	8.90E+02	1.78E+03
Eu-155	2.8736E-02	11,459.44	22,918.88	0.00E+00	3.29E+02	6.59E+02
Fe-55	5.1379E-03	11,459.44	22,918.88	0.00E+00	5.89E+01	1.18E+02
H-3	6.1239E-03	11,459.44	22,918.88	0.00E+00	7.02E+01	1.40E+02
I-129	6.6403E-07	11,459.44	22,918.88	0.00E+00	7.61E-03	1.52E-02
Kr-85	1.4927E-01	11,459.44	22,918.88	0.00E+00	1.71E+03	3.42E+03
Np-237	3.1525E-05	11,459.44	22,918.88	0.00E+00	3.61E-01	7.23E-01
Pa-231	7.8676E-10	11,459.44	22,918.88	0.00E+00	9.02E-06	1.80E-05
Pb-210	6.1847E-12	11,459.44	22,918.88	0.00E+00	7.09E-08	1.42E-07
Pm-147	9.1373E-02	11,459.44	22,918.88	0.00E+00	1.05E+03	2.09E+03
Pu-238	1.5978E-01	11,459.44	22,918.88	0.00E+00	1.83E+03	3.66E+03
Pu-239	6.9502E-04	11,459.44	22,918.88	0.00E+00	7.96E+00	1.59E+01
Pu-240	3.7424E-04	11,459.44	22,918.88	0.00E+00	4.29E+00	8.58E+00
Pu-241	1.7090E-01	11,459.44	22,918.88	0.00E+00	1.96E+03	3.92E+03
Pu-242	3.0911E-06	11,459.44	22,918.88	0.00E+00	3.54E-02	7.08E-02
Ra-226	3.4848E-11	11,459.44	22,918.88	0.00E+00	3.99E-07	7.99E-07
Ra-228	9.6173E-15	11,459.44	22,918.88	0.00E+00	1.10E-10	2.20E-10
Ru-106	2.2789E-04	11,459.44	22,918.88	0.00E+00	2.61E+00	5.22E+00
Se-79	1.2339E-05	11,459.44	22,918.88	0.00E+00	1.41E-01	2.83E-01
Sn-126	1.0194E-05	11,459.44	22,918.88	0.00E+00	1.17E-01	2.34E-01
Sr-90	2.1476E+00	11,459.44	22,918.88	0.00E+00	2.46E+04	4.92E+04
Tc-99	3.8056E-04	11,459.44	22,918.88	0.00E+00	4.36E+00	8.72E+00
Th-229	3.3026E-12	11,459.44	22,918.88	0.00E+00	3.78E-08	7.57E-08
Th-230	8.2503E-09	11,459.44	22,918.88	0.00E+00	9.45E-05	1.89E-04
Th-232	1.6586E-14	11,459.44	22,918.88	0.00E+00	1.90E-10	3.80E-10
Tl-208	4.8827E-08	11,459.44	22,918.88	0.00E+00	5.60E-04	1.12E-03
U-232	1.3821E-07	11,459.44	22,918.88	0.00E+00	1.58E-03	3.17E-03
U-233	3.0790E-09	11,459.44	22,918.88	0.00E+00	3.53E-05	7.06E-05
U-234	4.9915E-05	11,459.44	22,918.88	0.00E+00	5.72E-01	1.14E+00
U-235	-2.8661E-06	11,459.44	0.00	6.79E-02	3.50E-02	6.79E-02
U-236	1.6701E-05	11,459.44	22,918.88	0.00E+00	1.91E-01	3.83E-01
U-238	-9.4194E-09	11,459.44	0.00	2.66E-03	2.55E-03	2.66E-03
Y-90	2.1482E+00	11,459.44	22,918.88	0.00E+00	2.46E+04	4.92E+04
Other Radionuclides					2.51E+04	5.02E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.740E+15
0.0250	5.663E+14
0.0375	5.074E+14
0.0575	5.316E+14
0.0850	3.245E+14
0.1250	2.357E+14
0.2250	2.776E+14
0.3750	1.206E+14
0.5750	2.020E+15
0.8500	9.318E+13
1.2500	4.403E+13
1.7500	1.536E+12
2.2500	1.340E+09
2.7500	8.390E+07
3.5000	7.370E+06
5.0000	8.266E+05
7.0000	9.495E+04
11.0000	1.088E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.76E+02	7.51E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	79.89992512	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		11,459.44
Bounding:		22,918.88

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.67	
Bounding:	1.34	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRJ (UALX-MEU) GERMANY
SNF ID #: 1000
Fuel Units & Descr: 10 - CONCENTRIC TUBES
Heavy Metal Mass: BOL=3.781kg; EOL=3.338kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1993
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10'
0.28

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.1567E-10	408.05	816.10	0.00E+00	8.80E-08	1.76E-07	Avg. MeV	
Am-241	7.1264E-03	408.05	816.10	0.00E+00	2.91E+00	5.82E+00	0.0150	9.756E+13
Am-242m	1.4010E-06	408.05	816.10	0.00E+00	5.72E-04	1.14E-03	0.0250	2.017E+13
Am-243	3.7114E-05	408.05	816.10	0.00E+00	1.51E-02	3.03E-02	0.0375	1.807E+13
C-14	2.6476E-08	408.05	816.10	0.00E+00	1.08E-05	2.16E-05	0.0575	1.893E+13
Cl-36	4.4441E-31	408.05	816.10	0.00E+00	1.81E-28	3.63E-28	0.0850	1.156E+13
Cm-243	6.4399E-06	408.05	816.10	0.00E+00	2.63E-03	5.26E-03	0.1250	8.394E+12
Cm-244	5.6367E-03	408.05	816.10	0.00E+00	2.30E+00	4.60E+00	0.2250	9.884E+12
Co-60	9.3864E-05	408.05	816.10	0.00E+00	3.83E-02	7.66E-02	0.3750	4.293E+12
Cs-134	5.7047E-02	408.05	816.10	0.00E+00	2.33E+01	4.66E+01	0.5750	7.192E+13
Cs-135	4.2564E-06	408.05	816.10	0.00E+00	1.74E-03	3.47E-03	0.8500	3.318E+12
Cs-137	2.2855E+00	408.05	816.10	0.00E+00	9.33E+02	1.87E+03	1.2500	1.568E+12
Eu-154	7.7704E-02	408.05	816.10	0.00E+00	3.17E+01	6.34E+01	1.7500	5.469E+10
Eu-155	2.8736E-02	408.05	816.10	0.00E+00	1.17E+01	2.35E+01	2.2500	4.771E+07
Fe-55	5.1379E-03	408.05	816.10	0.00E+00	2.10E+00	4.19E+00	2.7500	2.987E+06
H-3	6.1239E-03	408.05	816.10	0.00E+00	2.50E+00	5.00E+00	3.5000	2.624E+05
I-129	6.6403E-07	408.05	816.10	0.00E+00	2.71E-04	5.42E-04	5.0000	2.943E+04
Kr-85	1.4927E-01	408.05	816.10	0.00E+00	6.09E+01	1.22E+02	7.0000	3.381E+03
Np-237	3.1525E-05	408.05	816.10	0.00E+00	1.29E-02	2.57E-02	11.0000	3.876E+02
Pa-231	7.8676E-10	408.05	816.10	0.00E+00	3.21E-07	6.42E-07		
Pb-210	6.1847E-12	408.05	816.10	0.00E+00	2.52E-09	5.05E-09		
Pm-147	9.1373E-02	408.05	816.10	0.00E+00	3.73E+01	7.46E+01		
Pu-238	1.5978E-01	408.05	816.10	0.00E+00	6.52E+01	1.30E+02		
Pu-239	6.9502E-04	408.05	816.10	0.00E+00	2.84E-01	5.67E-01		
Pu-240	3.7424E-04	408.05	816.10	0.00E+00	1.53E-01	3.05E-01		
Pu-241	1.7090E-01	408.05	816.10	0.00E+00	6.97E+01	1.39E+02		
Pu-242	3.0911E-06	408.05	816.10	0.00E+00	1.26E-03	2.52E-03		
Ra-226	3.4848E-11	408.05	816.10	0.00E+00	1.42E-08	2.84E-08		
Ra-228	9.6173E-15	408.05	816.10	0.00E+00	3.92E-12	7.85E-12		
Ru-106	2.2789E-04	408.05	816.10	0.00E+00	9.30E-02	1.86E-01		
Se-79	1.2339E-05	408.05	816.10	0.00E+00	5.03E-03	1.01E-02		
Sn-126	1.0194E-05	408.05	816.10	0.00E+00	4.16E-03	8.32E-03		
Sr-90	2.1476E+00	408.05	816.10	0.00E+00	8.76E+02	1.75E+03		
Tc-99	3.8056E-04	408.05	816.10	0.00E+00	1.55E-01	3.11E-01		
Th-229	3.3026E-12	408.05	816.10	0.00E+00	1.35E-09	2.70E-09		
Th-230	8.2503E-09	408.05	816.10	0.00E+00	3.37E-06	6.73E-06		
Th-232	1.6586E-14	408.05	816.10	0.00E+00	6.77E-12	1.35E-11		
Tl-208	4.8827E-08	408.05	816.10	0.00E+00	1.99E-05	3.98E-05		
U-232	1.3821E-07	408.05	816.10	0.00E+00	5.64E-05	1.13E-04		
U-233	3.0790E-09	408.05	816.10	0.00E+00	1.26E-06	2.51E-06		
U-234	4.9915E-05	408.05	816.10	0.00E+00	2.04E-02	4.07E-02		
U-235	-2.8661E-06	408.05	0.00	3.67E-03	2.50E-03	3.67E-03		
U-236	1.6701E-05	408.05	816.10	0.00E+00	6.81E-03	1.36E-02		
U-238	-9.4194E-09	408.05	0.00	7.00E-04	6.97E-04	7.00E-04		
Y-90	2.1482E+00	408.05	816.10	0.00E+00	8.77E+02	1.75E+03		
Other Radionuclides					8.93E+02	1.79E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.34E+01	2.67E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	44.88296013	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		408.05
Bounding:		816.10

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.25	
Bounding:	0.49	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRJ TUBES (U3O8 LEU) GERMANY
SNF ID #: 999
Fuel Units & Descr: 3 - CONCENTRIC TUBES
Heavy Metal Mass: BOL=3.038kg; EOL=3.008kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1998
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' 0.13

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.5433E-10	28.23	56.46	0.00E+00	1.00E-08	2.00E-08	Avg. MeV	
Am-241	1.6993E-02	28.23	56.46	0.00E+00	4.80E-01	9.59E-01	0.0150	7.361E+12
Am-242m	9.3333E-06	28.23	56.46	0.00E+00	2.63E-04	5.27E-04	0.0250	1.548E+12
Am-243	6.4067E-06	28.23	56.46	0.00E+00	1.81E-04	3.62E-04	0.0375	1.357E+12
C-14	2.9653E-08	28.23	56.46	0.00E+00	8.37E-07	1.67E-06	0.0575	1.436E+12
Cl-36	5.9513E-35	28.23	56.46	0.00E+00	1.68E-33	3.36E-33	0.0850	8.852E+11
Cm-243	2.8167E-06	28.23	56.46	0.00E+00	7.95E-05	1.59E-04	0.1250	6.001E+11
Cm-244	1.6140E-04	28.23	56.46	0.00E+00	4.56E-03	9.11E-03	0.2250	7.429E+11
Co-60	6.0893E-05	28.23	56.46	0.00E+00	1.72E-03	3.44E-03	0.3750	3.331E+11
Cs-134	6.1567E-02	28.23	56.46	0.00E+00	1.74E+00	3.48E+00	0.5750	5.550E+12
Cs-135	4.8607E-06	28.23	56.46	0.00E+00	1.37E-04	2.74E-04	0.8500	2.118E+11
Cs-137	2.5487E+00	28.23	56.46	0.00E+00	7.19E+01	1.44E+02	1.2500	7.682E+10
Eu-154	4.6760E-02	28.23	56.46	0.00E+00	1.32E+00	2.64E+00	1.7500	2.967E+09
Eu-155	1.6533E-02	28.23	56.46	0.00E+00	4.67E-01	9.33E-01	2.2500	1.794E+08
Fe-55	2.0373E-02	28.23	56.46	0.00E+00	5.75E-01	1.15E+00	2.7500	3.843E+08
H-3	8.1800E-03	28.23	56.46	0.00E+00	2.31E-01	4.62E-01	3.5000	4.824E+05
I-129	7.1600E-07	28.23	56.46	0.00E+00	2.02E-05	4.04E-05	5.0000	1.371E+02
Kr-85	1.9547E-01	28.23	56.46	0.00E+00	5.52E+00	1.10E+01	7.0000	1.559E+01
Np-237	3.6573E-06	28.23	56.46	0.00E+00	1.03E-04	2.06E-04	11.0000	1.778E+00
Pa-231	1.6420E-09	28.23	56.46	0.00E+00	4.64E-08	9.27E-08		
Pb-210	7.4600E-15	28.23	56.46	0.00E+00	2.11E-13	4.21E-13		
Pm-147	6.5033E-01	28.23	56.46	0.00E+00	1.84E+01	3.67E+01		
Pu-238	5.9807E-03	28.23	56.46	0.00E+00	1.69E-01	3.38E-01		
Pu-239	1.0320E-02	28.23	56.46	0.00E+00	2.91E-01	5.83E-01		
Pu-240	5.4233E-03	28.23	56.46	0.00E+00	1.53E-01	3.06E-01		
Pu-241	6.0807E-01	28.23	56.46	0.00E+00	1.72E+01	3.43E+01		
Pu-242	3.0713E-06	28.23	56.46	0.00E+00	8.67E-05	1.73E-04		
Ra-226	6.1580E-14	28.23	56.46	0.00E+00	1.74E-12	3.48E-12		
Ra-228	4.9953E-15	28.23	56.46	0.00E+00	1.41E-13	2.82E-13		
Ru-106	8.2133E-03	28.23	56.46	0.00E+00	2.32E-01	4.64E-01		
Se-79	1.2540E-05	28.23	56.46	0.00E+00	3.54E-04	7.08E-04		
Sn-126	1.1393E-05	28.23	56.46	0.00E+00	3.22E-04	6.43E-04		
Sr-90	2.3340E+00	28.23	56.46	0.00E+00	6.59E+01	1.32E+02		
Tc-99	4.3540E-04	28.23	56.46	0.00E+00	1.23E-02	2.46E-02		
Th-229	2.4973E-13	28.23	56.46	0.00E+00	7.05E-12	1.41E-11		
Th-230	2.4613E-11	28.23	56.46	0.00E+00	6.95E-10	1.39E-09		
Th-232	9.9467E-15	28.23	56.46	0.00E+00	2.81E-13	5.62E-13		
Tl-208	7.7667E-09	28.23	56.46	0.00E+00	2.19E-07	4.38E-07		
U-232	2.1927E-08	28.23	56.46	0.00E+00	6.19E-07	1.24E-06		
U-233	2.7887E-10	28.23	56.46	0.00E+00	7.87E-09	1.57E-08		
U-234	3.0807E-07	28.23	56.46	0.00E+00	8.70E-06	1.74E-05		
U-235	-2.5341E-06	28.23	0.00	1.30E-03	1.22E-03	1.30E-03		
U-236	1.3000E-05	28.23	56.46	0.00E+00	3.67E-04	7.34E-04		
U-238	-1.4207E-08	28.23	0.00	8.20E-04	8.19E-04	8.20E-04		
Y-90	2.3347E+00	28.23	56.46	0.00E+00	6.59E+01	1.32E+02		
Other Radionuclides					6.96E+01	1.39E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.76E-01	1.75E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.73	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.25	28.23
Bounding:		56.46

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.21	113.31
Bounding:	0.42	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRM (UALX HEU 45%) GERMANY
SNF ID #: 805
Fuel Units & Descr: 50 - MTR TYPE
Heavy Metal Mass: BOL=28.18kg; EOL=23.47kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1995
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 2.08

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.5861E-10	4,460.46	8,920.92	0.00E+00	2.05E-06	4.09E-06
Am-241	1.7832E-03	4,460.46	8,920.92	0.00E+00	7.95E+00	1.59E+01
Am-242m	4.3410E-07	4,460.46	8,920.92	0.00E+00	1.94E-03	3.87E-03
Am-243	1.4907E-06	4,460.46	8,920.92	0.00E+00	6.65E-03	1.33E-02
C-14	5.7162E-09	4,460.46	8,920.92	0.00E+00	2.55E-05	5.10E-05
Cl-36	1.3124E-32	4,460.46	8,920.92	0.00E+00	5.85E-29	1.17E-28
Cm-243	1.8568E-07	4,460.46	8,920.92	0.00E+00	8.28E-04	1.66E-03
Cm-244	3.5512E-05	4,460.46	8,920.92	0.00E+00	1.58E-01	3.17E-01
Co-60	1.0261E-05	4,460.46	8,920.92	0.00E+00	4.58E-02	9.15E-02
Cs-134	1.6931E-02	4,460.46	8,920.92	0.00E+00	7.55E+01	1.51E+02
Cs-135	3.4477E-06	4,460.46	8,920.92	0.00E+00	1.54E-02	3.08E-02
Cs-137	2.2800E+00	4,460.46	8,920.92	0.00E+00	1.02E+04	2.03E+04
Eu-154	3.6656E-02	4,460.46	8,920.92	0.00E+00	1.64E+02	3.27E+02
Eu-155	9.6841E-03	4,460.46	8,920.92	0.00E+00	4.32E+01	8.64E+01
Fe-55	4.6977E-04	4,460.46	8,920.92	0.00E+00	2.10E+00	4.19E+00
H-3	6.0485E-03	4,460.46	8,920.92	0.00E+00	2.70E+01	5.40E+01
I-129	7.5300E-07	4,460.46	8,920.92	0.00E+00	3.36E-03	6.72E-03
Kr-85	1.4989E-01	4,460.46	8,920.92	0.00E+00	6.69E+02	1.34E+03
Np-237	9.5534E-06	4,460.46	8,920.92	0.00E+00	4.26E-02	8.52E-02
Pa-231	1.6550E-09	4,460.46	8,920.92	0.00E+00	7.38E-06	1.48E-05
Pb-210	2.6631E-11	4,460.46	8,920.92	0.00E+00	1.19E-07	2.38E-07
Pm-147	1.8156E-01	4,460.46	8,920.92	0.00E+00	8.10E+02	1.62E+03
Pu-238	1.8990E-02	4,460.46	8,920.92	0.00E+00	8.47E+01	1.69E+02
Pu-239	4.2838E-04	4,460.46	8,920.92	0.00E+00	1.91E+00	3.82E+00
Pu-240	2.4379E-04	4,460.46	8,920.92	0.00E+00	1.09E+00	2.17E+00
Pu-241	4.2511E-02	4,460.46	8,920.92	0.00E+00	1.90E+02	3.79E+02
Pu-242	3.6329E-07	4,460.46	8,920.92	0.00E+00	1.62E-03	3.24E-03
Ra-226	1.4725E-10	4,460.46	8,920.92	0.00E+00	6.57E-07	1.31E-06
Ra-228	8.9760E-15	4,460.46	8,920.92	0.00E+00	4.00E-11	8.01E-11
Ru-106	1.9752E-04	4,460.46	8,920.92	0.00E+00	8.81E-01	1.76E+00
Se-79	1.2933E-05	4,460.46	8,920.92	0.00E+00	5.77E-02	1.15E-01
Sn-126	1.1574E-05	4,460.46	8,920.92	0.00E+00	5.16E-02	1.03E-01
Sr-90	2.1680E+00	4,460.46	8,920.92	0.00E+00	9.67E+03	1.93E+04
Tc-99	4.2239E-04	4,460.46	8,920.92	0.00E+00	1.88E+00	3.77E+00
Th-229	3.9270E-12	4,460.46	8,920.92	0.00E+00	1.75E-08	3.50E-08
Th-230	3.3578E-08	4,460.46	8,920.92	0.00E+00	1.50E-04	3.00E-04
Th-232	1.5452E-14	4,460.46	8,920.92	0.00E+00	6.89E-11	1.38E-10
Tl-208	4.6705E-08	4,460.46	8,920.92	0.00E+00	2.08E-04	4.17E-04
U-232	1.3045E-07	4,460.46	8,920.92	0.00E+00	5.82E-04	1.16E-03
U-233	2.3739E-09	4,460.46	8,920.92	0.00E+00	1.06E-05	2.12E-05
U-234	1.8423E-04	4,460.46	8,920.92	0.00E+00	8.22E-01	1.64E+00
U-235	-2.7235E-06	4,460.46	0.00	2.74E-02	1.52E-02	2.74E-02
U-236	1.5493E-05	4,460.46	8,920.92	0.00E+00	6.91E-02	1.38E-01
U-238	-4.2851E-09	4,460.46	0.00	5.21E-03	5.19E-03	5.21E-03
Y-90	2.1686E+00	4,460.46	8,920.92	0.00E+00	9.67E+03	1.93E+04
Other Radionuclides					9.70E+03	1.94E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.064E+15
0.0250	2.219E+14
0.0375	1.938E+14
0.0575	2.066E+14
0.0850	1.252E+14
0.1250	8.582E+13
0.2250	1.078E+14
0.3750	4.724E+13
0.5750	7.668E+14
0.8500	1.821E+13
1.2500	9.201E+12
1.7500	3.855E+11
2.2500	4.823E+06
2.7500	2.899E+07
3.5000	1.842E+06
5.0000	4.272E+03
7.0000	4.732E+02
11.0000	5.314E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.21E+02	2.41E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	44.97952648	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	686.61	4,460.46
Bounding:		8,920.92

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.50	6.50
Bounding:	1.01	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRM (UALX HEU) GERMANY
SNF ID #: 806
Fuel Units & Descr: 31 - MTR TYPE
Heavy Metal Mass: BOL=6.395kg; EOL=3.171kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1995
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 1.29

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	3,053.19	6,056.47	0.00E+00	1.40E-06	2.78E-06	Avg. MeV	
Am-241	1.7832E-03	3,053.19	6,056.47	0.00E+00	5.44E+00	1.08E+01	0.0150	7.225E+14
Am-242m	4.3410E-07	3,053.19	6,056.47	0.00E+00	1.33E-03	2.63E-03	0.0250	1.507E+14
Am-243	1.4907E-06	3,053.19	6,056.47	0.00E+00	4.55E-03	9.03E-03	0.0375	1.316E+14
C-14	5.7162E-09	3,053.19	6,056.47	0.00E+00	1.75E-05	3.46E-05	0.0575	1.403E+14
Cl-36	1.3124E-32	3,053.19	6,056.47	0.00E+00	4.01E-29	7.95E-29	0.0850	8.498E+13
Cm-243	1.8568E-07	3,053.19	6,056.47	0.00E+00	5.67E-04	1.12E-03	0.1250	5.826E+13
Cm-244	3.5512E-05	3,053.19	6,056.47	0.00E+00	1.08E-01	2.15E-01	0.2250	7.321E+13
Co-60	1.0261E-05	3,053.19	6,056.47	0.00E+00	3.13E-02	6.21E-02	0.3750	3.207E+13
Cs-134	1.6931E-02	3,053.19	6,056.47	0.00E+00	5.17E+01	1.03E+02	0.5750	5.206E+14
Cs-135	3.4477E-06	3,053.19	6,056.47	0.00E+00	1.05E-02	2.09E-02	0.8500	1.237E+13
Cs-137	2.2800E+00	3,053.19	6,056.47	0.00E+00	6.96E+03	1.38E+04	1.2500	6.247E+12
Eu-154	3.6656E-02	3,053.19	6,056.47	0.00E+00	1.12E+02	2.22E+02	1.7500	2.617E+11
Eu-155	9.6841E-03	3,053.19	6,056.47	0.00E+00	2.96E+01	5.87E+01	2.2500	3.274E+08
Fe-55	4.6977E-04	3,053.19	6,056.47	0.00E+00	1.43E+00	2.85E+00	2.7500	1.968E+07
H-3	6.0485E-03	3,053.19	6,056.47	0.00E+00	1.85E+01	3.66E+01	3.5000	1.251E+06
I-129	7.5300E-07	3,053.19	6,056.47	0.00E+00	2.30E-03	4.56E-03	5.0000	2.893E+03
Kr-85	1.4989E-01	3,053.19	6,056.47	0.00E+00	4.58E+02	9.08E+02	7.0000	3.204E+02
Np-237	9.5534E-06	3,053.19	6,056.47	0.00E+00	2.92E-02	5.79E-02	11.0000	3.597E+01
Pa-231	1.6550E-09	3,053.19	6,056.47	0.00E+00	5.05E-06	1.00E-05		
Pb-210	2.6631E-11	3,053.19	6,056.47	0.00E+00	8.13E-08	1.61E-07		
Pm-147	1.8156E-01	3,053.19	6,056.47	0.00E+00	5.54E+02	1.10E+03		
Pu-238	1.8990E-02	3,053.19	6,056.47	0.00E+00	5.80E+01	1.15E+02		
Pu-239	4.2838E-04	3,053.19	6,056.47	0.00E+00	1.31E+00	2.59E+00		
Pu-240	2.4379E-04	3,053.19	6,056.47	0.00E+00	7.44E-01	1.48E+00		
Pu-241	4.2511E-02	3,053.19	6,056.47	0.00E+00	1.30E+02	2.57E+02		
Pu-242	3.6329E-07	3,053.19	6,056.47	0.00E+00	1.11E-03	2.20E-03		
Ra-226	1.4725E-10	3,053.19	6,056.47	0.00E+00	4.50E-07	8.92E-07		
Ra-228	8.9760E-15	3,053.19	6,056.47	0.00E+00	2.74E-11	5.44E-11		
Ru-106	1.9752E-04	3,053.19	6,056.47	0.00E+00	6.03E-01	1.20E+00		
Se-79	1.2933E-05	3,053.19	6,056.47	0.00E+00	3.95E-02	7.83E-02		
Sn-126	1.1574E-05	3,053.19	6,056.47	0.00E+00	3.53E-02	7.01E-02		
Sr-90	2.1680E+00	3,053.19	6,056.47	0.00E+00	6.62E+03	1.31E+04		
Tc-99	4.2239E-04	3,053.19	6,056.47	0.00E+00	1.29E+00	2.56E+00		
Th-229	3.9270E-12	3,053.19	6,056.47	0.00E+00	1.20E-08	2.38E-08		
Th-230	3.3578E-08	3,053.19	6,056.47	0.00E+00	1.03E-04	2.03E-04		
Th-232	1.5452E-14	3,053.19	6,056.47	0.00E+00	4.72E-11	9.36E-11		
Tl-208	4.6705E-08	3,053.19	6,056.47	0.00E+00	1.43E-04	2.83E-04		
U-232	1.3045E-07	3,053.19	6,056.47	0.00E+00	3.98E-04	7.90E-04		
U-233	2.3739E-09	3,053.19	6,056.47	0.00E+00	7.25E-06	1.44E-05		
U-234	1.8423E-04	3,053.19	6,056.47	0.00E+00	5.62E-01	1.12E+00		
U-235	-2.7235E-06	3,053.19	0.00	1.26E-02	4.28E-03	1.26E-02		
U-236	1.5493E-05	3,053.19	6,056.47	0.00E+00	4.73E-02	9.38E-02		
U-238	-4.2851E-09	3,053.19	0.00	1.91E-04	1.78E-04	1.91E-04		
Y-90	2.1686E+00	3,053.19	6,056.47	0.00E+00	6.62E+03	1.31E+04		
Other Radionuclides					6.64E+03	1.32E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.26E+01	1.64E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	91.10863593	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3,053.19
Bounding:		6,056.47

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.52	
Bounding:	3.01	

Estimated EOL HM/Given EOL HM: 1.08

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR ASTRA (U308-LEU) AUSTRIA
SNF ID #: 556
Fuel Units & Descr: 4 - MTR TYPE
Heavy Metal Mass: BOL= ; EOL=6.96kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.11

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	1.4545E-10	6,591.26	6,591.26	0.00E+00	9.59E-07	9.59E-07
Am-241	1.1190E-03	6,591.26	6,591.26	0.00E+00	7.38E+00	7.38E+00
Am-242m	4.5425E-07	6,591.26	6,591.26	0.00E+00	2.99E-03	2.99E-03
Am-243	1.4921E-06	6,591.26	6,591.26	0.00E+00	9.83E-03	9.83E-03
C-14	5.7244E-09	6,591.26	6,591.26	0.00E+00	3.77E-05	3.77E-05
Cl-36	1.3124E-32	6,591.26	6,591.26	0.00E+00	8.65E-29	8.65E-29
Cm-243	2.3676E-07	6,591.26	6,591.26	0.00E+00	1.56E-03	1.56E-03
Cm-244	5.2042E-05	6,591.26	6,591.26	0.00E+00	3.43E-01	3.43E-01
Co-60	3.8208E-05	6,591.26	6,591.26	0.00E+00	2.52E-01	2.52E-01
Cs-134	4.8693E-01	6,591.26	6,591.26	0.00E+00	3.21E+03	3.21E+03
Cs-135	3.4477E-06	6,591.26	6,591.26	0.00E+00	2.27E-02	2.27E-02
Cs-137	2.8731E+00	6,591.26	6,591.26	0.00E+00	1.89E+04	1.89E+04
Eu-154	8.2053E-02	6,591.26	6,591.26	0.00E+00	5.41E+02	5.41E+02
Eu-155	3.9134E-02	6,591.26	6,591.26	0.00E+00	2.58E+02	2.58E+02
Fe-55	6.7429E-03	6,591.26	6,591.26	0.00E+00	4.44E+01	4.44E+01
H-3	1.0599E-02	6,591.26	6,591.26	0.00E+00	6.99E+01	6.99E+01
I-129	7.5300E-07	6,591.26	6,591.26	0.00E+00	4.96E-03	4.96E-03
Kr-85	2.8595E-01	6,591.26	6,591.26	0.00E+00	1.88E+03	1.88E+03
Np-237	9.5479E-06	6,591.26	6,591.26	0.00E+00	6.29E-02	6.29E-02
Pa-231	8.9297E-10	6,591.26	6,591.26	0.00E+00	5.89E-06	5.89E-06
Pb-210	3.7609E-12	6,591.26	6,591.26	0.00E+00	2.48E-08	2.48E-08
Pm-147	2.5452E+00	6,591.26	6,591.26	0.00E+00	1.68E+04	1.68E+04
Pu-238	2.0550E-02	6,591.26	6,591.26	0.00E+00	1.35E+02	1.35E+02
Pu-239	4.2838E-04	6,591.26	6,591.26	0.00E+00	2.82E+00	2.82E+00
Pu-240	2.4401E-04	6,591.26	6,591.26	0.00E+00	1.61E+00	1.61E+00
Pu-241	6.8764E-02	6,591.26	6,591.26	0.00E+00	4.53E+02	4.53E+02
Pu-242	3.6329E-07	6,591.26	6,591.26	0.00E+00	2.39E-03	2.39E-03
Ra-226	3.8045E-11	6,591.26	6,591.26	0.00E+00	2.51E-07	2.51E-07
Ra-228	2.9902E-15	6,591.26	6,591.26	0.00E+00	1.97E-11	1.97E-11
Ru-106	1.9055E-01	6,591.26	6,591.26	0.00E+00	1.26E+03	1.26E+03
Se-79	1.2936E-05	6,591.26	6,591.26	0.00E+00	8.53E-02	8.53E-02
Sn-126	1.1574E-05	6,591.26	6,591.26	0.00E+00	7.63E-02	7.63E-02
Sr-90	2.7505E+00	6,591.26	6,591.26	0.00E+00	1.81E+04	1.81E+04
Tc-99	4.2239E-04	6,591.26	6,591.26	0.00E+00	2.78E+00	2.78E+00
Th-229	1.8848E-12	6,591.26	6,591.26	0.00E+00	1.24E-08	1.24E-08
Th-230	1.7042E-08	6,591.26	6,591.26	0.00E+00	1.12E-04	1.12E-04
Th-232	7.8132E-15	6,591.26	6,591.26	0.00E+00	5.15E-11	5.15E-11
Tl-208	4.4063E-08	6,591.26	6,591.26	0.00E+00	2.90E-04	2.90E-04
U-232	1.3151E-07	6,591.26	6,591.26	0.00E+00	8.67E-04	8.67E-04
U-233	1.9564E-09	6,591.26	6,591.26	0.00E+00	1.29E-05	1.29E-05
U-234	1.8371E-04	6,591.26	6,591.26	0.00E+00	1.21E+00	1.21E+00
U-235	-2.7235E-06	6,591.26	0.00	2.77E-02	9.76E-03	2.77E-02
U-236	1.5493E-05	6,591.26	6,591.26	0.00E+00	1.02E-01	1.02E-01
U-238	-4.2851E-09	6,591.26	0.00	2.80E-04	2.52E-04	2.80E-04
Y-90	2.7505E+00	6,591.26	6,591.26	0.00E+00	1.81E+04	1.81E+04
Other Radionuclides					3.39E+04	3.39E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.272E+15
0.0250	2.740E+14
0.0375	2.528E+14
0.0575	2.486E+14
0.0850	1.585E+14
0.1250	1.372E+14
0.2250	1.343E+14
0.3750	6.501E+13
0.5750	8.930E+14
0.8500	1.251E+14
1.2500	2.327E+13
1.7500	9.757E+11
2.2500	2.047E+12
2.7500	1.177E+10
3.5000	1.306E+09
5.0000	3.905E+03
7.0000	4.353E+02
11.0000	4.906E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.34E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:		60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		6,591.26
Bounding:		6,591.26

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.50	
Bounding:	1.50	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR ASTRA (U3Si2 LEU) AUSTRIA
SNF ID #: 515
Fuel Units & Descr: 49 - MTR TYPE
Heavy Metal Mass: BOL=78.4kg; EOL=74.602kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' 2.04

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	3,596.31	7,192.61	0.00E+00	5.23E-07	1.05E-06	Avg. MeV	
Am-241	1.1190E-03	3,596.31	7,192.61	0.00E+00	4.02E+00	8.05E+00	0.0150	1.388E+15
Am-242m	4.5425E-07	3,596.31	7,192.61	0.00E+00	1.63E-03	3.27E-03	0.0250	2.989E+14
Am-243	1.4921E-06	3,596.31	7,192.61	0.00E+00	5.37E-03	1.07E-02	0.0375	2.759E+14
C-14	5.7244E-09	3,596.31	7,192.61	0.00E+00	2.06E-05	4.12E-05	0.0575	2.713E+14
Cl-36	1.3124E-32	3,596.31	7,192.61	0.00E+00	4.72E-29	9.44E-29	0.0850	1.729E+14
Cm-243	2.3676E-07	3,596.31	7,192.61	0.00E+00	8.51E-04	1.70E-03	0.1250	1.498E+14
Cm-244	5.2042E-05	3,596.31	7,192.61	0.00E+00	1.87E-01	3.74E-01	0.2250	1.466E+14
Co-60	3.8208E-05	3,596.31	7,192.61	0.00E+00	1.37E-01	2.75E-01	0.3750	7.095E+13
Cs-134	4.8693E-01	3,596.31	7,192.61	0.00E+00	1.75E+03	3.50E+03	0.5750	9.745E+14
Cs-135	3.4477E-06	3,596.31	7,192.61	0.00E+00	1.24E-02	2.48E-02	0.8500	1.365E+14
Cs-137	2.8731E+00	3,596.31	7,192.61	0.00E+00	1.03E+04	2.07E+04	1.2500	2.539E+13
Eu-154	8.2053E-02	3,596.31	7,192.61	0.00E+00	2.95E+02	5.90E+02	1.7500	1.085E+12
Eu-155	3.9134E-02	3,596.31	7,192.61	0.00E+00	1.41E+02	2.81E+02	2.2500	2.233E+12
Fe-55	6.7429E-03	3,596.31	7,192.61	0.00E+00	2.42E+01	4.85E+01	2.7500	1.285E+10
H-3	1.0599E-02	3,596.31	7,192.61	0.00E+00	3.81E+01	7.62E+01	3.5000	1.425E+09
I-129	7.5300E-07	3,596.31	7,192.61	0.00E+00	2.71E-03	5.42E-03	5.0000	4.315E+03
Kr-85	2.8595E-01	3,596.31	7,192.61	0.00E+00	1.03E+03	2.06E+03	7.0000	4.812E+02
Np-237	9.5479E-06	3,596.31	7,192.61	0.00E+00	3.43E-02	6.87E-02	11.0000	5.426E+01
Pa-231	8.9297E-10	3,596.31	7,192.61	0.00E+00	3.21E-06	6.42E-06		
Pb-210	3.7609E-12	3,596.31	7,192.61	0.00E+00	1.35E-08	2.71E-08		
Pm-147	2.5452E+00	3,596.31	7,192.61	0.00E+00	9.15E+03	1.83E+04		
Pu-238	2.0550E-02	3,596.31	7,192.61	0.00E+00	7.39E+01	1.48E+02		
Pu-239	4.2838E-04	3,596.31	7,192.61	0.00E+00	1.54E+00	3.08E+00		
Pu-240	2.4401E-04	3,596.31	7,192.61	0.00E+00	8.78E-01	1.76E+00		
Pu-241	6.8764E-02	3,596.31	7,192.61	0.00E+00	2.47E+02	4.95E+02		
Pu-242	3.6329E-07	3,596.31	7,192.61	0.00E+00	1.31E-03	2.61E-03		
Ra-226	3.8045E-11	3,596.31	7,192.61	0.00E+00	1.37E-07	2.74E-07		
Ra-228	2.9902E-15	3,596.31	7,192.61	0.00E+00	1.08E-11	2.15E-11		
Ru-106	1.9055E-01	3,596.31	7,192.61	0.00E+00	6.85E+02	1.37E+03		
Se-79	1.2936E-05	3,596.31	7,192.61	0.00E+00	4.65E-02	9.30E-02		
Sn-126	1.1574E-05	3,596.31	7,192.61	0.00E+00	4.16E-02	8.32E-02		
Sr-90	2.7505E+00	3,596.31	7,192.61	0.00E+00	9.89E+03	1.98E+04		
Tc-99	4.2239E-04	3,596.31	7,192.61	0.00E+00	1.52E+00	3.04E+00		
Th-229	1.8848E-12	3,596.31	7,192.61	0.00E+00	6.78E-09	1.36E-08		
Th-230	1.7042E-08	3,596.31	7,192.61	0.00E+00	6.13E-05	1.23E-04		
Th-232	7.8132E-15	3,596.31	7,192.61	0.00E+00	2.81E-11	5.62E-11		
Tl-208	4.4063E-08	3,596.31	7,192.61	0.00E+00	1.58E-04	3.17E-04		
U-232	1.3151E-07	3,596.31	7,192.61	0.00E+00	4.73E-04	9.46E-04		
U-233	1.9564E-09	3,596.31	7,192.61	0.00E+00	7.04E-06	1.41E-05		
U-234	1.8371E-04	3,596.31	7,192.61	0.00E+00	6.61E-01	1.32E+00		
U-235	-2.7235E-06	3,596.31	0.00	1.43E-02	4.50E-03	1.43E-02		
U-236	1.5493E-05	3,596.31	7,192.61	0.00E+00	5.57E-02	1.11E-01		
U-238	-4.2851E-09	3,596.31	0.00	2.41E-02	2.41E-02	2.41E-02		
Y-90	2.7505E+00	3,596.31	7,192.61	0.00E+00	9.89E+03	1.98E+04		
Other Radionuclides					1.85E+04	3.70E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.82E+02	3.65E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	8.4375	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3,596.31
Bounding:		7,192.61

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.15	
Bounding:	0.29	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR ASTRA (UALX-HEU) AUSTRIA
SNF ID #: 654
Fuel Units & Descr: 2 - MTR TYPE
Heavy Metal Mass: BOL=0.14kg; EOL=0.12kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10'
0.08

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	18.94	37.88	0.00E+00	2.75E-09	5.51E-09	Avg. MeV	
Am-241	1.1190E-03	18.94	37.88	0.00E+00	2.12E-02	4.24E-02	0.0150	7.308E+12
Am-242m	4.5425E-07	18.94	37.88	0.00E+00	8.60E-06	1.72E-05	0.0250	1.574E+12
Am-243	1.4921E-06	18.94	37.88	0.00E+00	2.83E-05	5.65E-05	0.0375	1.453E+12
C-14	5.7244E-09	18.94	37.88	0.00E+00	1.08E-07	2.17E-07	0.0575	1.429E+12
Cl-36	1.3124E-32	18.94	37.88	0.00E+00	2.49E-31	4.97E-31	0.0850	9.107E+11
Cm-243	2.3676E-07	18.94	37.88	0.00E+00	4.48E-06	8.97E-06	0.1250	7.887E+11
Cm-244	5.2042E-05	18.94	37.88	0.00E+00	9.86E-04	1.97E-03	0.2250	7.719E+11
Co-60	3.8208E-05	18.94	37.88	0.00E+00	7.24E-04	1.45E-03	0.3750	3.736E+11
Cs-134	4.8693E-01	18.94	37.88	0.00E+00	9.22E+00	1.84E+01	0.5750	5.132E+12
Cs-135	3.4477E-06	18.94	37.88	0.00E+00	6.53E-05	1.31E-04	0.8500	7.187E+11
Cs-137	2.8731E+00	18.94	37.88	0.00E+00	5.44E+01	1.09E+02	1.2500	1.337E+11
Eu-154	8.2053E-02	18.94	37.88	0.00E+00	1.55E+00	3.11E+00	1.7500	5.608E+09
Eu-155	3.9134E-02	18.94	37.88	0.00E+00	7.41E-01	1.48E+00	2.2500	1.176E+10
Fe-55	6.7429E-03	18.94	37.88	0.00E+00	1.28E-01	2.55E-01	2.7500	6.767E+07
H-3	1.0599E-02	18.94	37.88	0.00E+00	2.01E-01	4.02E-01	3.5000	7.505E+06
I-129	7.5300E-07	18.94	37.88	0.00E+00	1.43E-05	2.85E-05	5.0000	2.245E+01
Kr-85	2.8595E-01	18.94	37.88	0.00E+00	5.42E+00	1.08E+01	7.0000	2.502E+00
Np-237	9.5479E-06	18.94	37.88	0.00E+00	1.81E-04	3.62E-04	11.0000	2.820E-01
Pa-231	8.9297E-10	18.94	37.88	0.00E+00	1.69E-08	3.38E-08		
Pb-210	3.7609E-12	18.94	37.88	0.00E+00	7.12E-11	1.42E-10		
Pm-147	2.5452E+00	18.94	37.88	0.00E+00	4.82E+01	9.64E+01		
Pu-238	2.0550E-02	18.94	37.88	0.00E+00	3.89E-01	7.78E-01		
Pu-239	4.2838E-04	18.94	37.88	0.00E+00	8.11E-03	1.62E-02		
Pu-240	2.4401E-04	18.94	37.88	0.00E+00	4.62E-03	9.24E-03		
Pu-241	6.8764E-02	18.94	37.88	0.00E+00	1.30E+00	2.60E+00		
Pu-242	3.6329E-07	18.94	37.88	0.00E+00	6.88E-06	1.38E-05		
Ra-226	3.8045E-11	18.94	37.88	0.00E+00	7.21E-10	1.44E-09		
Ra-228	2.9902E-15	18.94	37.88	0.00E+00	5.66E-14	1.13E-13		
Ru-106	1.9055E-01	18.94	37.88	0.00E+00	3.61E+00	7.22E+00		
Se-79	1.2936E-05	18.94	37.88	0.00E+00	2.45E-04	4.90E-04		
Sn-126	1.1574E-05	18.94	37.88	0.00E+00	2.19E-04	4.38E-04		
Sr-90	2.7505E+00	18.94	37.88	0.00E+00	5.21E+01	1.04E+02		
Tc-99	4.2239E-04	18.94	37.88	0.00E+00	8.00E-03	1.60E-02		
Th-229	1.8848E-12	18.94	37.88	0.00E+00	3.57E-11	7.14E-11		
Th-230	1.7042E-08	18.94	37.88	0.00E+00	3.23E-07	6.46E-07		
Th-232	7.8132E-15	18.94	37.88	0.00E+00	1.48E-13	2.96E-13		
Tl-208	4.4063E-08	18.94	37.88	0.00E+00	8.35E-07	1.67E-06		
U-232	1.3151E-07	18.94	37.88	0.00E+00	2.49E-06	4.98E-06		
U-233	1.9564E-09	18.94	37.88	0.00E+00	3.71E-08	7.41E-08		
U-234	1.8371E-04	18.94	37.88	0.00E+00	3.48E-03	6.96E-03		
U-235	-2.7235E-06	18.94	0.00	2.82E-04	2.30E-04	2.82E-04		
U-236	1.5493E-05	18.94	37.88	0.00E+00	2.93E-04	5.87E-04		
U-238	-4.2851E-09	18.94	0.00	3.22E-06	3.14E-06	3.22E-06		
Y-90	2.7505E+00	18.94	37.88	0.00E+00	5.21E+01	1.04E+02		
Other Radionuclides					9.74E+01	1.95E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.60E-01	1.92E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.15	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		18.94
Bounding:		37.88

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.43	
Bounding:	0.86	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).*

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR ASTRA (UALX-HEU) AUSTRIA
SNF ID #: 738
Fuel Units & Descr: 14 - MTR TYPE
Heavy Metal Mass: BOL=5.6kg; EOL=4.858kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10" 0.58

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	702.69	1,405.38	0.00E+00	1.02E-07	2.04E-07
Am-241	1.1190E-03	702.69	1,405.38	0.00E+00	7.86E-01	1.57E+00
Am-242m	4.5425E-07	702.69	1,405.38	0.00E+00	3.19E-04	6.38E-04
Am-243	1.4921E-06	702.69	1,405.38	0.00E+00	1.05E-03	2.10E-03
C-14	5.7244E-09	702.69	1,405.38	0.00E+00	4.02E-06	8.04E-06
Cl-36	1.3124E-32	702.69	1,405.38	0.00E+00	9.22E-30	1.84E-29
Cm-243	2.3676E-07	702.69	1,405.38	0.00E+00	1.66E-04	3.33E-04
Cm-244	5.2042E-05	702.69	1,405.38	0.00E+00	3.66E-02	7.31E-02
Co-60	3.8208E-05	702.69	1,405.38	0.00E+00	2.68E-02	5.37E-02
Cs-134	4.8693E-01	702.69	1,405.38	0.00E+00	3.42E+02	6.84E+02
Cs-135	3.4477E-06	702.69	1,405.38	0.00E+00	2.42E-03	4.85E-03
Cs-137	2.8731E+00	702.69	1,405.38	0.00E+00	2.02E+03	4.04E+03
Eu-154	8.2053E-02	702.69	1,405.38	0.00E+00	5.77E+01	1.15E+02
Eu-155	3.9134E-02	702.69	1,405.38	0.00E+00	2.75E+01	5.50E+01
Fe-55	6.7429E-03	702.69	1,405.38	0.00E+00	4.74E+00	9.48E+00
H-3	1.0599E-02	702.69	1,405.38	0.00E+00	7.45E+00	1.49E+01
I-129	7.5300E-07	702.69	1,405.38	0.00E+00	5.29E-04	1.06E-03
Kr-85	2.8595E-01	702.69	1,405.38	0.00E+00	2.01E+02	4.02E+02
Np-237	9.5479E-06	702.69	1,405.38	0.00E+00	6.71E-03	1.34E-02
Pa-231	8.9297E-10	702.69	1,405.38	0.00E+00	6.27E-07	1.25E-06
Pb-210	3.7609E-12	702.69	1,405.38	0.00E+00	2.64E-09	5.29E-09
Pm-147	2.5452E+00	702.69	1,405.38	0.00E+00	1.79E+03	3.58E+03
Pu-238	2.0550E-02	702.69	1,405.38	0.00E+00	1.44E+01	2.89E+01
Pu-239	4.2838E-04	702.69	1,405.38	0.00E+00	3.01E-01	6.02E-01
Pu-240	2.4401E-04	702.69	1,405.38	0.00E+00	1.71E-01	3.43E-01
Pu-241	6.8764E-02	702.69	1,405.38	0.00E+00	4.83E+01	9.66E+01
Pu-242	3.6329E-07	702.69	1,405.38	0.00E+00	2.55E-04	5.11E-04
Ra-226	3.8045E-11	702.69	1,405.38	0.00E+00	2.67E-08	5.35E-08
Ra-228	2.9902E-15	702.69	1,405.38	0.00E+00	2.10E-12	4.20E-12
Ru-106	1.9055E-01	702.69	1,405.38	0.00E+00	1.34E+02	2.68E+02
Se-79	1.2936E-05	702.69	1,405.38	0.00E+00	9.09E-03	1.82E-02
Sn-126	1.1574E-05	702.69	1,405.38	0.00E+00	8.13E-03	1.63E-02
Sr-90	2.7505E+00	702.69	1,405.38	0.00E+00	1.93E+03	3.87E+03
Tc-99	4.2239E-04	702.69	1,405.38	0.00E+00	2.97E-01	5.94E-01
Th-229	1.8848E-12	702.69	1,405.38	0.00E+00	1.32E-09	2.65E-09
Th-230	1.7042E-08	702.69	1,405.38	0.00E+00	1.20E-05	2.40E-05
Th-232	7.8132E-15	702.69	1,405.38	0.00E+00	5.49E-12	1.10E-11
Tl-208	4.4063E-08	702.69	1,405.38	0.00E+00	3.10E-05	6.19E-05
U-232	1.3151E-07	702.69	1,405.38	0.00E+00	9.24E-05	1.85E-04
U-233	1.9564E-09	702.69	1,405.38	0.00E+00	1.37E-06	2.75E-06
U-234	1.8371E-04	702.69	1,405.38	0.00E+00	1.29E-01	2.58E-01
U-235	-2.7235E-06	702.69	0.00	1.13E-02	9.36E-03	1.13E-02
U-236	1.5493E-05	702.69	1,405.38	0.00E+00	1.09E-02	2.18E-02
U-238	-4.2851E-09	702.69	0.00	1.29E-04	1.26E-04	1.29E-04
Y-90	2.7505E+00	702.69	1,405.38	0.00E+00	1.93E+03	3.87E+03
Other Radionuclides					3.61E+03	7.23E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.711E+14
0.0250	5.841E+13
0.0375	5.390E+13
0.0575	5.300E+13
0.0850	3.379E+13
0.1250	2.926E+13
0.2250	2.864E+13
0.3750	1.388E+13
0.5750	1.904E+14
0.8500	2.667E+13
1.2500	4.961E+12
1.7500	2.080E+11
2.2500	4.364E+11
2.7500	2.510E+09
3.5000	2.784E+08
5.0000	8.328E+02
7.0000	9.283E+01
11.0000	1.046E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.56E+01	7.13E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.15	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		702.69
Bounding:		1,405.38

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.40	
Bounding:	0.80	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR FMRB (GERMANY)
SNF ID #: 1066
Fuel Units & Descr: 18 - MTR TYPE
Heavy Metal Mass: BOL=2.57kg; EOL=2.282kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1994
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 0.75

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.5861E-10	272.74	545.48	0.00E+00	1.25E-07	2.50E-07
Am-241	1.7832E-03	272.74	545.48	0.00E+00	4.86E-01	9.73E-01
Am-242m	4.3410E-07	272.74	545.48	0.00E+00	1.18E-04	2.37E-04
Am-243	1.4907E-06	272.74	545.48	0.00E+00	4.07E-04	8.13E-04
C-14	5.7162E-09	272.74	545.48	0.00E+00	1.56E-06	3.12E-06
Cl-36	1.3124E-32	272.74	545.48	0.00E+00	3.58E-30	7.16E-30
Cm-243	1.8568E-07	272.74	545.48	0.00E+00	5.06E-05	1.01E-04
Cm-244	3.5512E-05	272.74	545.48	0.00E+00	9.69E-03	1.94E-02
Co-60	1.0261E-05	272.74	545.48	0.00E+00	2.80E-03	5.60E-03
Cs-134	1.6931E-02	272.74	545.48	0.00E+00	4.62E+00	9.24E+00
Cs-135	3.4477E-06	272.74	545.48	0.00E+00	9.40E-04	1.88E-03
Cs-137	2.2800E+00	272.74	545.48	0.00E+00	6.22E+02	1.24E+03
Eu-154	3.6656E-02	272.74	545.48	0.00E+00	1.00E+01	2.00E+01
Eu-155	9.6841E-03	272.74	545.48	0.00E+00	2.64E+00	5.28E+00
Fe-55	4.6977E-04	272.74	545.48	0.00E+00	1.28E-01	2.56E-01
H-3	6.0485E-03	272.74	545.48	0.00E+00	1.65E+00	3.30E+00
I-129	7.5300E-07	272.74	545.48	0.00E+00	2.05E-04	4.11E-04
Kr-85	1.4989E-01	272.74	545.48	0.00E+00	4.09E+01	8.18E+01
Np-237	9.5534E-06	272.74	545.48	0.00E+00	2.61E-03	5.21E-03
Pa-231	1.6550E-09	272.74	545.48	0.00E+00	4.51E-07	9.03E-07
Pb-210	2.6631E-11	272.74	545.48	0.00E+00	7.26E-09	1.45E-08
Pm-147	1.8156E-01	272.74	545.48	0.00E+00	4.95E+01	9.90E+01
Pu-238	1.8990E-02	272.74	545.48	0.00E+00	5.18E+00	1.04E+01
Pu-239	4.2838E-04	272.74	545.48	0.00E+00	1.17E-01	2.34E-01
Pu-240	2.4379E-04	272.74	545.48	0.00E+00	6.65E-02	1.33E-01
Pu-241	4.2511E-02	272.74	545.48	0.00E+00	1.16E+01	2.32E+01
Pu-242	3.6329E-07	272.74	545.48	0.00E+00	9.91E-05	1.98E-04
Ra-226	1.4725E-10	272.74	545.48	0.00E+00	4.02E-08	8.03E-08
Ra-228	8.9760E-15	272.74	545.48	0.00E+00	2.45E-12	4.90E-12
Ru-106	1.9752E-04	272.74	545.48	0.00E+00	5.39E-02	1.08E-01
Se-79	1.2933E-05	272.74	545.48	0.00E+00	3.53E-03	7.05E-03
Sn-126	1.1574E-05	272.74	545.48	0.00E+00	3.16E-03	6.31E-03
Sr-90	2.1680E+00	272.74	545.48	0.00E+00	5.91E+02	1.18E+03
Tc-99	4.2239E-04	272.74	545.48	0.00E+00	1.15E-01	2.30E-01
Th-229	3.9270E-12	272.74	545.48	0.00E+00	1.07E-09	2.14E-09
Th-230	3.3578E-08	272.74	545.48	0.00E+00	9.16E-06	1.83E-05
Th-232	1.5452E-14	272.74	545.48	0.00E+00	4.21E-12	8.43E-12
Tl-208	4.6705E-08	272.74	545.48	0.00E+00	1.27E-05	2.55E-05
U-232	1.3045E-07	272.74	545.48	0.00E+00	3.56E-05	7.12E-05
U-233	2.3739E-09	272.74	545.48	0.00E+00	6.47E-07	1.29E-06
U-234	1.8423E-04	272.74	545.48	0.00E+00	5.02E-02	1.00E-01
U-235	-2.7235E-06	272.74	0.00	5.07E-03	4.33E-03	5.07E-03
U-236	1.5493E-05	272.74	545.48	0.00E+00	4.23E-03	8.45E-03
U-238	-4.2851E-09	272.74	0.00	7.55E-05	7.44E-05	7.55E-05
Y-90	2.1686E+00	272.74	545.48	0.00E+00	5.91E+02	1.18E+03
Other Radionuclides					5.93E+02	1.19E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.507E+13
0.0250	1.357E+13
0.0375	1.185E+13
0.0575	1.264E+13
0.0850	7.854E+12
0.1250	5.247E+12
0.2250	6.594E+12
0.3750	2.889E+12
0.5750	4.689E+13
0.8500	1.114E+12
1.2500	5.626E+11
1.7500	2.357E+10
2.2500	2.949E+07
2.7500	1.772E+06
3.5000	1.127E+05
5.0000	2.607E+02
7.0000	2.887E+01
11.0000	3.242E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.38E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	91.25787542	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		272.74
Bounding:		545.48

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.34	
Bounding:	0.67	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX HEU) AUSTRALIA
SNF ID #: 649
Fuel Units & Descr: 12 - ASSEMBLY
Heavy Metal Mass: BOL=3.32kg; EOL=3.317kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.50

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	3.41	6.82	0.00E+00	4.96E-10	9.92E-10
Am-241	1.1190E-03	3.41	6.82	0.00E+00	3.82E-03	7.63E-03
Am-242m	4.5425E-07	3.41	6.82	0.00E+00	1.55E-06	3.10E-06
Am-243	1.4921E-06	3.41	6.82	0.00E+00	5.09E-06	1.02E-05
C-14	5.7244E-09	3.41	6.82	0.00E+00	1.95E-08	3.90E-08
Cl-36	1.3124E-32	3.41	6.82	0.00E+00	4.47E-32	8.95E-32
Cm-243	2.3676E-07	3.41	6.82	0.00E+00	8.07E-07	1.61E-06
Cm-244	5.2042E-05	3.41	6.82	0.00E+00	1.77E-04	3.55E-04
Co-60	3.8208E-05	3.41	6.82	0.00E+00	1.30E-04	2.61E-04
Cs-134	4.8693E-01	3.41	6.82	0.00E+00	1.66E+00	3.32E+00
Cs-135	3.4477E-06	3.41	6.82	0.00E+00	1.18E-05	2.35E-05
Cs-137	2.8731E+00	3.41	6.82	0.00E+00	9.80E+00	1.96E+01
Eu-154	8.2053E-02	3.41	6.82	0.00E+00	2.80E-01	5.59E-01
Eu-155	3.9134E-02	3.41	6.82	0.00E+00	1.33E-01	2.67E-01
Fe-55	6.7429E-03	3.41	6.82	0.00E+00	2.30E-02	4.60E-02
H-3	1.0599E-02	3.41	6.82	0.00E+00	3.61E-02	7.23E-02
I-129	7.5300E-07	3.41	6.82	0.00E+00	2.57E-06	5.13E-06
Kr-85	2.8595E-01	3.41	6.82	0.00E+00	9.75E-01	1.95E+00
Np-237	9.5479E-06	3.41	6.82	0.00E+00	3.26E-05	6.51E-05
Pa-231	8.9297E-10	3.41	6.82	0.00E+00	3.04E-09	6.09E-09
Pb-210	3.7609E-12	3.41	6.82	0.00E+00	1.28E-11	2.56E-11
Pm-147	2.5452E+00	3.41	6.82	0.00E+00	8.68E+00	1.74E+01
Pu-238	2.0550E-02	3.41	6.82	0.00E+00	7.01E-02	1.40E-01
Pu-239	4.2838E-04	3.41	6.82	0.00E+00	1.46E-03	2.92E-03
Pu-240	2.4401E-04	3.41	6.82	0.00E+00	8.32E-04	1.66E-03
Pu-241	6.8764E-02	3.41	6.82	0.00E+00	2.34E-01	4.69E-01
Pu-242	3.6329E-07	3.41	6.82	0.00E+00	1.24E-06	2.48E-06
Ra-226	3.8045E-11	3.41	6.82	0.00E+00	1.30E-10	2.59E-10
Ra-228	2.9902E-15	3.41	6.82	0.00E+00	1.02E-14	2.04E-14
Ru-106	1.9055E-01	3.41	6.82	0.00E+00	6.50E-01	1.30E+00
Se-79	1.2936E-05	3.41	6.82	0.00E+00	4.41E-05	8.82E-05
Sn-126	1.1574E-05	3.41	6.82	0.00E+00	3.95E-05	7.89E-05
Sr-90	2.7505E+00	3.41	6.82	0.00E+00	9.38E+00	1.88E+01
Tc-99	4.2239E-04	3.41	6.82	0.00E+00	1.44E-03	2.88E-03
Th-229	1.8848E-12	3.41	6.82	0.00E+00	6.43E-12	1.29E-11
Th-230	1.7042E-08	3.41	6.82	0.00E+00	5.81E-08	1.16E-07
Th-232	7.8132E-15	3.41	6.82	0.00E+00	2.66E-14	5.33E-14
Tl-208	4.4063E-08	3.41	6.82	0.00E+00	1.50E-07	3.00E-07
U-232	1.3151E-07	3.41	6.82	0.00E+00	4.48E-07	8.97E-07
U-233	1.9564E-09	3.41	6.82	0.00E+00	6.67E-09	1.33E-08
U-234	1.8371E-04	3.41	6.82	0.00E+00	6.26E-04	1.25E-03
U-235	-2.7235E-08	3.41	0.00	6.46E-03	6.45E-03	6.46E-03
U-236	1.5493E-05	3.41	6.82	0.00E+00	5.28E-05	1.06E-04
U-238	-4.2851E-09	3.41	0.00	1.12E-04	1.12E-04	1.12E-04
Y-90	2.7505E+00	3.41	6.82	0.00E+00	9.38E+00	1.88E+01
Other Radionuclides					1.75E+01	3.51E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.316E+12
0.0250	2.834E+11
0.0375	2.615E+11
0.0575	2.572E+11
0.0850	1.640E+11
0.1250	1.420E+11
0.2250	1.391E+11
0.3750	6.726E+10
0.5750	9.238E+11
0.8500	1.294E+11
1.2500	2.407E+10
1.7500	1.009E+09
2.2500	2.117E+09
2.7500	1.218E+07
3.5000	1.351E+06
5.0000	4.382E+00
7.0000	4.891E-01
11.0000	5.518E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.73E-01	3.46E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	89.99998815	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3.41
Bounding:		6.82

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	
Bounding:	0.01	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-HEU) JAPAN
SNF ID #: 603
Fuel Units & Descr: 12 - MTR TYPE
Heavy Metal Mass: BOL=3.553kg; EOL=3.553kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 0.33

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	67.30	134.60	0.00E+00	9.79E-09	1.96E-08
Am-241	1.1190E-03	67.30	134.60	0.00E+00	7.53E-02	1.51E-01
Am-242m	4.5425E-07	67.30	134.60	0.00E+00	3.06E-05	6.11E-05
Am-243	1.4921E-06	67.30	134.60	0.00E+00	1.00E-04	2.01E-04
C-14	5.7244E-09	67.30	134.60	0.00E+00	3.85E-07	7.70E-07
Cl-36	1.3124E-32	67.30	134.60	0.00E+00	8.83E-31	1.77E-30
Cm-243	2.3676E-07	67.30	134.60	0.00E+00	1.59E-05	3.19E-05
Cm-244	5.2042E-05	67.30	134.60	0.00E+00	3.50E-03	7.00E-03
Co-60	3.8208E-05	67.30	134.60	0.00E+00	2.57E-03	5.14E-03
Cs-134	4.8693E-01	67.30	134.60	0.00E+00	3.28E+01	6.55E+01
Cs-135	3.4477E-06	67.30	134.60	0.00E+00	2.32E-04	4.64E-04
Cs-137	2.8731E+00	67.30	134.60	0.00E+00	1.93E+02	3.87E+02
Eu-154	8.2053E-02	67.30	134.60	0.00E+00	5.52E+00	1.10E+01
Eu-155	3.9134E-02	67.30	134.60	0.00E+00	2.63E+00	5.27E+00
Fe-55	6.7429E-03	67.30	134.60	0.00E+00	4.54E-01	9.08E-01
H-3	1.0599E-02	67.30	134.60	0.00E+00	7.13E-01	1.43E+00
I-129	7.5300E-07	67.30	134.60	0.00E+00	5.07E-05	1.01E-04
Kr-85	2.8595E-01	67.30	134.60	0.00E+00	1.92E+01	3.85E+01
Np-237	9.5479E-06	67.30	134.60	0.00E+00	6.43E-04	1.29E-03
Pa-231	8.9297E-10	67.30	134.60	0.00E+00	6.01E-08	1.20E-07
Pb-210	3.7609E-12	67.30	134.60	0.00E+00	2.53E-10	5.06E-10
Pm-147	2.5452E+00	67.30	134.60	0.00E+00	1.71E+02	3.43E+02
Pu-238	2.0550E-02	67.30	134.60	0.00E+00	1.38E+00	2.77E+00
Pu-239	4.2838E-04	67.30	134.60	0.00E+00	2.88E-02	5.77E-02
Pu-240	2.4401E-04	67.30	134.60	0.00E+00	1.64E-02	3.28E-02
Pu-241	6.8764E-02	67.30	134.60	0.00E+00	4.63E+00	9.26E+00
Pu-242	3.6329E-07	67.30	134.60	0.00E+00	2.44E-05	4.89E-05
Ra-226	3.8045E-11	67.30	134.60	0.00E+00	2.56E-09	5.12E-09
Ra-228	2.9902E-15	67.30	134.60	0.00E+00	2.01E-13	4.02E-13
Ru-106	1.9055E-01	67.30	134.60	0.00E+00	1.28E+01	2.56E+01
Se-79	1.2936E-05	67.30	134.60	0.00E+00	8.71E-04	1.74E-03
Sn-126	1.1574E-05	67.30	134.60	0.00E+00	7.79E-04	1.56E-03
Sr-90	2.7505E+00	67.30	134.60	0.00E+00	1.85E+02	3.70E+02
Tc-99	4.2239E-04	67.30	134.60	0.00E+00	2.84E-02	5.69E-02
Th-229	1.8848E-12	67.30	134.60	0.00E+00	1.27E-10	2.54E-10
Th-230	1.7042E-08	67.30	134.60	0.00E+00	1.15E-06	2.29E-06
Th-232	7.8132E-15	67.30	134.60	0.00E+00	5.26E-13	1.05E-12
Tl-208	4.4063E-08	67.30	134.60	0.00E+00	2.97E-06	5.93E-06
U-232	1.3151E-07	67.30	134.60	0.00E+00	8.85E-06	1.77E-05
U-233	1.9564E-09	67.30	134.60	0.00E+00	1.32E-07	2.63E-07
U-234	1.8371E-04	67.30	134.60	0.00E+00	1.24E-02	2.47E-02
U-235	-2.7235E-06	67.30	0.00	6.90E-03	6.71E-03	6.90E-03
U-236	1.5493E-05	67.30	134.60	0.00E+00	1.04E-03	2.09E-03
U-238	-4.2851E-09	67.30	0.00	1.22E-04	1.21E-04	1.22E-04
Y-90	2.7505E+00	67.30	134.60	0.00E+00	1.85E+02	3.70E+02
Other Radionuclides					3.46E+02	6.92E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	-
0.0150	2.597E+13
0.0250	5.594E+12
0.0375	5.162E+12
0.0575	5.076E+12
0.0650	3.236E+12
0.1250	2.802E+12
0.2250	2.743E+12
0.3750	1.328E+12
0.5750	1.824E+13
0.8500	2.554E+12
1.2500	4.751E+11
1.7500	1.993E+10
2.2500	4.179E+10
2.7500	2.404E+08
3.5000	2.667E+07
5.0000	8.009E+01
7.0000	8.928E+00
11.0000	1.006E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.41E+00	6.82E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	89.81998522	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		67.30
Bounding:		134.60

Basis for burnup used in estimate:
Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM: 0.98

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-HEU) JAPAN
SNF ID #: 605
Fuel Units & Descr: 81 - MTR TYPE
Heavy Metal Mass: BOL=24.818kg; EOL=24.786kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10" = 3.38

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	1.4545E-10	30.68	61.37	0.00E+00	4.46E-09	8.93E-09
Am-241	1.1190E-03	30.68	61.37	0.00E+00	3.43E-02	6.87E-02
Am-242m	4.5425E-07	30.68	61.37	0.00E+00	1.39E-05	2.79E-05
Am-243	1.4921E-06	30.68	61.37	0.00E+00	4.58E-05	9.16E-05
C-14	5.7244E-09	30.68	61.37	0.00E+00	1.76E-07	3.51E-07
Cl-36	1.3124E-32	30.68	61.37	0.00E+00	4.03E-31	8.05E-31
Cm-243	2.3676E-07	30.68	61.37	0.00E+00	7.26E-06	1.45E-05
Cm-244	5.2042E-05	30.68	61.37	0.00E+00	1.60E-03	3.19E-03
Co-60	3.8208E-05	30.68	61.37	0.00E+00	1.17E-03	2.34E-03
Cs-134	4.8693E-01	30.68	61.37	0.00E+00	1.49E+01	2.99E+01
Cs-135	3.4477E-06	30.68	61.37	0.00E+00	1.06E-04	2.12E-04
Cs-137	2.8731E+00	30.68	61.37	0.00E+00	8.82E+01	1.76E+02
Eu-154	8.2053E-02	30.68	61.37	0.00E+00	2.52E+00	5.04E+00
Eu-155	3.9134E-02	30.68	61.37	0.00E+00	1.20E+00	2.40E+00
Fe-55	6.7429E-03	30.68	61.37	0.00E+00	2.07E-01	4.14E-01
H-3	1.0599E-02	30.68	61.37	0.00E+00	3.25E-01	6.50E-01
I-129	7.5300E-07	30.68	61.37	0.00E+00	2.31E-05	4.62E-05
Kr-85	2.8595E-01	30.68	61.37	0.00E+00	8.77E+00	1.75E+01
Np-237	9.5479E-06	30.68	61.37	0.00E+00	2.93E-04	5.86E-04
Pa-231	8.9297E-10	30.68	61.37	0.00E+00	2.74E-08	5.48E-08
Pb-210	3.7609E-12	30.68	61.37	0.00E+00	1.15E-10	2.31E-10
Pm-147	2.5452E+00	30.68	61.37	0.00E+00	7.81E+01	1.56E+02
Pu-238	2.0550E-02	30.68	61.37	0.00E+00	6.31E-01	1.26E+00
Pu-239	4.2838E-04	30.68	61.37	0.00E+00	1.31E-02	2.63E-02
Pu-240	2.4401E-04	30.68	61.37	0.00E+00	7.49E-03	1.50E-02
Pu-241	6.8764E-02	30.68	61.37	0.00E+00	2.11E+00	4.22E+00
Pu-242	3.6329E-07	30.68	61.37	0.00E+00	1.11E-05	2.23E-05
Ra-226	3.8045E-11	30.68	61.37	0.00E+00	1.17E-09	2.33E-09
Ra-228	2.9902E-15	30.68	61.37	0.00E+00	9.18E-14	1.84E-13
Ru-106	1.9055E-01	30.68	61.37	0.00E+00	5.85E+00	1.17E+01
Se-79	1.2936E-05	30.68	61.37	0.00E+00	3.97E-04	7.94E-04
Sn-126	1.1574E-05	30.68	61.37	0.00E+00	3.55E-04	7.10E-04
Sr-90	2.7505E+00	30.68	61.37	0.00E+00	8.44E+01	1.69E+02
Tc-99	4.2239E-04	30.68	61.37	0.00E+00	1.30E-02	2.59E-02
Th-229	1.8848E-12	30.68	61.37	0.00E+00	5.78E-11	1.16E-10
Th-230	1.7042E-08	30.68	61.37	0.00E+00	5.23E-07	1.05E-06
Th-232	7.8132E-15	30.68	61.37	0.00E+00	2.40E-13	4.79E-13
Tl-208	4.4063E-08	30.68	61.37	0.00E+00	1.35E-06	2.70E-06
U-232	1.3151E-07	30.68	61.37	0.00E+00	4.04E-06	8.07E-06
U-233	1.9564E-09	30.68	61.37	0.00E+00	6.00E-08	1.20E-07
U-234	1.8371E-04	30.68	61.37	0.00E+00	5.64E-03	1.13E-02
U-235	-2.7235E-06	30.68	0.00	4.99E-02	4.98E-02	4.99E-02
U-236	1.5493E-05	30.68	61.37	0.00E+00	4.75E-04	9.51E-04
U-238	-4.2851E-09	30.68	0.00	5.84E-04	5.84E-04	5.84E-04
Y-90	2.7505E+00	30.68	61.37	0.00E+00	8.44E+01	1.69E+02
Other Radionuclides					1.58E+02	3.16E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.184E+13
0.0250	2.551E+12
0.0375	2.354E+12
0.0575	2.314E+12
0.0850	1.476E+12
0.1250	1.278E+12
0.2250	1.251E+12
0.3750	6.053E+11
0.5750	8.315E+12
0.8500	1.164E+12
1.2500	2.166E+11
1.7500	9.084E+09
2.2500	1.905E+10
2.7500	1.096E+08
3.5000	1.216E+07
5.0000	3.836E+01
7.0000	4.279E+00
11.0000	4.825E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.56E+00	3.11E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.00000613	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		30.68
Bounding:		61.37

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	
Bounding:	0.01	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-HEU) NETHERLANDS
SNF ID #: 609
Fuel Units & Descr: 14 - MTR TYPE
Heavy Metal Mass: BOL=3.192kg; EOL=3.188kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage:

18"x10'
0.58

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	3.98	7.96	0.00E+00	5.79E-10	1.16E-09
Am-241	1.1190E-03	3.98	7.96	0.00E+00	4.45E-03	8.90E-03
Am-242m	4.5425E-07	3.98	7.96	0.00E+00	1.81E-06	3.61E-06
Am-243	1.4921E-06	3.98	7.96	0.00E+00	5.93E-06	1.19E-05
C-14	5.7244E-09	3.98	7.96	0.00E+00	2.28E-08	4.55E-08
Cl-36	1.3124E-32	3.98	7.96	0.00E+00	5.22E-32	1.04E-31
Cm-243	2.3676E-07	3.98	7.96	0.00E+00	9.42E-07	1.88E-06
Cm-244	5.2042E-05	3.98	7.96	0.00E+00	2.07E-04	4.14E-04
Co-60	3.8208E-05	3.98	7.96	0.00E+00	1.52E-04	3.04E-04
Cs-134	4.8693E-01	3.98	7.96	0.00E+00	1.94E+00	3.87E+00
Cs-135	3.4477E-06	3.98	7.96	0.00E+00	1.37E-05	2.74E-05
Cs-137	2.8731E+00	3.98	7.96	0.00E+00	1.14E+01	2.29E+01
Eu-154	8.2053E-02	3.98	7.96	0.00E+00	3.26E-01	6.53E-01
Eu-155	3.9134E-02	3.98	7.96	0.00E+00	1.56E-01	3.11E-01
Fe-55	6.7429E-03	3.98	7.96	0.00E+00	2.68E-02	5.36E-02
H-3	1.0599E-02	3.98	7.96	0.00E+00	4.22E-02	8.43E-02
I-129	7.5300E-07	3.98	7.96	0.00E+00	3.00E-06	5.99E-06
Kr-85	2.8595E-01	3.98	7.96	0.00E+00	1.14E+00	2.27E+00
Np-237	9.5479E-06	3.98	7.96	0.00E+00	3.80E-05	7.60E-05
Pa-231	8.9297E-10	3.98	7.96	0.00E+00	3.55E-09	7.10E-09
Pb-210	3.7609E-12	3.98	7.96	0.00E+00	1.50E-11	2.99E-11
Pm-147	2.5452E+00	3.98	7.96	0.00E+00	1.01E+01	2.02E+01
Pu-238	2.0550E-02	3.98	7.96	0.00E+00	8.17E-02	1.63E-01
Pu-239	4.2838E-04	3.98	7.96	0.00E+00	1.70E-03	3.41E-03
Pu-240	2.4401E-04	3.98	7.96	0.00E+00	9.71E-04	1.94E-03
Pu-241	6.8764E-02	3.98	7.96	0.00E+00	2.74E-01	5.47E-01
Pu-242	3.6329E-07	3.98	7.96	0.00E+00	1.44E-06	2.89E-06
Ra-226	3.8045E-11	3.98	7.96	0.00E+00	1.51E-10	3.03E-10
Ra-228	2.9902E-15	3.98	7.96	0.00E+00	1.19E-14	2.38E-14
Ru-106	1.9055E-01	3.98	7.96	0.00E+00	7.58E-01	1.52E+00
Se-79	1.2936E-05	3.98	7.96	0.00E+00	5.15E-05	1.03E-04
Sn-126	1.1574E-05	3.98	7.96	0.00E+00	4.60E-05	9.21E-05
Sr-90	2.7505E+00	3.98	7.96	0.00E+00	1.09E+01	2.19E+01
Tc-99	4.2239E-04	3.98	7.96	0.00E+00	1.68E-03	3.36E-03
Th-229	1.8848E-12	3.98	7.96	0.00E+00	7.50E-12	1.50E-11
Th-230	1.7042E-08	3.98	7.96	0.00E+00	6.78E-08	1.36E-07
Th-232	7.8132E-15	3.98	7.96	0.00E+00	3.11E-14	6.22E-14
Tl-208	4.4063E-08	3.98	7.96	0.00E+00	1.75E-07	3.51E-07
U-232	1.3151E-07	3.98	7.96	0.00E+00	5.23E-07	1.05E-06
U-233	1.9564E-09	3.98	7.96	0.00E+00	7.78E-09	1.56E-08
U-234	1.8371E-04	3.98	7.96	0.00E+00	7.31E-04	1.46E-03
U-235	-2.7235E-06	3.98	0.00	6.42E-03	6.40E-03	6.42E-03
U-236	1.5493E-05	3.98	7.96	0.00E+00	6.16E-05	1.23E-04
U-238	-4.2851E-09	3.98	0.00	7.51E-05	7.51E-05	7.51E-05
Y-90	2.7505E+00	3.98	7.96	0.00E+00	1.09E+01	2.19E+01
Other Radionuclides					2.05E+01	4.09E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.535E+12
0.0250	3.306E+11
0.0375	3.051E+11
0.0575	3.000E+11
0.0850	1.913E+11
0.1250	1.657E+11
0.2250	1.622E+11
0.3750	7.847E+10
0.5750	1.078E+12
0.8500	1.509E+11
1.2500	2.808E+10
1.7500	1.178E+09
2.2500	2.470E+09
2.7500	1.421E+07
3.5000	1.576E+06
5.0000	4.971E+00
7.0000	5.544E-01
11.0000	6.252E-02

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:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.9999964	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3.98
Bounding:		7.96

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	
Bounding:	0.01	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-HEU) TAIWAN
SNF ID #: 628
Fuel Units & Descr: 35 - MTR TYPE
Heavy Metal Mass: BOL=4.764kg; EOL=4.76kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.46

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	3.31	6.63	0.00E+00	4.82E-10	9.64E-10
Am-241	1.1190E-03	3.31	6.63	0.00E+00	3.71E-03	7.42E-03
Am-242m	4.5425E-07	3.31	6.63	0.00E+00	1.51E-06	3.01E-06
Am-243	1.4921E-06	3.31	6.63	0.00E+00	4.95E-06	9.89E-06
C-14	5.7244E-09	3.31	6.63	0.00E+00	1.90E-08	3.79E-08
Cl-36	1.3124E-32	3.31	6.63	0.00E+00	4.35E-32	8.70E-32
Cm-243	2.3676E-07	3.31	6.63	0.00E+00	7.85E-07	1.57E-06
Cm-244	5.2042E-05	3.31	6.63	0.00E+00	1.72E-04	3.45E-04
Co-60	3.8208E-05	3.31	6.63	0.00E+00	1.27E-04	2.53E-04
Cs-134	4.8693E-01	3.31	6.63	0.00E+00	1.61E+00	3.23E+00
Cs-135	3.4477E-06	3.31	6.63	0.00E+00	1.14E-05	2.29E-05
Cs-137	2.8731E+00	3.31	6.63	0.00E+00	9.52E+00	1.90E+01
Eu-154	8.2053E-02	3.31	6.63	0.00E+00	2.72E-01	5.44E-01
Eu-155	3.9134E-02	3.31	6.63	0.00E+00	1.30E-01	2.59E-01
Fe-55	6.7429E-03	3.31	6.63	0.00E+00	2.24E-02	4.47E-02
H-3	1.0599E-02	3.31	6.63	0.00E+00	3.51E-02	7.03E-02
I-129	7.5300E-07	3.31	6.63	0.00E+00	2.50E-06	4.99E-06
Kr-85	2.8595E-01	3.31	6.63	0.00E+00	9.48E-01	1.90E+00
Np-237	9.5479E-06	3.31	6.63	0.00E+00	3.16E-05	6.33E-05
Pa-231	8.9297E-10	3.31	6.63	0.00E+00	2.96E-09	5.92E-09
Pb-210	3.7609E-12	3.31	6.63	0.00E+00	1.25E-11	2.49E-11
Pm-147	2.5452E+00	3.31	6.63	0.00E+00	8.44E+00	1.69E+01
Pu-238	2.0550E-02	3.31	6.63	0.00E+00	6.81E-02	1.36E-01
Pu-239	4.2838E-04	3.31	6.63	0.00E+00	1.42E-03	2.84E-03
Pu-240	2.4401E-04	3.31	6.63	0.00E+00	8.09E-04	1.62E-03
Pu-241	6.8764E-02	3.31	6.63	0.00E+00	2.28E-01	4.56E-01
Pu-242	3.6329E-07	3.31	6.63	0.00E+00	1.20E-06	2.41E-06
Ra-226	3.8045E-11	3.31	6.63	0.00E+00	1.26E-10	2.52E-10
Ra-228	2.9902E-15	3.31	6.63	0.00E+00	9.91E-15	1.98E-14
Ru-106	1.9055E-01	3.31	6.63	0.00E+00	6.32E-01	1.26E+00
Se-79	1.2936E-05	3.31	6.63	0.00E+00	4.29E-05	8.58E-05
Sn-126	1.1574E-05	3.31	6.63	0.00E+00	3.84E-05	7.67E-05
Sr-90	2.7505E+00	3.31	6.63	0.00E+00	9.12E+00	1.82E+01
Tc-99	4.2239E-04	3.31	6.63	0.00E+00	1.40E-03	2.80E-03
Th-229	1.8848E-12	3.31	6.63	0.00E+00	6.25E-12	1.25E-11
Th-230	1.7042E-08	3.31	6.63	0.00E+00	5.65E-08	1.13E-07
Th-232	7.8132E-15	3.31	6.63	0.00E+00	2.59E-14	5.18E-14
Tl-208	4.4063E-08	3.31	6.63	0.00E+00	1.46E-07	2.92E-07
U-232	1.3151E-07	3.31	6.63	0.00E+00	4.36E-07	8.72E-07
U-233	1.9564E-09	3.31	6.63	0.00E+00	6.48E-09	1.30E-08
U-234	1.8371E-04	3.31	6.63	0.00E+00	6.09E-04	1.22E-03
U-235	-2.7235E-06	3.31	0.00	9.59E-03	9.58E-03	9.59E-03
U-236	1.5493E-05	3.31	6.63	0.00E+00	5.14E-05	1.03E-04
U-238	-4.2851E-09	3.31	0.00	1.09E-04	1.09E-04	1.09E-04
Y-90	2.7505E+00	3.31	6.63	0.00E+00	9.12E+00	1.82E+01
Other Radionuclides					1.70E+01	3.41E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.279E+12
0.0250	2.755E+11
0.0375	2.543E+11
0.0575	2.500E+11
0.0850	1.594E+11
0.1250	1.381E+11
0.2250	1.353E+11
0.3750	6.539E+10
0.5750	8.982E+11
0.8500	1.258E+11
1.2500	2.340E+10
1.7500	9.813E+08
2.2500	2.058E+09
2.7500	1.184E+07
3.5000	1.313E+06
5.0000	4.306E+00
7.0000	4.805E-01
11.0000	5.420E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.68E-01	3.36E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.19000561	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3.31
Bounding:		6.63

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	
Bounding:	0.00	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-LEU) ARGENTINA
SNF ID #: 547
Fuel Units & Descr: 30 - ASSEMBLY
Heavy Metal Mass: BOL=18.75kg; EOL=18.714kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10" 1.25

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	34.09	68.19	0.00E+00	4.96E-09	9.92E-09
Am-241	1.1190E-03	34.09	68.19	0.00E+00	3.82E-02	7.63E-02
Am-242m	4.5425E-07	34.09	68.19	0.00E+00	1.55E-05	3.10E-05
Am-243	1.4921E-06	34.09	68.19	0.00E+00	5.09E-05	1.02E-04
C-14	5.7244E-09	34.09	68.19	0.00E+00	1.95E-07	3.90E-07
Cl-36	1.3124E-32	34.09	68.19	0.00E+00	4.47E-31	8.95E-31
Cm-243	2.3676E-07	34.09	68.19	0.00E+00	8.07E-06	1.61E-05
Cm-244	5.2042E-05	34.09	68.19	0.00E+00	1.77E-03	3.55E-03
Co-60	3.8208E-05	34.09	68.19	0.00E+00	1.30E-03	2.61E-03
Cs-134	4.8693E-01	34.09	68.19	0.00E+00	1.66E+01	3.32E+01
Cs-135	3.4477E-06	34.09	68.19	0.00E+00	1.18E-04	2.35E-04
Cs-137	2.8731E+00	34.09	68.19	0.00E+00	9.80E+01	1.96E+02
Eu-154	8.2053E-02	34.09	68.19	0.00E+00	2.80E+00	5.59E+00
Eu-155	3.9134E-02	34.09	68.19	0.00E+00	1.33E+00	2.67E+00
Fe-55	6.7429E-03	34.09	68.19	0.00E+00	2.30E-01	4.60E-01
H-3	1.0599E-02	34.09	68.19	0.00E+00	3.61E-01	7.23E-01
I-129	7.5300E-07	34.09	68.19	0.00E+00	2.57E-05	5.13E-05
Kr-85	2.8595E-01	34.09	68.19	0.00E+00	9.75E+00	1.95E+01
Np-237	9.5479E-06	34.09	68.19	0.00E+00	3.26E-04	6.51E-04
Pa-231	8.9297E-10	34.09	68.19	0.00E+00	3.04E-08	6.09E-08
Pb-210	3.7609E-12	34.09	68.19	0.00E+00	1.28E-10	2.56E-10
Pm-147	2.5452E+00	34.09	68.19	0.00E+00	8.68E+01	1.74E+02
Pu-238	2.0550E-02	34.09	68.19	0.00E+00	7.01E-01	1.40E+00
Pu-239	4.2838E-04	34.09	68.19	0.00E+00	1.46E-02	2.92E-02
Pu-240	2.4401E-04	34.09	68.19	0.00E+00	8.32E-03	1.66E-02
Pu-241	6.8764E-02	34.09	68.19	0.00E+00	2.34E+00	4.69E+00
Pu-242	3.6329E-07	34.09	68.19	0.00E+00	1.24E-05	2.48E-05
Ra-226	3.8045E-11	34.09	68.19	0.00E+00	1.30E-09	2.59E-09
Ra-228	2.9902E-15	34.09	68.19	0.00E+00	1.02E-13	2.04E-13
Ru-106	1.9055E-01	34.09	68.19	0.00E+00	6.50E+00	1.30E+01
Se-79	1.2936E-05	34.09	68.19	0.00E+00	4.41E-04	8.82E-04
Sn-126	1.1574E-05	34.09	68.19	0.00E+00	3.95E-04	7.89E-04
Sr-90	2.7505E+00	34.09	68.19	0.00E+00	9.38E+01	1.88E+02
Tc-99	4.2239E-04	34.09	68.19	0.00E+00	1.44E-02	2.88E-02
Th-229	1.8848E-12	34.09	68.19	0.00E+00	6.43E-11	1.29E-10
Th-230	1.7042E-06	34.09	68.19	0.00E+00	5.81E-07	1.16E-06
Th-232	7.8132E-15	34.09	68.19	0.00E+00	2.66E-13	5.33E-13
Tl-208	4.4063E-06	34.09	68.19	0.00E+00	1.50E-06	3.00E-06
U-232	1.3151E-07	34.09	68.19	0.00E+00	4.48E-06	8.97E-06
U-233	1.9564E-09	34.09	68.19	0.00E+00	6.67E-08	1.33E-07
U-234	1.8371E-04	34.09	68.19	0.00E+00	6.26E-03	1.25E-02
U-235	-2.7235E-06	34.09	0.00	8.10E-03	8.01E-03	8.10E-03
U-236	1.5493E-05	34.09	68.19	0.00E+00	5.28E-04	1.06E-03
U-238	-4.2851E-09	34.09	0.00	5.04E-03	5.04E-03	5.04E-03
Y-90	2.7505E+00	34.09	68.19	0.00E+00	9.38E+01	1.88E+02
Other Radionuclides					1.75E+02	3.51E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.316E+13
0.0250	2.834E+12
0.0375	2.615E+12
0.0575	2.572E+12
0.0850	1.639E+12
0.1250	1.420E+12
0.2250	1.390E+12
0.3750	6.726E+11
0.5750	9.238E+12
0.8500	1.294E+12
1.2500	2.407E+11
1.7500	1.009E+10
2.2500	2.117E+10
2.7500	1.218E+08
3.5000	1.351E+07
5.0000	5.204E+01
7.0000	5.843E+00
11.0000	6.617E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.73E+00	3.46E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		34.09
Bounding:		68.19

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.01	
Bounding:	0.01	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-LEU) JAPAN
SNF ID #: 551
Fuel Units & Descr: 27 - ASSEMBLY
Heavy Metal Mass: BOL=17.482kg; EOL=17.469kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.13

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	1.4545E-10	12.78	25.57	0.00E+00	1.86E-09	3.72E-09
Am-241	1.1190E-03	12.78	25.57	0.00E+00	1.43E-02	2.86E-02
Am-242m	4.5425E-07	12.78	25.57	0.00E+00	5.81E-06	1.16E-05
Am-243	1.4921E-06	12.78	25.57	0.00E+00	1.91E-05	3.82E-05
C-14	5.7244E-09	12.78	25.57	0.00E+00	7.32E-08	1.46E-07
Cl-36	1.3124E-32	12.78	25.57	0.00E+00	1.68E-31	3.36E-31
Cm-243	2.3676E-07	12.78	25.57	0.00E+00	3.03E-06	6.05E-06
Cm-244	5.2042E-05	12.78	25.57	0.00E+00	6.65E-04	1.33E-03
Co-60	3.8208E-05	12.78	25.57	0.00E+00	4.88E-04	9.77E-04
Cs-134	4.8693E-01	12.78	25.57	0.00E+00	6.23E+00	1.25E+01
Cs-135	3.4477E-06	12.78	25.57	0.00E+00	4.41E-05	8.82E-05
Cs-137	2.8731E+00	12.78	25.57	0.00E+00	3.67E+01	7.35E+01
Eu-154	8.2053E-02	12.78	25.57	0.00E+00	1.05E+00	2.10E+00
Eu-155	3.9134E-02	12.78	25.57	0.00E+00	5.00E-01	1.00E+00
Fe-55	6.7429E-03	12.78	25.57	0.00E+00	8.62E-02	1.72E-01
H-3	1.0599E-02	12.78	25.57	0.00E+00	1.36E-01	2.71E-01
I-129	7.5300E-07	12.78	25.57	0.00E+00	9.63E-06	1.93E-05
Kr-85	2.8595E-01	12.78	25.57	0.00E+00	3.66E+00	7.31E+00
Np-237	9.5479E-06	12.78	25.57	0.00E+00	1.22E-04	2.44E-04
Pa-231	8.9297E-10	12.78	25.57	0.00E+00	1.14E-08	2.28E-08
Pb-210	3.7609E-12	12.78	25.57	0.00E+00	4.81E-11	9.62E-11
Pm-147	2.5452E+00	12.78	25.57	0.00E+00	3.25E+01	6.51E+01
Pu-238	2.0550E-02	12.78	25.57	0.00E+00	2.63E-01	5.25E-01
Pu-239	4.2838E-04	12.78	25.57	0.00E+00	5.48E-03	1.10E-02
Pu-240	2.4401E-04	12.78	25.57	0.00E+00	3.12E-03	6.24E-03
Pu-241	6.8764E-02	12.78	25.57	0.00E+00	8.79E-01	1.76E+00
Pu-242	3.6329E-07	12.78	25.57	0.00E+00	4.64E-06	9.29E-06
Ra-226	3.8045E-11	12.78	25.57	0.00E+00	4.86E-10	9.73E-10
Ra-228	2.9902E-15	12.78	25.57	0.00E+00	3.82E-14	7.65E-14
Ru-106	1.9055E-01	12.78	25.57	0.00E+00	2.44E+00	4.87E+00
Se-79	1.2936E-05	12.78	25.57	0.00E+00	1.65E-04	3.31E-04
Sn-126	1.1574E-05	12.78	25.57	0.00E+00	1.48E-04	2.96E-04
Sr-90	2.7505E+00	12.78	25.57	0.00E+00	3.52E+01	7.03E+01
Tc-99	4.2239E-04	12.78	25.57	0.00E+00	5.40E-03	1.08E-02
Th-229	1.8848E-12	12.78	25.57	0.00E+00	2.41E-11	4.82E-11
Th-230	1.7042E-08	12.78	25.57	0.00E+00	2.18E-07	4.36E-07
Th-232	7.8132E-15	12.78	25.57	0.00E+00	9.99E-14	2.00E-13
Tl-208	4.4063E-08	12.78	25.57	0.00E+00	5.63E-07	1.13E-06
U-232	1.3151E-07	12.78	25.57	0.00E+00	1.68E-06	3.36E-06
U-233	1.9564E-09	12.78	25.57	0.00E+00	2.50E-08	5.00E-08
U-234	1.8371E-04	12.78	25.57	0.00E+00	2.35E-03	4.70E-03
U-235	-2.7235E-06	12.78	0.00	7.56E-03	7.52E-03	7.56E-03
U-236	1.5493E-05	12.78	25.57	0.00E+00	1.98E-04	3.96E-04
U-238	-4.2851E-09	12.78	0.00	4.70E-03	4.70E-03	4.70E-03
Y-90	2.7505E+00	12.78	25.57	0.00E+00	3.52E+01	7.03E+01
Other Radionuclides					6.58E+01	1.32E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.933E+12
0.0250	1.083E+12
0.0375	9.807E+11
0.0575	9.643E+11
0.0850	6.148E+11
0.1250	5.324E+11
0.2250	5.212E+11
0.3750	2.522E+11
0.5750	3.464E+12
0.8500	4.852E+11
1.2500	9.026E+10
1.7500	3.785E+09
2.2500	7.939E+09
2.7500	4.568E+07
3.5000	5.066E+08
5.0000	2.601E+01
7.0000	2.939E+00
11.0000	3.341E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.49E-01	1.30E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000092	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[1]

	From SFD	Estimated
Nominal:		12.78
Bounding:		25.57

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	
Bounding:	0.00	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-LEU) TAIWAN
SNF ID #: 555
Fuel Units & Descr: 23 - ASSEMBLY
Heavy Metal Mass: BOL=34.797kg; EOL=34.797kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10'
0.96

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	659.06	1,318.13	0.00E+00	9.59E-08	1.92E-07	Avg. MeV	
Am-241	1.1190E-03	659.06	1,318.13	0.00E+00	7.37E-01	1.47E+00	0.0150	2.543E+14
Am-242m	4.5425E-07	659.06	1,318.13	0.00E+00	2.99E-04	5.99E-04	0.0250	5.479E+13
Am-243	1.4921E-06	659.06	1,318.13	0.00E+00	9.83E-04	1.97E-03	0.0375	5.056E+13
C-14	5.7244E-09	659.06	1,318.13	0.00E+00	3.77E-06	7.55E-06	0.0575	4.971E+13
Cl-36	1.3124E-32	659.06	1,318.13	0.00E+00	8.65E-30	1.73E-29	0.0850	3.169E+13
Cm-243	2.3676E-07	659.06	1,318.13	0.00E+00	1.56E-04	3.12E-04	0.1250	2.744E+13
Cm-244	5.2042E-05	659.06	1,318.13	0.00E+00	3.43E-02	6.86E-02	0.2250	2.686E+13
Co-60	3.8208E-05	659.06	1,318.13	0.00E+00	2.52E-02	5.04E-02	0.3750	1.300E+13
Cs-134	4.8693E-01	659.06	1,318.13	0.00E+00	3.21E+02	6.42E+02	0.5750	1.786E+14
Cs-135	3.4477E-06	659.06	1,318.13	0.00E+00	2.27E-03	4.54E-03	0.8500	2.501E+13
Cs-137	2.8731E+00	659.06	1,318.13	0.00E+00	1.89E+03	3.79E+03	1.2500	4.653E+12
Eu-154	8.2053E-02	659.06	1,318.13	0.00E+00	5.41E+01	1.08E+02	1.7500	1.951E+11
Eu-155	3.9134E-02	659.06	1,318.13	0.00E+00	2.58E+01	5.16E+01	2.2500	4.093E+11
Fe-55	6.7429E-03	659.06	1,318.13	0.00E+00	4.44E+00	8.89E+00	2.7500	2.355E+09
H-3	1.0599E-02	659.06	1,318.13	0.00E+00	6.99E+00	1.40E+01	3.5000	2.611E+08
I-129	7.5300E-07	659.06	1,318.13	0.00E+00	4.96E-04	9.93E-04	5.0000	8.023E+02
Kr-85	2.8595E-01	659.06	1,318.13	0.00E+00	1.88E+02	3.77E+02	7.0000	8.952E+01
Np-237	9.5479E-06	659.06	1,318.13	0.00E+00	6.29E-03	1.26E-02	11.0000	1.010E+01
Pa-231	8.9297E-10	659.06	1,318.13	0.00E+00	5.89E-07	1.18E-06		
Pb-210	3.7609E-12	659.06	1,318.13	0.00E+00	2.48E-09	4.96E-09		
Pm-147	2.5452E+00	659.06	1,318.13	0.00E+00	1.68E+03	3.35E+03		
Pu-238	2.0550E-02	659.06	1,318.13	0.00E+00	1.35E+01	2.71E+01		
Pu-239	4.2838E-04	659.06	1,318.13	0.00E+00	2.82E-01	5.65E-01		
Pu-240	2.4401E-04	659.06	1,318.13	0.00E+00	1.61E-01	3.22E-01		
Pu-241	6.8764E-02	659.06	1,318.13	0.00E+00	4.53E+01	9.06E+01		
Pu-242	3.6329E-07	659.06	1,318.13	0.00E+00	2.39E-04	4.79E-04		
Ra-226	3.8045E-11	659.06	1,318.13	0.00E+00	2.51E-08	5.01E-08		
Ra-228	2.9902E-15	659.06	1,318.13	0.00E+00	1.97E-12	3.94E-12		
Ru-106	1.9055E-01	659.06	1,318.13	0.00E+00	1.26E+02	2.51E+02		
Se-79	1.2936E-05	659.06	1,318.13	0.00E+00	8.53E-03	1.71E-02		
Sn-126	1.1574E-05	659.06	1,318.13	0.00E+00	7.63E-03	1.53E-02		
Sr-90	2.7505E+00	659.06	1,318.13	0.00E+00	1.81E+03	3.63E+03		
Tc-99	4.2239E-04	659.06	1,318.13	0.00E+00	2.78E-01	5.57E-01		
Th-229	1.8848E-12	659.06	1,318.13	0.00E+00	1.24E-09	2.48E-09		
Th-230	1.7042E-06	659.06	1,318.13	0.00E+00	1.12E-05	2.25E-05		
Th-232	7.8132E-15	659.06	1,318.13	0.00E+00	5.15E-12	1.03E-11		
Tl-208	4.4063E-08	659.06	1,318.13	0.00E+00	2.90E-05	5.81E-05		
U-232	1.3151E-07	659.06	1,318.13	0.00E+00	8.67E-05	1.73E-04		
U-233	1.9564E-09	659.06	1,318.13	0.00E+00	1.29E-06	2.58E-06		
U-234	1.8371E-04	659.06	1,318.13	0.00E+00	1.21E-01	2.42E-01		
U-235	-2.7235E-06	659.06	0.00	1.49E-02	1.31E-02	1.49E-02		
U-236	1.5493E-05	659.06	1,318.13	0.00E+00	1.02E-02	2.04E-02		
U-238	-4.2851E-09	659.06	0.00	9.38E-03	9.37E-03	9.38E-03		
Y-90	2.7505E+00	659.06	1,318.13	0.00E+00	1.81E+03	3.63E+03		
Other Radionuclides					3.39E+03	6.78E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.34E+01	6.68E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.83000026	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		659.06
Bounding:		1,318.13

Basis for burnup used in estimate:
Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM: 0.98

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-LEU) VENEZUELA
SNF ID #: 559
Fuel Units & Descr: 64 - ASSEMBLY
Heavy Metal Mass: BOL=43.2kg; EOL=39.046kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' 2.67

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	3,933.54	7,867.08	0.00E+00	5.72E-07	1.14E-06	Avg. MeV	
Am-241	1.1190E-03	3,933.54	7,867.08	0.00E+00	4.40E+00	8.80E+00	0.0150	1.518E+15
Am-242m	4.5425E-07	3,933.54	7,867.08	0.00E+00	1.79E-03	3.57E-03	0.0250	3.270E+14
Am-243	1.4921E-06	3,933.54	7,867.08	0.00E+00	5.87E-03	1.17E-02	0.0375	3.017E+14
C-14	5.7244E-09	3,933.54	7,867.08	0.00E+00	2.25E-05	4.50E-05	0.0575	2.967E+14
Cl-36	1.3124E-32	3,933.54	7,867.08	0.00E+00	5.16E-29	1.03E-28	0.0850	1.891E+14
Cm-243	2.3676E-07	3,933.54	7,867.08	0.00E+00	9.31E-04	1.86E-03	0.1250	1.638E+14
Cm-244	5.2042E-05	3,933.54	7,867.08	0.00E+00	2.05E-01	4.09E-01	0.2250	1.603E+14
Co-60	3.8208E-05	3,933.54	7,867.08	0.00E+00	1.50E-01	3.01E-01	0.3750	7.760E+13
Cs-134	4.8693E-01	3,933.54	7,867.08	0.00E+00	1.92E+03	3.83E+03	0.5750	1.066E+15
Cs-135	3.4477E-06	3,933.54	7,867.08	0.00E+00	1.36E-02	2.71E-02	0.8500	1.493E+14
Cs-137	2.8731E+00	3,933.54	7,867.08	0.00E+00	1.13E+04	2.26E+04	1.2500	2.777E+13
Eu-154	8.2053E-02	3,933.54	7,867.08	0.00E+00	3.23E+02	6.46E+02	1.7500	1.165E+12
Eu-155	3.9134E-02	3,933.54	7,867.08	0.00E+00	1.54E+02	3.08E+02	2.2500	2.443E+12
Fe-55	6.7429E-03	3,933.54	7,867.08	0.00E+00	2.65E+01	5.30E+01	2.7500	1.405E+10
H-3	1.0599E-02	3,933.54	7,867.08	0.00E+00	4.17E+01	8.34E+01	3.5000	1.559E+09
I-129	7.5300E-07	3,933.54	7,867.08	0.00E+00	2.96E-03	5.92E-03	5.0000	4.686E+03
Kr-85	2.8595E-01	3,933.54	7,867.08	0.00E+00	1.12E+03	2.25E+03	7.0000	5.225E+02
Np-237	9.5479E-06	3,933.54	7,867.08	0.00E+00	3.76E-02	7.51E-02	11.0000	5.890E+01
Pa-231	8.9297E-10	3,933.54	7,867.08	0.00E+00	3.51E-06	7.03E-06		
Pb-210	3.7609E-12	3,933.54	7,867.08	0.00E+00	1.48E-08	2.96E-08		
Pm-147	2.5452E+00	3,933.54	7,867.08	0.00E+00	1.00E+04	2.00E+04		
Pu-238	2.0550E-02	3,933.54	7,867.08	0.00E+00	8.08E+01	1.62E+02		
Pu-239	4.2838E-04	3,933.54	7,867.08	0.00E+00	1.69E+00	3.37E+00		
Pu-240	2.4401E-04	3,933.54	7,867.08	0.00E+00	9.60E-01	1.92E+00		
Pu-241	6.8764E-02	3,933.54	7,867.08	0.00E+00	2.70E+02	5.41E+02		
Pu-242	3.6329E-07	3,933.54	7,867.08	0.00E+00	1.43E-03	2.86E-03		
Ra-226	3.8045E-11	3,933.54	7,867.08	0.00E+00	1.50E-07	2.99E-07		
Ra-228	2.9902E-15	3,933.54	7,867.08	0.00E+00	1.18E-11	2.35E-11		
Ru-106	1.9055E-01	3,933.54	7,867.08	0.00E+00	7.50E+02	1.50E+03		
Se-79	1.2936E-05	3,933.54	7,867.08	0.00E+00	5.09E-02	1.02E-01		
Sn-126	1.1574E-05	3,933.54	7,867.08	0.00E+00	4.55E-02	9.11E-02		
Sr-90	2.7505E+00	3,933.54	7,867.08	0.00E+00	1.08E+04	2.16E+04		
Tc-99	4.2239E-04	3,933.54	7,867.08	0.00E+00	1.66E+00	3.32E+00		
Th-229	1.8848E-12	3,933.54	7,867.08	0.00E+00	7.41E-09	1.48E-08		
Th-230	1.7042E-08	3,933.54	7,867.08	0.00E+00	6.70E-05	1.34E-04		
Th-232	7.8132E-15	3,933.54	7,867.08	0.00E+00	3.07E-11	6.15E-11		
Tl-208	4.4063E-08	3,933.54	7,867.08	0.00E+00	1.73E-04	3.47E-04		
U-232	1.3151E-07	3,933.54	7,867.08	0.00E+00	5.17E-04	1.03E-03		
U-233	1.9564E-09	3,933.54	7,867.08	0.00E+00	7.70E-06	1.54E-05		
U-234	1.8371E-04	3,933.54	7,867.08	0.00E+00	7.23E-01	1.45E+00		
U-235	-2.7235E-06	3,933.54	0.00	1.87E-02	7.96E-03	1.87E-02		
U-236	1.5493E-05	3,933.54	7,867.08	0.00E+00	6.09E-02	1.22E-01		
U-238	-4.2851E-09	3,933.54	0.00	1.16E-02	1.16E-02	1.16E-02		
Y-90	2.7505E+00	3,933.54	7,867.08	0.00E+00	1.08E+04	2.16E+04		
Other Radionuclides					2.02E+04	4.05E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.99E+02	3.99E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3,933.54
Bounding:		7,867.08

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.29	
Bounding:	0.58	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR (UALX-MEU) JAPAN
SNF ID #: 565
Fuel Units & Descr: 30 - MTR TYPE
Heavy Metal Mass: BOL=21.543kg; EOL=21.525kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.25

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	17.05	34.09	0.00E+00	2.48E-09	4.96E-09
Am-241	1.1190E-03	17.05	34.09	0.00E+00	1.91E-02	3.82E-02
Am-242m	4.5425E-07	17.05	34.09	0.00E+00	7.74E-06	1.55E-05
Am-243	1.4921E-06	17.05	34.09	0.00E+00	2.54E-05	5.09E-05
C-14	5.7244E-09	17.05	34.09	0.00E+00	9.76E-08	1.95E-07
Cl-36	1.3124E-32	17.05	34.09	0.00E+00	2.24E-31	4.47E-31
Cm-243	2.3676E-07	17.05	34.09	0.00E+00	4.04E-06	8.07E-06
Cm-244	5.2042E-05	17.05	34.09	0.00E+00	8.87E-04	1.77E-03
Co-60	3.8208E-05	17.05	34.09	0.00E+00	6.51E-04	1.30E-03
Cs-134	4.8693E-01	17.05	34.09	0.00E+00	8.30E+00	1.66E+01
Cs-135	3.4477E-06	17.05	34.09	0.00E+00	5.88E-05	1.18E-04
Cs-137	2.8731E+00	17.05	34.09	0.00E+00	4.90E+01	9.80E+01
Eu-154	8.2053E-02	17.05	34.09	0.00E+00	1.40E+00	2.80E+00
Eu-155	3.9134E-02	17.05	34.09	0.00E+00	6.67E-01	1.33E+00
Fe-55	6.7429E-03	17.05	34.09	0.00E+00	1.15E-01	2.30E-01
H-3	1.0599E-02	17.05	34.09	0.00E+00	1.81E-01	3.61E-01
I-129	7.5300E-07	17.05	34.09	0.00E+00	1.28E-05	2.57E-05
Kr-85	2.8595E-01	17.05	34.09	0.00E+00	4.87E+00	9.75E+00
Np-237	9.5479E-06	17.05	34.09	0.00E+00	1.63E-04	3.26E-04
Pa-231	8.9297E-10	17.05	34.09	0.00E+00	1.52E-08	3.04E-08
Pb-210	3.7609E-12	17.05	34.09	0.00E+00	6.41E-11	1.28E-10
Pm-147	2.5452E+00	17.05	34.09	0.00E+00	4.34E+01	8.68E+01
Pu-238	2.0550E-02	17.05	34.09	0.00E+00	3.50E-01	7.01E-01
Pu-239	4.2838E-04	17.05	34.09	0.00E+00	7.30E-03	1.46E-02
Pu-240	2.4401E-04	17.05	34.09	0.00E+00	4.16E-03	8.32E-03
Pu-241	6.8764E-02	17.05	34.09	0.00E+00	1.17E+00	2.34E+00
Pu-242	3.6329E-07	17.05	34.09	0.00E+00	6.19E-06	1.24E-05
Ra-226	3.8045E-11	17.05	34.09	0.00E+00	6.49E-10	1.30E-09
Ra-228	2.9902E-15	17.05	34.09	0.00E+00	5.10E-14	1.02E-13
Ru-106	1.9055E-01	17.05	34.09	0.00E+00	3.25E+00	6.50E+00
Se-79	1.2936E-05	17.05	34.09	0.00E+00	2.21E-04	4.41E-04
Sn-126	1.1574E-05	17.05	34.09	0.00E+00	1.97E-04	3.95E-04
Sr-90	2.7505E+00	17.05	34.09	0.00E+00	4.69E+01	9.38E+01
Tc-99	4.2239E-04	17.05	34.09	0.00E+00	7.20E-03	1.44E-02
Th-229	1.8848E-12	17.05	34.09	0.00E+00	3.21E-11	6.43E-11
Th-230	1.7042E-08	17.05	34.09	0.00E+00	2.91E-07	5.81E-07
Th-232	7.8132E-15	17.05	34.09	0.00E+00	1.33E-13	2.66E-13
Tl-208	4.4063E-08	17.05	34.09	0.00E+00	7.51E-07	1.50E-06
U-232	1.3151E-07	17.05	34.09	0.00E+00	2.24E-06	4.48E-06
U-233	1.9564E-09	17.05	34.09	0.00E+00	3.34E-08	6.67E-08
U-234	1.8371E-04	17.05	34.09	0.00E+00	3.13E-03	6.26E-03
U-235	-2.7235E-06	17.05	0.00	2.09E-02	2.09E-02	2.09E-02
U-236	1.5493E-05	17.05	34.09	0.00E+00	2.64E-04	5.28E-04
U-238	-4.2851E-09	17.05	0.00	3.98E-03	3.98E-03	3.98E-03
Y-90	2.7505E+00	17.05	34.09	0.00E+00	4.69E+01	9.38E+01
Other Radionuclides					8.77E+01	1.75E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.578E+12
0.0250	1.417E+12
0.0375	1.308E+12
0.0575	1.286E+12
0.0850	8.197E+11
0.1250	7.099E+11
0.2250	6.951E+11
0.3750	3.363E+11
0.5750	4.619E+12
0.8500	6.469E+11
1.2500	1.204E+11
1.7500	5.047E+09
2.2500	1.059E+10
2.7500	6.090E+07
3.5000	6.754E+06
5.0000	2.960E+01
7.0000	3.333E+00
11.0000	3.780E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.65E-01	1.73E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	44.97911463	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		17.05
Bounding:		34.09

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	
Bounding:	0.01	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR UALX HEU CANADA
SNF ID #: 294
Fuel Units & Descr: 14 - MULTI-PIN CLUSTER
Heavy Metal Mass: BOL=2.204kg; EOL=2.192kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.58

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	10.61	21.21	0.00E+00	1.54E-09	3.09E-09	Avg. MeV	
Am-241	1.1190E-03	10.61	21.21	0.00E+00	1.19E-02	2.37E-02	0.0150	4.093E+12
Am-242m	4.5425E-07	10.61	21.21	0.00E+00	4.82E-06	9.64E-06	0.0250	8.817E+11
Am-243	1.4921E-06	10.61	21.21	0.00E+00	1.58E-05	3.17E-05	0.0375	8.136E+11
C-14	5.7244E-09	10.61	21.21	0.00E+00	6.07E-08	1.21E-07	0.0575	8.000E+11
Cl-36	1.3124E-32	10.61	21.21	0.00E+00	1.39E-31	2.78E-31	0.0850	5.100E+11
Cm-243	2.3676E-07	10.61	21.21	0.00E+00	2.51E-06	5.02E-06	0.1250	4.417E+11
Cm-244	5.2042E-05	10.61	21.21	0.00E+00	5.52E-04	1.10E-03	0.2250	4.324E+11
Co-60	3.8208E-05	10.61	21.21	0.00E+00	4.05E-04	8.11E-04	0.3750	2.092E+11
Cs-134	4.8693E-01	10.61	21.21	0.00E+00	5.16E+00	1.03E+01	0.5750	2.874E+12
Cs-135	3.4477E-06	10.61	21.21	0.00E+00	3.66E-05	7.31E-05	0.8500	4.025E+11
Cs-137	2.8731E+00	10.61	21.21	0.00E+00	3.05E+01	6.09E+01	1.2500	7.488E+10
Eu-154	8.2053E-02	10.61	21.21	0.00E+00	8.70E-01	1.74E+00	1.7500	3.140E+09
Eu-155	3.9134E-02	10.61	21.21	0.00E+00	4.15E-01	8.30E-01	2.2500	6.587E+09
Fe-55	6.7429E-03	10.61	21.21	0.00E+00	7.15E-02	1.43E-01	2.7500	3.789E+07
H-3	1.0599E-02	10.61	21.21	0.00E+00	1.12E-01	2.25E-01	3.5000	4.203E+06
I-129	7.5300E-07	10.61	21.21	0.00E+00	7.99E-06	1.60E-05	5.0000	1.274E+01
Kr-85	2.8595E-01	10.61	21.21	0.00E+00	3.03E+00	6.07E+00	7.0000	1.420E+00
Np-237	9.5479E-06	10.61	21.21	0.00E+00	1.01E-04	2.03E-04	11.0000	1.601E-01
Pa-231	8.9297E-10	10.61	21.21	0.00E+00	9.47E-09	1.89E-08		
Pb-210	3.7609E-12	10.61	21.21	0.00E+00	3.99E-11	7.98E-11		
Pm-147	2.5452E+00	10.61	21.21	0.00E+00	2.70E+01	5.40E+01		
Pu-238	2.0550E-02	10.61	21.21	0.00E+00	2.18E-01	4.36E-01		
Pu-239	4.2838E-04	10.61	21.21	0.00E+00	4.54E-03	9.09E-03		
Pu-240	2.4401E-04	10.61	21.21	0.00E+00	2.59E-03	5.18E-03		
Pu-241	6.8764E-02	10.61	21.21	0.00E+00	7.29E-01	1.46E+00		
Pu-242	3.6329E-07	10.61	21.21	0.00E+00	3.85E-06	7.71E-06		
Ra-226	3.8045E-11	10.61	21.21	0.00E+00	4.04E-10	8.07E-10		
Ra-228	2.9902E-15	10.61	21.21	0.00E+00	3.17E-14	6.34E-14		
Ru-106	1.9055E-01	10.61	21.21	0.00E+00	2.02E+00	4.04E+00		
Se-79	1.2936E-05	10.61	21.21	0.00E+00	1.37E-04	2.74E-04		
Sn-126	1.1574E-05	10.61	21.21	0.00E+00	1.23E-04	2.46E-04		
Sr-90	2.7505E+00	10.61	21.21	0.00E+00	2.92E+01	5.83E+01		
Tc-99	4.2239E-04	10.61	21.21	0.00E+00	4.48E-03	8.96E-03		
Th-229	1.8848E-12	10.61	21.21	0.00E+00	2.00E-11	4.00E-11		
Th-230	1.7042E-08	10.61	21.21	0.00E+00	1.81E-07	3.62E-07		
Th-232	7.8132E-15	10.61	21.21	0.00E+00	8.29E-14	1.66E-13		
Tl-208	4.4063E-08	10.61	21.21	0.00E+00	4.67E-07	9.35E-07		
U-232	1.3151E-07	10.61	21.21	0.00E+00	1.39E-06	2.79E-06		
U-233	1.9564E-09	10.61	21.21	0.00E+00	2.08E-08	4.15E-08		
U-234	1.8371E-04	10.61	21.21	0.00E+00	1.95E-03	3.90E-03		
U-235	-2.7235E-06	10.61	0.00	4.43E-03	4.40E-03	4.43E-03		
U-236	1.5493E-05	10.61	21.21	0.00E+00	1.64E-04	3.29E-04		
U-238	-4.2851E-09	10.61	0.00	5.11E-05	5.11E-05	5.11E-05		
Y-90	2.7505E+00	10.61	21.21	0.00E+00	2.92E+01	5.83E+01		
Other Radionuclides					5.46E+01	1.09E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.38E-01	1.08E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.09999644	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		10.61
Bounding:		21.21

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.02	
Bounding:	0.03	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (U308-LEU) PERU
SNF ID #: 503
Fuel Units & Descr: 6 - ASSEMBLY
Heavy Metal Mass: BOL=6kg; EOL=5.67kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.25

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	312.52	625.03	0.00E+00	4.55E-08	9.09E-08
Am-241	1.1190E-03	312.52	625.03	0.00E+00	3.50E-01	6.99E-01
Am-242m	4.5425E-07	312.52	625.03	0.00E+00	1.42E-04	2.84E-04
Am-243	1.4921E-06	312.52	625.03	0.00E+00	4.66E-04	9.33E-04
C-14	5.7244E-09	312.52	625.03	0.00E+00	1.79E-06	3.58E-06
Cl-36	1.3124E-32	312.52	625.03	0.00E+00	4.10E-30	8.20E-30
Cm-243	2.3676E-07	312.52	625.03	0.00E+00	7.40E-05	1.48E-04
Cm-244	5.2042E-05	312.52	625.03	0.00E+00	1.63E-02	3.25E-02
Co-60	3.8208E-05	312.52	625.03	0.00E+00	1.19E-02	2.39E-02
Cs-134	4.8693E-01	312.52	625.03	0.00E+00	1.52E+02	3.04E+02
Cs-135	3.4477E-06	312.52	625.03	0.00E+00	1.08E-03	2.15E-03
Cs-137	2.8731E+00	312.52	625.03	0.00E+00	8.98E+02	1.80E+03
Eu-154	8.2053E-02	312.52	625.03	0.00E+00	2.56E+01	5.13E+01
Eu-155	3.9134E-02	312.52	625.03	0.00E+00	1.22E+01	2.45E+01
Fe-55	6.7429E-03	312.52	625.03	0.00E+00	2.11E+00	4.21E+00
H-3	1.0599E-02	312.52	625.03	0.00E+00	3.31E+00	6.62E+00
I-129	7.5300E-07	312.52	625.03	0.00E+00	2.35E-04	4.71E-04
Kr-85	2.8595E-01	312.52	625.03	0.00E+00	8.94E+01	1.79E+02
Np-237	9.5479E-06	312.52	625.03	0.00E+00	2.98E-03	5.97E-03
Pa-231	8.9297E-10	312.52	625.03	0.00E+00	2.79E-07	5.58E-07
Pb-210	3.7609E-12	312.52	625.03	0.00E+00	1.18E-09	2.35E-09
Pm-147	2.5452E+00	312.52	625.03	0.00E+00	7.95E+02	1.59E+03
Pu-238	2.0550E-02	312.52	625.03	0.00E+00	6.42E+00	1.28E+01
Pu-239	4.2838E-04	312.52	625.03	0.00E+00	1.34E-01	2.68E-01
Pu-240	2.4401E-04	312.52	625.03	0.00E+00	7.63E-02	1.53E-01
Pu-241	6.8764E-02	312.52	625.03	0.00E+00	2.15E+01	4.30E+01
Pu-242	3.6329E-07	312.52	625.03	0.00E+00	1.14E-04	2.27E-04
Ra-226	3.8045E-11	312.52	625.03	0.00E+00	1.19E-08	2.38E-08
Ra-228	2.9902E-15	312.52	625.03	0.00E+00	9.34E-13	1.87E-12
Ru-106	1.9055E-01	312.52	625.03	0.00E+00	5.96E+01	1.19E+02
Se-79	1.2936E-05	312.52	625.03	0.00E+00	4.04E-03	8.09E-03
Sn-126	1.1574E-05	312.52	625.03	0.00E+00	3.62E-03	7.23E-03
Sr-90	2.7505E+00	312.52	625.03	0.00E+00	8.60E+02	1.72E+03
Tc-99	4.2239E-04	312.52	625.03	0.00E+00	1.32E-01	2.64E-01
Th-229	1.8848E-12	312.52	625.03	0.00E+00	5.89E-10	1.18E-09
Th-230	1.7042E-08	312.52	625.03	0.00E+00	5.33E-06	1.07E-05
Th-232	7.8132E-15	312.52	625.03	0.00E+00	2.44E-12	4.88E-12
Tl-208	4.4063E-08	312.52	625.03	0.00E+00	1.38E-05	2.75E-05
U-232	1.3151E-07	312.52	625.03	0.00E+00	4.11E-05	8.22E-05
U-233	1.9564E-09	312.52	625.03	0.00E+00	6.11E-07	1.22E-06
U-234	1.8371E-04	312.52	625.03	0.00E+00	5.74E-02	1.15E-01
U-235	-2.7235E-06	312.52	0.00	2.59E-03	1.74E-03	2.59E-03
U-236	1.5493E-05	312.52	625.03	0.00E+00	4.84E-03	9.68E-03
U-238	-4.2851E-09	312.52	0.00	1.61E-03	1.61E-03	1.61E-03
Y-90	2.7505E+00	312.52	625.03	0.00E+00	8.60E+02	1.72E+03
Other Radionuclides					1.61E+03	3.21E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.206E+14
0.0250	2.598E+13
0.0375	2.397E+13
0.0575	2.357E+13
0.0850	1.503E+13
0.1250	1.301E+13
0.2250	1.274E+13
0.3750	6.165E+12
0.5750	8.468E+13
0.8500	1.186E+13
1.2500	2.206E+12
1.7500	9.253E+10
2.2500	1.941E+11
2.7500	1.117E+09
3.5000	1.238E+08
5.0000	3.739E+02
7.0000	4.169E+01
11.0000	4.701E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.58E+01	3.17E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		312.52
Bounding:		625.03

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.17	
Bounding:	0.33	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (U3Si2 LEU) CANADA
SNF ID #: 512
Fuel Units & Descr: 8 - ASSEMBLY
Heavy Metal Mass: BOL=6.52kg; EOL=5.868kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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"x18" 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	1.4545E-10	617.46	1,234.91	0.00E+00	8.98E-08	1.80E-07
Am-241	1.1190E-03	617.46	1,234.91	0.00E+00	6.91E-01	1.38E+00
Am-242m	4.5425E-07	617.46	1,234.91	0.00E+00	2.80E-04	5.61E-04
Am-243	1.4921E-06	617.46	1,234.91	0.00E+00	9.21E-04	1.84E-03
C-14	5.7244E-09	617.46	1,234.91	0.00E+00	3.53E-06	7.07E-06
Cl-36	1.3124E-32	617.46	1,234.91	0.00E+00	8.10E-30	1.62E-29
Cm-243	2.3676E-07	617.46	1,234.91	0.00E+00	1.46E-04	2.92E-04
Cm-244	5.2042E-05	617.46	1,234.91	0.00E+00	3.21E-02	6.43E-02
Co-60	3.8208E-05	617.46	1,234.91	0.00E+00	2.36E-02	4.72E-02
Cs-134	4.8693E-01	617.46	1,234.91	0.00E+00	3.01E+02	6.01E+02
Cs-135	3.4477E-06	617.46	1,234.91	0.00E+00	2.13E-03	4.26E-03
Cs-137	2.8731E+00	617.46	1,234.91	0.00E+00	1.77E+03	3.55E+03
Eu-154	8.2053E-02	617.46	1,234.91	0.00E+00	5.07E+01	1.01E+02
Eu-155	3.9134E-02	617.46	1,234.91	0.00E+00	2.42E+01	4.83E+01
Fe-55	6.7429E-03	617.46	1,234.91	0.00E+00	4.16E+00	8.33E+00
H-3	1.0599E-02	617.46	1,234.91	0.00E+00	6.54E+00	1.31E+01
I-129	7.5300E-07	617.46	1,234.91	0.00E+00	4.65E-04	9.30E-04
Kr-85	2.8595E-01	617.46	1,234.91	0.00E+00	1.77E+02	3.53E+02
Np-237	9.5479E-06	617.46	1,234.91	0.00E+00	5.90E-03	1.18E-02
Pa-231	8.9297E-10	617.46	1,234.91	0.00E+00	5.51E-07	1.10E-06
Pb-210	3.7609E-12	617.46	1,234.91	0.00E+00	2.32E-09	4.64E-09
Pm-147	2.5452E+00	617.46	1,234.91	0.00E+00	1.57E+03	3.14E+03
Pu-238	2.0550E-02	617.46	1,234.91	0.00E+00	1.27E+01	2.54E+01
Pu-239	4.2838E-04	617.46	1,234.91	0.00E+00	2.65E-01	5.29E-01
Pu-240	2.4401E-04	617.46	1,234.91	0.00E+00	1.51E-01	3.01E-01
Pu-241	6.8764E-02	617.46	1,234.91	0.00E+00	4.25E+01	8.49E+01
Pu-242	3.6329E-07	617.46	1,234.91	0.00E+00	2.24E-04	4.49E-04
Ra-226	3.8045E-11	617.46	1,234.91	0.00E+00	2.35E-08	4.70E-08
Ra-228	2.9902E-15	617.46	1,234.91	0.00E+00	1.85E-12	3.69E-12
Ru-106	1.9055E-01	617.46	1,234.91	0.00E+00	1.18E+02	2.35E+02
Se-79	1.2936E-05	617.46	1,234.91	0.00E+00	7.99E-03	1.60E-02
Sn-126	1.1574E-05	617.46	1,234.91	0.00E+00	7.15E-03	1.43E-02
Sr-90	2.7505E+00	617.46	1,234.91	0.00E+00	1.70E+03	3.40E+03
Tc-99	4.2239E-04	617.46	1,234.91	0.00E+00	2.61E-01	5.22E-01
Th-229	1.8848E-12	617.46	1,234.91	0.00E+00	1.16E-09	2.33E-09
Th-230	1.7042E-08	617.46	1,234.91	0.00E+00	1.05E-05	2.10E-05
Th-232	7.8132E-15	617.46	1,234.91	0.00E+00	4.82E-12	9.65E-12
Tl-208	4.4063E-08	617.46	1,234.91	0.00E+00	2.72E-05	5.44E-05
U-232	1.3151E-07	617.46	1,234.91	0.00E+00	8.12E-05	1.62E-04
U-233	1.9564E-09	617.46	1,234.91	0.00E+00	1.21E-06	2.42E-06
U-234	1.8371E-04	617.46	1,234.91	0.00E+00	1.13E-01	2.27E-01
U-235	-2.7235E-06	617.46	0.00	2.82E-03	1.14E-03	2.82E-03
U-236	1.5493E-05	617.46	1,234.91	0.00E+00	9.57E-03	1.91E-02
U-238	-4.2851E-09	617.46	0.00	1.75E-03	1.75E-03	1.75E-03
Y-90	2.7505E+00	617.46	1,234.91	0.00E+00	1.70E+03	3.40E+03
Other Radionuclides					3.18E+03	6.35E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.382E+14
0.0250	5.133E+13
0.0375	4.736E+13
0.0575	4.657E+13
0.0850	2.969E+13
0.1250	2.571E+13
0.2250	2.516E+13
0.3750	1.218E+13
0.5750	1.673E+14
0.8500	2.343E+13
1.2500	4.359E+12
1.7500	1.828E+11
2.2500	3.834E+11
2.7500	2.206E+09
3.5000	2.447E+08
5.0000	7.354E+02
7.0000	8.199E+01
11.0000	9.243E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.13E+01	6.26E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000037	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		617.46
Bounding:		1,234.91

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.30	
Bounding:	0.60	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (U3Si2 LEU) GERMANY
SNF ID #: 517
Fuel Units & Descr: 26 - ASSEMBLY
Heavy Metal Mass: BOL=30.94kg; EOL=26.114kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.06

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.0632E-10	4,606.13	9,212.25	0.00E+00	3.71E-06	7.43E-06
Am-241	2.2586E-03	4,606.13	9,212.25	0.00E+00	1.04E+01	2.08E+01
Am-242m	1.9925E-06	4,606.13	9,212.25	0.00E+00	9.18E-03	1.84E-02
Am-243	2.3323E-07	4,606.13	9,212.25	0.00E+00	1.07E-03	2.15E-03
C-14	4.3308E-05	4,606.13	9,212.25	0.00E+00	1.99E-01	3.99E-01
Cl-36	4.3023E-06	4,606.13	9,212.25	0.00E+00	1.98E-04	3.96E-04
Cm-243	2.7429E-07	4,606.13	9,212.25	0.00E+00	1.26E-03	2.53E-03
Cm-244	3.1504E-06	4,606.13	9,212.25	0.00E+00	1.45E-02	2.90E-02
Co-60	3.1008E-02	4,606.13	9,212.25	0.00E+00	1.43E+02	2.86E+02
Cs-134	1.0367E-01	4,606.13	9,212.25	0.00E+00	4.78E+02	9.55E+02
Cs-135	3.1549E-05	4,606.13	9,212.25	0.00E+00	1.45E-01	2.91E-01
Cs-137	2.7564E+00	4,606.13	9,212.25	0.00E+00	1.27E+04	2.54E+04
Eu-154	1.3490E+00	4,606.13	9,212.25	0.00E+00	6.21E+03	1.24E+04
Eu-155	4.3880E-01	4,606.13	9,212.25	0.00E+00	2.02E+03	4.04E+03
Fe-55	8.6782E-03	4,606.13	9,212.25	0.00E+00	4.00E+01	7.99E+01
H-3	1.0805E-02	4,606.13	9,212.25	0.00E+00	4.98E+01	9.95E+01
I-129	7.3805E-07	4,606.13	9,212.25	0.00E+00	3.40E-03	6.80E-03
Kr-85	2.5218E-01	4,606.13	9,212.25	0.00E+00	1.16E+03	2.32E+03
Np-237	1.4463E-06	4,606.13	9,212.25	0.00E+00	6.66E-03	1.33E-02
Pa-231	3.5970E-09	4,606.13	9,212.25	0.00E+00	1.66E-05	3.31E-05
Pb-210	8.2511E-15	4,606.13	9,212.25	0.00E+00	3.80E-11	7.60E-11
Pm-147	2.0767E+00	4,606.13	9,212.25	0.00E+00	9.57E+03	1.91E+04
Pu-238	1.3514E-03	4,606.13	9,212.25	0.00E+00	6.22E+00	1.24E+01
Pu-239	5.6947E-03	4,606.13	9,212.25	0.00E+00	2.62E+01	5.25E+01
Pu-240	2.2647E-03	4,606.13	9,212.25	0.00E+00	1.04E+01	2.09E+01
Pu-241	1.2574E-01	4,606.13	9,212.25	0.00E+00	5.79E+02	1.16E+03
Pu-242	3.0602E-07	4,606.13	9,212.25	0.00E+00	1.41E-03	2.82E-03
Ra-226	5.7353E-14	4,606.13	9,212.25	0.00E+00	2.64E-10	5.28E-10
Ra-228	1.8150E-10	4,606.13	9,212.25	0.00E+00	8.36E-07	1.67E-06
Ru-106	9.3744E-02	4,606.13	9,212.25	0.00E+00	4.32E+02	8.64E+02
Se-79	1.2938E-05	4,606.13	9,212.25	0.00E+00	5.96E-02	1.19E-01
Sn-126	1.2239E-05	4,606.13	9,212.25	0.00E+00	5.64E-02	1.13E-01
Sr-90	2.6000E+00	4,606.13	9,212.25	0.00E+00	1.20E+04	2.40E+04
Tc-99	4.4120E-04	4,606.13	9,212.25	0.00E+00	2.03E+00	4.06E+00
Th-229	1.4749E-10	4,606.13	9,212.25	0.00E+00	6.79E-07	1.36E-06
Th-230	1.9549E-11	4,606.13	9,212.25	0.00E+00	9.00E-08	1.80E-07
Th-232	2.3744E-10	4,606.13	9,212.25	0.00E+00	1.09E-06	2.19E-06
Tl-208	1.9459E-08	4,606.13	9,212.25	0.00E+00	8.96E-05	1.79E-04
U-232	5.6015E-08	4,606.13	9,212.25	0.00E+00	2.58E-04	5.16E-04
U-233	1.3132E-07	4,606.13	9,212.25	0.00E+00	6.05E-04	1.21E-03
U-234	1.7323E-07	4,606.13	9,212.25	0.00E+00	7.98E-04	1.60E-03
U-235	-2.6159E-06	4,606.13	0.00	1.34E-02	1.32E-03	1.34E-02
U-236	1.2717E-05	4,606.13	9,212.25	0.00E+00	5.86E-02	1.17E-01
U-238	-3.8857E-08	4,606.13	0.00	8.32E-03	8.14E-03	8.32E-03
Y-90	2.6015E+00	4,606.13	9,212.25	0.00E+00	1.20E+04	2.40E+04
Other Radionuclides					1.75E+04	3.50E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.559E+15
0.0250	3.384E+14
0.0375	4.215E+14
0.0575	3.231E+14
0.0850	2.262E+14
0.1250	3.383E+14
0.2250	1.888E+14
0.3750	8.404E+13
0.5750	1.066E+15
0.8500	2.623E+14
1.2500	2.719E+14
1.7500	7.781E+12
2.2500	9.458E+11
2.7500	7.682E+09
3.5000	8.979E+08
5.0000	5.274E+03
7.0000	5.969E+02
11.0000	6.796E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.31E+02	4.63E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.9999995	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		4,606.13
Bounding:		9,212.25

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	4.03	
Bounding:	8.06	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (U3Si2 LEU) GREECE
SNF ID #: 531
Fuel Units & Descr: 18 - ASSEMBLY
Heavy Metal Mass: BOL=11.07kg; EOL=10.294kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.75

II. Estimates

	m	x_o	x_b	b	y_o	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	734.70	1,469.40	0.00E+00	1.07E-07	2.14E-07	Avg. MeV	
Am-241	1.1190E-03	734.70	1,469.40	0.00E+00	8.22E-01	1.64E+00	0.0150	2.835E+14
Am-242m	4.5425E-07	734.70	1,469.40	0.00E+00	3.34E-04	6.67E-04	0.0250	6.107E+13
Am-243	1.4921E-06	734.70	1,469.40	0.00E+00	1.10E-03	2.19E-03	0.0375	5.636E+13
C-14	5.7244E-09	734.70	1,469.40	0.00E+00	4.21E-06	8.41E-06	0.0575	5.542E+13
Cl-36	1.3124E-32	734.70	1,469.40	0.00E+00	9.64E-30	1.93E-29	0.0850	3.533E+13
Cm-243	2.3676E-07	734.70	1,469.40	0.00E+00	1.74E-04	3.48E-04	0.1250	3.059E+13
Cm-244	5.2042E-05	734.70	1,469.40	0.00E+00	3.82E-02	7.65E-02	0.2250	2.994E+13
Co-60	3.8208E-05	734.70	1,469.40	0.00E+00	2.81E-02	5.61E-02	0.3750	1.449E+13
Cs-134	4.8693E-01	734.70	1,469.40	0.00E+00	3.58E+02	7.15E+02	0.5750	1.991E+14
Cs-135	3.4477E-06	734.70	1,469.40	0.00E+00	2.53E-03	5.07E-03	0.8500	2.788E+13
Cs-137	2.8731E+00	734.70	1,469.40	0.00E+00	2.11E+03	4.22E+03	1.2500	5.187E+12
Eu-154	8.2053E-02	734.70	1,469.40	0.00E+00	6.03E+01	1.21E+02	1.7500	2.175E+11
Eu-155	3.9134E-02	734.70	1,469.40	0.00E+00	2.88E+01	5.75E+01	2.2500	4.562E+11
Fe-55	6.7429E-03	734.70	1,469.40	0.00E+00	4.95E+00	9.91E+00	2.7500	2.625E+09
H-3	1.0599E-02	734.70	1,469.40	0.00E+00	7.79E+00	1.56E+01	3.5000	2.911E+08
I-129	7.5300E-07	734.70	1,469.40	0.00E+00	5.53E-04	1.11E-03	5.0000	8.771E+02
Kr-85	2.8595E-01	734.70	1,469.40	0.00E+00	2.10E+02	4.20E+02	7.0000	9.780E+01
Np-237	9.5479E-06	734.70	1,469.40	0.00E+00	7.01E-03	1.40E-02	11.0000	1.103E+01
Pa-231	8.9297E-10	734.70	1,469.40	0.00E+00	6.56E-07	1.31E-06		
Pb-210	3.7609E-12	734.70	1,469.40	0.00E+00	2.76E-09	5.53E-09		
Pm-147	2.5452E+00	734.70	1,469.40	0.00E+00	1.87E+03	3.74E+03		
Pu-238	2.0550E-02	734.70	1,469.40	0.00E+00	1.51E+01	3.02E+01		
Pu-239	4.2838E-04	734.70	1,469.40	0.00E+00	3.15E-01	6.29E-01		
Pu-240	2.4401E-04	734.70	1,469.40	0.00E+00	1.79E-01	3.59E-01		
Pu-241	6.8764E-02	734.70	1,469.40	0.00E+00	5.05E+01	1.01E+02		
Pu-242	3.6329E-07	734.70	1,469.40	0.00E+00	2.67E-04	5.34E-04		
Ra-226	3.8045E-11	734.70	1,469.40	0.00E+00	2.80E-08	5.59E-08		
Ra-228	2.9902E-15	734.70	1,469.40	0.00E+00	2.20E-12	4.39E-12		
Ru-106	1.9055E-01	734.70	1,469.40	0.00E+00	1.40E+02	2.80E+02		
Se-79	1.2936E-05	734.70	1,469.40	0.00E+00	9.50E-03	1.90E-02		
Sn-126	1.1574E-05	734.70	1,469.40	0.00E+00	8.50E-03	1.70E-02		
Sr-90	2.7505E+00	734.70	1,469.40	0.00E+00	2.02E+03	4.04E+03		
Tc-99	4.2239E-04	734.70	1,469.40	0.00E+00	3.10E-01	6.21E-01		
Th-229	1.8848E-12	734.70	1,469.40	0.00E+00	1.38E-09	2.77E-09		
Th-230	1.7042E-08	734.70	1,469.40	0.00E+00	1.25E-05	2.50E-05		
Th-232	7.8132E-15	734.70	1,469.40	0.00E+00	5.74E-12	1.15E-11		
Tl-208	4.4063E-08	734.70	1,469.40	0.00E+00	3.24E-05	6.47E-05		
U-232	1.3151E-07	734.70	1,469.40	0.00E+00	9.66E-05	1.93E-04		
U-233	1.9564E-09	734.70	1,469.40	0.00E+00	1.44E-06	2.87E-06		
U-234	1.8371E-04	734.70	1,469.40	0.00E+00	1.35E-01	2.70E-01		
U-235	-2.7235E-08	734.70	0.00	4.78E-03	2.78E-03	4.78E-03		
U-236	1.5493E-05	734.70	1,469.40	0.00E+00	1.14E-02	2.28E-02		
U-238	-4.2851E-09	734.70	0.00	2.98E-03	2.97E-03	2.98E-03		
Y-90	2.7505E+00	734.70	1,469.40	0.00E+00	2.02E+03	4.04E+03		
Other Radionuclides					3.78E+03	7.56E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.73E+01	7.45E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000024	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		734.70
Bounding:		1,469.40

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.21	
Bounding:	0.42	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (U3Si2 LEU) JAPAN
SNF ID #: 289
Fuel Units & Descr: 17 - ASSEMBLY
Heavy Metal Mass: BOL=8.925kg; EOL=8.6kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10" 0.71

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	307.50	614.99	0.00E+00	4.47E-08	8.95E-08
Am-241	1.1190E-03	307.50	614.99	0.00E+00	3.44E-01	6.88E-01
Am-242m	4.5425E-07	307.50	614.99	0.00E+00	1.40E-04	2.79E-04
Am-243	1.4921E-06	307.50	614.99	0.00E+00	4.59E-04	9.18E-04
C-14	5.7244E-09	307.50	614.99	0.00E+00	1.76E-06	3.52E-06
Cl-36	1.3124E-32	307.50	614.99	0.00E+00	4.04E-30	8.07E-30
Cm-243	2.3676E-07	307.50	614.99	0.00E+00	7.28E-05	1.46E-04
Cm-244	5.2042E-05	307.50	614.99	0.00E+00	1.60E-02	3.20E-02
Co-60	3.8208E-05	307.50	614.99	0.00E+00	1.17E-02	2.35E-02
Cs-134	4.8693E-01	307.50	614.99	0.00E+00	1.50E+02	2.99E+02
Cs-135	3.4477E-06	307.50	614.99	0.00E+00	1.06E-03	2.12E-03
Cs-137	2.8731E+00	307.50	614.99	0.00E+00	8.83E+02	1.77E+03
Eu-154	8.2053E-02	307.50	614.99	0.00E+00	2.52E+01	5.05E+01
Eu-155	3.9134E-02	307.50	614.99	0.00E+00	1.20E+01	2.41E+01
Fe-55	6.7429E-03	307.50	614.99	0.00E+00	2.07E+00	4.15E+00
H-3	1.0599E-02	307.50	614.99	0.00E+00	3.26E+00	6.52E+00
I-129	7.5300E-07	307.50	614.99	0.00E+00	2.32E-04	4.63E-04
Kr-85	2.8595E-01	307.50	614.99	0.00E+00	8.79E+01	1.76E+02
Np-237	9.5479E-06	307.50	614.99	0.00E+00	2.94E-03	5.87E-03
Pa-231	8.9297E-10	307.50	614.99	0.00E+00	2.75E-07	5.49E-07
Pb-210	3.7609E-12	307.50	614.99	0.00E+00	1.16E-09	2.31E-09
Pm-147	2.5452E+00	307.50	614.99	0.00E+00	7.83E+02	1.57E+03
Pu-238	2.0550E-02	307.50	614.99	0.00E+00	6.32E+00	1.26E+01
Pu-239	4.2838E-04	307.50	614.99	0.00E+00	1.32E-01	2.63E-01
Pu-240	2.4401E-04	307.50	614.99	0.00E+00	7.50E-02	1.50E-01
Pu-241	6.8764E-02	307.50	614.99	0.00E+00	2.11E+01	4.23E+01
Pu-242	3.6329E-07	307.50	614.99	0.00E+00	1.12E-04	2.23E-04
Ra-226	3.8045E-11	307.50	614.99	0.00E+00	1.17E-08	2.34E-08
Ra-228	2.9902E-15	307.50	614.99	0.00E+00	9.19E-13	1.84E-12
Ru-106	1.9055E-01	307.50	614.99	0.00E+00	5.86E+01	1.17E+02
Se-79	1.2936E-05	307.50	614.99	0.00E+00	3.98E-03	7.96E-03
Sn-126	1.1574E-05	307.50	614.99	0.00E+00	3.56E-03	7.12E-03
Sr-90	2.7505E+00	307.50	614.99	0.00E+00	8.46E+02	1.69E+03
Tc-99	4.2239E-04	307.50	614.99	0.00E+00	1.30E-01	2.60E-01
Th-229	1.8848E-12	307.50	614.99	0.00E+00	5.80E-10	1.16E-09
Th-230	1.7042E-08	307.50	614.99	0.00E+00	5.24E-06	1.05E-05
Th-232	7.8132E-15	307.50	614.99	0.00E+00	2.40E-12	4.81E-12
Tl-208	4.4063E-08	307.50	614.99	0.00E+00	1.35E-05	2.71E-05
U-232	1.3151E-07	307.50	614.99	0.00E+00	4.04E-05	8.09E-05
U-233	1.9564E-09	307.50	614.99	0.00E+00	6.02E-07	1.20E-06
U-234	1.8371E-04	307.50	614.99	0.00E+00	5.65E-02	1.13E-01
U-235	-2.7235E-06	307.50	0.00	3.86E-03	3.02E-03	3.86E-03
U-236	1.5493E-05	307.50	614.99	0.00E+00	4.76E-03	9.53E-03
U-238	-4.2851E-09	307.50	0.00	2.40E-03	2.40E-03	2.40E-03
Y-90	2.7505E+00	307.50	614.99	0.00E+00	8.46E+02	1.69E+03
Other Radionuclides					1.58E+03	3.16E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.186E+14
0.0250	2.556E+13
0.0375	2.359E+13
0.0575	2.319E+13
0.0850	1.479E+13
0.1250	1.280E+13
0.2250	1.253E+13
0.3750	6.066E+12
0.5750	8.332E+13
0.8500	1.167E+13
1.2500	2.171E+12
1.7500	9.104E+10
2.2500	1.910E+11
2.7500	1.099E+09
3.5000	1.218E+08
5.0000	3.698E+02
7.0000	4.124E+01
11.0000	4.650E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.66E+01	3.12E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000028	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		307.50
Bounding:		614.99

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.11	
Bounding:	0.22	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (U3Si2 LEU) NETHERLANDS
SNF ID #: 509
Fuel Units & Descr: 7 - ASSEMBLY
Heavy Metal Mass: BOL=5.53kg; EOL=4.866kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.29

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	1.4545E-10	628.44	1,256.88	0.00E+00	9.14E-08	1.83E-07
Am-241	1.1190E-03	628.44	1,256.88	0.00E+00	7.03E-01	1.41E+00
Am-242m	4.5425E-07	628.44	1,256.88	0.00E+00	2.85E-04	5.71E-04
Am-243	1.4921E-06	628.44	1,256.88	0.00E+00	9.38E-04	1.88E-03
C-14	5.7244E-09	628.44	1,256.88	0.00E+00	3.60E-06	7.19E-06
Cl-36	1.3124E-32	628.44	1,256.88	0.00E+00	8.25E-30	1.65E-29
Cm-243	2.3676E-07	628.44	1,256.88	0.00E+00	1.49E-04	2.98E-04
Cm-244	5.2042E-05	628.44	1,256.88	0.00E+00	3.27E-02	6.54E-02
Co-60	3.8208E-05	628.44	1,256.88	0.00E+00	2.40E-02	4.80E-02
Cs-134	4.8693E-01	628.44	1,256.88	0.00E+00	3.06E+02	6.12E+02
Cs-135	3.4477E-06	628.44	1,256.88	0.00E+00	2.17E-03	4.33E-03
Cs-137	2.8731E+00	628.44	1,256.88	0.00E+00	1.81E+03	3.61E+03
Eu-154	8.2053E-02	628.44	1,256.88	0.00E+00	5.16E+01	1.03E+02
Eu-155	3.9134E-02	628.44	1,256.88	0.00E+00	2.46E+01	4.92E+01
Fe-55	6.7429E-03	628.44	1,256.88	0.00E+00	4.24E+00	8.48E+00
H-3	1.0599E-02	628.44	1,256.88	0.00E+00	6.66E+00	1.33E+01
I-129	7.5300E-07	628.44	1,256.88	0.00E+00	4.73E-04	9.46E-04
Kr-85	2.8595E-01	628.44	1,256.88	0.00E+00	1.80E+02	3.59E+02
Np-237	9.5479E-06	628.44	1,256.88	0.00E+00	6.00E-03	1.20E-02
Pa-231	8.9297E-10	628.44	1,256.88	0.00E+00	5.61E-07	1.12E-06
Pb-210	3.7609E-12	628.44	1,256.88	0.00E+00	2.36E-09	4.73E-09
Pm-147	2.5452E+00	628.44	1,256.88	0.00E+00	1.60E+03	3.20E+03
Pu-238	2.0550E-02	628.44	1,256.88	0.00E+00	1.29E+01	2.58E+01
Pu-239	4.2838E-04	628.44	1,256.88	0.00E+00	2.69E-01	5.38E-01
Pu-240	2.4401E-04	628.44	1,256.88	0.00E+00	1.53E-01	3.07E-01
Pu-241	6.8764E-02	628.44	1,256.88	0.00E+00	4.32E+01	8.64E+01
Pu-242	3.6329E-07	628.44	1,256.88	0.00E+00	2.28E-04	4.57E-04
Ra-226	3.8045E-11	628.44	1,256.88	0.00E+00	2.39E-08	4.78E-08
Ra-228	2.9902E-15	628.44	1,256.88	0.00E+00	1.88E-12	3.76E-12
Ru-106	1.9055E-01	628.44	1,256.88	0.00E+00	1.20E+02	2.39E+02
Se-79	1.2936E-05	628.44	1,256.88	0.00E+00	8.13E-03	1.63E-02
Sn-126	1.1574E-05	628.44	1,256.88	0.00E+00	7.27E-03	1.45E-02
Sr-90	2.7505E+00	628.44	1,256.88	0.00E+00	1.73E+03	3.46E+03
Tc-99	4.2239E-04	628.44	1,256.88	0.00E+00	2.65E-01	5.31E-01
Th-229	1.8848E-12	628.44	1,256.88	0.00E+00	1.18E-09	2.37E-09
Th-230	1.7042E-08	628.44	1,256.88	0.00E+00	1.07E-05	2.14E-05
Th-232	7.8132E-15	628.44	1,256.88	0.00E+00	4.91E-12	9.82E-12
Tl-208	4.4063E-08	628.44	1,256.88	0.00E+00	2.77E-05	5.54E-05
U-232	1.3151E-07	628.44	1,256.88	0.00E+00	8.26E-05	1.65E-04
U-233	1.9564E-09	628.44	1,256.88	0.00E+00	1.23E-06	2.46E-06
U-234	1.8371E-04	628.44	1,256.88	0.00E+00	1.15E-01	2.31E-01
U-235	-2.7235E-08	628.44	0.00	2.39E-03	6.78E-04	2.39E-03
U-236	1.5493E-05	628.44	1,256.88	0.00E+00	9.74E-03	1.95E-02
U-238	-4.2851E-09	628.44	0.00	1.49E-03	1.48E-03	1.49E-03
Y-90	2.7505E+00	628.44	1,256.88	0.00E+00	1.73E+03	3.46E+03
Other Radionuclides					3.23E+03	6.46E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.425E+14
0.0250	5.224E+13
0.0375	4.821E+13
0.0575	4.740E+13
0.0850	3.022E+13
0.1250	2.617E+13
0.2250	2.561E+13
0.3750	1.240E+13
0.5750	1.703E+14
0.8500	2.385E+13
1.2500	4.437E+12
1.7500	1.861E+11
2.2500	3.903E+11
2.7500	2.245E+09
3.5000	2.490E+08
5.0000	7.478E+02
7.0000	8.337E+01
11.0000	9.399E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.19E+01	6.37E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000038	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		628.44
Bounding:		1,256.88

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.36	
Bounding:	0.72	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX LEU) SWEDEN
SNF ID #: 523
Fuel Units & Descr: 480 - ASSEMBLY
Heavy Metal Mass: BOL=960kg; EOL=789.888kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' 20.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	161,099.36	322,198.73	0.00E+00	2.34E-05	4.69E-05	Avg. MeV	
Am-241	1.1190E-03	161,099.36	322,198.73	0.00E+00	1.80E+02	3.61E+02	0.0150	6.216E+16
Am-242m	4.5425E-07	161,099.36	322,198.73	0.00E+00	7.32E-02	1.46E-01	0.0250	1.339E+16
Am-243	1.4921E-06	161,099.36	322,198.73	0.00E+00	2.40E-01	4.81E-01	0.0375	1.236E+16
C-14	5.7244E-09	161,099.36	322,198.73	0.00E+00	9.22E-04	1.84E-03	0.0575	1.215E+16
Cl-36	1.3124E-32	161,099.36	322,198.73	0.00E+00	2.11E-27	4.23E-27	0.0850	7.746E+15
Cm-243	2.3676E-07	161,099.36	322,198.73	0.00E+00	3.81E-02	7.63E-02	0.1250	6.708E+15
Cm-244	5.2042E-05	161,099.36	322,198.73	0.00E+00	8.38E+00	1.68E+01	0.2250	6.565E+15
Co-60	3.8208E-05	161,099.36	322,198.73	0.00E+00	6.16E+00	1.23E+01	0.3750	3.178E+15
Cs-134	4.8693E-01	161,099.36	322,198.73	0.00E+00	7.84E+04	1.57E+05	0.5750	4.365E+16
Cs-135	3.4477E-06	161,099.36	322,198.73	0.00E+00	5.55E-01	1.11E+00	0.8500	6.113E+15
Cs-137	2.8731E+00	161,099.36	322,198.73	0.00E+00	4.63E+05	9.26E+05	1.2500	1.137E+15
Eu-154	8.2053E-02	161,099.36	322,198.73	0.00E+00	1.32E+04	2.64E+04	1.7500	4.770E+13
Eu-155	3.9134E-02	161,099.36	322,198.73	0.00E+00	6.30E+03	1.26E+04	2.2500	1.000E+14
Fe-55	6.7429E-03	161,099.36	322,198.73	0.00E+00	1.09E+03	2.17E+03	2.7500	5.756E+11
H-3	1.0599E-02	161,099.36	322,198.73	0.00E+00	1.71E+03	3.42E+03	3.5000	6.383E+10
I-129	7.5300E-07	161,099.36	322,198.73	0.00E+00	1.21E-01	2.43E-01	5.0000	1.914E+06
Kr-85	2.8595E-01	161,099.36	322,198.73	0.00E+00	4.61E+04	9.21E+04	7.0000	2.134E+04
Np-237	9.5479E-06	161,099.36	322,198.73	0.00E+00	1.54E+00	3.08E+00	11.0000	2.406E+03
Pa-231	8.9297E-10	161,099.36	322,198.73	0.00E+00	1.44E-04	2.88E-04		
Pb-210	3.7609E-12	161,099.36	322,198.73	0.00E+00	6.06E-07	1.21E-06		
Pm-147	2.5452E+00	161,099.36	322,198.73	0.00E+00	4.10E+05	8.20E+05		
Pu-238	2.0550E-02	161,099.36	322,198.73	0.00E+00	3.31E+03	6.62E+03		
Pu-239	4.2838E-04	161,099.36	322,198.73	0.00E+00	6.90E+01	1.38E+02		
Pu-240	2.4401E-04	161,099.36	322,198.73	0.00E+00	3.93E+01	7.86E+01		
Pu-241	6.8764E-02	161,099.36	322,198.73	0.00E+00	1.11E+04	2.22E+04		
Pu-242	3.6329E-07	161,099.36	322,198.73	0.00E+00	5.85E-02	1.17E-01		
Ra-226	3.8045E-11	161,099.36	322,198.73	0.00E+00	6.13E-06	1.23E-05		
Ra-228	2.9902E-15	161,099.36	322,198.73	0.00E+00	4.82E-10	9.63E-10		
Ru-106	1.9055E-01	161,099.36	322,198.73	0.00E+00	3.07E+04	6.14E+04		
Se-79	1.2936E-05	161,099.36	322,198.73	0.00E+00	2.08E+00	4.17E+00		
Sn-126	1.1574E-05	161,099.36	322,198.73	0.00E+00	1.86E+00	3.73E+00		
Sr-90	2.7505E+00	161,099.36	322,198.73	0.00E+00	4.43E+05	8.86E+05		
Tc-99	4.2239E-04	161,099.36	322,198.73	0.00E+00	6.80E+01	1.36E+02		
Th-229	1.8848E-12	161,099.36	322,198.73	0.00E+00	3.04E-07	6.07E-07		
Th-230	1.7042E-08	161,099.36	322,198.73	0.00E+00	2.75E-03	5.49E-03		
Th-232	7.8132E-15	161,099.36	322,198.73	0.00E+00	1.26E-09	2.52E-09		
Tl-208	4.4063E-08	161,099.36	322,198.73	0.00E+00	7.10E-03	1.42E-02		
U-232	1.3151E-07	161,099.36	322,198.73	0.00E+00	2.12E-02	4.24E-02		
U-233	1.9564E-09	161,099.36	322,198.73	0.00E+00	3.15E-04	6.30E-04		
U-234	1.8371E-04	161,099.36	322,198.73	0.00E+00	2.96E+01	5.92E+01		
U-235	-2.7235E-06	161,099.36	0.00	4.15E-01	0.00E+00	4.15E-01		
U-236	1.5493E-05	161,099.36	322,198.73	0.00E+00	2.50E+00	4.99E+00		
U-238	-4.2851E-09	161,099.36	0.00	2.58E-01	2.57E-01	2.58E-01		
Y-90	2.7505E+00	161,099.36	322,198.73	0.00E+00	4.43E+05	8.86E+05		
Other Radionuclides					8.29E+05	1.66E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.17E+03	1.63E+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 %:	20	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		161,099.36
Bounding:		322,198.73

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.53	
Bounding:	1.07	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-HEU) ARGENTINA
SNF ID #: 635
Fuel Units & Descr: 14 - MTR TYPE
Heavy Metal Mass: BOL=2.395kg; EOL=1.749kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.58

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	612.53	1,225.06	0.00E+00	8.91E-08	1.78E-07
Am-241	1.1190E-03	612.53	1,225.06	0.00E+00	6.85E-01	1.37E+00
Am-242m	4.5425E-07	612.53	1,225.06	0.00E+00	2.78E-04	5.56E-04
Am-243	1.4921E-06	612.53	1,225.06	0.00E+00	9.14E-04	1.83E-03
C-14	5.7244E-09	612.53	1,225.06	0.00E+00	3.51E-06	7.01E-06
Cl-36	1.3124E-32	612.53	1,225.06	0.00E+00	8.04E-30	1.61E-29
Cm-243	2.3676E-07	612.53	1,225.06	0.00E+00	1.45E-04	2.90E-04
Cm-244	5.2042E-05	612.53	1,225.06	0.00E+00	3.19E-02	6.38E-02
Co-60	3.8208E-05	612.53	1,225.06	0.00E+00	2.34E-02	4.68E-02
Cs-134	4.8693E-01	612.53	1,225.06	0.00E+00	2.98E+02	5.97E+02
Cs-135	3.4477E-06	612.53	1,225.06	0.00E+00	2.11E-03	4.22E-03
Cs-137	2.8731E+00	612.53	1,225.06	0.00E+00	1.76E+03	3.52E+03
Eu-154	8.2053E-02	612.53	1,225.06	0.00E+00	5.03E+01	1.01E+02
Eu-155	3.9134E-02	612.53	1,225.06	0.00E+00	2.40E+01	4.79E+01
Fe-55	6.7429E-03	612.53	1,225.06	0.00E+00	4.13E+00	8.26E+00
H-3	1.0599E-02	612.53	1,225.06	0.00E+00	6.49E+00	1.30E+01
I-129	7.5300E-07	612.53	1,225.06	0.00E+00	4.61E-04	9.22E-04
Kr-85	2.8595E-01	612.53	1,225.06	0.00E+00	1.75E+02	3.50E+02
Np-237	9.5479E-06	612.53	1,225.06	0.00E+00	5.85E-03	1.17E-02
Pa-231	8.9297E-10	612.53	1,225.06	0.00E+00	5.47E-07	1.09E-06
Pb-210	3.7609E-12	612.53	1,225.06	0.00E+00	2.30E-09	4.61E-09
Pm-147	2.5452E+00	612.53	1,225.06	0.00E+00	1.56E+03	3.12E+03
Pu-238	2.0550E-02	612.53	1,225.06	0.00E+00	1.26E+01	2.52E+01
Pu-239	4.2838E-04	612.53	1,225.06	0.00E+00	2.62E-01	5.25E-01
Pu-240	2.4401E-04	612.53	1,225.06	0.00E+00	1.49E-01	2.99E-01
Pu-241	6.8764E-02	612.53	1,225.06	0.00E+00	4.21E+01	8.42E+01
Pu-242	3.6329E-07	612.53	1,225.06	0.00E+00	2.23E-04	4.45E-04
Ra-226	3.8045E-11	612.53	1,225.06	0.00E+00	2.33E-08	4.66E-08
Ra-228	2.9902E-15	612.53	1,225.06	0.00E+00	1.83E-12	3.66E-12
Ru-106	1.9055E-01	612.53	1,225.06	0.00E+00	1.17E+02	2.33E+02
Se-79	1.2936E-05	612.53	1,225.06	0.00E+00	7.92E-03	1.58E-02
Sn-126	1.1574E-05	612.53	1,225.06	0.00E+00	7.09E-03	1.42E-02
Sr-90	2.7505E+00	612.53	1,225.06	0.00E+00	1.68E+03	3.37E+03
Tc-99	4.2239E-04	612.53	1,225.06	0.00E+00	2.59E-01	5.17E-01
Th-229	1.8848E-12	612.53	1,225.06	0.00E+00	1.15E-09	2.31E-09
Th-230	1.7042E-08	612.53	1,225.06	0.00E+00	1.04E-05	2.09E-05
Th-232	7.8132E-15	612.53	1,225.06	0.00E+00	4.79E-12	9.57E-12
Tl-208	4.4063E-08	612.53	1,225.06	0.00E+00	2.70E-05	5.40E-05
U-232	1.3151E-07	612.53	1,225.06	0.00E+00	8.06E-05	1.61E-04
U-233	1.9564E-09	612.53	1,225.06	0.00E+00	1.20E-06	2.40E-06
U-234	1.8371E-04	612.53	1,225.06	0.00E+00	1.13E-01	2.25E-01
U-235	-2.7235E-06	612.53	0.00	4.66E-03	2.99E-03	4.66E-03
U-236	1.5493E-05	612.53	1,225.06	0.00E+00	9.49E-03	1.90E-02
U-238	-4.2851E-09	612.53	0.00	8.05E-05	7.79E-05	8.05E-05
Y-90	2.7505E+00	612.53	1,225.06	0.00E+00	1.68E+03	3.37E+03
Other Radionuclides					3.15E+03	6.30E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.363E+14
0.0250	5.092E+13
0.0375	4.699E+13
0.0575	4.620E+13
0.0850	2.945E+13
0.1250	2.551E+13
0.2250	2.496E+13
0.3750	1.208E+13
0.5750	1.660E+14
0.8500	2.324E+13
1.2500	4.325E+12
1.7500	1.814E+11
2.2500	3.804E+11
2.7500	2.188E+09
3.5000	2.427E+08
5.0000	7.258E+02
7.0000	8.091E+01
11.0000	9.120E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.11E+01	6.21E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	90.00000174	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		612.53
Bounding:		1,225.06

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.81	
Bounding:	1.63	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-HEU) CANADA
SNF ID #: 612
Fuel Units & Descr: 23 - MTR TYPE
Heavy Metal Mass: BOL=2.721kg; EOL=1.76kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.96

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	1.4545E-10	910.46	1,820.93	0.00E+00	1.32E-07	2.65E-07
Am-241	1.1190E-03	910.46	1,820.93	0.00E+00	1.02E+00	2.04E+00
Am-242m	4.5425E-07	910.46	1,820.93	0.00E+00	4.14E-04	8.27E-04
Am-243	1.4921E-06	910.46	1,820.93	0.00E+00	1.36E-03	2.72E-03
C-14	5.7244E-09	910.46	1,820.93	0.00E+00	5.21E-06	1.04E-05
Cl-36	1.3124E-32	910.46	1,820.93	0.00E+00	1.19E-29	2.39E-29
Cm-243	2.3676E-07	910.46	1,820.93	0.00E+00	2.16E-04	4.31E-04
Cm-244	5.2042E-05	910.46	1,820.93	0.00E+00	4.74E-02	9.48E-02
Co-60	3.8208E-05	910.46	1,820.93	0.00E+00	3.48E-02	6.96E-02
Cs-134	4.8693E-01	910.46	1,820.93	0.00E+00	4.43E+02	8.87E+02
Cs-135	3.4477E-06	910.46	1,820.93	0.00E+00	3.14E-03	6.28E-03
Cs-137	2.8731E+00	910.46	1,820.93	0.00E+00	2.62E+03	5.23E+03
Eu-154	8.2053E-02	910.46	1,820.93	0.00E+00	7.47E+01	1.49E+02
Eu-155	3.9134E-02	910.46	1,820.93	0.00E+00	3.56E+01	7.13E+01
Fe-55	6.7429E-03	910.46	1,820.93	0.00E+00	6.14E+00	1.23E+01
H-3	1.0599E-02	910.46	1,820.93	0.00E+00	9.65E+00	1.93E+01
I-129	7.5300E-07	910.46	1,820.93	0.00E+00	6.86E-04	1.37E-03
Kr-85	2.8595E-01	910.46	1,820.93	0.00E+00	2.60E+02	5.21E+02
Np-237	9.5479E-06	910.46	1,820.93	0.00E+00	8.69E-03	1.74E-02
Pa-231	8.9297E-10	910.46	1,820.93	0.00E+00	8.13E-07	1.63E-06
Pb-210	3.7609E-12	910.46	1,820.93	0.00E+00	3.42E-09	6.85E-09
Pm-147	2.5452E+00	910.46	1,820.93	0.00E+00	2.32E+03	4.63E+03
Pu-238	2.0550E-02	910.46	1,820.93	0.00E+00	1.87E+01	3.74E+01
Pu-239	4.2838E-04	910.46	1,820.93	0.00E+00	3.90E-01	7.80E-01
Pu-240	2.4401E-04	910.46	1,820.93	0.00E+00	2.22E-01	4.44E-01
Pu-241	6.8764E-02	910.46	1,820.93	0.00E+00	6.26E+01	1.25E+02
Pu-242	3.6329E-07	910.46	1,820.93	0.00E+00	3.31E-04	6.62E-04
Ra-226	3.8045E-11	910.46	1,820.93	0.00E+00	3.46E-08	6.93E-08
Ra-228	2.9902E-15	910.46	1,820.93	0.00E+00	2.72E-12	5.44E-12
Ru-106	1.9055E-01	910.46	1,820.93	0.00E+00	1.73E+02	3.47E+02
Se-79	1.2936E-05	910.46	1,820.93	0.00E+00	1.18E-02	2.36E-02
Sn-126	1.1574E-05	910.46	1,820.93	0.00E+00	1.05E-02	2.11E-02
Sr-90	2.7505E+00	910.46	1,820.93	0.00E+00	2.50E+03	5.01E+03
Tc-99	4.2239E-04	910.46	1,820.93	0.00E+00	3.85E-01	7.69E-01
Th-229	1.8848E-12	910.46	1,820.93	0.00E+00	1.72E-09	3.43E-09
Th-230	1.7042E-08	910.46	1,820.93	0.00E+00	1.55E-05	3.10E-05
Th-232	7.8132E-15	910.46	1,820.93	0.00E+00	7.11E-12	1.42E-11
Tl-208	4.4063E-08	910.46	1,820.93	0.00E+00	4.01E-05	8.02E-05
U-232	1.3151E-07	910.46	1,820.93	0.00E+00	1.20E-04	2.39E-04
U-233	1.9564E-09	910.46	1,820.93	0.00E+00	1.78E-06	3.56E-06
U-234	1.8371E-04	910.46	1,820.93	0.00E+00	1.67E-01	3.35E-01
U-235	-2.7235E-06	910.46	0.00	5.47E-03	2.99E-03	5.47E-03
U-236	1.5493E-05	910.46	1,820.93	0.00E+00	1.41E-02	2.82E-02
U-238	-4.2851E-09	910.46	0.00	6.40E-05	6.01E-05	6.40E-05
Y-90	2.7505E+00	910.46	1,820.93	0.00E+00	2.50E+03	5.01E+03
Other Radionuclides					4.68E+03	9.37E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.513E+14
0.0250	7.568E+13
0.0375	6.984E+13
0.0575	6.867E+13
0.0850	4.378E+13
0.1250	3.791E+13
0.2250	3.711E+13
0.3750	1.796E+13
0.5750	2.467E+14
0.8500	3.455E+13
1.2500	6.428E+12
1.7500	2.696E+11
2.2500	5.654E+11
2.7500	3.253E+09
3.5000	3.608E+08
5.0000	1.079E+03
7.0000	1.202E+02
11.0000	1.355E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.62E+01	9.23E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99997633	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		910.46
Bounding:		1,820.93

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.06	
Bounding:	2.13	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-HEU) GERMANY
SNF ID #: 579
Fuel Units & Descr: 33 - MTR TYPE
Heavy Metal Mass: BOL=3.336kg; EOL=2.062kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.38

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	1,206.31	2,412.63	0.00E+00	1.75E-07	3.51E-07	Avg. MeV	
Am-241	1.1190E-03	1,206.31	2,412.63	0.00E+00	1.35E+00	2.70E+00	0.0150	4.655E+14
Am-242m	4.5425E-07	1,206.31	2,412.63	0.00E+00	5.48E-04	1.10E-03	0.0250	1.003E+14
Am-243	1.4921E-06	1,206.31	2,412.63	0.00E+00	1.80E-03	3.60E-03	0.0375	9.254E+13
C-14	5.7244E-09	1,206.31	2,412.63	0.00E+00	6.91E-06	1.38E-05	0.0575	9.099E+13
Cl-36	1.3124E-32	1,206.31	2,412.63	0.00E+00	1.58E-29	3.17E-29	0.0850	5.801E+13
Cm-243	2.3676E-07	1,206.31	2,412.63	0.00E+00	2.86E-04	5.71E-04	0.1250	5.023E+13
Cm-244	5.2042E-05	1,206.31	2,412.63	0.00E+00	6.28E-02	1.26E-01	0.2250	4.916E+13
Co-60	3.8208E-05	1,206.31	2,412.63	0.00E+00	4.61E-02	9.22E-02	0.3750	2.380E+13
Cs-134	4.8693E-01	1,206.31	2,412.63	0.00E+00	5.87E+02	1.17E+03	0.5750	3.269E+14
Cs-135	3.4477E-06	1,206.31	2,412.63	0.00E+00	4.16E-03	8.32E-03	0.8500	4.578E+13
Cs-137	2.8731E+00	1,206.31	2,412.63	0.00E+00	3.47E+03	6.93E+03	1.2500	8.517E+12
Eu-154	8.2053E-02	1,206.31	2,412.63	0.00E+00	9.90E+01	1.98E+02	1.7500	3.572E+11
Eu-155	3.9134E-02	1,206.31	2,412.63	0.00E+00	4.72E+01	9.44E+01	2.2500	7.491E+11
Fe-55	6.7429E-03	1,206.31	2,412.63	0.00E+00	8.13E+00	1.63E+01	2.7500	4.310E+09
H-3	1.0599E-02	1,206.31	2,412.63	0.00E+00	1.28E+01	2.56E+01	3.5000	4.780E+08
I-129	7.5300E-07	1,206.31	2,412.63	0.00E+00	9.08E-04	1.82E-03	5.0000	1.429E+03
Kr-85	2.8595E-01	1,206.31	2,412.63	0.00E+00	3.45E+02	6.90E+02	7.0000	1.593E+02
Np-237	9.5479E-06	1,206.31	2,412.63	0.00E+00	1.15E-02	2.30E-02	11.0000	1.796E+01
Pa-231	8.9297E-10	1,206.31	2,412.63	0.00E+00	1.08E-06	2.15E-06		
Pb-210	3.7609E-12	1,206.31	2,412.63	0.00E+00	4.54E-09	9.07E-09		
Pm-147	2.5452E+00	1,206.31	2,412.63	0.00E+00	3.07E+03	6.14E+03		
Pu-238	2.0550E-02	1,206.31	2,412.63	0.00E+00	2.48E+01	4.96E+01		
Pu-239	4.2838E-04	1,206.31	2,412.63	0.00E+00	5.17E-01	1.03E+00		
Pu-240	2.4401E-04	1,206.31	2,412.63	0.00E+00	2.94E-01	5.89E-01		
Pu-241	6.8764E-02	1,206.31	2,412.63	0.00E+00	8.30E+01	1.66E+02		
Pu-242	3.6329E-07	1,206.31	2,412.63	0.00E+00	4.38E-04	8.76E-04		
Ra-226	3.8045E-11	1,206.31	2,412.63	0.00E+00	4.59E-08	9.18E-08		
Ra-228	2.9902E-15	1,206.31	2,412.63	0.00E+00	3.61E-12	7.21E-12		
Ru-106	1.9055E-01	1,206.31	2,412.63	0.00E+00	2.30E+02	4.60E+02		
Se-79	1.2936E-05	1,206.31	2,412.63	0.00E+00	1.56E-02	3.12E-02		
Sn-126	1.1574E-05	1,206.31	2,412.63	0.00E+00	1.40E-02	2.79E-02		
Sr-90	2.7505E+00	1,206.31	2,412.63	0.00E+00	3.32E+03	6.64E+03		
Tc-99	4.2239E-04	1,206.31	2,412.63	0.00E+00	5.10E-01	1.02E+00		
Th-229	1.8848E-12	1,206.31	2,412.63	0.00E+00	2.27E-09	4.55E-09		
Th-230	1.7042E-08	1,206.31	2,412.63	0.00E+00	2.06E-05	4.11E-05		
Th-232	7.8132E-15	1,206.31	2,412.63	0.00E+00	9.43E-12	1.89E-11		
Tl-208	4.4063E-08	1,206.31	2,412.63	0.00E+00	5.32E-05	1.06E-04		
U-232	1.3151E-07	1,206.31	2,412.63	0.00E+00	1.59E-04	3.17E-04		
U-233	1.9564E-09	1,206.31	2,412.63	0.00E+00	2.36E-06	4.72E-06		
U-234	1.8371E-04	1,206.31	2,412.63	0.00E+00	2.22E-01	4.43E-01		
U-235	-2.7235E-08	1,206.31	0.00	6.71E-03	3.42E-03	6.71E-03		
U-236	1.5493E-05	1,206.31	2,412.63	0.00E+00	1.87E-02	3.74E-02		
U-238	-4.2851E-09	1,206.31	0.00	7.85E-05	7.33E-05	7.85E-05		
Y-90	2.7505E+00	1,206.31	2,412.63	0.00E+00	3.32E+03	6.64E+03		
Other Radionuclides					6.20E+03	1.24E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.12E+01	1.22E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99997131	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		1,206.31	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		2,412.63	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.15	
Bounding:	2.30	

Estimated EOL HM/Given EOL HM: 1.04

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-HEU) JAPAN
SNF ID #: 600
Fuel Units & Descr: 54 - MTR TYPE
Heavy Metal Mass: BOL=5.227kg; EOL=4.158kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' 2.25

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	1.4545E-10	1,012.55	2,025.11	0.00E+00	1.47E-07	2.95E-07
Am-241	1.1190E-03	1,012.55	2,025.11	0.00E+00	1.13E+00	2.27E+00
Am-242m	4.5425E-07	1,012.55	2,025.11	0.00E+00	4.60E-04	9.20E-04
Am-243	1.4921E-06	1,012.55	2,025.11	0.00E+00	1.51E-03	3.02E-03
C-14	5.7244E-09	1,012.55	2,025.11	0.00E+00	5.80E-06	1.16E-05
Cl-36	1.3124E-32	1,012.55	2,025.11	0.00E+00	1.33E-29	2.66E-29
Cm-243	2.3676E-07	1,012.55	2,025.11	0.00E+00	2.40E-04	4.79E-04
Cm-244	5.2042E-05	1,012.55	2,025.11	0.00E+00	5.27E-02	1.05E-01
Co-60	3.8208E-05	1,012.55	2,025.11	0.00E+00	3.87E-02	7.74E-02
Cs-134	4.8693E-01	1,012.55	2,025.11	0.00E+00	4.93E+02	9.86E+02
Cs-135	3.4477E-06	1,012.55	2,025.11	0.00E+00	3.49E-03	6.98E-03
Cs-137	2.8731E+00	1,012.55	2,025.11	0.00E+00	2.91E+03	5.82E+03
Eu-154	8.2053E-02	1,012.55	2,025.11	0.00E+00	8.31E+01	1.66E+02
Eu-155	3.9134E-02	1,012.55	2,025.11	0.00E+00	3.96E+01	7.93E+01
Fe-55	6.7429E-03	1,012.55	2,025.11	0.00E+00	6.83E+00	1.37E+01
H-3	1.0599E-02	1,012.55	2,025.11	0.00E+00	1.07E+01	2.15E+01
I-129	7.5300E-07	1,012.55	2,025.11	0.00E+00	7.62E-04	1.52E-03
Kr-85	2.8595E-01	1,012.55	2,025.11	0.00E+00	2.90E+02	5.79E+02
Np-237	9.5479E-06	1,012.55	2,025.11	0.00E+00	9.67E-03	1.93E-02
Pa-231	8.9297E-10	1,012.55	2,025.11	0.00E+00	9.04E-07	1.81E-06
Pb-210	3.7609E-12	1,012.55	2,025.11	0.00E+00	3.81E-09	7.62E-09
Pm-147	2.5452E+00	1,012.55	2,025.11	0.00E+00	2.58E+03	5.15E+03
Pu-238	2.0550E-02	1,012.55	2,025.11	0.00E+00	2.08E+01	4.16E+01
Pu-239	4.2838E-04	1,012.55	2,025.11	0.00E+00	4.34E-01	8.68E-01
Pu-240	2.4401E-04	1,012.55	2,025.11	0.00E+00	2.47E-01	4.94E-01
Pu-241	6.8764E-02	1,012.55	2,025.11	0.00E+00	6.96E+01	1.39E+02
Pu-242	3.6329E-07	1,012.55	2,025.11	0.00E+00	3.68E-04	7.36E-04
Ra-226	3.8045E-11	1,012.55	2,025.11	0.00E+00	3.85E-08	7.70E-08
Ra-228	2.9902E-15	1,012.55	2,025.11	0.00E+00	3.03E-12	6.06E-12
Ru-106	1.9055E-01	1,012.55	2,025.11	0.00E+00	1.93E+02	3.86E+02
Se-79	1.2936E-05	1,012.55	2,025.11	0.00E+00	1.31E-02	2.62E-02
Sn-126	1.1574E-05	1,012.55	2,025.11	0.00E+00	1.17E-02	2.34E-02
Sr-90	2.7505E+00	1,012.55	2,025.11	0.00E+00	2.79E+03	5.57E+03
Tc-99	4.2239E-04	1,012.55	2,025.11	0.00E+00	4.28E-01	8.55E-01
Th-229	1.8848E-12	1,012.55	2,025.11	0.00E+00	1.91E-09	3.82E-09
Th-230	1.7042E-08	1,012.55	2,025.11	0.00E+00	1.73E-05	3.45E-05
Th-232	7.8132E-15	1,012.55	2,025.11	0.00E+00	7.91E-12	1.58E-11
Tl-208	4.4063E-08	1,012.55	2,025.11	0.00E+00	4.46E-05	8.92E-05
U-232	1.3151E-07	1,012.55	2,025.11	0.00E+00	1.33E-04	2.66E-04
U-233	1.9564E-09	1,012.55	2,025.11	0.00E+00	1.98E-06	3.96E-06
U-234	1.8371E-04	1,012.55	2,025.11	0.00E+00	1.86E-01	3.72E-01
U-235	-2.7235E-06	1,012.55	0.00	1.05E-02	7.75E-03	1.05E-02
U-236	1.5493E-05	1,012.55	2,025.11	0.00E+00	1.57E-02	3.14E-02
U-238	-4.2851E-09	1,012.55	0.00	1.23E-04	1.19E-04	1.23E-04
Y-90	2.7505E+00	1,012.55	2,025.11	0.00E+00	2.79E+03	5.57E+03
Other Radionuclides					5.21E+03	1.04E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.907E+14
0.0250	8.417E+13
0.0375	7.767E+13
0.0575	7.637E+13
0.0850	4.869E+13
0.1250	4.216E+13
0.2250	4.127E+13
0.3750	1.998E+13
0.5750	2.744E+14
0.8500	3.842E+13
1.2500	7.149E+12
1.7500	2.998E+11
2.2500	6.288E+11
2.7500	3.618E+09
3.5000	4.012E+08
5.0000	1.200E+03
7.0000	1.337E+02
11.0000	1.508E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.13E+01	1.63E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99999931	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,012.55
Bounding:		2,025.11

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.62	
Bounding:	1.23	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-HEU) PORTUGAL
SNF ID #: 631
Fuel Units & Descr: 9 - MTR TYPE
Heavy Metal Mass: BOL=1.423kg; EOL=0.894kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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"x18" 0.38

II. Estimates	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	501.16	1,002.33	0.00E+00	7.29E-08	1.46E-07	Avg. MeV	
Am-241	1.1190E-03	501.16	1,002.33	0.00E+00	5.61E-01	1.12E+00	0.0150	1.934E+14
Am-242m	4.5425E-07	501.16	1,002.33	0.00E+00	2.28E-04	4.55E-04	0.0250	4.166E+13
Am-243	1.4921E-06	501.16	1,002.33	0.00E+00	7.48E-04	1.50E-03	0.0375	3.844E+13
C-14	5.7244E-09	501.16	1,002.33	0.00E+00	2.87E-06	5.74E-06	0.0575	3.780E+13
Cl-36	1.3124E-32	501.16	1,002.33	0.00E+00	6.58E-30	1.32E-29	0.0850	2.410E+13
Cm-243	2.3676E-07	501.16	1,002.33	0.00E+00	1.19E-04	2.37E-04	0.1250	2.087E+13
Cm-244	5.2042E-05	501.16	1,002.33	0.00E+00	2.61E-02	5.22E-02	0.2250	2.042E+13
Co-60	3.8208E-05	501.16	1,002.33	0.00E+00	1.91E-02	3.83E-02	0.3750	9.887E+12
Cs-134	4.8693E-01	501.16	1,002.33	0.00E+00	2.44E+02	4.88E+02	0.5750	1.358E+14
Cs-135	3.4477E-06	501.16	1,002.33	0.00E+00	1.73E-03	3.46E-03	0.8500	1.902E+13
Cs-137	2.8731E+00	501.16	1,002.33	0.00E+00	1.44E+03	2.88E+03	1.2500	3.538E+12
Eu-154	8.2053E-02	501.16	1,002.33	0.00E+00	4.11E+01	8.22E+01	1.7500	1.484E+11
Eu-155	3.9134E-02	501.16	1,002.33	0.00E+00	1.96E+01	3.92E+01	2.2500	3.112E+11
Fe-55	6.7429E-03	501.16	1,002.33	0.00E+00	3.38E+00	6.76E+00	2.7500	1.790E+09
H-3	1.0599E-02	501.16	1,002.33	0.00E+00	5.31E+00	1.06E+01	3.5000	1.986E+08
I-129	7.5300E-07	501.16	1,002.33	0.00E+00	3.77E-04	7.55E-04	5.0000	5.937E+02
Kr-85	2.8595E-01	501.16	1,002.33	0.00E+00	1.43E+02	2.87E+02	7.0000	6.619E+01
Np-237	9.5479E-06	501.16	1,002.33	0.00E+00	4.79E-03	9.57E-03	11.0000	7.460E+00
Pa-231	8.9297E-10	501.16	1,002.33	0.00E+00	4.48E-07	8.95E-07		
Pb-210	3.7609E-12	501.16	1,002.33	0.00E+00	1.88E-09	3.77E-09		
Pm-147	2.5452E+00	501.16	1,002.33	0.00E+00	1.28E+03	2.55E+03		
Pu-238	2.0550E-02	501.16	1,002.33	0.00E+00	1.03E+01	2.06E+01		
Pu-239	4.2838E-04	501.16	1,002.33	0.00E+00	2.15E-01	4.29E-01		
Pu-240	2.4401E-04	501.16	1,002.33	0.00E+00	1.22E-01	2.45E-01		
Pu-241	6.8764E-02	501.16	1,002.33	0.00E+00	3.45E+01	6.89E+01		
Pu-242	3.6329E-07	501.16	1,002.33	0.00E+00	1.82E-04	3.64E-04		
Ra-226	3.8045E-11	501.16	1,002.33	0.00E+00	1.91E-08	3.81E-08		
Ra-228	2.9902E-15	501.16	1,002.33	0.00E+00	1.50E-12	3.00E-12		
Ru-106	1.9055E-01	501.16	1,002.33	0.00E+00	9.55E+01	1.91E+02		
Se-79	1.2936E-05	501.16	1,002.33	0.00E+00	6.48E-03	1.30E-02		
Sn-126	1.1574E-05	501.16	1,002.33	0.00E+00	5.80E-03	1.16E-02		
Sr-90	2.7505E+00	501.16	1,002.33	0.00E+00	1.38E+03	2.76E+03		
Tc-99	4.2239E-04	501.16	1,002.33	0.00E+00	2.12E-01	4.23E-01		
Th-229	1.8848E-12	501.16	1,002.33	0.00E+00	9.45E-10	1.89E-09		
Th-230	1.7042E-08	501.16	1,002.33	0.00E+00	8.54E-08	1.71E-05		
Th-232	7.8132E-15	501.16	1,002.33	0.00E+00	3.92E-12	7.83E-12		
Tl-208	4.4063E-08	501.16	1,002.33	0.00E+00	2.21E-05	4.42E-05		
U-232	1.3151E-07	501.16	1,002.33	0.00E+00	6.59E-05	1.32E-04		
U-233	1.9564E-09	501.16	1,002.33	0.00E+00	9.80E-07	1.96E-06		
U-234	1.8371E-04	501.16	1,002.33	0.00E+00	9.21E-02	1.84E-01		
U-235	-2.7235E-06	501.16	0.00	2.86E-03	1.49E-03	2.86E-03		
U-236	1.5493E-05	501.16	1,002.33	0.00E+00	7.76E-03	1.55E-02		
U-238	-4.2851E-09	501.16	0.00	3.35E-05	3.13E-05	3.35E-05		
Y-90	2.7505E+00	501.16	1,002.33	0.00E+00	1.38E+03	2.76E+03		
Other Radionuclides					2.58E+03	5.16E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.54E+01	5.08E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.00000971	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		501.16
Bounding:		1,002.33

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.12	
Bounding:	2.24	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-HEU) TURKEY
SNF ID #: 643
Fuel Units & Descr: 8 - MTR TYPE
Heavy Metal Mass: BOL=1.781kg; EOL=0.953kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 0.33

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	784.13	1,568.26	0.00E+00	1.14E-07	2.28E-07
Am-241	1.1190E-03	784.13	1,568.26	0.00E+00	8.77E-01	1.75E+00
Am-242m	4.5425E-07	784.13	1,568.26	0.00E+00	3.56E-04	7.12E-04
Am-243	1.4921E-06	784.13	1,568.26	0.00E+00	1.17E-03	2.34E-03
C-14	5.7244E-09	784.13	1,568.26	0.00E+00	4.49E-06	8.98E-06
Cl-36	1.3124E-32	784.13	1,568.26	0.00E+00	1.03E-29	2.06E-29
Cm-243	2.3676E-07	784.13	1,568.26	0.00E+00	1.86E-04	3.71E-04
Cm-244	5.2042E-05	784.13	1,568.26	0.00E+00	4.08E-02	8.16E-02
Co-60	3.8208E-05	784.13	1,568.26	0.00E+00	3.00E-02	5.99E-02
Cs-134	4.8693E-01	784.13	1,568.26	0.00E+00	3.82E+02	7.64E+02
Cs-135	3.4477E-06	784.13	1,568.26	0.00E+00	2.70E-03	5.41E-03
Cs-137	2.8731E+00	784.13	1,568.26	0.00E+00	2.25E+03	4.51E+03
Eu-154	8.2053E-02	784.13	1,568.26	0.00E+00	6.43E+01	1.29E+02
Eu-155	3.9134E-02	784.13	1,568.26	0.00E+00	3.07E+01	6.14E+01
Fe-55	6.7429E-03	784.13	1,568.26	0.00E+00	5.29E+00	1.06E+01
H-3	1.0599E-02	784.13	1,568.26	0.00E+00	8.31E+00	1.66E+01
I-129	7.5300E-07	784.13	1,568.26	0.00E+00	5.90E-04	1.18E-03
Kr-85	2.8595E-01	784.13	1,568.26	0.00E+00	2.24E+02	4.48E+02
Np-237	9.5479E-06	784.13	1,568.26	0.00E+00	7.49E-03	1.50E-02
Pa-231	8.9297E-10	784.13	1,568.26	0.00E+00	7.00E-07	1.40E-06
Pb-210	3.7609E-12	784.13	1,568.26	0.00E+00	2.95E-09	5.90E-09
Pm-147	2.5452E+00	784.13	1,568.26	0.00E+00	2.00E+03	3.99E+03
Pu-238	2.0550E-02	784.13	1,568.26	0.00E+00	1.61E+01	3.22E+01
Pu-239	4.2838E-04	784.13	1,568.26	0.00E+00	3.36E-01	6.72E-01
Pu-240	2.4401E-04	784.13	1,568.26	0.00E+00	1.91E-01	3.83E-01
Pu-241	6.8764E-02	784.13	1,568.26	0.00E+00	5.39E+01	1.08E+02
Pu-242	3.6329E-07	784.13	1,568.26	0.00E+00	2.85E-04	5.70E-04
Ra-226	3.8045E-11	784.13	1,568.26	0.00E+00	2.98E-08	5.97E-08
Ra-228	2.9902E-15	784.13	1,568.26	0.00E+00	2.34E-12	4.69E-12
Ru-106	1.9055E-01	784.13	1,568.26	0.00E+00	1.49E+02	2.99E+02
Se-79	1.2936E-05	784.13	1,568.26	0.00E+00	1.01E-02	2.03E-02
Sn-126	1.1574E-05	784.13	1,568.26	0.00E+00	9.08E-03	1.82E-02
Sr-90	2.7505E+00	784.13	1,568.26	0.00E+00	2.16E+03	4.31E+03
Tc-99	4.2239E-04	784.13	1,568.26	0.00E+00	3.31E-01	6.62E-01
Th-229	1.8848E-12	784.13	1,568.26	0.00E+00	1.48E-09	2.96E-09
Th-230	1.7042E-08	784.13	1,568.26	0.00E+00	1.34E-05	2.67E-05
Th-232	7.8132E-15	784.13	1,568.26	0.00E+00	6.13E-12	1.23E-11
Tl-208	4.4063E-08	784.13	1,568.26	0.00E+00	3.46E-05	6.91E-05
U-232	1.3151E-07	784.13	1,568.26	0.00E+00	1.03E-04	2.06E-04
U-233	1.9564E-09	784.13	1,568.26	0.00E+00	1.53E-06	3.07E-06
U-234	1.8371E-04	784.13	1,568.26	0.00E+00	1.44E-01	2.88E-01
U-235	-2.7235E-06	784.13	0.00	3.58E-03	1.44E-03	3.58E-03
U-236	1.5493E-05	784.13	1,568.26	0.00E+00	1.21E-02	2.43E-02
U-238	-4.2851E-09	784.13	0.00	4.19E-05	3.85E-05	4.19E-05
Y-90	2.7505E+00	784.13	1,568.26	0.00E+00	2.16E+03	4.31E+03
Other Radionuclides					4.03E+03	8.07E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.026E+14
0.0250	6.518E+13
0.0375	6.015E+13
0.0575	5.914E+13
0.0850	3.771E+13
0.1250	3.265E+13
0.2250	3.196E+13
0.3750	1.547E+13
0.5750	2.125E+14
0.8500	2.976E+13
1.2500	5.536E+12
1.7500	2.322E+11
2.2500	4.869E+11
2.7500	2.801E+09
3.5000	3.107E+08
5.0000	9.289E+02
7.0000	1.036E+02
11.0000	1.167E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.98E+01	7.95E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.00002122	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		784.13	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,568.26	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.40	
Bounding:	2.80	

Estimated EOL HM/Given EOL HM: 1.05

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-LEU) JAPAN
SNF ID #: 552
Fuel Units & Descr: 99 - ASSEMBLY
Heavy Metal Mass: BOL=94.05kg; EOL=84.645kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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: 5 years

Estimated Canister usage: 18"x10" 4.13

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.7533E-10	8,939.12	17,878.25	0.00E+00	1.57E-06	3.13E-06	Avg. MeV	
Am-241	1.2780E-02	8,939.12	17,878.25	0.00E+00	1.14E+02	2.28E+02	0.0150	3.244E+15
Am-242m	9.5467E-06	8,939.12	17,878.25	0.00E+00	8.53E-02	1.71E-01	0.0250	6.989E+14
Am-243	6.4100E-06	8,939.12	17,878.25	0.00E+00	5.73E-02	1.15E-01	0.0375	6.369E+14
C-14	2.9673E-06	8,939.12	17,878.25	0.00E+00	2.65E-04	5.31E-04	0.0575	6.358E+14
Cl-36	5.9513E-35	8,939.12	17,878.25	0.00E+00	5.32E-31	1.06E-30	0.0850	4.004E+14
Cm-243	3.1807E-06	8,939.12	17,878.25	0.00E+00	2.84E-02	5.69E-02	0.1250	3.344E+14
Cm-244	1.9540E-04	8,939.12	17,878.25	0.00E+00	1.75E+00	3.49E+00	0.2250	3.415E+14
Co-60	1.1753E-04	8,939.12	17,878.25	0.00E+00	1.05E+00	2.10E+00	0.3750	1.656E+14
Cs-134	3.3060E-01	8,939.12	17,878.25	0.00E+00	2.96E+03	5.91E+03	0.5750	2.287E+15
Cs-135	4.8607E-06	8,939.12	17,878.25	0.00E+00	4.35E-02	8.69E-02	0.8500	2.425E+14
Cs-137	2.8607E+00	8,939.12	17,878.25	0.00E+00	2.56E+04	5.11E+04	1.2500	5.380E+13
Eu-154	6.9933E-02	8,939.12	17,878.25	0.00E+00	6.25E+02	1.25E+03	1.7500	2.551E+12
Eu-155	3.3253E-02	8,939.12	17,878.25	0.00E+00	2.97E+02	5.95E+02	2.2500	4.437E+12
Fe-55	7.7267E-02	8,939.12	17,878.25	0.00E+00	6.91E+02	1.38E+03	2.7500	4.014E+10
H-3	1.0827E-02	8,939.12	17,878.25	0.00E+00	9.68E+01	1.94E+02	3.5000	4.755E+09
I-129	7.1600E-07	8,939.12	17,878.25	0.00E+00	6.40E-03	1.28E-02	5.0000	4.655E+04
Kr-85	2.7007E-01	8,939.12	17,878.25	0.00E+00	2.41E+03	4.83E+03	7.0000	5.303E+03
Np-237	3.6327E-06	8,939.12	17,878.25	0.00E+00	3.25E-02	6.49E-02	11.0000	6.057E+02
Pa-231	1.1267E-09	8,939.12	17,878.25	0.00E+00	1.01E-05	2.01E-05		
Pb-210	1.9773E-15	8,939.12	17,878.25	0.00E+00	1.77E-11	3.54E-11		
Pm-147	2.4367E+00	8,939.12	17,878.25	0.00E+00	2.18E+04	4.36E+04		
Pu-238	6.2213E-03	8,939.12	17,878.25	0.00E+00	5.56E+01	1.11E+02		
Pu-239	1.0320E-02	8,939.12	17,878.25	0.00E+00	9.23E+01	1.85E+02		
Pu-240	5.4260E-03	8,939.12	17,878.25	0.00E+00	4.85E+01	9.70E+01		
Pu-241	7.7333E-01	8,939.12	17,878.25	0.00E+00	6.91E+03	1.38E+04		
Pu-242	3.0713E-06	8,939.12	17,878.25	0.00E+00	2.75E-02	5.49E-02		
Ra-226	2.2027E-14	8,939.12	17,878.25	0.00E+00	1.97E-10	3.94E-10		
Ra-228	2.6333E-15	8,939.12	17,878.25	0.00E+00	2.35E-11	4.71E-11		
Ru-106	2.5580E-01	8,939.12	17,878.25	0.00E+00	2.29E+03	4.57E+03		
Se-79	1.2540E-05	8,939.12	17,878.25	0.00E+00	1.12E-01	2.24E-01		
Sn-126	1.1393E-05	8,939.12	17,878.25	0.00E+00	1.02E-01	2.04E-01		
Sr-90	2.6293E+00	8,939.12	17,878.25	0.00E+00	2.35E+04	4.70E+04		
Tc-99	4.3540E-04	8,939.12	17,878.25	0.00E+00	3.89E+00	7.78E+00		
Th-229	1.3653E-13	8,939.12	17,878.25	0.00E+00	1.22E-09	2.44E-09		
Th-230	1.2607E-11	8,939.12	17,878.25	0.00E+00	1.13E-07	2.25E-07		
Th-232	6.7400E-15	8,939.12	17,878.25	0.00E+00	6.02E-11	1.20E-10		
Tl-208	7.4667E-09	8,939.12	17,878.25	0.00E+00	6.67E-05	1.33E-04		
U-232	2.1927E-08	8,939.12	17,878.25	0.00E+00	1.96E-04	3.92E-04		
U-233	1.9920E-10	8,939.12	17,878.25	0.00E+00	1.78E-06	3.56E-06		
U-234	2.2487E-07	8,939.12	17,878.25	0.00E+00	2.01E-03	4.02E-03		
U-235	-2.5341E-06	8,939.12	0.00	4.06E-02	1.80E-02	4.06E-02		
U-236	1.3000E-05	8,939.12	17,878.25	0.00E+00	1.16E-01	2.32E-01		
U-238	-1.4207E-08	8,939.12	0.00	2.53E-02	2.52E-02	2.53E-02		
Y-90	2.6300E+00	8,939.12	17,878.25	0.00E+00	2.35E+04	4.70E+04		
Other Radionuclides					4.22E+04	8.44E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.23E+02	8.46E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		8,939.12	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		17,878.25	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	2.17		1.03
Bounding:	4.34		

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C (UALX-LEU) PORTUGAL
SNF ID #: 540
Fuel Units & Descr: 9 - ASSEMBLY
Heavy Metal Mass: BOL=4.05kg; EOL=3.912kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 0.38

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	1.4545E-10	130.40	260.81	0.00E+00	1.90E-08	3.79E-08
Am-241	1.1190E-03	130.40	260.81	0.00E+00	1.46E-01	2.92E-01
Am-242m	4.5425E-07	130.40	260.81	0.00E+00	5.92E-05	1.18E-04
Am-243	1.4921E-06	130.40	260.81	0.00E+00	1.95E-04	3.89E-04
C-14	5.7244E-09	130.40	260.81	0.00E+00	7.46E-07	1.49E-06
Cl-36	1.3124E-32	130.40	260.81	0.00E+00	1.71E-30	3.42E-30
Cm-243	2.3676E-07	130.40	260.81	0.00E+00	3.09E-05	6.18E-05
Cm-244	5.2042E-05	130.40	260.81	0.00E+00	6.79E-03	1.36E-02
Co-60	3.8208E-05	130.40	260.81	0.00E+00	4.98E-03	9.97E-03
Cs-134	4.8693E-01	130.40	260.81	0.00E+00	6.35E+01	1.27E+02
Cs-135	3.4477E-06	130.40	260.81	0.00E+00	4.50E-04	8.99E-04
Cs-137	2.8731E+00	130.40	260.81	0.00E+00	3.75E+02	7.49E+02
Eu-154	8.2053E-02	130.40	260.81	0.00E+00	1.07E+01	2.14E+01
Eu-155	3.9134E-02	130.40	260.81	0.00E+00	5.10E+00	1.02E+01
Fe-55	6.7429E-03	130.40	260.81	0.00E+00	8.79E-01	1.76E+00
H-3	1.0599E-02	130.40	260.81	0.00E+00	1.38E+00	2.76E+00
I-129	7.5300E-07	130.40	260.81	0.00E+00	9.82E-05	1.96E-04
Kr-85	2.8595E-01	130.40	260.81	0.00E+00	3.73E+01	7.46E+01
Np-237	9.5479E-06	130.40	260.81	0.00E+00	1.25E-03	2.49E-03
Pa-231	8.9297E-10	130.40	260.81	0.00E+00	1.16E-07	2.33E-07
Pb-210	3.7609E-12	130.40	260.81	0.00E+00	4.90E-10	9.81E-10
Pm-147	2.5452E+00	130.40	260.81	0.00E+00	3.32E+02	6.64E+02
Pu-238	2.0550E-02	130.40	260.81	0.00E+00	2.68E+00	5.36E+00
Pu-239	4.2838E-04	130.40	260.81	0.00E+00	5.59E-02	1.12E-01
Pu-240	2.4401E-04	130.40	260.81	0.00E+00	3.18E-02	6.36E-02
Pu-241	6.8764E-02	130.40	260.81	0.00E+00	8.97E+00	1.79E+01
Pu-242	3.6329E-07	130.40	260.81	0.00E+00	4.74E-05	9.47E-05
Ra-226	3.8045E-11	130.40	260.81	0.00E+00	4.96E-09	9.92E-09
Ra-228	2.9902E-15	130.40	260.81	0.00E+00	3.90E-13	7.80E-13
Ru-106	1.9055E-01	130.40	260.81	0.00E+00	2.48E+01	4.97E+01
Se-79	1.2936E-05	130.40	260.81	0.00E+00	1.69E-03	3.37E-03
Sn-126	1.1574E-05	130.40	260.81	0.00E+00	1.51E-03	3.02E-03
Sr-90	2.7505E+00	130.40	260.81	0.00E+00	3.59E+02	7.17E+02
Tc-99	4.2239E-04	130.40	260.81	0.00E+00	5.51E-02	1.10E-01
Th-229	1.8848E-12	130.40	260.81	0.00E+00	2.46E-10	4.92E-10
Th-230	1.7042E-08	130.40	260.81	0.00E+00	2.22E-06	4.44E-06
Th-232	7.8132E-15	130.40	260.81	0.00E+00	1.02E-12	2.04E-12
Tl-208	4.4063E-08	130.40	260.81	0.00E+00	5.75E-06	1.15E-05
U-232	1.3151E-07	130.40	260.81	0.00E+00	1.71E-05	3.43E-05
U-233	1.9564E-09	130.40	260.81	0.00E+00	2.55E-07	5.10E-07
U-234	1.8371E-04	130.40	260.81	0.00E+00	2.40E-02	4.79E-02
U-235	-2.7235E-06	130.40	0.00	1.75E-03	1.40E-03	1.75E-03
U-236	1.5493E-05	130.40	260.81	0.00E+00	2.02E-03	4.04E-03
U-238	-4.2851E-09	130.40	0.00	1.09E-03	1.09E-03	1.09E-03
Y-90	2.7505E+00	130.40	260.81	0.00E+00	3.59E+02	7.17E+02
Other Radionuclides					6.71E+02	1.34E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.032E+13
0.0250	1.084E+13
0.0375	1.000E+13
0.0575	9.836E+12
0.0850	6.271E+12
0.1250	5.430E+12
0.2250	5.315E+12
0.3750	2.573E+12
0.5750	3.534E+13
0.8500	4.949E+12
1.2500	9.207E+11
1.7500	3.861E+10
2.2500	8.098E+10
2.7500	4.659E+08
3.5000	5.167E+07
5.0000	1.570E+02
7.0000	1.751E+01
11.0000	1.974E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.61E+00	1.32E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000132	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		130.40
Bounding:		260.81

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.10	
Bounding:	0.20	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C1 (UALX-HEU) SWITZERLAND
SNF ID #: 656
Fuel Units & Descr: 7 - MTR TYPE
Heavy Metal Mass: BOL=1.28kg; EOL=0.518kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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"x18" 0.29

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	721.25	1,211.81	0.00E+00	1.05E-07	1.76E-07
Am-241	1.1190E-03	721.25	1,211.81	0.00E+00	8.07E-01	1.36E+00
Am-242m	4.5425E-07	721.25	1,211.81	0.00E+00	3.28E-04	5.50E-04
Am-243	1.4921E-06	721.25	1,211.81	0.00E+00	1.08E-03	1.81E-03
C-14	5.7244E-09	721.25	1,211.81	0.00E+00	4.13E-06	6.94E-06
Cl-36	1.3124E-32	721.25	1,211.81	0.00E+00	9.47E-30	1.59E-29
Cm-243	2.3676E-07	721.25	1,211.81	0.00E+00	1.71E-04	2.87E-04
Cm-244	5.2042E-05	721.25	1,211.81	0.00E+00	3.75E-02	6.31E-02
Co-60	3.8208E-05	721.25	1,211.81	0.00E+00	2.76E-02	4.63E-02
Cs-134	4.8693E-01	721.25	1,211.81	0.00E+00	3.51E+02	5.90E+02
Cs-135	3.4477E-06	721.25	1,211.81	0.00E+00	2.49E-03	4.18E-03
Cs-137	2.8731E+00	721.25	1,211.81	0.00E+00	2.07E+03	3.48E+03
Eu-154	8.2053E-02	721.25	1,211.81	0.00E+00	5.92E+01	9.94E+01
Eu-155	3.9134E-02	721.25	1,211.81	0.00E+00	2.82E+01	4.74E+01
Fe-55	6.7429E-03	721.25	1,211.81	0.00E+00	4.86E+00	8.17E+00
H-3	1.0599E-02	721.25	1,211.81	0.00E+00	7.64E+00	1.28E+01
I-129	7.5300E-07	721.25	1,211.81	0.00E+00	5.43E-04	9.12E-04
Kr-85	2.8595E-01	721.25	1,211.81	0.00E+00	2.06E+02	3.47E+02
Np-237	9.5479E-06	721.25	1,211.81	0.00E+00	6.89E-03	1.16E-02
Pa-231	8.9297E-10	721.25	1,211.81	0.00E+00	6.44E-07	1.08E-06
Pb-210	3.7609E-12	721.25	1,211.81	0.00E+00	2.71E-09	4.56E-09
Pm-147	2.5452E+00	721.25	1,211.81	0.00E+00	1.84E+03	3.08E+03
Pu-238	2.0550E-02	721.25	1,211.81	0.00E+00	1.48E+01	2.49E+01
Pu-239	4.2838E-04	721.25	1,211.81	0.00E+00	3.09E-01	5.19E-01
Pu-240	2.4401E-04	721.25	1,211.81	0.00E+00	1.76E-01	2.96E-01
Pu-241	6.8764E-02	721.25	1,211.81	0.00E+00	4.96E+01	8.33E+01
Pu-242	3.6329E-07	721.25	1,211.81	0.00E+00	2.62E-04	4.40E-04
Ra-226	3.8045E-11	721.25	1,211.81	0.00E+00	2.74E-08	4.61E-08
Ra-228	2.9902E-15	721.25	1,211.81	0.00E+00	2.16E-12	3.62E-12
Ru-106	1.9055E-01	721.25	1,211.81	0.00E+00	1.37E+02	2.31E+02
Se-79	1.2936E-05	721.25	1,211.81	0.00E+00	9.33E-03	1.57E-02
Sn-126	1.1574E-05	721.25	1,211.81	0.00E+00	8.35E-03	1.40E-02
Sr-90	2.7505E+00	721.25	1,211.81	0.00E+00	1.98E+03	3.33E+03
Tc-99	4.2239E-04	721.25	1,211.81	0.00E+00	3.05E-01	5.12E-01
Th-229	1.8848E-12	721.25	1,211.81	0.00E+00	1.36E-09	2.28E-09
Th-230	1.7042E-08	721.25	1,211.81	0.00E+00	1.23E-05	2.07E-05
Th-232	7.8132E-15	721.25	1,211.81	0.00E+00	5.64E-12	9.47E-12
Tl-208	4.4063E-08	721.25	1,211.81	0.00E+00	3.18E-05	5.34E-05
U-232	1.3151E-07	721.25	1,211.81	0.00E+00	9.49E-05	1.59E-04
U-233	1.9564E-09	721.25	1,211.81	0.00E+00	1.41E-06	2.37E-06
U-234	1.8371E-04	721.25	1,211.81	0.00E+00	1.33E-01	2.23E-01
U-235	-2.7235E-06	721.25	0.00	2.57E-03	6.07E-04	2.57E-03
U-236	1.5493E-05	721.25	1,211.81	0.00E+00	1.12E-02	1.88E-02
U-238	-4.2851E-09	721.25	0.00	3.01E-05	2.70E-05	3.01E-05
Y-90	2.7505E+00	721.25	1,211.81	0.00E+00	1.98E+03	3.33E+03
Other Radionuclides					3.71E+03	6.23E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.338E+14
0.0250	5.037E+13
0.0375	4.648E+13
0.0575	4.570E+13
0.0850	2.913E+13
0.1250	2.523E+13
0.2250	2.469E+13
0.3750	1.195E+13
0.5750	1.642E+14
0.8500	2.299E+13
1.2500	4.278E+12
1.7500	1.794E+11
2.2500	3.763E+11
2.7500	2.165E+09
3.5000	2.401E+08
5.0000	7.178E+02
7.0000	8.001E+01
11.0000	9.019E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.66E+01	6.14E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.9999987	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		721.25
Bounding:		1,211.81

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.79	
Bounding:	3.01	

Estimated EOL HM/Given EOL HM: 1.09

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C2 (U3Si2 LEU) TURKEY
SNF ID #: 527
Fuel Units & Descr: 9 - ASSEMBLY
Heavy Metal Mass: BOL=13.95kg; EOL=12.276kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10'
0.38

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	1,585.31	3,170.62	0.00E+00	2.31E-07	4.61E-07	Avg. MeV	
Am-241	1.1190E-03	1,585.31	3,170.62	0.00E+00	1.77E+00	3.55E+00	0.0150	6.117E+14
Am-242m	4.5425E-07	1,585.31	3,170.62	0.00E+00	7.20E-04	1.44E-03	0.0250	1.318E+14
Am-243	1.4921E-06	1,585.31	3,170.62	0.00E+00	2.37E-03	4.73E-03	0.0375	1.216E+14
C-14	5.7244E-09	1,585.31	3,170.62	0.00E+00	9.07E-06	1.81E-05	0.0575	1.196E+14
Cl-36	1.3124E-32	1,585.31	3,170.62	0.00E+00	2.08E-29	4.16E-29	0.0850	7.623E+13
Cm-243	2.3676E-07	1,585.31	3,170.62	0.00E+00	3.75E-04	7.51E-04	0.1250	6.601E+13
Cm-244	5.2042E-05	1,585.31	3,170.62	0.00E+00	8.25E-02	1.65E-01	0.2250	6.461E+13
Co-60	3.8208E-05	1,585.31	3,170.62	0.00E+00	6.06E-02	1.21E-01	0.3750	3.127E+13
Cs-134	4.8693E-01	1,585.31	3,170.62	0.00E+00	7.72E+02	1.54E+03	0.5750	4.296E+14
Cs-135	3.4477E-06	1,585.31	3,170.62	0.00E+00	5.47E-03	1.09E-02	0.8500	6.016E+13
Cs-137	2.8731E+00	1,585.31	3,170.62	0.00E+00	4.55E+03	9.11E+03	1.2500	1.119E+13
Eu-154	8.2053E-02	1,585.31	3,170.62	0.00E+00	1.30E+02	2.60E+02	1.7500	4.694E+11
Eu-155	3.9134E-02	1,585.31	3,170.62	0.00E+00	6.20E+01	1.24E+02	2.2500	9.845E+11
Fe-55	6.7429E-03	1,585.31	3,170.62	0.00E+00	1.07E+01	2.14E+01	2.7500	5.664E+09
H-3	1.0599E-02	1,585.31	3,170.62	0.00E+00	1.68E+01	3.36E+01	3.5000	6.282E+06
I-129	7.5300E-07	1,585.31	3,170.62	0.00E+00	1.19E-03	2.39E-03	5.0000	1.886E+03
Kr-85	2.8595E-01	1,585.31	3,170.62	0.00E+00	4.53E+02	9.07E+02	7.0000	2.103E+02
Np-237	9.5479E-06	1,585.31	3,170.62	0.00E+00	1.51E-02	3.03E-02	11.0000	2.371E+01
Pa-231	8.9297E-10	1,585.31	3,170.62	0.00E+00	1.42E-06	2.83E-06		
Pb-210	3.7609E-12	1,585.31	3,170.62	0.00E+00	5.96E-09	1.19E-08		
Pm-147	2.5452E+00	1,585.31	3,170.62	0.00E+00	4.03E+03	8.07E+03		
Pu-238	2.0550E-02	1,585.31	3,170.62	0.00E+00	3.26E+01	6.52E+01		
Pu-239	4.2838E-04	1,585.31	3,170.62	0.00E+00	6.79E-01	1.36E+00		
Pu-240	2.4401E-04	1,585.31	3,170.62	0.00E+00	3.87E-01	7.74E-01		
Pu-241	6.8764E-02	1,585.31	3,170.62	0.00E+00	1.09E+02	2.18E+02		
Pu-242	3.6329E-07	1,585.31	3,170.62	0.00E+00	5.76E-04	1.15E-03		
Ra-226	3.8045E-11	1,585.31	3,170.62	0.00E+00	6.03E-08	1.21E-07		
Ra-228	2.9902E-15	1,585.31	3,170.62	0.00E+00	4.74E-12	9.48E-12		
Ru-106	1.9055E-01	1,585.31	3,170.62	0.00E+00	3.02E+02	6.04E+02		
Se-79	1.2936E-05	1,585.31	3,170.62	0.00E+00	2.05E-02	4.10E-02		
Sn-126	1.1574E-05	1,585.31	3,170.62	0.00E+00	1.83E-02	3.67E-02		
Sr-90	2.7505E+00	1,585.31	3,170.62	0.00E+00	4.36E+03	8.72E+03		
Tc-99	4.2239E-04	1,585.31	3,170.62	0.00E+00	6.70E-01	1.34E+00		
Th-229	1.8848E-12	1,585.31	3,170.62	0.00E+00	2.99E-09	5.98E-09		
Th-230	1.7042E-06	1,585.31	3,170.62	0.00E+00	2.70E-05	5.40E-05		
Th-232	7.8132E-15	1,585.31	3,170.62	0.00E+00	1.24E-11	2.48E-11		
Tl-208	4.4063E-08	1,585.31	3,170.62	0.00E+00	6.99E-05	1.40E-04		
U-232	1.3151E-07	1,585.31	3,170.62	0.00E+00	2.08E-04	4.17E-04		
U-233	1.9564E-09	1,585.31	3,170.62	0.00E+00	3.10E-06	6.20E-06		
U-234	1.8371E-04	1,585.31	3,170.62	0.00E+00	2.91E-01	5.82E-01		
U-235	-2.7235E-06	1,585.31	0.00	6.03E-03	1.71E-03	6.03E-03		
U-236	1.5493E-05	1,585.31	3,170.62	0.00E+00	2.46E-02	4.91E-02		
U-238	-4.2851E-09	1,585.31	0.00	3.75E-03	3.74E-03	3.75E-03		
Y-90	2.7505E+00	1,585.31	3,170.62	0.00E+00	4.36E+03	8.72E+03		
Other Radionuclides					8.15E+03	1.63E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.04E+01	1.61E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000077	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,585.31
Bounding:		3,170.62

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.36	
Bounding:	0.72	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-C2 (UALX-HEU) SWITZERLAND
SNF ID #: 657
Fuel Units & Descr: 11 - MTR TYPE
Heavy Metal Mass: BOL=2.461kg; EOL=0.995kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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"x18" 0.46

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	1,387.57	2,330.33	0.00E+00	2.02E-07	3.39E-07
Am-241	1.1190E-03	1,387.57	2,330.33	0.00E+00	1.55E+00	2.61E+00
Am-242m	4.5425E-07	1,387.57	2,330.33	0.00E+00	6.30E-04	1.06E-03
Am-243	1.4921E-06	1,387.57	2,330.33	0.00E+00	2.07E-03	3.48E-03
C-14	5.7244E-09	1,387.57	2,330.33	0.00E+00	7.94E-06	1.33E-05
Cl-36	1.3124E-32	1,387.57	2,330.33	0.00E+00	1.82E-29	3.06E-29
Cm-243	2.3676E-07	1,387.57	2,330.33	0.00E+00	3.29E-04	5.52E-04
Cm-244	5.2042E-05	1,387.57	2,330.33	0.00E+00	7.22E-02	1.21E-01
Co-60	3.8208E-05	1,387.57	2,330.33	0.00E+00	5.30E-02	8.90E-02
Cs-134	4.8693E-01	1,387.57	2,330.33	0.00E+00	6.76E+02	1.13E+03
Cs-135	3.4477E-06	1,387.57	2,330.33	0.00E+00	4.78E-03	8.03E-03
Cs-137	2.8731E+00	1,387.57	2,330.33	0.00E+00	3.99E+03	6.70E+03
Eu-154	8.2053E-02	1,387.57	2,330.33	0.00E+00	1.14E+02	1.91E+02
Eu-155	3.9134E-02	1,387.57	2,330.33	0.00E+00	5.43E+01	9.12E+01
Fe-55	6.7429E-03	1,387.57	2,330.33	0.00E+00	9.36E+00	1.57E+01
H-3	1.0599E-02	1,387.57	2,330.33	0.00E+00	1.47E+01	2.47E+01
I-129	7.5300E-07	1,387.57	2,330.33	0.00E+00	1.04E-03	1.75E-03
Kr-85	2.8595E-01	1,387.57	2,330.33	0.00E+00	3.97E+02	6.66E+02
Np-237	9.5479E-06	1,387.57	2,330.33	0.00E+00	1.32E-02	2.22E-02
Pa-231	8.9297E-10	1,387.57	2,330.33	0.00E+00	1.24E-06	2.08E-06
Pb-210	3.7609E-12	1,387.57	2,330.33	0.00E+00	5.22E-09	8.76E-09
Pm-147	2.5452E+00	1,387.57	2,330.33	0.00E+00	3.53E+03	5.93E+03
Pu-238	2.0550E-02	1,387.57	2,330.33	0.00E+00	2.85E+01	4.79E+01
Pu-239	4.2838E-04	1,387.57	2,330.33	0.00E+00	5.94E-01	9.98E-01
Pu-240	2.4401E-04	1,387.57	2,330.33	0.00E+00	3.39E-01	5.69E-01
Pu-241	6.8764E-02	1,387.57	2,330.33	0.00E+00	9.54E+01	1.60E+02
Pu-242	3.6329E-07	1,387.57	2,330.33	0.00E+00	5.04E-04	8.47E-04
Ra-226	3.8045E-11	1,387.57	2,330.33	0.00E+00	5.28E-08	8.87E-08
Ra-228	2.9902E-15	1,387.57	2,330.33	0.00E+00	4.15E-12	6.97E-12
Ru-106	1.9055E-01	1,387.57	2,330.33	0.00E+00	2.64E+02	4.44E+02
Se-79	1.2936E-05	1,387.57	2,330.33	0.00E+00	1.79E-02	3.01E-02
Sn-126	1.1574E-05	1,387.57	2,330.33	0.00E+00	1.61E-02	2.70E-02
Sr-90	2.7505E+00	1,387.57	2,330.33	0.00E+00	3.82E+03	6.41E+03
Tc-99	4.2239E-04	1,387.57	2,330.33	0.00E+00	5.86E-01	9.84E-01
Th-229	1.8848E-12	1,387.57	2,330.33	0.00E+00	2.62E-09	4.39E-09
Th-230	1.7042E-08	1,387.57	2,330.33	0.00E+00	2.36E-05	3.97E-05
Th-232	7.8132E-15	1,387.57	2,330.33	0.00E+00	1.08E-11	1.82E-11
Tl-208	4.4063E-08	1,387.57	2,330.33	0.00E+00	6.11E-05	1.03E-04
U-232	1.3151E-07	1,387.57	2,330.33	0.00E+00	1.82E-04	3.06E-04
U-233	1.9564E-09	1,387.57	2,330.33	0.00E+00	2.71E-06	4.56E-06
U-234	1.8371E-04	1,387.57	2,330.33	0.00E+00	2.55E-01	4.28E-01
U-235	-2.7235E-06	1,387.57	0.00	4.95E-03	1.17E-03	4.95E-03
U-236	1.5493E-05	1,387.57	2,330.33	0.00E+00	2.15E-02	3.61E-02
U-238	-4.2851E-09	1,387.57	0.00	5.79E-05	5.19E-05	5.79E-05
Y-90	2.7505E+00	1,387.57	2,330.33	0.00E+00	3.82E+03	6.41E+03
Other Radionuclides					7.14E+03	1.20E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.496E+14
0.0250	9.686E+13
0.0375	8.938E+13
0.0575	8.788E+13
0.0850	5.603E+13
0.1250	4.852E+13
0.2250	4.749E+13
0.3750	2.299E+13
0.5750	3.157E+14
0.8500	4.422E+13
1.2500	8.226E+12
1.7500	3.450E+11
2.2500	7.236E+11
2.7500	4.163E+09
3.5000	4.617E+08
5.0000	1.380E+03
7.0000	1.539E+02
11.0000	1.734E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.04E+01	1.18E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.00001008	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,387.57
Bounding:		2,330.33

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.79	
Bounding:	3.01	

Estimated EOL HM/Given EOL HM: 1.09

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-O (UALX-HEU) TURKEY
SNF ID #: 642
Fuel Units & Descr: 2 - MTR TYPE
Heavy Metal Mass: BOL=0.366kg; EOL=0.196kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10'
0.08

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	160.99	321.99	0.00E+00	2.34E-08	4.68E-08
Am-241	1.1190E-03	160.99	321.99	0.00E+00	1.80E-01	3.60E-01
Am-242m	4.5425E-07	160.99	321.99	0.00E+00	7.31E-05	1.46E-04
Am-243	1.4921E-06	160.99	321.99	0.00E+00	2.40E-04	4.80E-04
C-14	5.7244E-09	160.99	321.99	0.00E+00	9.22E-07	1.84E-06
Cl-36	1.3124E-32	160.99	321.99	0.00E+00	2.11E-30	4.23E-30
Cm-243	2.3676E-07	160.99	321.99	0.00E+00	3.81E-05	7.62E-05
Cm-244	5.2042E-05	160.99	321.99	0.00E+00	8.38E-03	1.68E-02
Co-60	3.8208E-05	160.99	321.99	0.00E+00	6.15E-03	1.23E-02
Cs-134	4.8693E-01	160.99	321.99	0.00E+00	7.84E+01	1.57E+02
Cs-135	3.4477E-06	160.99	321.99	0.00E+00	5.55E-04	1.11E-03
Cs-137	2.8731E+00	160.99	321.99	0.00E+00	4.63E+02	9.25E+02
Eu-154	8.2053E-02	160.99	321.99	0.00E+00	1.32E+01	2.64E+01
Eu-155	3.9134E-02	160.99	321.99	0.00E+00	6.30E+00	1.26E+01
Fe-55	6.7429E-03	160.99	321.99	0.00E+00	1.09E+00	2.17E+00
H-3	1.0599E-02	160.99	321.99	0.00E+00	1.71E+00	3.41E+00
I-129	7.5300E-07	160.99	321.99	0.00E+00	1.21E-04	2.42E-04
Kr-85	2.8595E-01	160.99	321.99	0.00E+00	4.60E+01	9.21E+01
Np-237	9.5479E-06	160.99	321.99	0.00E+00	1.54E-03	3.07E-03
Pa-231	8.9297E-10	160.99	321.99	0.00E+00	1.44E-07	2.88E-07
Pb-210	3.7609E-12	160.99	321.99	0.00E+00	6.05E-10	1.21E-09
Pm-147	2.5452E+00	160.99	321.99	0.00E+00	4.10E+02	8.20E+02
Pu-238	2.0550E-02	160.99	321.99	0.00E+00	3.31E+00	6.62E+00
Pu-239	4.2838E-04	160.99	321.99	0.00E+00	6.90E-02	1.38E-01
Pu-240	2.4401E-04	160.99	321.99	0.00E+00	3.93E-02	7.86E-02
Pu-241	6.8764E-02	160.99	321.99	0.00E+00	1.11E+01	2.21E+01
Pu-242	3.6329E-07	160.99	321.99	0.00E+00	5.85E-05	1.17E-04
Ra-226	3.8045E-11	160.99	321.99	0.00E+00	6.12E-09	1.22E-08
Ra-228	2.9902E-15	160.99	321.99	0.00E+00	4.81E-13	9.63E-13
Ru-106	1.9055E-01	160.99	321.99	0.00E+00	3.07E+01	6.14E+01
Se-79	1.2936E-05	160.99	321.99	0.00E+00	2.08E-03	4.17E-03
Sn-126	1.1574E-05	160.99	321.99	0.00E+00	1.86E-03	3.73E-03
Sr-90	2.7505E+00	160.99	321.99	0.00E+00	4.43E+02	8.86E+02
Tc-99	4.2239E-04	160.99	321.99	0.00E+00	6.80E-02	1.36E-01
Th-229	1.8848E-12	160.99	321.99	0.00E+00	3.03E-10	6.07E-10
Th-230	1.7042E-08	160.99	321.99	0.00E+00	2.74E-06	5.49E-06
Th-232	7.8132E-15	160.99	321.99	0.00E+00	1.26E-12	2.52E-12
Tl-208	4.4063E-08	160.99	321.99	0.00E+00	7.09E-06	1.42E-05
U-232	1.3151E-07	160.99	321.99	0.00E+00	2.12E-05	4.23E-05
U-233	1.9564E-09	160.99	321.99	0.00E+00	3.15E-07	6.30E-07
U-234	1.8371E-04	160.99	321.99	0.00E+00	2.96E-02	5.92E-02
U-235	-2.7235E-06	160.99	0.00	7.35E-04	2.96E-04	7.35E-04
U-236	1.5493E-05	160.99	321.99	0.00E+00	2.49E-03	4.99E-03
U-238	-4.2851E-09	160.99	0.00	8.60E-06	7.91E-06	8.60E-06
Y-90	2.7505E+00	160.99	321.99	0.00E+00	4.43E+02	8.86E+02
Other Radionuclides					8.28E+02	1.66E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.212E+13
0.0250	1.338E+13
0.0375	1.235E+13
0.0575	1.214E+13
0.0850	7.741E+12
0.1250	6.704E+12
0.2250	6.561E+12
0.3750	3.176E+12
0.5750	4.363E+13
0.8500	6.109E+12
1.2500	1.137E+12
1.7500	4.767E+10
2.2500	9.997E+10
2.7500	5.752E+08
3.5000	6.379E+07
5.0000	1.907E+02
7.0000	2.126E+01
11.0000	2.396E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.16E+00	1.63E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.9999987	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		160.99	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		321.99	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.40	
Bounding:	2.80	

Estimated EOL HM/Given EOL HM: 1.05

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-O (UALX-LEU) PORTUGAL
SNF ID #: 541
Fuel Units & Descr: 3 - ASSEMBLY
Heavy Metal Mass: BOL=1.35kg; EOL=1.35kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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"x18" 0.13

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	1.4545E-10	25.57	51.14	0.00E+00	3.72E-09	7.44E-09
Am-241	1.1190E-03	25.57	51.14	0.00E+00	2.86E-02	5.72E-02
Am-242m	4.5425E-07	25.57	51.14	0.00E+00	1.16E-05	2.32E-05
Am-243	1.4921E-06	25.57	51.14	0.00E+00	3.82E-05	7.63E-05
C-14	5.7244E-09	25.57	51.14	0.00E+00	1.46E-07	2.93E-07
Cl-36	1.3124E-32	25.57	51.14	0.00E+00	3.36E-31	6.71E-31
Cm-243	2.3676E-07	25.57	51.14	0.00E+00	6.05E-06	1.21E-05
Cm-244	5.2042E-05	25.57	51.14	0.00E+00	1.33E-03	2.66E-03
Co-60	3.8208E-05	25.57	51.14	0.00E+00	9.77E-04	1.95E-03
Cs-134	4.8693E-01	25.57	51.14	0.00E+00	1.25E+01	2.49E+01
Cs-135	3.4477E-06	25.57	51.14	0.00E+00	8.82E-05	1.76E-04
Cs-137	2.8731E+00	25.57	51.14	0.00E+00	7.35E+01	1.47E+02
Eu-154	8.2053E-02	25.57	51.14	0.00E+00	2.10E+00	4.20E+00
Eu-155	3.9134E-02	25.57	51.14	0.00E+00	1.00E+00	2.00E+00
Fe-55	6.7429E-03	25.57	51.14	0.00E+00	1.72E-01	3.45E-01
H-3	1.0599E-02	25.57	51.14	0.00E+00	2.71E-01	5.42E-01
I-129	7.5300E-07	25.57	51.14	0.00E+00	1.93E-05	3.85E-05
Kr-85	2.8595E-01	25.57	51.14	0.00E+00	7.31E+00	1.46E+01
Np-237	9.5479E-06	25.57	51.14	0.00E+00	2.44E-04	4.88E-04
Pa-231	8.9297E-10	25.57	51.14	0.00E+00	2.28E-08	4.57E-08
Pb-210	3.7609E-12	25.57	51.14	0.00E+00	9.62E-11	1.92E-10
Pm-147	2.5452E+00	25.57	51.14	0.00E+00	6.51E+01	1.30E+02
Pu-238	2.0550E-02	25.57	51.14	0.00E+00	5.25E-01	1.05E+00
Pu-239	4.2838E-04	25.57	51.14	0.00E+00	1.10E-02	2.19E-02
Pu-240	2.4401E-04	25.57	51.14	0.00E+00	6.24E-03	1.25E-02
Pu-241	6.8764E-02	25.57	51.14	0.00E+00	1.76E+00	3.52E+00
Pu-242	3.6329E-07	25.57	51.14	0.00E+00	9.29E-06	1.86E-05
Ra-226	3.8045E-11	25.57	51.14	0.00E+00	9.73E-10	1.95E-09
Ra-228	2.9902E-15	25.57	51.14	0.00E+00	7.65E-14	1.53E-13
Ru-106	1.9055E-01	25.57	51.14	0.00E+00	4.87E+00	9.74E+00
Se-79	1.2936E-05	25.57	51.14	0.00E+00	3.31E-04	6.62E-04
Sn-126	1.1574E-05	25.57	51.14	0.00E+00	2.96E-04	5.92E-04
Sr-90	2.7505E+00	25.57	51.14	0.00E+00	7.03E+01	1.41E+02
Tc-99	4.2239E-04	25.57	51.14	0.00E+00	1.08E-02	2.16E-02
Th-229	1.8848E-12	25.57	51.14	0.00E+00	4.82E-11	9.64E-11
Th-230	1.7042E-08	25.57	51.14	0.00E+00	4.36E-07	8.72E-07
Th-232	7.8132E-15	25.57	51.14	0.00E+00	2.00E-13	4.00E-13
Tl-208	4.4063E-08	25.57	51.14	0.00E+00	1.13E-06	2.25E-06
U-232	1.3151E-07	25.57	51.14	0.00E+00	3.36E-06	6.73E-06
U-233	1.9564E-09	25.57	51.14	0.00E+00	5.00E-08	1.00E-07
U-234	1.8371E-04	25.57	51.14	0.00E+00	4.70E-03	9.39E-03
U-235	-2.7235E-06	25.57	0.00	5.83E-04	5.14E-04	5.83E-04
U-236	1.5493E-05	25.57	51.14	0.00E+00	3.96E-04	7.92E-04
U-238	-4.2851E-09	25.57	0.00	3.63E-04	3.63E-04	3.63E-04
Y-90	2.7505E+00	25.57	51.14	0.00E+00	7.03E+01	1.41E+02
Other Radionuclides					1.32E+02	2.63E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.866E+12
0.0250	2.125E+12
0.0375	1.981E+12
0.0575	1.929E+12
0.0850	1.230E+12
0.1250	1.065E+12
0.2250	1.042E+12
0.3750	5.044E+11
0.5750	6.929E+12
0.8500	9.703E+11
1.2500	1.805E+11
1.7500	7.570E+09
2.2500	1.588E+10
2.7500	9.135E+07
3.5000	1.013E+07
5.0000	3.113E+01
7.0000	3.473E+00
11.0000	3.917E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.30E+00	2.59E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000132	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		25.57
Bounding:		51.14

Basis for burnup used in estimate:
Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM: 0.98

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U308-LEU) INDONESIA
SNF ID #: 502
Fuel Units & Descr: 142 - ASSEMBLY
Heavy Metal Mass: BOL=177.5kg; EOL=159.75kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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" 5.92

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	16,809.59	33,619.19	0.00E+00	2.44E-06	4.89E-06
Am-241	1.1190E-03	16,809.59	33,619.19	0.00E+00	1.88E+01	3.76E+01
Am-242m	4.5425E-07	16,809.59	33,619.19	0.00E+00	7.64E-03	1.53E-02
Am-243	1.4921E-06	16,809.59	33,619.19	0.00E+00	2.51E-02	5.02E-02
C-14	5.7244E-09	16,809.59	33,619.19	0.00E+00	9.62E-05	1.92E-04
Cl-36	1.3124E-32	16,809.59	33,619.19	0.00E+00	2.21E-28	4.41E-28
Cm-243	2.3676E-07	16,809.59	33,619.19	0.00E+00	3.98E-03	7.96E-03
Cm-244	5.2042E-05	16,809.59	33,619.19	0.00E+00	8.75E-01	1.75E+00
Co-60	3.8208E-05	16,809.59	33,619.19	0.00E+00	6.42E-01	1.28E+00
Cs-134	4.8693E-01	16,809.59	33,619.19	0.00E+00	8.19E+03	1.64E+04
Cs-135	3.4477E-06	16,809.59	33,619.19	0.00E+00	5.80E-02	1.16E-01
Cs-137	2.8731E+00	16,809.59	33,619.19	0.00E+00	4.83E+04	9.66E+04
Eu-154	8.2053E-02	16,809.59	33,619.19	0.00E+00	1.38E+03	2.76E+03
Eu-155	3.9134E-02	16,809.59	33,619.19	0.00E+00	6.58E+02	1.32E+03
Fe-55	6.7429E-03	16,809.59	33,619.19	0.00E+00	1.13E+02	2.27E+02
H-3	1.0599E-02	16,809.59	33,619.19	0.00E+00	1.78E+02	3.56E+02
I-129	7.5300E-07	16,809.59	33,619.19	0.00E+00	1.27E-02	2.53E-02
Kr-85	2.8595E-01	16,809.59	33,619.19	0.00E+00	4.81E+03	9.61E+03
Np-237	9.5479E-06	16,809.59	33,619.19	0.00E+00	1.60E-01	3.21E-01
Pa-231	8.9297E-10	16,809.59	33,619.19	0.00E+00	1.50E-05	3.00E-05
Pb-210	3.7609E-12	16,809.59	33,619.19	0.00E+00	6.32E-08	1.26E-07
Pm-147	2.5452E+00	16,809.59	33,619.19	0.00E+00	4.28E+04	8.56E+04
Pu-238	2.0550E-02	16,809.59	33,619.19	0.00E+00	3.45E+02	6.91E+02
Pu-239	4.2838E-04	16,809.59	33,619.19	0.00E+00	7.20E+00	1.44E+01
Pu-240	2.4401E-04	16,809.59	33,619.19	0.00E+00	4.10E+00	8.20E+00
Pu-241	6.8764E-02	16,809.59	33,619.19	0.00E+00	1.16E+03	2.31E+03
Pu-242	3.6329E-07	16,809.59	33,619.19	0.00E+00	6.11E-03	1.22E-02
Ra-226	3.8045E-11	16,809.59	33,619.19	0.00E+00	6.40E-07	1.28E-06
Ra-228	2.9902E-15	16,809.59	33,619.19	0.00E+00	5.03E-11	1.01E-10
Ru-106	1.9055E-01	16,809.59	33,619.19	0.00E+00	3.20E+03	6.41E+03
Se-79	1.2936E-05	16,809.59	33,619.19	0.00E+00	2.17E-01	4.35E-01
Sn-126	1.1574E-05	16,809.59	33,619.19	0.00E+00	1.95E-01	3.89E-01
Sr-90	2.7505E+00	16,809.59	33,619.19	0.00E+00	4.62E+04	9.25E+04
Tc-99	4.2239E-04	16,809.59	33,619.19	0.00E+00	7.10E+00	1.42E+01
Th-229	1.8848E-12	16,809.59	33,619.19	0.00E+00	3.17E-08	6.34E-08
Th-230	1.7042E-08	16,809.59	33,619.19	0.00E+00	2.86E-04	5.73E-04
Th-232	7.8132E-15	16,809.59	33,619.19	0.00E+00	1.31E-10	2.63E-10
Tl-208	4.4063E-08	16,809.59	33,619.19	0.00E+00	7.41E-04	1.48E-03
U-232	1.3151E-07	16,809.59	33,619.19	0.00E+00	2.21E-03	4.42E-03
U-233	1.9564E-09	16,809.59	33,619.19	0.00E+00	3.29E-05	6.58E-05
U-234	1.8371E-04	16,809.59	33,619.19	0.00E+00	3.09E+00	6.18E+00
U-235	-2.7235E-06	16,809.59	0.00	7.67E-02	3.09E-02	7.67E-02
U-236	1.5493E-05	16,809.59	33,619.19	0.00E+00	2.60E-01	5.21E-01
U-238	-4.2851E-09	16,809.59	0.00	4.77E-02	4.77E-02	4.77E-02
Y-90	2.7505E+00	16,809.59	33,619.19	0.00E+00	4.62E+04	9.25E+04
Other Radionuclides					8.65E+04	1.73E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.486E+15
0.0250	1.397E+15
0.0375	1.289E+15
0.0575	1.268E+15
0.0850	8.083E+14
0.1250	7.000E+14
0.2250	6.851E+14
0.3750	3.316E+14
0.5750	4.555E+15
0.8500	6.379E+14
1.2500	1.187E+14
1.7500	4.977E+12
2.2500	1.044E+13
2.7500	6.006E+10
3.5000	6.661E+09
5.0000	2.002E+04
7.0000	2.232E+03
11.0000	2.516E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.52E+02	1.70E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		16,809.59
Bounding:		33,619.19

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:	0.60	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U308-LEU) PERU
SNF ID #: 504
Fuel Units & Descr: 23 - ASSEMBLY
Heavy Metal Mass: BOL=32.2kg; EOL=28.98kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116589
Template Decay Time: 5 years

Estimated Canister usage: 18"x10'
0.96

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	1.4545E-10	3,049.40	6,098.80	0.00E+00	4.44E-07	8.87E-07
Am-241	1.1190E-03	3,049.40	6,098.80	0.00E+00	3.41E+00	6.82E+00
Am-242m	4.5425E-07	3,049.40	6,098.80	0.00E+00	1.39E-03	2.77E-03
Am-243	1.4921E-06	3,049.40	6,098.80	0.00E+00	4.55E-03	9.10E-03
C-14	5.7244E-09	3,049.40	6,098.80	0.00E+00	1.75E-05	3.49E-05
Cl-36	1.3124E-32	3,049.40	6,098.80	0.00E+00	4.00E-29	8.00E-29
Cm-243	2.3676E-07	3,049.40	6,098.80	0.00E+00	7.22E-04	1.44E-03
Cm-244	5.2042E-05	3,049.40	6,098.80	0.00E+00	1.59E-01	3.17E-01
Co-60	3.8208E-05	3,049.40	6,098.80	0.00E+00	1.17E-01	2.33E-01
Cs-134	4.8693E-01	3,049.40	6,098.80	0.00E+00	1.48E+03	2.97E+03
Cs-135	3.4477E-06	3,049.40	6,098.80	0.00E+00	1.05E-02	2.10E-02
Cs-137	2.8731E+00	3,049.40	6,098.80	0.00E+00	8.76E+03	1.75E+04
Eu-154	8.2053E-02	3,049.40	6,098.80	0.00E+00	2.50E+02	5.00E+02
Eu-155	3.9134E-02	3,049.40	6,098.80	0.00E+00	1.19E+02	2.39E+02
Fe-55	6.7429E-03	3,049.40	6,098.80	0.00E+00	2.06E+01	4.11E+01
H-3	1.0599E-02	3,049.40	6,098.80	0.00E+00	3.23E+01	6.46E+01
I-129	7.5300E-07	3,049.40	6,098.80	0.00E+00	2.30E-03	4.59E-03
Kr-85	2.8595E-01	3,049.40	6,098.80	0.00E+00	8.72E+02	1.74E+03
Np-237	9.5479E-06	3,049.40	6,098.80	0.00E+00	2.91E-02	5.82E-02
Pa-231	8.9297E-10	3,049.40	6,098.80	0.00E+00	2.72E-06	5.45E-06
Pb-210	3.7609E-12	3,049.40	6,098.80	0.00E+00	1.15E-08	2.29E-08
Pm-147	2.5452E+00	3,049.40	6,098.80	0.00E+00	7.76E+03	1.55E+04
Pu-238	2.0550E-02	3,049.40	6,098.80	0.00E+00	6.27E+01	1.25E+02
Pu-239	4.2838E-04	3,049.40	6,098.80	0.00E+00	1.31E+00	2.61E+00
Pu-240	2.4401E-04	3,049.40	6,098.80	0.00E+00	7.44E-01	1.49E+00
Pu-241	6.8764E-02	3,049.40	6,098.80	0.00E+00	2.10E+02	4.19E+02
Pu-242	3.6329E-07	3,049.40	6,098.80	0.00E+00	1.11E-03	2.22E-03
Ra-226	3.8045E-11	3,049.40	6,098.80	0.00E+00	1.16E-07	2.32E-07
Ra-228	2.9902E-15	3,049.40	6,098.80	0.00E+00	9.12E-12	1.82E-11
Ru-106	1.9055E-01	3,049.40	6,098.80	0.00E+00	5.81E+02	1.16E+03
Se-79	1.2936E-05	3,049.40	6,098.80	0.00E+00	3.94E-02	7.89E-02
Sn-126	1.1574E-05	3,049.40	6,098.80	0.00E+00	3.53E-02	7.06E-02
Sr-90	2.7505E+00	3,049.40	6,098.80	0.00E+00	8.39E+03	1.68E+04
Tc-99	4.2239E-04	3,049.40	6,098.80	0.00E+00	1.29E+00	2.58E+00
Th-229	1.8848E-12	3,049.40	6,098.80	0.00E+00	5.75E-09	1.15E-08
Th-230	1.7042E-08	3,049.40	6,098.80	0.00E+00	5.20E-05	1.04E-04
Th-232	7.8132E-15	3,049.40	6,098.80	0.00E+00	2.38E-11	4.77E-11
Tl-208	4.4063E-08	3,049.40	6,098.80	0.00E+00	1.34E-04	2.69E-04
U-232	1.3151E-07	3,049.40	6,098.80	0.00E+00	4.01E-04	8.02E-04
U-233	1.9564E-09	3,049.40	6,098.80	0.00E+00	5.97E-06	1.19E-05
U-234	1.8371E-04	3,049.40	6,098.80	0.00E+00	5.60E-01	1.12E+00
U-235	-2.7235E-06	3,049.40	0.00	1.14E-02	3.13E-03	1.14E-02
U-236	1.5493E-05	3,049.40	6,098.80	0.00E+00	4.72E-02	9.45E-02
U-238	-4.2851E-09	3,049.40	0.00	9.04E-03	9.03E-03	9.04E-03
Y-90	2.7505E+00	3,049.40	6,098.80	0.00E+00	8.39E+03	1.68E+04
Other Radionuclides					1.57E+04	3.14E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.177E+15
0.0250	2.535E+14
0.0375	2.339E+14
0.0575	2.300E+14
0.0850	1.466E+14
0.1250	1.270E+14
0.2250	1.243E+14
0.3750	6.016E+13
0.5750	8.263E+14
0.8500	1.157E+14
1.2500	2.153E+13
1.7500	9.028E+11
2.2500	1.894E+12
2.7500	1.089E+10
3.5000	1.208E+09
5.0000	3.633E+03
7.0000	4.050E+02
11.0000	4.566E+01

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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	16.42857201	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3,049.40
Bounding:		6,098.80

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.30	
Bounding:	0.60	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U3Si2 LEU) CANADA
SNF ID #: 513
Fuel Units & Descr: 35 - ASSEMBLY
Heavy Metal Mass: BOL=50.75kg; EOL=45.675kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 1.46

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	4,806.12	9,612.25	0.00E+00	6.99E-07	1.40E-06
Am-241	1.1190E-03	4,806.12	9,612.25	0.00E+00	5.38E+00	1.08E+01
Am-242m	4.5425E-07	4,806.12	9,612.25	0.00E+00	2.18E-03	4.37E-03
Am-243	1.4921E-06	4,806.12	9,612.25	0.00E+00	7.17E-03	1.43E-02
C-14	5.7244E-09	4,806.12	9,612.25	0.00E+00	2.75E-05	5.50E-05
Cl-36	1.3124E-32	4,806.12	9,612.25	0.00E+00	6.31E-29	1.26E-28
Cm-243	2.3676E-07	4,806.12	9,612.25	0.00E+00	1.14E-03	2.28E-03
Cm-244	5.2042E-05	4,806.12	9,612.25	0.00E+00	2.50E-01	5.00E-01
Co-60	3.8208E-05	4,806.12	9,612.25	0.00E+00	1.84E-01	3.67E-01
Cs-134	4.8693E-01	4,806.12	9,612.25	0.00E+00	2.34E+03	4.68E+03
Cs-135	3.4477E-06	4,806.12	9,612.25	0.00E+00	1.66E-02	3.31E-02
Cs-137	2.8731E+00	4,806.12	9,612.25	0.00E+00	1.38E+04	2.76E+04
Eu-154	8.2053E-02	4,806.12	9,612.25	0.00E+00	3.94E+02	7.89E+02
Eu-155	3.9134E-02	4,806.12	9,612.25	0.00E+00	1.88E+02	3.76E+02
Fe-55	6.7429E-03	4,806.12	9,612.25	0.00E+00	3.24E+01	6.48E+01
H-3	1.0599E-02	4,806.12	9,612.25	0.00E+00	5.09E+01	1.02E+02
I-129	7.5300E-07	4,806.12	9,612.25	0.00E+00	3.62E-03	7.24E-03
Kr-85	2.8595E-01	4,806.12	9,612.25	0.00E+00	1.37E+03	2.75E+03
Np-237	9.5479E-06	4,806.12	9,612.25	0.00E+00	4.59E-02	9.18E-02
Pa-231	8.9297E-10	4,806.12	9,612.25	0.00E+00	4.29E-06	8.58E-06
Pb-210	3.7609E-12	4,806.12	9,612.25	0.00E+00	1.81E-08	3.62E-08
Pm-147	2.5452E+00	4,806.12	9,612.25	0.00E+00	1.22E+04	2.45E+04
Pu-238	2.0550E-02	4,806.12	9,612.25	0.00E+00	9.88E+01	1.98E+02
Pu-239	4.2838E-04	4,806.12	9,612.25	0.00E+00	2.06E+00	4.12E+00
Pu-240	2.4401E-04	4,806.12	9,612.25	0.00E+00	1.17E+00	2.35E+00
Pu-241	6.8764E-02	4,806.12	9,612.25	0.00E+00	3.30E+02	6.61E+02
Pu-242	3.6329E-07	4,806.12	9,612.25	0.00E+00	1.75E-03	3.49E-03
Ra-226	3.8045E-11	4,806.12	9,612.25	0.00E+00	1.83E-07	3.66E-07
Ra-228	2.9902E-15	4,806.12	9,612.25	0.00E+00	1.44E-11	2.87E-11
Ru-106	1.9055E-01	4,806.12	9,612.25	0.00E+00	9.16E+02	1.83E+03
Se-79	1.2936E-05	4,806.12	9,612.25	0.00E+00	6.22E-02	1.24E-01
Sn-126	1.1574E-05	4,806.12	9,612.25	0.00E+00	5.56E-02	1.11E-01
Sr-90	2.7505E+00	4,806.12	9,612.25	0.00E+00	1.32E+04	2.64E+04
Tc-99	4.2239E-04	4,806.12	9,612.25	0.00E+00	2.03E+00	4.06E+00
Th-229	1.8848E-12	4,806.12	9,612.25	0.00E+00	9.06E-09	1.81E-08
Th-230	1.7042E-08	4,806.12	9,612.25	0.00E+00	8.19E-05	1.64E-04
Th-232	7.8132E-15	4,806.12	9,612.25	0.00E+00	3.76E-11	7.51E-11
Tl-208	4.4063E-08	4,806.12	9,612.25	0.00E+00	2.12E-04	4.24E-04
U-232	1.3151E-07	4,806.12	9,612.25	0.00E+00	6.32E-04	1.26E-03
U-233	1.9564E-09	4,806.12	9,612.25	0.00E+00	9.40E-06	1.88E-05
U-234	1.8371E-04	4,806.12	9,612.25	0.00E+00	8.83E-01	1.77E+00
U-235	-2.7235E-06	4,806.12	0.00	2.19E-02	8.84E-03	2.19E-02
U-236	1.5493E-05	4,806.12	9,612.25	0.00E+00	7.45E-02	1.49E-01
U-238	-4.2851E-09	4,806.12	0.00	1.36E-02	1.36E-02	1.36E-02
Y-90	2.7505E+00	4,806.12	9,612.25	0.00E+00	1.32E+04	2.64E+04
Other Radionuclides					2.47E+04	4.94E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.854E+15
0.0250	3.995E+14
0.0375	3.687E+14
0.0575	3.625E+14
0.0850	2.311E+14
0.1250	2.001E+14
0.2250	1.959E+14
0.3750	9.481E+13
0.5750	1.302E+15
0.8500	1.824E+14
1.2500	3.393E+13
1.7500	1.423E+12
2.2500	2.985E+12
2.7500	1.717E+10
3.5000	1.904E+09
5.0000	5.724E+03
7.0000	6.382E+02
11.0000	7.195E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.44E+02	4.87E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		4,806.12
Bounding:		9,612.25

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.30	
Bounding:	0.60	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U3Si2 LEU) GERMANY
SNF ID #: 519
Fuel Units & Descr: 97 - ASSEMBLY
Heavy Metal Mass: BOL=155.2kg; EOL=131.804kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x18" 4.04

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.0632E-10	22,332.30	44,664.59	0.00E+00	1.80E-05	3.60E-05	Avg. MeV	
Am-241	2.2586E-03	22,332.30	44,664.59	0.00E+00	5.04E+01	1.01E+02	0.0150	7.557E+15
Am-242m	1.9925E-06	22,332.30	44,664.59	0.00E+00	4.45E-02	8.90E-02	0.0250	1.641E+15
Am-243	2.3323E-07	22,332.30	44,664.59	0.00E+00	5.21E-03	1.04E-02	0.0375	2.044E+15
C-14	4.3308E-05	22,332.30	44,664.59	0.00E+00	9.67E-01	1.93E+00	0.0575	1.567E+15
Cl-36	4.3023E-08	22,332.30	44,664.59	0.00E+00	9.61E-04	1.92E-03	0.0850	1.097E+15
Cm-243	2.7429E-07	22,332.30	44,664.59	0.00E+00	6.13E-03	1.23E-02	0.1250	1.640E+15
Cm-244	3.1504E-06	22,332.30	44,664.59	0.00E+00	7.04E-02	1.41E-01	0.2250	9.155E+14
Co-60	3.1008E-02	22,332.30	44,664.59	0.00E+00	6.92E+02	1.38E+03	0.3750	4.075E+14
Cs-134	1.0367E-01	22,332.30	44,664.59	0.00E+00	2.32E+03	4.63E+03	0.5750	5.166E+15
Cs-135	3.1549E-05	22,332.30	44,664.59	0.00E+00	7.05E-01	1.41E+00	0.8500	1.272E+15
Cs-137	2.7564E+00	22,332.30	44,664.59	0.00E+00	6.16E+04	1.23E+05	1.2500	1.318E+15
Eu-154	1.3490E+00	22,332.30	44,664.59	0.00E+00	3.01E+04	6.03E+04	1.7500	3.773E+13
Eu-155	4.3880E-01	22,332.30	44,664.59	0.00E+00	9.80E+03	1.96E+04	2.2500	4.586E+12
Fe-55	8.6782E-03	22,332.30	44,664.59	0.00E+00	1.94E+02	3.88E+02	2.7500	3.725E+10
H-3	1.0805E-02	22,332.30	44,664.59	0.00E+00	2.41E+02	4.83E+02	3.5000	4.353E+09
I-129	7.3805E-07	22,332.30	44,664.59	0.00E+00	1.65E-02	3.30E-02	5.0000	2.558E+04
Kr-85	2.5218E-01	22,332.30	44,664.59	0.00E+00	5.63E+03	1.13E+04	7.0000	2.894E+03
Np-237	1.4463E-06	22,332.30	44,664.59	0.00E+00	3.23E-02	6.46E-02	11.0000	3.296E+02
Pa-231	3.5970E-09	22,332.30	44,664.59	0.00E+00	8.03E-05	1.61E-04		
Pb-210	8.2511E-15	22,332.30	44,664.59	0.00E+00	1.84E-10	3.69E-10		
Pm-147	2.0767E+00	22,332.30	44,664.59	0.00E+00	4.64E+04	9.28E+04		
Pu-238	1.3514E-03	22,332.30	44,664.59	0.00E+00	3.02E+01	6.04E+01		
Pu-239	5.6947E-03	22,332.30	44,664.59	0.00E+00	1.27E+02	2.54E+02		
Pu-240	2.2647E-03	22,332.30	44,664.59	0.00E+00	5.06E+01	1.01E+02		
Pu-241	1.2574E-01	22,332.30	44,664.59	0.00E+00	2.81E+03	5.62E+03		
Pu-242	3.0602E-07	22,332.30	44,664.59	0.00E+00	6.83E-03	1.37E-02		
Ra-226	5.7353E-14	22,332.30	44,664.59	0.00E+00	1.28E-09	2.56E-09		
Ra-228	1.8150E-10	22,332.30	44,664.59	0.00E+00	4.05E-06	8.11E-06		
Ru-106	9.3744E-02	22,332.30	44,664.59	0.00E+00	2.09E+03	4.19E+03		
Se-79	1.2938E-05	22,332.30	44,664.59	0.00E+00	2.89E-01	5.78E-01		
Sn-126	1.2239E-05	22,332.30	44,664.59	0.00E+00	2.73E-01	5.47E-01		
Sr-90	2.6000E+00	22,332.30	44,664.59	0.00E+00	5.81E+04	1.16E+05		
Tc-99	4.4120E-04	22,332.30	44,664.59	0.00E+00	9.85E+00	1.97E+01		
Th-229	1.4749E-10	22,332.30	44,664.59	0.00E+00	3.29E-06	6.59E-06		
Th-230	1.9549E-11	22,332.30	44,664.59	0.00E+00	4.37E-07	8.73E-07		
Th-232	2.3744E-10	22,332.30	44,664.59	0.00E+00	5.30E-06	1.06E-05		
Tl-208	1.9459E-08	22,332.30	44,664.59	0.00E+00	4.35E-04	8.69E-04		
U-232	5.6015E-06	22,332.30	44,664.59	0.00E+00	1.25E-03	2.50E-03		
U-233	1.3132E-07	22,332.30	44,664.59	0.00E+00	2.93E-03	5.87E-03		
U-234	1.7323E-07	22,332.30	44,664.59	0.00E+00	3.87E-03	7.74E-03		
U-235	-2.6159E-06	22,332.30	0.00	6.71E-02	8.66E-03	6.71E-02		
U-236	1.2717E-05	22,332.30	44,664.59	0.00E+00	2.84E-01	5.68E-01		
U-238	-3.8857E-06	22,332.30	0.00	4.17E-02	4.09E-02	4.17E-02		
Y-90	2.6015E+00	22,332.30	44,664.59	0.00E+00	5.81E+04	1.16E+05		
Other Radionuclides					8.49E+04	1.70E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.12E+03	2.24E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.99999963	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		22,332.30
Bounding:		44,664.59

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.89	
Bounding:	7.79	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U3Si2 LEU) GERMANY
SNF ID #: 1067
Fuel Units & Descr: 7 - ASSEMBLY
Heavy Metal Mass: BOL=14.7kg; EOL=12.936kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 0.29

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	1,670.54	3,341.08	0.00E+00	2.43E-07	4.86E-07
Am-241	1.1190E-03	1,670.54	3,341.08	0.00E+00	1.87E+00	3.74E+00
Am-242m	4.5425E-07	1,670.54	3,341.08	0.00E+00	7.59E-04	1.52E-03
Am-243	1.4921E-06	1,670.54	3,341.08	0.00E+00	2.49E-03	4.99E-03
C-14	5.7244E-09	1,670.54	3,341.08	0.00E+00	9.56E-06	1.91E-05
Cl-36	1.3124E-32	1,670.54	3,341.08	0.00E+00	2.19E-29	4.38E-29
Cm-243	2.3676E-07	1,670.54	3,341.08	0.00E+00	3.96E-04	7.91E-04
Cm-244	5.2042E-05	1,670.54	3,341.08	0.00E+00	8.69E-02	1.74E-01
Co-60	3.8208E-05	1,670.54	3,341.08	0.00E+00	6.38E-02	1.28E-01
Cs-134	4.8693E-01	1,670.54	3,341.08	0.00E+00	8.13E+02	1.63E+03
Cs-135	3.4477E-06	1,670.54	3,341.08	0.00E+00	5.76E-03	1.15E-02
Cs-137	2.8731E+00	1,670.54	3,341.08	0.00E+00	4.80E+03	9.60E+03
Eu-154	8.2053E-02	1,670.54	3,341.08	0.00E+00	1.37E+02	2.74E+02
Eu-155	3.9134E-02	1,670.54	3,341.08	0.00E+00	6.54E+01	1.31E+02
Fe-55	6.7429E-03	1,670.54	3,341.08	0.00E+00	1.13E+01	2.25E+01
H-3	1.0599E-02	1,670.54	3,341.08	0.00E+00	1.77E+01	3.54E+01
I-129	7.5300E-07	1,670.54	3,341.08	0.00E+00	1.26E-03	2.52E-03
Kr-85	2.8595E-01	1,670.54	3,341.08	0.00E+00	4.78E+02	9.55E+02
Np-237	9.5479E-06	1,670.54	3,341.08	0.00E+00	1.60E-02	3.19E-02
Pa-231	8.9297E-10	1,670.54	3,341.08	0.00E+00	1.49E-06	2.98E-06
Pb-210	3.7609E-12	1,670.54	3,341.08	0.00E+00	6.28E-09	1.26E-08
Pm-147	2.5452E+00	1,670.54	3,341.08	0.00E+00	4.25E+03	8.50E+03
Pu-238	2.0550E-02	1,670.54	3,341.08	0.00E+00	3.43E+01	6.87E+01
Pu-239	4.2838E-04	1,670.54	3,341.08	0.00E+00	7.16E-01	1.43E+00
Pu-240	2.4401E-04	1,670.54	3,341.08	0.00E+00	4.08E-01	8.15E-01
Pu-241	6.8764E-02	1,670.54	3,341.08	0.00E+00	1.15E+02	2.30E+02
Pu-242	3.6329E-07	1,670.54	3,341.08	0.00E+00	6.07E-04	1.21E-03
Ra-226	3.8045E-11	1,670.54	3,341.08	0.00E+00	6.36E-08	1.27E-07
Ra-228	2.9902E-15	1,670.54	3,341.08	0.00E+00	5.00E-12	9.99E-12
Ru-106	1.9055E-01	1,670.54	3,341.08	0.00E+00	3.18E+02	6.37E+02
Se-79	1.2936E-05	1,670.54	3,341.08	0.00E+00	2.16E-02	4.32E-02
Sn-126	1.1574E-05	1,670.54	3,341.08	0.00E+00	1.93E-02	3.87E-02
Sr-90	2.7505E+00	1,670.54	3,341.08	0.00E+00	4.59E+03	9.19E+03
Tc-99	4.2239E-04	1,670.54	3,341.08	0.00E+00	7.06E-01	1.41E+00
Th-229	1.8848E-12	1,670.54	3,341.08	0.00E+00	3.15E-09	6.30E-09
Th-230	1.7042E-08	1,670.54	3,341.08	0.00E+00	2.85E-05	5.69E-05
Th-232	7.8132E-15	1,670.54	3,341.08	0.00E+00	1.31E-11	2.61E-11
Tl-208	4.4063E-08	1,670.54	3,341.08	0.00E+00	7.36E-05	1.47E-04
U-232	1.3151E-07	1,670.54	3,341.08	0.00E+00	2.20E-04	4.39E-04
U-233	1.9564E-09	1,670.54	3,341.08	0.00E+00	3.27E-06	6.54E-06
U-234	1.8371E-04	1,670.54	3,341.08	0.00E+00	3.07E-01	6.14E-01
U-235	-2.7235E-06	1,670.54	0.00	6.35E-03	1.80E-03	6.35E-03
U-236	1.5493E-05	1,670.54	3,341.08	0.00E+00	2.59E-02	5.18E-02
U-238	-4.2851E-09	1,670.54	0.00	3.95E-03	3.95E-03	3.95E-03
Y-90	2.7505E+00	1,670.54	3,341.08	0.00E+00	4.59E+03	9.19E+03
Other Radionuclides					8.59E+03	1.72E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.446E+14
0.0250	1.389E+14
0.0375	1.281E+14
0.0575	1.260E+14
0.0850	8.033E+13
0.1250	6.956E+13
0.2250	6.808E+13
0.3750	3.296E+13
0.5750	4.527E+14
0.8500	6.339E+13
1.2500	1.179E+13
1.7500	4.946E+11
2.2500	1.037E+12
2.7500	5.968E+09
3.5000	6.619E+06
5.0000	1.988E+03
7.0000	2.216E+02
11.0000	2.498E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.47E+01	1.69E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000028	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,670.54
Bounding:		3,341.08

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.36	
Bounding:	0.72	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U3Si2 LEU) GREECE
SNF ID #: 532
Fuel Units & Descr: 67 - ASSEMBLY
Heavy Metal Mass: BOL=74.37kg; EOL=67.683kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' 2.79

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	6,332.34	12,664.68	0.00E+00	9.21E-07	1.84E-06	Avg. MeV	
Am-241	1.1190E-03	6,332.34	12,664.68	0.00E+00	7.09E+00	1.42E+01	0.0150	2.443E+15
Am-242m	4.5425E-07	6,332.34	12,664.68	0.00E+00	2.88E-03	5.75E-03	0.0250	5.264E+14
Am-243	1.4921E-06	6,332.34	12,664.68	0.00E+00	9.45E-03	1.89E-02	0.0375	4.857E+14
C-14	5.7244E-09	6,332.34	12,664.68	0.00E+00	3.62E-05	7.25E-05	0.0575	4.776E+14
Cl-36	1.3124E-32	6,332.34	12,664.68	0.00E+00	8.31E-29	1.66E-28	0.0850	3.045E+14
Cm-243	2.3676E-07	6,332.34	12,664.68	0.00E+00	1.50E-03	3.00E-03	0.1250	2.637E+14
Cm-244	5.2042E-05	6,332.34	12,664.68	0.00E+00	3.30E-01	6.59E-01	0.2250	2.581E+14
Co-60	3.8208E-05	6,332.34	12,664.68	0.00E+00	2.42E-01	4.84E-01	0.3750	1.249E+14
Cs-134	4.8693E-01	6,332.34	12,664.68	0.00E+00	3.08E+03	6.17E+03	0.5750	1.716E+15
Cs-135	3.4477E-06	6,332.34	12,664.68	0.00E+00	2.18E-02	4.37E-02	0.8500	2.403E+14
Cs-137	2.8731E+00	6,332.34	12,664.68	0.00E+00	1.82E+04	3.64E+04	1.2500	4.471E+13
Eu-154	8.2053E-02	6,332.34	12,664.68	0.00E+00	5.20E+02	1.04E+03	1.7500	1.875E+12
Eu-155	3.9134E-02	6,332.34	12,664.68	0.00E+00	2.48E+02	4.96E+02	2.2500	3.932E+12
Fe-55	6.7429E-03	6,332.34	12,664.68	0.00E+00	4.27E+01	8.54E+01	2.7500	2.262E+10
H-3	1.0599E-02	6,332.34	12,664.68	0.00E+00	6.71E+01	1.34E+02	3.5000	2.509E+09
I-129	7.5300E-07	6,332.34	12,664.68	0.00E+00	4.77E-03	9.54E-03	5.0000	7.547E+03
Kr-85	2.8595E-01	6,332.34	12,664.68	0.00E+00	1.81E+03	3.62E+03	7.0000	8.414E+02
Np-237	9.5479E-06	6,332.34	12,664.68	0.00E+00	6.05E-02	1.21E-01	11.0000	9.488E+01
Pa-231	8.9297E-10	6,332.34	12,664.68	0.00E+00	5.65E-06	1.13E-05		
Pb-210	3.7609E-12	6,332.34	12,664.68	0.00E+00	2.38E-08	4.76E-08		
Pm-147	2.5452E+00	6,332.34	12,664.68	0.00E+00	1.61E+04	3.22E+04		
Pu-238	2.0550E-02	6,332.34	12,664.68	0.00E+00	1.30E+02	2.60E+02		
Pu-239	4.2838E-04	6,332.34	12,664.68	0.00E+00	2.71E+00	5.43E+00		
Pu-240	2.4401E-04	6,332.34	12,664.68	0.00E+00	1.55E+00	3.09E+00		
Pu-241	6.8764E-02	6,332.34	12,664.68	0.00E+00	4.35E+02	8.71E+02		
Pu-242	3.6329E-07	6,332.34	12,664.68	0.00E+00	2.30E-03	4.60E-03		
Ra-226	3.8045E-11	6,332.34	12,664.68	0.00E+00	2.41E-07	4.82E-07		
Ra-228	2.9902E-15	6,332.34	12,664.68	0.00E+00	1.89E-11	3.79E-11		
Ru-106	1.9055E-01	6,332.34	12,664.68	0.00E+00	1.21E+03	2.41E+03		
Se-79	1.2936E-05	6,332.34	12,664.68	0.00E+00	8.19E-02	1.64E-01		
Sn-126	1.1574E-05	6,332.34	12,664.68	0.00E+00	7.33E-02	1.47E-01		
Sr-90	2.7505E+00	6,332.34	12,664.68	0.00E+00	1.74E+04	3.48E+04		
Tc-99	4.2239E-04	6,332.34	12,664.68	0.00E+00	2.67E+00	5.35E+00		
Th-229	1.8848E-12	6,332.34	12,664.68	0.00E+00	1.19E-08	2.39E-08		
Th-230	1.7042E-08	6,332.34	12,664.68	0.00E+00	1.08E-04	2.16E-04		
Th-232	7.8132E-15	6,332.34	12,664.68	0.00E+00	4.95E-11	9.90E-11		
Tl-208	4.4063E-08	6,332.34	12,664.68	0.00E+00	2.79E-04	5.58E-04		
U-232	1.3151E-07	6,332.34	12,664.68	0.00E+00	8.33E-04	1.67E-03		
U-233	1.9564E-09	6,332.34	12,664.68	0.00E+00	1.24E-05	2.48E-05		
U-234	1.8371E-04	6,332.34	12,664.68	0.00E+00	1.16E+00	2.33E+00		
U-235	-2.7235E-06	6,332.34	0.00	3.21E-02	1.49E-02	3.21E-02		
U-236	1.5493E-05	6,332.34	12,664.68	0.00E+00	9.81E-02	1.96E-01		
U-238	-4.2851E-09	6,332.34	0.00	2.00E-02	2.00E-02	2.00E-02		
Y-90	2.7505E+00	6,332.34	12,664.68	0.00E+00	1.74E+04	3.48E+04		
Other Radionuclides					3.26E+04	6.51E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.21E+02	6.42E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		6,332.34
Bounding:		12,664.68

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:	0.27	
Bounding:	0.54	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U3SI2 LEU) JAPAN
SNF ID #: 506
Fuel Units & Descr: 70 - ASSEMBLY
Heavy Metal Mass: BOL=73.5kg; EOL=70.413kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' = 2.92

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	2,923.45	5,846.90	0.00E+00	4.25E-07	8.50E-07
Am-241	1.1190E-03	2,923.45	5,846.90	0.00E+00	3.27E+00	6.54E+00
Am-242m	4.5425E-07	2,923.45	5,846.90	0.00E+00	1.33E-03	2.66E-03
Am-243	1.4921E-06	2,923.45	5,846.90	0.00E+00	4.36E-03	8.72E-03
C-14	5.7244E-09	2,923.45	5,846.90	0.00E+00	1.67E-05	3.35E-05
Cl-36	1.3124E-32	2,923.45	5,846.90	0.00E+00	3.84E-29	7.67E-29
Cm-243	2.3676E-07	2,923.45	5,846.90	0.00E+00	6.92E-04	1.38E-03
Cm-244	5.2042E-05	2,923.45	5,846.90	0.00E+00	1.52E-01	3.04E-01
Co-60	3.8208E-05	2,923.45	5,846.90	0.00E+00	1.12E-01	2.23E-01
Cs-134	4.8693E-01	2,923.45	5,846.90	0.00E+00	1.42E+03	2.85E+03
Cs-135	3.4477E-06	2,923.45	5,846.90	0.00E+00	1.01E-02	2.02E-02
Cs-137	2.8731E+00	2,923.45	5,846.90	0.00E+00	8.40E+03	1.68E+04
Eu-154	8.2053E-02	2,923.45	5,846.90	0.00E+00	2.40E+02	4.80E+02
Eu-155	3.9134E-02	2,923.45	5,846.90	0.00E+00	1.14E+02	2.29E+02
Fe-55	6.7429E-03	2,923.45	5,846.90	0.00E+00	1.97E+01	3.94E+01
H-3	1.0599E-02	2,923.45	5,846.90	0.00E+00	3.10E+01	6.20E+01
I-129	7.5300E-07	2,923.45	5,846.90	0.00E+00	2.20E-03	4.40E-03
Kr-85	2.8595E-01	2,923.45	5,846.90	0.00E+00	8.36E+02	1.67E+03
Np-237	9.5479E-06	2,923.45	5,846.90	0.00E+00	2.79E-02	5.58E-02
Pa-231	8.9297E-10	2,923.45	5,846.90	0.00E+00	2.61E-06	5.22E-06
Pb-210	3.7609E-12	2,923.45	5,846.90	0.00E+00	1.10E-08	2.20E-08
Pm-147	2.5452E+00	2,923.45	5,846.90	0.00E+00	7.44E+03	1.49E+04
Pu-238	2.0550E-02	2,923.45	5,846.90	0.00E+00	6.01E+01	1.20E+02
Pu-239	4.2838E-04	2,923.45	5,846.90	0.00E+00	1.25E+00	2.50E+00
Pu-240	2.4401E-04	2,923.45	5,846.90	0.00E+00	7.13E-01	1.43E+00
Pu-241	6.8764E-02	2,923.45	5,846.90	0.00E+00	2.01E+02	4.02E+02
Pu-242	3.6329E-07	2,923.45	5,846.90	0.00E+00	1.06E-03	2.12E-03
Ra-226	3.8045E-11	2,923.45	5,846.90	0.00E+00	1.11E-07	2.22E-07
Ra-228	2.9902E-15	2,923.45	5,846.90	0.00E+00	8.74E-12	1.75E-11
Ru-106	1.9055E-01	2,923.45	5,846.90	0.00E+00	5.57E+02	1.11E+03
Se-79	1.2936E-05	2,923.45	5,846.90	0.00E+00	3.78E-02	7.56E-02
Sn-126	1.1574E-05	2,923.45	5,846.90	0.00E+00	3.38E-02	6.77E-02
Sr-90	2.7505E+00	2,923.45	5,846.90	0.00E+00	8.04E+03	1.61E+04
Tc-99	4.2239E-04	2,923.45	5,846.90	0.00E+00	1.23E+00	2.47E+00
Th-229	1.8848E-12	2,923.45	5,846.90	0.00E+00	5.51E-09	1.10E-08
Th-230	1.7042E-08	2,923.45	5,846.90	0.00E+00	4.98E-05	9.96E-05
Th-232	7.8132E-15	2,923.45	5,846.90	0.00E+00	2.28E-11	4.57E-11
Tl-208	4.4063E-08	2,923.45	5,846.90	0.00E+00	1.29E-04	2.58E-04
U-232	1.3151E-07	2,923.45	5,846.90	0.00E+00	3.84E-04	7.69E-04
U-233	1.9564E-09	2,923.45	5,846.90	0.00E+00	5.72E-06	1.14E-05
U-234	1.8371E-04	2,923.45	5,846.90	0.00E+00	5.37E-01	1.07E+00
U-235	-2.7235E-06	2,923.45	0.00	3.18E-02	2.38E-02	3.18E-02
U-236	1.5493E-05	2,923.45	5,846.90	0.00E+00	4.53E-02	9.06E-02
U-238	-4.2851E-09	2,923.45	0.00	1.98E-02	1.98E-02	1.98E-02
Y-90	2.7505E+00	2,923.45	5,846.90	0.00E+00	8.04E+03	1.61E+04
Other Radionuclides					1.50E+04	3.01E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.128E+15
0.0250	2.430E+14
0.0375	2.243E+14
0.0575	2.205E+14
0.0850	1.406E+14
0.1250	1.217E+14
0.2250	1.191E+14
0.3750	5.767E+13
0.5750	7.922E+14
0.8500	1.109E+14
1.2500	2.064E+13
1.7500	8.655E+11
2.2500	1.815E+12
2.7500	1.044E+10
3.5000	1.158E+09
5.0000	3.508E+03
7.0000	3.913E+02
11.0000	4.411E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.48E+02	2.96E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000028	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2,923.45
Bounding:		5,846.90

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.13	
Bounding:	0.25	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U3Si2 LEU) JAPAN
SNF ID #: 508
Fuel Units & Descr: 149 - ASSEMBLY
Heavy Metal Mass: BOL=205.62kg; EOL=193.283kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' 6.21

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	1.4545E-10	11,683.57	23,367.15	0.00E+00	1.70E-06	3.40E-06
Am-241	1.1190E-03	11,683.57	23,367.15	0.00E+00	1.31E+01	2.61E+01
Am-242m	4.5425E-07	11,683.57	23,367.15	0.00E+00	5.31E-03	1.06E-02
Am-243	1.4921E-06	11,683.57	23,367.15	0.00E+00	1.74E-02	3.49E-02
C-14	5.7244E-09	11,683.57	23,367.15	0.00E+00	6.69E-05	1.34E-04
Cl-36	1.3124E-32	11,683.57	23,367.15	0.00E+00	1.53E-28	3.07E-28
Cm-243	2.3676E-07	11,683.57	23,367.15	0.00E+00	2.77E-03	5.53E-03
Cm-244	5.2042E-05	11,683.57	23,367.15	0.00E+00	6.08E-01	1.22E+00
Co-60	3.8208E-05	11,683.57	23,367.15	0.00E+00	4.46E-01	8.93E-01
Cs-134	4.8693E-01	11,683.57	23,367.15	0.00E+00	5.69E+03	1.14E+04
Cs-135	3.4477E-06	11,683.57	23,367.15	0.00E+00	4.03E-02	8.06E-02
Cs-137	2.8731E+00	11,683.57	23,367.15	0.00E+00	3.36E+04	6.71E+04
Eu-154	8.2053E-02	11,683.57	23,367.15	0.00E+00	9.59E+02	1.92E+03
Eu-155	3.9134E-02	11,683.57	23,367.15	0.00E+00	4.57E+02	9.14E+02
Fe-55	6.7429E-03	11,683.57	23,367.15	0.00E+00	7.88E+01	1.58E+02
H-3	1.0599E-02	11,683.57	23,367.15	0.00E+00	1.24E+02	2.48E+02
I-129	7.5300E-07	11,683.57	23,367.15	0.00E+00	8.80E-03	1.76E-02
Kr-85	2.8595E-01	11,683.57	23,367.15	0.00E+00	3.34E+03	6.68E+03
Np-237	9.5479E-06	11,683.57	23,367.15	0.00E+00	1.12E-01	2.23E-01
Pa-231	8.9297E-10	11,683.57	23,367.15	0.00E+00	1.04E-05	2.09E-05
Pb-210	3.7609E-12	11,683.57	23,367.15	0.00E+00	4.39E-08	8.79E-08
Pm-147	2.5452E+00	11,683.57	23,367.15	0.00E+00	2.97E+04	5.95E+04
Pu-238	2.0550E-02	11,683.57	23,367.15	0.00E+00	2.40E+02	4.80E+02
Pu-239	4.2838E-04	11,683.57	23,367.15	0.00E+00	5.00E+00	1.00E+01
Pu-240	2.4401E-04	11,683.57	23,367.15	0.00E+00	2.85E+00	5.70E+00
Pu-241	6.8764E-02	11,683.57	23,367.15	0.00E+00	8.03E+02	1.61E+03
Pu-242	3.6329E-07	11,683.57	23,367.15	0.00E+00	4.24E-03	8.49E-03
Ra-226	3.8045E-11	11,683.57	23,367.15	0.00E+00	4.44E-07	8.89E-07
Ra-228	2.9902E-15	11,683.57	23,367.15	0.00E+00	3.49E-11	6.99E-11
Ru-106	1.9055E-01	11,683.57	23,367.15	0.00E+00	2.23E+03	4.45E+03
Se-79	1.2936E-05	11,683.57	23,367.15	0.00E+00	1.51E-01	3.02E-01
Sn-126	1.1574E-05	11,683.57	23,367.15	0.00E+00	1.35E-01	2.70E-01
Sr-90	2.7505E+00	11,683.57	23,367.15	0.00E+00	3.21E+04	6.43E+04
Tc-99	4.2239E-04	11,683.57	23,367.15	0.00E+00	4.93E+00	9.87E+00
Th-229	1.8848E-12	11,683.57	23,367.15	0.00E+00	2.20E-08	4.40E-08
Th-230	1.7042E-08	11,683.57	23,367.15	0.00E+00	1.99E-04	3.98E-04
Th-232	7.8132E-15	11,683.57	23,367.15	0.00E+00	9.13E-11	1.83E-10
Tl-208	4.4063E-08	11,683.57	23,367.15	0.00E+00	5.15E-04	1.03E-03
U-232	1.3151E-07	11,683.57	23,367.15	0.00E+00	1.54E-03	3.07E-03
U-233	1.9564E-09	11,683.57	23,367.15	0.00E+00	2.29E-05	4.57E-05
U-234	1.8371E-04	11,683.57	23,367.15	0.00E+00	2.15E+00	4.29E+00
U-235	-2.7235E-08	11,683.57	0.00	8.89E-02	5.70E-02	8.89E-02
U-236	1.5493E-05	11,683.57	23,367.15	0.00E+00	1.81E-01	3.62E-01
U-238	-4.2851E-09	11,683.57	0.00	5.53E-02	5.52E-02	5.53E-02
Y-90	2.7505E+00	11,683.57	23,367.15	0.00E+00	3.21E+04	6.43E+04
Other Radionuclides					6.01E+04	1.20E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.508E+15
0.0250	9.712E+14
0.0375	8.962E+14
0.0575	8.813E+14
0.0850	5.618E+14
0.1250	4.865E+14
0.2250	4.762E+14
0.3750	2.305E+14
0.5750	3.166E+15
0.8500	4.434E+14
1.2500	8.249E+13
1.7500	3.459E+12
2.2500	7.255E+12
2.7500	4.174E+10
3.5000	4.629E+09
5.0000	1.397E+04
7.0000	1.557E+03
11.0000	1.756E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.92E+02	1.18E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.99999957	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		11,683.57
Bounding:		23,367.15

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.18	
Bounding:	0.36	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U3Si2 LEU) NETHERLANDS
SNF ID #: 510
Fuel Units & Descr: 43 - ASSEMBLY
Heavy Metal Mass: BOL=64.5kg; EOL=56.76kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 1.79

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	1.4545E-10	7,329.93	14,659.86	0.00E+00	1.07E-06	2.13E-06
Am-241	1.1190E-03	7,329.93	14,659.86	0.00E+00	8.20E+00	1.64E+01
Am-242m	4.5425E-07	7,329.93	14,659.86	0.00E+00	3.33E-03	6.66E-03
Am-243	1.4921E-06	7,329.93	14,659.86	0.00E+00	1.09E-02	2.19E-02
C-14	5.7244E-09	7,329.93	14,659.86	0.00E+00	4.20E-05	8.39E-05
Cl-36	1.3124E-32	7,329.93	14,659.86	0.00E+00	9.62E-29	1.92E-28
Cm-243	2.3676E-07	7,329.93	14,659.86	0.00E+00	1.74E-03	3.47E-03
Cm-244	5.2042E-05	7,329.93	14,659.86	0.00E+00	3.81E-01	7.63E-01
Co-60	3.8208E-05	7,329.93	14,659.86	0.00E+00	2.80E-01	5.60E-01
Cs-134	4.8693E-01	7,329.93	14,659.86	0.00E+00	3.57E+03	7.14E+03
Cs-135	3.4477E-06	7,329.93	14,659.86	0.00E+00	2.53E-02	5.05E-02
Cs-137	2.8731E+00	7,329.93	14,659.86	0.00E+00	2.11E+04	4.21E+04
Eu-154	8.2053E-02	7,329.93	14,659.86	0.00E+00	6.01E+02	1.20E+03
Eu-155	3.9134E-02	7,329.93	14,659.86	0.00E+00	2.87E+02	5.74E+02
Fe-55	6.7429E-03	7,329.93	14,659.86	0.00E+00	4.94E+01	9.89E+01
H-3	1.0599E-02	7,329.93	14,659.86	0.00E+00	7.77E+01	1.55E+02
I-129	7.5300E-07	7,329.93	14,659.86	0.00E+00	5.52E-03	1.10E-02
Kr-85	2.8595E-01	7,329.93	14,659.86	0.00E+00	2.10E+03	4.19E+03
Np-237	9.5479E-06	7,329.93	14,659.86	0.00E+00	7.00E-02	1.40E-01
Pa-231	8.9297E-10	7,329.93	14,659.86	0.00E+00	6.55E-06	1.31E-05
Pb-210	3.7609E-12	7,329.93	14,659.86	0.00E+00	2.76E-08	5.51E-08
Pm-147	2.5452E+00	7,329.93	14,659.86	0.00E+00	1.87E+04	3.73E+04
Pu-238	2.0550E-02	7,329.93	14,659.86	0.00E+00	1.51E+02	3.01E+02
Pu-239	4.2838E-04	7,329.93	14,659.86	0.00E+00	3.14E+00	6.28E+00
Pu-240	2.4401E-04	7,329.93	14,659.86	0.00E+00	1.79E+00	3.58E+00
Pu-241	6.8764E-02	7,329.93	14,659.86	0.00E+00	5.04E+02	1.01E+03
Pu-242	3.6329E-07	7,329.93	14,659.86	0.00E+00	2.66E-03	5.33E-03
Ra-226	3.8045E-11	7,329.93	14,659.86	0.00E+00	2.79E-07	5.58E-07
Ra-228	2.9902E-15	7,329.93	14,659.86	0.00E+00	2.19E-11	4.38E-11
Ru-106	1.9055E-01	7,329.93	14,659.86	0.00E+00	1.40E+03	2.79E+03
Se-79	1.2936E-05	7,329.93	14,659.86	0.00E+00	9.48E-02	1.90E-01
Sn-126	1.1574E-05	7,329.93	14,659.86	0.00E+00	8.48E-02	1.70E-01
Sr-90	2.7505E+00	7,329.93	14,659.86	0.00E+00	2.02E+04	4.03E+04
Tc-99	4.2239E-04	7,329.93	14,659.86	0.00E+00	3.10E+00	6.19E+00
Th-229	1.8848E-12	7,329.93	14,659.86	0.00E+00	1.38E-08	2.76E-08
Th-230	1.7042E-06	7,329.93	14,659.86	0.00E+00	1.25E-04	2.50E-04
Th-232	7.8132E-15	7,329.93	14,659.86	0.00E+00	5.73E-11	1.15E-10
Tl-208	4.4063E-08	7,329.93	14,659.86	0.00E+00	3.23E-04	6.46E-04
U-232	1.3151E-07	7,329.93	14,659.86	0.00E+00	9.64E-04	1.93E-03
U-233	1.9564E-09	7,329.93	14,659.86	0.00E+00	1.43E-05	2.87E-05
U-234	1.8371E-04	7,329.93	14,659.86	0.00E+00	1.35E+00	2.69E+00
U-235	-2.7235E-06	7,329.93	0.00	2.79E-02	7.91E-03	2.79E-02
U-236	1.5493E-05	7,329.93	14,659.86	0.00E+00	1.14E-01	2.27E-01
U-238	-4.2851E-09	7,329.93	0.00	1.73E-02	1.73E-02	1.73E-02
Y-90	2.7505E+00	7,329.93	14,659.86	0.00E+00	2.02E+04	4.03E+04
Other Radionuclides					3.77E+04	7.54E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.828E+15
0.0250	6.093E+14
0.0375	5.623E+14
0.0575	5.529E+14
0.0850	3.525E+14
0.1250	3.052E+14
0.2250	2.987E+14
0.3750	1.446E+14
0.5750	1.986E+15
0.8500	2.782E+14
1.2500	5.175E+13
1.7500	2.170E+12
2.2500	4.552E+12
2.7500	2.619E+10
3.5000	2.904E+09
5.0000	8.722E+03
7.0000	9.724E+02
11.0000	1.096E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.72E+02	7.43E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000079	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		7,329.93
Bounding:		14,659.86

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.36	
Bounding:	0.72	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U3Si2 LEU) TURKEY
SNF ID #: 528
Fuel Units & Descr: 32 - ASSEMBLY
Heavy Metal Mass: BOL=67.2kg; EOL=59.136kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.33

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	1.4545E-10	7,636.76	15,273.53	0.00E+00	1.11E-06	2.22E-06
Am-241	1.1190E-03	7,636.76	15,273.53	0.00E+00	8.55E+00	1.71E+01
Am-242m	4.5425E-07	7,636.76	15,273.53	0.00E+00	3.47E-03	6.94E-03
Am-243	1.4921E-06	7,636.76	15,273.53	0.00E+00	1.14E-02	2.28E-02
C-14	5.7244E-09	7,636.76	15,273.53	0.00E+00	4.37E-05	8.74E-05
Cl-36	1.3124E-32	7,636.76	15,273.53	0.00E+00	1.00E-28	2.00E-28
Cm-243	2.3676E-07	7,636.76	15,273.53	0.00E+00	1.81E-03	3.62E-03
Cm-244	5.2042E-05	7,636.76	15,273.53	0.00E+00	3.97E-01	7.95E-01
Co-60	3.8208E-05	7,636.76	15,273.53	0.00E+00	2.92E-01	5.84E-01
Cs-134	4.8693E-01	7,636.76	15,273.53	0.00E+00	3.72E+03	7.44E+03
Cs-135	3.4477E-06	7,636.76	15,273.53	0.00E+00	2.63E-02	5.27E-02
Cs-137	2.8731E+00	7,636.76	15,273.53	0.00E+00	2.19E+04	4.39E+04
Eu-154	8.2053E-02	7,636.76	15,273.53	0.00E+00	6.27E+02	1.25E+03
Eu-155	3.9134E-02	7,636.76	15,273.53	0.00E+00	2.99E+02	5.98E+02
Fe-55	6.7429E-03	7,636.76	15,273.53	0.00E+00	5.15E+01	1.03E+02
H-3	1.0599E-02	7,636.76	15,273.53	0.00E+00	8.09E+01	1.62E+02
I-129	7.5300E-07	7,636.76	15,273.53	0.00E+00	5.75E-03	1.15E-02
Kr-85	2.8595E-01	7,636.76	15,273.53	0.00E+00	2.18E+03	4.37E+03
Np-237	9.5479E-06	7,636.76	15,273.53	0.00E+00	7.29E-02	1.46E-01
Pa-231	8.9297E-10	7,636.76	15,273.53	0.00E+00	6.82E-06	1.36E-05
Pb-210	3.7609E-12	7,636.76	15,273.53	0.00E+00	2.87E-08	5.74E-08
Pm-147	2.5452E+00	7,636.76	15,273.53	0.00E+00	1.94E+04	3.89E+04
Pu-238	2.0550E-02	7,636.76	15,273.53	0.00E+00	1.57E+02	3.14E+02
Pu-239	4.2838E-04	7,636.76	15,273.53	0.00E+00	3.27E+00	6.54E+00
Pu-240	2.4401E-04	7,636.76	15,273.53	0.00E+00	1.86E+00	3.73E+00
Pu-241	6.8764E-02	7,636.76	15,273.53	0.00E+00	5.25E+02	1.05E+03
Pu-242	3.6329E-07	7,636.76	15,273.53	0.00E+00	2.77E-03	5.55E-03
Ra-226	3.8045E-11	7,636.76	15,273.53	0.00E+00	2.91E-07	5.81E-07
Ra-228	2.9902E-15	7,636.76	15,273.53	0.00E+00	2.28E-11	4.57E-11
Ru-106	1.9055E-01	7,636.76	15,273.53	0.00E+00	1.46E+03	2.91E+03
Se-79	1.2936E-05	7,636.76	15,273.53	0.00E+00	9.88E-02	1.98E-01
Sn-126	1.1574E-05	7,636.76	15,273.53	0.00E+00	8.84E-02	1.77E-01
Sr-90	2.7505E+00	7,636.76	15,273.53	0.00E+00	2.10E+04	4.20E+04
Tc-99	4.2239E-04	7,636.76	15,273.53	0.00E+00	3.23E+00	6.45E+00
Th-229	1.8848E-12	7,636.76	15,273.53	0.00E+00	1.44E-08	2.88E-08
Th-230	1.7042E-08	7,636.76	15,273.53	0.00E+00	1.30E-04	2.60E-04
Th-232	7.8132E-15	7,636.76	15,273.53	0.00E+00	5.97E-11	1.19E-10
Tl-208	4.4063E-08	7,636.76	15,273.53	0.00E+00	3.37E-04	6.73E-04
U-232	1.3151E-07	7,636.76	15,273.53	0.00E+00	1.00E-03	2.01E-03
U-233	1.9564E-09	7,636.76	15,273.53	0.00E+00	1.49E-05	2.99E-05
U-234	1.8371E-04	7,636.76	15,273.53	0.00E+00	1.40E+00	2.81E+00
U-235	-2.7235E-06	7,636.76	0.00	2.90E-02	8.24E-03	2.90E-02
U-236	1.5493E-05	7,636.76	15,273.53	0.00E+00	1.18E-01	2.37E-01
U-238	-4.2851E-09	7,636.76	0.00	1.81E-02	1.80E-02	1.81E-02
Y-90	2.7505E+00	7,636.76	15,273.53	0.00E+00	2.10E+04	4.20E+04
Other Radionuclides					3.93E+04	7.86E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.947E+15
0.0250	6.348E+14
0.0375	5.858E+14
0.0575	5.760E+14
0.0850	3.672E+14
0.1250	3.180E+14
0.2250	3.112E+14
0.3750	1.507E+14
0.5750	2.069E+15
0.8500	2.898E+14
1.2500	5.392E+13
1.7500	2.281E+12
2.2500	4.742E+12
2.7500	2.728E+10
3.5000	3.026E+09
5.0000	9.087E+03
7.0000	1.013E+03
11.0000	1.142E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.87E+02	7.74E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000028	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		7,636.76
Bounding:		15,273.53

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.36	
Bounding:	0.72	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) CANADA
SNF ID #: 720
Fuel Units & Descr: 21 - MTR TYPE
Heavy Metal Mass: BOL=4.427kg; EOL=2.862kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10'
0.88

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	1,481.61	2,963.22	0.00E+00	2.16E-07	4.31E-07	Avg. MeV	
Am-241	1.1190E-03	1,481.61	2,963.22	0.00E+00	1.66E+00	3.32E+00	0.0150	5.717E+14
Am-242m	4.5425E-07	1,481.61	2,963.22	0.00E+00	6.73E-04	1.35E-03	0.0250	1.232E+14
Am-243	1.4921E-06	1,481.61	2,963.22	0.00E+00	2.21E-03	4.42E-03	0.0375	1.137E+14
C-14	5.7244E-09	1,481.61	2,963.22	0.00E+00	8.48E-06	1.70E-05	0.0575	1.118E+14
Cl-36	1.3124E-32	1,481.61	2,963.22	0.00E+00	1.94E-29	3.89E-29	0.0850	7.124E+13
Cm-243	2.3676E-07	1,481.61	2,963.22	0.00E+00	3.51E-04	7.02E-04	0.1250	6.170E+13
Cm-244	5.2042E-05	1,481.61	2,963.22	0.00E+00	7.71E-02	1.54E-01	0.2250	6.038E+13
Co-60	3.8208E-05	1,481.61	2,963.22	0.00E+00	5.66E-02	1.13E-01	0.3750	2.923E+13
Cs-134	4.8693E-01	1,481.61	2,963.22	0.00E+00	7.21E+02	1.44E+03	0.5750	4.015E+14
Cs-135	3.4477E-06	1,481.61	2,963.22	0.00E+00	5.11E-03	1.02E-02	0.8500	5.622E+13
Cs-137	2.8731E+00	1,481.61	2,963.22	0.00E+00	4.26E+03	8.51E+03	1.2500	1.046E+13
Eu-154	8.2053E-02	1,481.61	2,963.22	0.00E+00	1.22E+02	2.43E+02	1.7500	4.387E+11
Eu-155	3.9134E-02	1,481.61	2,963.22	0.00E+00	5.80E+01	1.16E+02	2.2500	9.201E+11
Fe-55	6.7429E-03	1,481.61	2,963.22	0.00E+00	9.99E+00	2.00E+01	2.7500	5.293E+09
H-3	1.0599E-02	1,481.61	2,963.22	0.00E+00	1.57E+01	3.14E+01	3.5000	5.871E+08
I-129	7.5300E-07	1,481.61	2,963.22	0.00E+00	1.12E-03	2.23E-03	5.0000	1.755E+03
Kr-85	2.8595E-01	1,481.61	2,963.22	0.00E+00	4.24E+02	8.47E+02	7.0000	1.957E+02
Np-237	9.5479E-06	1,481.61	2,963.22	0.00E+00	1.41E-02	2.83E-02	11.0000	2.206E+01
Pa-231	8.9297E-10	1,481.61	2,963.22	0.00E+00	1.32E-06	2.65E-06		
Pb-210	3.7609E-12	1,481.61	2,963.22	0.00E+00	5.57E-09	1.11E-08		
Pm-147	2.5452E+00	1,481.61	2,963.22	0.00E+00	3.77E+03	7.54E+03		
Pu-238	2.0550E-02	1,481.61	2,963.22	0.00E+00	3.04E+01	6.09E+01		
Pu-239	4.2838E-04	1,481.61	2,963.22	0.00E+00	6.35E-01	1.27E+00		
Pu-240	2.4401E-04	1,481.61	2,963.22	0.00E+00	3.62E-01	7.23E-01		
Pu-241	6.8764E-02	1,481.61	2,963.22	0.00E+00	1.02E+02	2.04E+02		
Pu-242	3.6329E-07	1,481.61	2,963.22	0.00E+00	5.38E-04	1.08E-03		
Ra-226	3.8045E-11	1,481.61	2,963.22	0.00E+00	5.64E-08	1.13E-07		
Ra-228	2.9902E-15	1,481.61	2,963.22	0.00E+00	4.43E-12	8.86E-12		
Ru-106	1.9055E-01	1,481.61	2,963.22	0.00E+00	2.82E+02	5.65E+02		
Se-79	1.2936E-05	1,481.61	2,963.22	0.00E+00	1.92E-02	3.83E-02		
Sn-126	1.1574E-05	1,481.61	2,963.22	0.00E+00	1.71E-02	3.43E-02		
Sr-90	2.7505E+00	1,481.61	2,963.22	0.00E+00	4.08E+03	8.15E+03		
Tc-99	4.2239E-04	1,481.61	2,963.22	0.00E+00	6.26E-01	1.25E+00		
Th-229	1.8848E-12	1,481.61	2,963.22	0.00E+00	2.79E-09	5.59E-09		
Th-230	1.7042E-08	1,481.61	2,963.22	0.00E+00	2.53E-05	5.05E-05		
Th-232	7.8132E-15	1,481.61	2,963.22	0.00E+00	1.16E-11	2.32E-11		
Tl-208	4.4063E-08	1,481.61	2,963.22	0.00E+00	6.53E-05	1.31E-04		
U-232	1.3151E-07	1,481.61	2,963.22	0.00E+00	1.95E-04	3.90E-04	Thermal Power	
U-233	1.9564E-09	1,481.61	2,963.22	0.00E+00	2.90E-06	5.80E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8371E-04	1,481.61	2,963.22	0.00E+00	2.72E-01	5.44E-01		
U-235	-2.7235E-06	1,481.61	0.00	8.90E-03	4.86E-03	8.90E-03		
U-236	1.5493E-05	1,481.61	2,963.22	0.00E+00	2.30E-02	4.59E-02	7.51E+01	1.50E+02
U-238	-4.2851E-09	1,481.61	0.00	1.04E-04	9.78E-05	1.04E-04	Total	Total
Y-90	2.7505E+00	1,481.61	2,963.22	0.00E+00	4.08E+03	8.15E+03		
Other Radionuclides					7.62E+03	1.52E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99999478	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,481.61
Bounding:		2,963.22

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.06	
Bounding:	2.13	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) GERMANY
SNF ID #: 582
Fuel Units & Descr: 1 - MTR TYPE
Heavy Metal Mass: BOL=0.176kg; EOL=0.126kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.04

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	1.4545E-10	48.11	96.22	0.00E+00	7.00E-09	1.40E-08
Am-241	1.1190E-03	48.11	96.22	0.00E+00	5.38E-02	1.08E-01
Am-242m	4.5425E-07	48.11	96.22	0.00E+00	2.19E-05	4.37E-05
Am-243	1.4921E-06	48.11	96.22	0.00E+00	7.18E-05	1.44E-04
C-14	5.7244E-09	48.11	96.22	0.00E+00	2.75E-07	5.51E-07
Cl-36	1.3124E-32	48.11	96.22	0.00E+00	6.31E-31	1.26E-30
Cm-243	2.3676E-07	48.11	96.22	0.00E+00	1.14E-05	2.28E-05
Cm-244	5.2042E-05	48.11	96.22	0.00E+00	2.50E-03	5.01E-03
Co-60	3.8208E-05	48.11	96.22	0.00E+00	1.84E-03	3.68E-03
Cs-134	4.8693E-01	48.11	96.22	0.00E+00	2.34E+01	4.69E+01
Cs-135	3.4477E-06	48.11	96.22	0.00E+00	1.66E-04	3.32E-04
Cs-137	2.8731E+00	48.11	96.22	0.00E+00	1.38E+02	2.76E+02
Eu-154	8.2053E-02	48.11	96.22	0.00E+00	3.95E+00	7.89E+00
Eu-155	3.9134E-02	48.11	96.22	0.00E+00	1.88E+00	3.77E+00
Fe-55	6.7429E-03	48.11	96.22	0.00E+00	3.24E-01	6.49E-01
H-3	1.0599E-02	48.11	96.22	0.00E+00	5.10E-01	1.02E+00
I-129	7.5300E-07	48.11	96.22	0.00E+00	3.62E-05	7.25E-05
Kr-85	2.8595E-01	48.11	96.22	0.00E+00	1.38E+01	2.75E+01
Np-237	9.5479E-06	48.11	96.22	0.00E+00	4.59E-04	9.19E-04
Pa-231	8.9297E-10	48.11	96.22	0.00E+00	4.30E-08	8.59E-08
Pb-210	3.7609E-12	48.11	96.22	0.00E+00	1.81E-10	3.62E-10
Pm-147	2.5452E+00	48.11	96.22	0.00E+00	1.22E+02	2.45E+02
Pu-238	2.0550E-02	48.11	96.22	0.00E+00	9.89E-01	1.98E+00
Pu-239	4.2838E-04	48.11	96.22	0.00E+00	2.06E-02	4.12E-02
Pu-240	2.4401E-04	48.11	96.22	0.00E+00	1.17E-02	2.35E-02
Pu-241	6.8764E-02	48.11	96.22	0.00E+00	3.31E+00	6.62E+00
Pu-242	3.6329E-07	48.11	96.22	0.00E+00	1.75E-05	3.50E-05
Ra-226	3.8045E-11	48.11	96.22	0.00E+00	1.83E-09	3.66E-09
Ra-228	2.9902E-15	48.11	96.22	0.00E+00	1.44E-13	2.88E-13
Ru-106	1.9055E-01	48.11	96.22	0.00E+00	9.17E+00	1.83E+01
Se-79	1.2936E-05	48.11	96.22	0.00E+00	6.22E-04	1.24E-03
Sn-126	1.1574E-05	48.11	96.22	0.00E+00	5.57E-04	1.11E-03
Sr-90	2.7505E+00	48.11	96.22	0.00E+00	1.32E+02	2.65E+02
Tc-99	4.2239E-04	48.11	96.22	0.00E+00	2.03E-02	4.06E-02
Th-229	1.8848E-12	48.11	96.22	0.00E+00	9.07E-11	1.81E-10
Th-230	1.7042E-08	48.11	96.22	0.00E+00	8.20E-07	1.64E-06
Th-232	7.8132E-15	48.11	96.22	0.00E+00	3.76E-13	7.52E-13
Tl-208	4.4063E-08	48.11	96.22	0.00E+00	2.12E-06	4.24E-06
U-232	1.3151E-07	48.11	96.22	0.00E+00	6.33E-06	1.27E-05
U-233	1.9564E-09	48.11	96.22	0.00E+00	9.41E-08	1.88E-07
U-234	1.8371E-04	48.11	96.22	0.00E+00	8.84E-03	1.77E-02
U-235	-2.7235E-08	48.11	0.00	3.54E-04	2.23E-04	3.54E-04
U-236	1.5493E-05	48.11	96.22	0.00E+00	7.45E-04	1.49E-03
U-238	-4.2851E-09	48.11	0.00	4.15E-06	3.94E-06	4.15E-06
Y-90	2.7505E+00	48.11	96.22	0.00E+00	1.32E+02	2.65E+02
Other Radionuclides					2.47E+02	4.95E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.856E+13
0.0250	3.999E+12
0.0375	3.690E+12
0.0575	3.629E+12
0.0850	2.313E+12
0.1250	2.003E+12
0.2250	1.961E+12
0.3750	9.491E+11
0.5750	1.304E+13
0.8500	1.826E+12
1.2500	3.397E+11
1.7500	1.424E+10
2.2500	2.987E+10
2.7500	1.719E+06
3.5000	1.906E+07
5.0000	5.700E+01
7.0000	6.354E+00
11.0000	7.162E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.44E+00	4.88E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99999263	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		48.11
Bounding:		96.22

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.87	
Bounding:	1.73	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) GERMANY
SNF ID #: 584
Fuel Units & Descr: 44 - MTR TYPE
Heavy Metal Mass: BOL=8.136kg; EOL=5.944kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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: 16"x10" 1.83

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	2,075.11	4,150.22	0.00E+00	3.02E-07	6.04E-07
Am-241	1.1190E-03	2,075.11	4,150.22	0.00E+00	2.32E+00	4.64E+00
Am-242m	4.5425E-07	2,075.11	4,150.22	0.00E+00	9.43E-04	1.89E-03
Am-243	1.4921E-06	2,075.11	4,150.22	0.00E+00	3.10E-03	6.19E-03
C-14	5.7244E-09	2,075.11	4,150.22	0.00E+00	1.19E-05	2.38E-05
Cl-36	1.3124E-32	2,075.11	4,150.22	0.00E+00	2.72E-29	5.45E-29
Cm-243	2.3676E-07	2,075.11	4,150.22	0.00E+00	4.91E-04	9.83E-04
Cm-244	5.2042E-05	2,075.11	4,150.22	0.00E+00	1.08E-01	2.16E-01
Co-60	3.8208E-05	2,075.11	4,150.22	0.00E+00	7.93E-02	1.59E-01
Cs-134	4.8693E-01	2,075.11	4,150.22	0.00E+00	1.01E+03	2.02E+03
Cs-135	3.4477E-06	2,075.11	4,150.22	0.00E+00	7.15E-03	1.43E-02
Cs-137	2.8731E+00	2,075.11	4,150.22	0.00E+00	5.96E+03	1.19E+04
Eu-154	8.2053E-02	2,075.11	4,150.22	0.00E+00	1.70E+02	3.41E+02
Eu-155	3.9134E-02	2,075.11	4,150.22	0.00E+00	8.12E+01	1.62E+02
Fe-55	6.7429E-03	2,075.11	4,150.22	0.00E+00	1.40E+01	2.80E+01
H-3	1.0599E-02	2,075.11	4,150.22	0.00E+00	2.20E+01	4.40E+01
I-129	7.5300E-07	2,075.11	4,150.22	0.00E+00	1.56E-03	3.13E-03
Kr-85	2.8595E-01	2,075.11	4,150.22	0.00E+00	5.93E+02	1.19E+03
Np-237	9.5479E-06	2,075.11	4,150.22	0.00E+00	1.98E-02	3.96E-02
Pa-231	8.9297E-10	2,075.11	4,150.22	0.00E+00	1.85E-06	3.71E-06
Pb-210	3.7609E-12	2,075.11	4,150.22	0.00E+00	7.80E-09	1.56E-08
Pm-147	2.5452E+00	2,075.11	4,150.22	0.00E+00	5.28E+03	1.06E+04
Pu-238	2.0550E-02	2,075.11	4,150.22	0.00E+00	4.26E+01	8.53E+01
Pu-239	4.2838E-04	2,075.11	4,150.22	0.00E+00	8.89E-01	1.78E+00
Pu-240	2.4401E-04	2,075.11	4,150.22	0.00E+00	5.06E-01	1.01E+00
Pu-241	6.8764E-02	2,075.11	4,150.22	0.00E+00	1.43E+02	2.85E+02
Pu-242	3.6329E-07	2,075.11	4,150.22	0.00E+00	7.54E-04	1.51E-03
Ra-226	3.8045E-11	2,075.11	4,150.22	0.00E+00	7.89E-08	1.58E-07
Ra-228	2.9902E-15	2,075.11	4,150.22	0.00E+00	6.20E-12	1.24E-11
Ru-106	1.9055E-01	2,075.11	4,150.22	0.00E+00	3.95E+02	7.91E+02
Se-79	1.2936E-05	2,075.11	4,150.22	0.00E+00	2.68E-02	5.37E-02
Sn-126	1.1574E-05	2,075.11	4,150.22	0.00E+00	2.40E-02	4.80E-02
Sr-90	2.7505E+00	2,075.11	4,150.22	0.00E+00	5.71E+03	1.14E+04
Tc-99	4.2239E-04	2,075.11	4,150.22	0.00E+00	8.76E-01	1.75E+00
Th-229	1.8848E-12	2,075.11	4,150.22	0.00E+00	3.91E-09	7.82E-09
Th-230	1.7042E-08	2,075.11	4,150.22	0.00E+00	3.54E-05	7.07E-05
Th-232	7.8132E-15	2,075.11	4,150.22	0.00E+00	1.62E-11	3.24E-11
Tl-208	4.4063E-08	2,075.11	4,150.22	0.00E+00	9.14E-05	1.83E-04
U-232	1.3151E-07	2,075.11	4,150.22	0.00E+00	2.73E-04	5.46E-04
U-233	1.9564E-09	2,075.11	4,150.22	0.00E+00	4.06E-06	8.12E-06
U-234	1.8371E-04	2,075.11	4,150.22	0.00E+00	3.81E-01	7.62E-01
U-235	-2.7235E-06	2,075.11	0.00	1.64E-02	1.07E-02	1.64E-02
U-236	1.5493E-05	2,075.11	4,150.22	0.00E+00	3.21E-02	6.43E-02
U-238	-4.2851E-09	2,075.11	0.00	1.91E-04	1.83E-04	1.91E-04
Y-90	2.7505E+00	2,075.11	4,150.22	0.00E+00	5.71E+03	1.14E+04
Other Radionuclides					1.07E+04	2.13E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.007E+14
0.0250	1.725E+14
0.0375	1.592E+14
0.0575	1.565E+14
0.0850	9.978E+13
0.1250	8.641E+13
0.2250	8.457E+13
0.3750	4.094E+13
0.5750	5.623E+14
0.8500	7.875E+13
1.2500	1.465E+13
1.7500	6.144E+11
2.2500	1.289E+12
2.7500	7.414E+09
3.5000	8.222E+08
5.0000	2.459E+03
7.0000	2.741E+02
11.0000	3.089E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.05E+02	2.10E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.00001838	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2,075.11
Bounding:		4,150.22

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.81	
Bounding:	1.62	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) GERMANY
SNF ID #: 585
Fuel Units & Descr: 50 - MTR TYPE
Heavy Metal Mass: BOL=9.675kg; EOL=4.635kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 5 years

Estimated Canister usage: 18"x10" 2.08

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	8.0632E-10	4,810.77	9,234.97	0.00E+00	3.88E-06	7.45E-06
Am-241	2.2586E-03	4,810.77	9,234.97	0.00E+00	1.09E+01	2.09E+01
Am-242m	1.9925E-06	4,810.77	9,234.97	0.00E+00	9.59E-03	1.84E-02
Am-243	2.3323E-07	4,810.77	9,234.97	0.00E+00	1.12E-03	2.15E-03
C-14	4.3308E-05	4,810.77	9,234.97	0.00E+00	2.08E-01	4.00E-01
Cl-36	4.3023E-08	4,810.77	9,234.97	0.00E+00	2.07E-04	3.97E-04
Cm-243	2.7429E-07	4,810.77	9,234.97	0.00E+00	1.32E-03	2.53E-03
Cm-244	3.1504E-06	4,810.77	9,234.97	0.00E+00	1.52E-02	2.91E-02
Co-60	3.1008E-02	4,810.77	9,234.97	0.00E+00	1.49E+02	2.86E+02
Cs-134	1.0367E-01	4,810.77	9,234.97	0.00E+00	4.99E+02	9.57E+02
Cs-135	3.1549E-05	4,810.77	9,234.97	0.00E+00	1.52E-01	2.91E-01
Cs-137	2.7564E+00	4,810.77	9,234.97	0.00E+00	1.33E+04	2.55E+04
Eu-154	1.3490E+00	4,810.77	9,234.97	0.00E+00	6.49E+03	1.25E+04
Eu-155	4.3880E-01	4,810.77	9,234.97	0.00E+00	2.11E+03	4.05E+03
Fe-55	8.6782E-03	4,810.77	9,234.97	0.00E+00	4.17E+01	8.01E+01
H-3	1.0805E-02	4,810.77	9,234.97	0.00E+00	5.20E+01	9.98E+01
I-129	7.3805E-07	4,810.77	9,234.97	0.00E+00	3.55E-03	6.82E-03
Kr-85	2.5218E-01	4,810.77	9,234.97	0.00E+00	1.21E+03	2.33E+03
Np-237	1.4463E-06	4,810.77	9,234.97	0.00E+00	6.96E-03	1.34E-02
Pa-231	3.5970E-09	4,810.77	9,234.97	0.00E+00	1.73E-05	3.32E-05
Pb-210	8.2511E-15	4,810.77	9,234.97	0.00E+00	3.97E-11	7.62E-11
Pm-147	2.0767E+00	4,810.77	9,234.97	0.00E+00	9.99E+03	1.92E+04
Pu-238	1.3514E-03	4,810.77	9,234.97	0.00E+00	6.50E+00	1.25E+01
Pu-239	5.6947E-03	4,810.77	9,234.97	0.00E+00	2.74E+01	5.26E+01
Pu-240	2.2647E-03	4,810.77	9,234.97	0.00E+00	1.09E+01	2.09E+01
Pu-241	1.2574E-01	4,810.77	9,234.97	0.00E+00	6.05E+02	1.16E+03
Pu-242	3.0602E-07	4,810.77	9,234.97	0.00E+00	1.47E-03	2.83E-03
Ra-226	5.7353E-14	4,810.77	9,234.97	0.00E+00	2.76E-10	5.30E-10
Ra-228	1.8150E-10	4,810.77	9,234.97	0.00E+00	8.73E-07	1.68E-06
Ru-106	9.3744E-02	4,810.77	9,234.97	0.00E+00	4.51E+02	8.66E+02
Se-79	1.2938E-05	4,810.77	9,234.97	0.00E+00	6.22E-02	1.19E-01
Sn-126	1.2239E-05	4,810.77	9,234.97	0.00E+00	5.89E-02	1.13E-01
Sr-90	2.6000E+00	4,810.77	9,234.97	0.00E+00	1.25E+04	2.40E+04
Tc-99	4.4120E-04	4,810.77	9,234.97	0.00E+00	2.12E+00	4.07E+00
Th-229	1.4749E-10	4,810.77	9,234.97	0.00E+00	7.10E-07	1.36E-06
Th-230	1.9549E-11	4,810.77	9,234.97	0.00E+00	9.40E-08	1.81E-07
Th-232	2.3744E-10	4,810.77	9,234.97	0.00E+00	1.14E-06	2.19E-06
Tl-208	1.9459E-08	4,810.77	9,234.97	0.00E+00	9.36E-05	1.80E-04
U-232	5.6015E-06	4,810.77	9,234.97	0.00E+00	2.69E-04	5.17E-04
U-233	1.3132E-07	4,810.77	9,234.97	0.00E+00	6.32E-04	1.21E-03
U-234	1.7323E-07	4,810.77	9,234.97	0.00E+00	8.33E-04	1.60E-03
U-235	-2.6159E-06	4,810.77	0.00	1.94E-02	6.86E-03	1.94E-02
U-236	1.2717E-05	4,810.77	9,234.97	0.00E+00	6.12E-02	1.17E-01
U-238	-3.8857E-08	4,810.77	0.00	2.28E-04	4.07E-05	2.28E-04
Y-90	2.6015E+00	4,810.77	9,234.97	0.00E+00	1.25E+04	2.40E+04
Other Radionuclides					1.83E+04	3.51E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.563E+15
0.0250	3.392E+14
0.0375	4.226E+14
0.0575	3.239E+14
0.0850	2.268E+14
0.1250	3.391E+14
0.2250	1.893E+14
0.3750	8.425E+13
0.5750	1.068E+15
0.8500	2.629E+14
1.2500	2.725E+14
1.7500	7.800E+12
2.2500	9.481E+11
2.7500	7.701E+09
3.5000	9.001E+08
5.0000	5.269E+03
7.0000	5.962E+02
11.0000	6.790E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.42E+02	4.64E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.9999938	10 to 20.1

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		4,810.77
Bounding:		9,234.97

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	13.46	
Bounding:	25.84	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) GERMANY
SNF ID #: 588
Fuel Units & Descr: 2 - MTR TYPE
Heavy Metal Mass: BOL=0.404kg; EOL=0.273kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.08

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (CI)	Nominal Fuel Inventories(CI)	Bounding Fuel Inventories(CI)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	124.06	248.12	0.00E+00	1.80E-08	3.61E-08	Avg. MeV	
Am-241	1.1190E-03	124.06	248.12	0.00E+00	1.39E-01	2.78E-01	0.0150	4.787E+13
Am-242m	4.5425E-07	124.06	248.12	0.00E+00	5.64E-05	1.13E-04	0.0250	1.031E+13
Am-243	1.4921E-06	124.06	248.12	0.00E+00	1.85E-04	3.70E-04	0.0375	9.516E+12
C-14	5.7244E-09	124.06	248.12	0.00E+00	7.10E-07	1.42E-06	0.0575	9.357E+12
Cl-36	1.3124E-32	124.06	248.12	0.00E+00	1.63E-30	3.26E-30	0.0850	5.965E+12
Cm-243	2.3676E-07	124.06	248.12	0.00E+00	2.94E-05	5.87E-05	0.1250	5.166E+12
Cm-244	5.2042E-05	124.06	248.12	0.00E+00	6.46E-03	1.29E-02	0.2250	5.056E+12
Co-60	3.8208E-05	124.06	248.12	0.00E+00	4.74E-03	9.48E-03	0.3750	2.447E+12
Cs-134	4.8693E-01	124.06	248.12	0.00E+00	6.04E+01	1.21E+02	0.5750	3.362E+13
Cs-135	3.4477E-06	124.06	248.12	0.00E+00	4.28E-04	8.55E-04	0.8500	4.708E+12
Cs-137	2.8731E+00	124.06	248.12	0.00E+00	3.56E+02	7.13E+02	1.2500	8.759E+11
Eu-154	8.2053E-02	124.06	248.12	0.00E+00	1.02E+01	2.04E+01	1.7500	3.673E+10
Eu-155	3.9134E-02	124.06	248.12	0.00E+00	4.85E+00	9.71E+00	2.2500	7.704E+10
Fe-55	6.7429E-03	124.06	248.12	0.00E+00	8.37E-01	1.67E+00	2.7500	4.432E+08
H-3	1.0599E-02	124.06	248.12	0.00E+00	1.31E+00	2.63E+00	3.5000	4.916E+07
I-129	7.5300E-07	124.06	248.12	0.00E+00	9.34E-05	1.87E-04	5.0000	1.470E+02
Kr-85	2.8595E-01	124.06	248.12	0.00E+00	3.55E+01	7.09E+01	7.0000	1.639E+01
Np-237	9.5479E-06	124.06	248.12	0.00E+00	1.18E-03	2.37E-03	11.0000	1.847E+00
Pa-231	8.9297E-10	124.06	248.12	0.00E+00	1.11E-07	2.22E-07		
Pb-210	3.7609E-12	124.06	248.12	0.00E+00	4.67E-10	9.33E-10		
Pm-147	2.5452E+00	124.06	248.12	0.00E+00	3.16E+02	6.32E+02		
Pu-238	2.0550E-02	124.06	248.12	0.00E+00	2.55E+00	5.10E+00		
Pu-239	4.2838E-04	124.06	248.12	0.00E+00	5.31E-02	1.06E-01		
Pu-240	2.4401E-04	124.06	248.12	0.00E+00	3.03E-02	6.05E-02		
Pu-241	6.8764E-02	124.06	248.12	0.00E+00	8.53E+00	1.71E+01		
Pu-242	3.6329E-07	124.06	248.12	0.00E+00	4.51E-05	9.01E-05		
Ra-226	3.8045E-11	124.06	248.12	0.00E+00	4.72E-09	9.44E-09		
Ra-228	2.9902E-15	124.06	248.12	0.00E+00	3.71E-13	7.42E-13		
Ru-106	1.9055E-01	124.06	248.12	0.00E+00	2.36E+01	4.73E+01		
Se-79	1.2936E-05	124.06	248.12	0.00E+00	1.60E-03	3.21E-03		
Sn-126	1.1574E-05	124.06	248.12	0.00E+00	1.44E-03	2.87E-03		
Sr-90	2.7505E+00	124.06	248.12	0.00E+00	3.41E+02	6.82E+02		
Tc-99	4.2239E-04	124.06	248.12	0.00E+00	5.24E-02	1.05E-01		
Th-229	1.8848E-12	124.06	248.12	0.00E+00	2.34E-10	4.68E-10		
Th-230	1.7042E-08	124.06	248.12	0.00E+00	2.11E-06	4.23E-06		
Th-232	7.8132E-15	124.06	248.12	0.00E+00	9.69E-13	1.94E-12		
Tl-208	4.4063E-08	124.06	248.12	0.00E+00	5.47E-06	1.09E-05		
U-232	1.3151E-07	124.06	248.12	0.00E+00	1.63E-05	3.26E-05		
U-233	1.9564E-09	124.06	248.12	0.00E+00	2.43E-07	4.85E-07		
U-234	1.8371E-04	124.06	248.12	0.00E+00	2.28E-02	4.56E-02		
U-235	-2.7235E-06	124.06	0.00	7.87E-04	4.49E-04	7.87E-04		
U-236	1.5493E-05	124.06	248.12	0.00E+00	1.92E-03	3.84E-03		
U-238	-4.2851E-09	124.06	0.00	1.36E-05	1.31E-05	1.36E-05		
Y-90	2.7505E+00	124.06	248.12	0.00E+00	3.41E+02	6.82E+02		
Other Radionuclides					6.38E+02	1.28E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.29E+00	1.26E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	90.00000989	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		124.06	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		248.12	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.97		1.03
Bounding:	1.95		

[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: FRR MTR-S (UALX-HEU) JAPAN
SNF ID #: 602
Fuel Units & Descr: 40 - MTR TYPE
Heavy Metal Mass: BOL=7.74kg; EOL=6.012kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.67

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	1,636.45	3,272.90	0.00E+00	2.38E-07	4.76E-07
Am-241	1.1190E-03	1,636.45	3,272.90	0.00E+00	1.83E+00	3.66E+00
Am-242m	4.5425E-07	1,636.45	3,272.90	0.00E+00	7.43E-04	1.49E-03
Am-243	1.4921E-06	1,636.45	3,272.90	0.00E+00	2.44E-03	4.88E-03
C-14	5.7244E-09	1,636.45	3,272.90	0.00E+00	9.37E-06	1.87E-05
Cl-36	1.3124E-32	1,636.45	3,272.90	0.00E+00	2.15E-29	4.30E-29
Cm-243	2.3676E-07	1,636.45	3,272.90	0.00E+00	3.87E-04	7.75E-04
Cm-244	5.2042E-05	1,636.45	3,272.90	0.00E+00	8.52E-02	1.70E-01
Co-60	3.8208E-05	1,636.45	3,272.90	0.00E+00	6.25E-02	1.25E-01
Cs-134	4.8693E-01	1,636.45	3,272.90	0.00E+00	7.97E+02	1.59E+03
Cs-135	3.4477E-06	1,636.45	3,272.90	0.00E+00	5.64E-03	1.13E-02
Cs-137	2.8731E+00	1,636.45	3,272.90	0.00E+00	4.70E+03	9.40E+03
Eu-154	8.2053E-02	1,636.45	3,272.90	0.00E+00	1.34E+02	2.69E+02
Eu-155	3.9134E-02	1,636.45	3,272.90	0.00E+00	6.40E+01	1.28E+02
Fe-55	6.7429E-03	1,636.45	3,272.90	0.00E+00	1.10E+01	2.21E+01
H-3	1.0599E-02	1,636.45	3,272.90	0.00E+00	1.73E+01	3.47E+01
I-129	7.5300E-07	1,636.45	3,272.90	0.00E+00	1.23E-03	2.46E-03
Kr-85	2.8595E-01	1,636.45	3,272.90	0.00E+00	4.68E+02	9.36E+02
Np-237	9.5479E-06	1,636.45	3,272.90	0.00E+00	1.56E-02	3.12E-02
Pa-231	8.9297E-10	1,636.45	3,272.90	0.00E+00	1.46E-06	2.92E-06
Pb-210	3.7609E-12	1,636.45	3,272.90	0.00E+00	6.15E-09	1.23E-08
Pm-147	2.5452E+00	1,636.45	3,272.90	0.00E+00	4.17E+03	8.33E+03
Pu-238	2.0550E-02	1,636.45	3,272.90	0.00E+00	3.36E+01	6.73E+01
Pu-239	4.2838E-04	1,636.45	3,272.90	0.00E+00	7.01E-01	1.40E+00
Pu-240	2.4401E-04	1,636.45	3,272.90	0.00E+00	3.99E-01	7.99E-01
Pu-241	6.8764E-02	1,636.45	3,272.90	0.00E+00	1.13E+02	2.25E+02
Pu-242	3.6329E-07	1,636.45	3,272.90	0.00E+00	5.95E-04	1.19E-03
Ra-226	3.8045E-11	1,636.45	3,272.90	0.00E+00	6.23E-08	1.25E-07
Ra-228	2.9902E-15	1,636.45	3,272.90	0.00E+00	4.89E-12	9.79E-12
Ru-106	1.9055E-01	1,636.45	3,272.90	0.00E+00	3.12E+02	6.24E+02
Se-79	1.2936E-05	1,636.45	3,272.90	0.00E+00	2.12E-02	4.23E-02
Sn-126	1.1574E-05	1,636.45	3,272.90	0.00E+00	1.89E-02	3.79E-02
Sr-90	2.7505E+00	1,636.45	3,272.90	0.00E+00	4.50E+03	9.00E+03
Tc-99	4.2239E-04	1,636.45	3,272.90	0.00E+00	6.91E-01	1.38E+00
Th-229	1.8848E-12	1,636.45	3,272.90	0.00E+00	3.08E-09	6.17E-09
Th-230	1.7042E-08	1,636.45	3,272.90	0.00E+00	2.79E-05	5.58E-05
Th-232	7.8132E-15	1,636.45	3,272.90	0.00E+00	1.28E-11	2.56E-11
Tl-208	4.4063E-08	1,636.45	3,272.90	0.00E+00	7.21E-05	1.44E-04
U-232	1.3151E-07	1,636.45	3,272.90	0.00E+00	2.15E-04	4.30E-04
U-233	1.9564E-09	1,636.45	3,272.90	0.00E+00	3.20E-06	6.40E-06
U-234	1.8371E-04	1,636.45	3,272.90	0.00E+00	3.01E-01	6.01E-01
U-235	-2.7235E-08	1,636.45	0.00	1.56E-02	1.11E-02	1.56E-02
U-236	1.5493E-05	1,636.45	3,272.90	0.00E+00	2.54E-02	5.07E-02
U-238	-4.2851E-09	1,636.45	0.00	1.82E-04	1.75E-04	1.82E-04
Y-90	2.7505E+00	1,636.45	3,272.90	0.00E+00	4.50E+03	9.00E+03
Other Radionuclides					8.42E+03	1.68E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.314E+14
0.0250	1.360E+14
0.0375	1.255E+14
0.0575	1.234E+14
0.0850	7.869E+13
0.1250	6.814E+13
0.2250	6.669E+13
0.3750	3.228E+13
0.5750	4.434E+14
0.8500	6.210E+13
1.2500	1.155E+13
1.7500	4.845E+11
2.2500	1.016E+12
2.7500	5.847E+09
3.5000	6.484E+08
5.0000	1.939E+03
7.0000	2.161E+02
11.0000	2.436E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.30E+01	1.66E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99999931	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,636.45
Bounding:		3,272.90

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.67	
Bounding:	1.34	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) NETHERLANDS
SNF ID #: 607
Fuel Units & Descr: 19 - MTR TYPE
Heavy Metal Mass: BOL=2.042kg; EOL=1.093kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 0.79

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	1.4545E-10	899.67	1,799.34	0.00E+00	1.31E-07	2.62E-07
Am-241	1.1190E-03	899.67	1,799.34	0.00E+00	1.01E+00	2.01E+00
Am-242m	4.5425E-07	899.67	1,799.34	0.00E+00	4.09E-04	8.17E-04
Am-243	1.4921E-06	899.67	1,799.34	0.00E+00	1.34E-03	2.68E-03
C-14	5.7244E-09	899.67	1,799.34	0.00E+00	5.15E-06	1.03E-05
Cl-36	1.3124E-32	899.67	1,799.34	0.00E+00	1.18E-29	2.36E-29
Cm-243	2.3676E-07	899.67	1,799.34	0.00E+00	2.13E-04	4.26E-04
Cm-244	5.2042E-05	899.67	1,799.34	0.00E+00	4.68E-02	9.36E-02
Co-60	3.8208E-05	899.67	1,799.34	0.00E+00	3.44E-02	6.87E-02
Cs-134	4.8693E-01	899.67	1,799.34	0.00E+00	4.38E+02	8.76E+02
Cs-135	3.4477E-06	899.67	1,799.34	0.00E+00	3.10E-03	6.20E-03
Cs-137	2.8731E+00	899.67	1,799.34	0.00E+00	2.58E+03	5.17E+03
Eu-154	8.2053E-02	899.67	1,799.34	0.00E+00	7.38E+01	1.48E+02
Eu-155	3.9134E-02	899.67	1,799.34	0.00E+00	3.52E+01	7.04E+01
Fe-55	6.7429E-03	899.67	1,799.34	0.00E+00	6.07E+00	1.21E+01
H-3	1.0599E-02	899.67	1,799.34	0.00E+00	9.54E+00	1.91E+01
I-129	7.5300E-07	899.67	1,799.34	0.00E+00	6.77E-04	1.35E-03
Kr-85	2.8595E-01	899.67	1,799.34	0.00E+00	2.57E+02	5.15E+02
Np-237	9.5479E-06	899.67	1,799.34	0.00E+00	8.59E-03	1.72E-02
Pa-231	8.9297E-10	899.67	1,799.34	0.00E+00	8.03E-07	1.61E-06
Pb-210	3.7609E-12	899.67	1,799.34	0.00E+00	3.38E-09	6.77E-09
Pm-147	2.5452E+00	899.67	1,799.34	0.00E+00	2.29E+03	4.58E+03
Pu-238	2.0550E-02	899.67	1,799.34	0.00E+00	1.85E+01	3.70E+01
Pu-239	4.2838E-04	899.67	1,799.34	0.00E+00	3.85E-01	7.71E-01
Pu-240	2.4401E-04	899.67	1,799.34	0.00E+00	2.20E-01	4.39E-01
Pu-241	6.8764E-02	899.67	1,799.34	0.00E+00	6.19E+01	1.24E+02
Pu-242	3.6329E-07	899.67	1,799.34	0.00E+00	3.27E-04	6.54E-04
Ra-226	3.8045E-11	899.67	1,799.34	0.00E+00	3.42E-08	6.85E-08
Ra-228	2.9902E-15	899.67	1,799.34	0.00E+00	2.69E-12	5.38E-12
Ru-106	1.9055E-01	899.67	1,799.34	0.00E+00	1.71E+02	3.43E+02
Se-79	1.2936E-05	899.67	1,799.34	0.00E+00	1.16E-02	2.33E-02
Sn-126	1.1574E-05	899.67	1,799.34	0.00E+00	1.04E-02	2.08E-02
Sr-90	2.7505E+00	899.67	1,799.34	0.00E+00	2.47E+03	4.95E+03
Tc-99	4.2239E-04	899.67	1,799.34	0.00E+00	3.80E-01	7.60E-01
Th-229	1.8848E-12	899.67	1,799.34	0.00E+00	1.70E-09	3.39E-09
Th-230	1.7042E-08	899.67	1,799.34	0.00E+00	1.53E-05	3.07E-05
Th-232	7.8132E-15	899.67	1,799.34	0.00E+00	7.03E-12	1.41E-11
Tl-208	4.4063E-08	899.67	1,799.34	0.00E+00	3.96E-05	7.93E-05
U-232	1.3151E-07	899.67	1,799.34	0.00E+00	1.18E-04	2.37E-04
U-233	1.9564E-09	899.67	1,799.34	0.00E+00	1.76E-06	3.52E-06
U-234	1.8371E-04	899.67	1,799.34	0.00E+00	1.65E-01	3.31E-01
U-235	-2.7235E-06	899.67	0.00	4.10E-03	1.65E-03	4.10E-03
U-236	1.5493E-05	899.67	1,799.34	0.00E+00	1.39E-02	2.79E-02
U-238	-4.2851E-09	899.67	0.00	4.81E-05	4.42E-05	4.81E-05
Y-90	2.7505E+00	899.67	1,799.34	0.00E+00	2.47E+03	4.95E+03
Other Radionuclides					4.63E+03	9.25E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.471E+14
0.0250	7.479E+13
0.0375	6.901E+13
0.0575	6.786E+13
0.0850	4.326E+13
0.1250	3.746E+13
0.2250	3.667E+13
0.3750	1.775E+13
0.5750	2.438E+14
0.8500	3.414E+13
1.2500	6.352E+12
1.7500	2.664E+11
2.2500	5.587E+11
2.7500	3.214E+09
3.5000	3.565E+08
5.0000	1.066E+03
7.0000	1.188E+02
11.0000	1.339E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.66E+01	9.12E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99998697	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		899.67	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,799.34	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.40	
Bounding:	2.80	

Estimated EOL HM/Given EOL HM: 1.05

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) NETHERLANDS
SNF ID #: 608
Fuel Units & Descr: 61 - MTR TYPE
Heavy Metal Mass: BOL=12.462kg; EOL=6.667kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' 2.54

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	5,487.98	10,975.95	0.00E+00	7.98E-07	1.60E-06	Avg. MeV	
Am-241	1.1190E-03	5,487.98	10,975.95	0.00E+00	6.14E+00	1.23E+01	0.0150	2.118E+15
Am-242m	4.5425E-07	5,487.98	10,975.95	0.00E+00	2.49E-03	4.99E-03	0.0250	4.562E+14
Am-243	1.4921E-06	5,487.98	10,975.95	0.00E+00	8.19E-03	1.64E-02	0.0375	4.210E+14
C-14	5.7244E-09	5,487.98	10,975.95	0.00E+00	3.14E-05	6.28E-05	0.0575	4.139E+14
Cl-36	1.3124E-32	5,487.98	10,975.95	0.00E+00	7.20E-29	1.44E-28	0.0850	2.639E+14
Cm-243	2.3676E-07	5,487.98	10,975.95	0.00E+00	1.30E-03	2.60E-03	0.1250	2.285E+14
Cm-244	5.2042E-05	5,487.98	10,975.95	0.00E+00	2.86E-01	5.71E-01	0.2250	2.237E+14
Co-60	3.8208E-05	5,487.98	10,975.95	0.00E+00	2.10E-01	4.19E-01	0.3750	1.083E+14
Cs-134	4.8693E-01	5,487.98	10,975.95	0.00E+00	2.67E+03	5.34E+03	0.5750	1.487E+15
Cs-135	3.4477E-06	5,487.98	10,975.95	0.00E+00	1.89E-02	3.78E-02	0.8500	2.083E+14
Cs-137	2.8731E+00	5,487.98	10,975.95	0.00E+00	1.58E+04	3.15E+04	1.2500	3.875E+13
Eu-154	8.2053E-02	5,487.98	10,975.95	0.00E+00	4.50E+02	9.01E+02	1.7500	1.625E+12
Eu-155	3.9134E-02	5,487.98	10,975.95	0.00E+00	2.15E+02	4.30E+02	2.2500	3.408E+12
Fe-55	6.7429E-03	5,487.98	10,975.95	0.00E+00	3.70E+01	7.40E+01	2.7500	1.961E+10
H-3	1.0599E-02	5,487.98	10,975.95	0.00E+00	5.82E+01	1.16E+02	3.5000	2.175E+09
I-129	7.5300E-07	5,487.98	10,975.95	0.00E+00	4.13E-03	8.26E-03	5.0000	6.501E+03
Kr-85	2.8595E-01	5,487.98	10,975.95	0.00E+00	1.57E+03	3.14E+03	7.0000	7.247E+02
Np-237	9.5479E-06	5,487.98	10,975.95	0.00E+00	5.24E-02	1.05E-01	11.0000	8.169E+01
Pa-231	8.9297E-10	5,487.98	10,975.95	0.00E+00	4.90E-06	9.80E-06		
Pb-210	3.7609E-12	5,487.98	10,975.95	0.00E+00	2.06E-08	4.13E-08		
Pm-147	2.5452E+00	5,487.98	10,975.95	0.00E+00	1.40E+04	2.79E+04		
Pu-238	2.0550E-02	5,487.98	10,975.95	0.00E+00	1.13E+02	2.26E+02		
Pu-239	4.2838E-04	5,487.98	10,975.95	0.00E+00	2.35E+00	4.70E+00		
Pu-240	2.4401E-04	5,487.98	10,975.95	0.00E+00	1.34E+00	2.68E+00		
Pu-241	6.8764E-02	5,487.98	10,975.95	0.00E+00	3.77E+02	7.55E+02		
Pu-242	3.6329E-07	5,487.98	10,975.95	0.00E+00	1.99E-03	3.99E-03		
Ra-226	3.8045E-11	5,487.98	10,975.95	0.00E+00	2.09E-07	4.18E-07		
Ra-228	2.9902E-15	5,487.98	10,975.95	0.00E+00	1.64E-11	3.28E-11		
Ru-106	1.9055E-01	5,487.98	10,975.95	0.00E+00	1.05E+03	2.09E+03		
Se-79	1.2936E-05	5,487.98	10,975.95	0.00E+00	7.10E-02	1.42E-01		
Sn-126	1.1574E-05	5,487.98	10,975.95	0.00E+00	6.35E-02	1.27E-01		
Sr-90	2.7505E+00	5,487.98	10,975.95	0.00E+00	1.51E+04	3.02E+04		
Tc-99	4.2239E-04	5,487.98	10,975.95	0.00E+00	2.32E+00	4.64E+00		
Th-229	1.8848E-12	5,487.98	10,975.95	0.00E+00	1.03E-08	2.07E-08		
Th-230	1.7042E-08	5,487.98	10,975.95	0.00E+00	9.35E-05	1.87E-04		
Th-232	7.8132E-15	5,487.98	10,975.95	0.00E+00	4.29E-11	8.58E-11		
Tl-208	4.4063E-08	5,487.98	10,975.95	0.00E+00	2.42E-04	4.84E-04		
U-232	1.3151E-07	5,487.98	10,975.95	0.00E+00	7.22E-04	1.44E-03		
U-233	1.9564E-09	5,487.98	10,975.95	0.00E+00	1.07E-05	2.15E-05		
U-234	1.8371E-04	5,487.98	10,975.95	0.00E+00	1.01E+00	2.02E+00		
U-235	-2.7235E-06	5,487.98	0.00	2.50E-02	1.01E-02	2.50E-02		
U-236	1.5493E-05	5,487.98	10,975.95	0.00E+00	8.50E-02	1.70E-01		
U-238	-4.2851E-09	5,487.98	0.00	2.93E-04	2.70E-04	2.93E-04		
Y-90	2.7505E+00	5,487.98	10,975.95	0.00E+00	1.51E+04	3.02E+04		
Other Radionuclides					2.82E+04	5.65E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.78E+02	5.57E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99998578	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		5,487.98
Bounding:		10,975.95

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.40	
Bounding:	2.80	

Estimated EOL HM/Given EOL HM: 1.05

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) PORTUGAL
SNF ID #: 632
Fuel Units & Descr: 22 - MTR TYPE
Heavy Metal Mass: BOL=6.246kg; EOL=3.923kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 0.92

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	1.4545E-10	2,200.12	4,400.23	0.00E+00	3.20E-07	6.40E-07
Am-241	1.1190E-03	2,200.12	4,400.23	0.00E+00	2.46E+00	4.92E+00
Am-242m	4.5425E-07	2,200.12	4,400.23	0.00E+00	9.99E-04	2.00E-03
Am-243	1.4921E-06	2,200.12	4,400.23	0.00E+00	3.28E-03	6.57E-03
C-14	5.7244E-09	2,200.12	4,400.23	0.00E+00	1.26E-05	2.52E-05
Cl-36	1.3124E-32	2,200.12	4,400.23	0.00E+00	2.89E-29	5.77E-29
Cm-243	2.3676E-07	2,200.12	4,400.23	0.00E+00	5.21E-04	1.04E-03
Cm-244	5.2042E-05	2,200.12	4,400.23	0.00E+00	1.14E-01	2.29E-01
Co-60	3.8208E-05	2,200.12	4,400.23	0.00E+00	8.41E-02	1.68E-01
Cs-134	4.8693E-01	2,200.12	4,400.23	0.00E+00	1.07E+03	2.14E+03
Cs-135	3.4477E-06	2,200.12	4,400.23	0.00E+00	7.59E-03	1.52E-02
Cs-137	2.8731E+00	2,200.12	4,400.23	0.00E+00	6.32E+03	1.26E+04
Eu-154	8.2053E-02	2,200.12	4,400.23	0.00E+00	1.81E+02	3.61E+02
Eu-155	3.9134E-02	2,200.12	4,400.23	0.00E+00	8.61E+01	1.72E+02
Fe-55	6.7429E-03	2,200.12	4,400.23	0.00E+00	1.48E+01	2.97E+01
H-3	1.0599E-02	2,200.12	4,400.23	0.00E+00	2.33E+01	4.66E+01
I-129	7.5300E-07	2,200.12	4,400.23	0.00E+00	1.66E-03	3.31E-03
Kr-85	2.8595E-01	2,200.12	4,400.23	0.00E+00	6.29E+02	1.26E+03
Np-237	9.5479E-06	2,200.12	4,400.23	0.00E+00	2.10E-02	4.20E-02
Pa-231	8.9297E-10	2,200.12	4,400.23	0.00E+00	1.96E-06	3.93E-06
Pb-210	3.7609E-12	2,200.12	4,400.23	0.00E+00	8.27E-09	1.65E-08
Pm-147	2.5452E+00	2,200.12	4,400.23	0.00E+00	5.60E+03	1.12E+04
Pu-238	2.0550E-02	2,200.12	4,400.23	0.00E+00	4.52E+01	9.04E+01
Pu-239	4.2838E-04	2,200.12	4,400.23	0.00E+00	9.42E-01	1.88E+00
Pu-240	2.4401E-04	2,200.12	4,400.23	0.00E+00	5.37E-01	1.07E+00
Pu-241	6.8764E-02	2,200.12	4,400.23	0.00E+00	1.51E+02	3.03E+02
Pu-242	3.6329E-07	2,200.12	4,400.23	0.00E+00	7.99E-04	1.60E-03
Ra-226	3.8045E-11	2,200.12	4,400.23	0.00E+00	8.37E-08	1.67E-07
Ra-228	2.9902E-15	2,200.12	4,400.23	0.00E+00	6.58E-12	1.32E-11
Ru-106	1.9055E-01	2,200.12	4,400.23	0.00E+00	4.19E+02	8.38E+02
Se-79	1.2936E-05	2,200.12	4,400.23	0.00E+00	2.85E-02	5.69E-02
Sn-126	1.1574E-05	2,200.12	4,400.23	0.00E+00	2.55E-02	5.09E-02
Sr-90	2.7505E+00	2,200.12	4,400.23	0.00E+00	6.05E+03	1.21E+04
Tc-99	4.2239E-04	2,200.12	4,400.23	0.00E+00	9.29E-01	1.86E+00
Th-229	1.8848E-12	2,200.12	4,400.23	0.00E+00	4.15E-09	8.29E-09
Th-230	1.7042E-08	2,200.12	4,400.23	0.00E+00	3.75E-05	7.50E-05
Th-232	7.8132E-15	2,200.12	4,400.23	0.00E+00	1.72E-11	3.44E-11
Tl-208	4.4063E-08	2,200.12	4,400.23	0.00E+00	9.69E-05	1.94E-04
U-232	1.3151E-07	2,200.12	4,400.23	0.00E+00	2.89E-04	5.79E-04
U-233	1.9564E-09	2,200.12	4,400.23	0.00E+00	4.30E-06	8.61E-06
U-234	1.8371E-04	2,200.12	4,400.23	0.00E+00	4.04E-01	8.08E-01
U-235	-2.7235E-06	2,200.12	0.00	1.26E-02	6.56E-03	1.26E-02
U-236	1.5493E-05	2,200.12	4,400.23	0.00E+00	3.41E-02	6.82E-02
U-238	-4.2851E-09	2,200.12	0.00	1.47E-04	1.38E-04	1.47E-04
Y-90	2.7505E+00	2,200.12	4,400.23	0.00E+00	6.05E+03	1.21E+04
Other Radionuclides					1.13E+04	2.26E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.489E+14
0.0250	1.829E+14
0.0375	1.688E+14
0.0575	1.659E+14
0.0850	1.058E+14
0.1250	9.161E+13
0.2250	8.966E+13
0.3750	4.340E+13
0.5750	5.962E+14
0.8500	8.349E+13
1.2500	1.553E+13
1.7500	6.514E+11
2.2500	1.366E+12
2.7500	7.860E+09
3.5000	8.716E+08
5.0000	2.606E+03
7.0000	2.906E+02
11.0000	3.275E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.12E+02	2.23E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99999055	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2,200.12
Bounding:		4,400.23

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.12	
Bounding:	2.24	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) SWITZERLAND
SNF ID #: 658
Fuel Units & Descr: 55 - MTR TYPE
Heavy Metal Mass: BOL=16.676kg; EOL=5.973kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' = 2.29

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	10,135.95	15,792.50	0.00E+00	1.47E-06	2.30E-06	Avg. MeV	
Am-241	1.1190E-03	10,135.95	15,792.50	0.00E+00	1.13E+01	1.77E+01	0.0150	3.047E+15
Am-242m	4.5425E-07	10,135.95	15,792.50	0.00E+00	4.60E-03	7.17E-03	0.0250	6.564E+14
Am-243	1.4921E-06	10,135.95	15,792.50	0.00E+00	1.51E-02	2.36E-02	0.0375	6.057E+14
C-14	5.7244E-09	10,135.95	15,792.50	0.00E+00	5.80E-05	9.04E-05	0.0575	5.956E+14
Cl-36	1.3124E-32	10,135.95	15,792.50	0.00E+00	1.33E-28	2.07E-28	0.0850	3.797E+14
Cm-243	2.3676E-07	10,135.95	15,792.50	0.00E+00	2.40E-03	3.74E-03	0.1250	3.288E+14
Cm-244	5.2042E-05	10,135.95	15,792.50	0.00E+00	5.27E-01	8.22E-01	0.2250	3.218E+14
Co-60	3.8208E-05	10,135.95	15,792.50	0.00E+00	3.87E-01	6.03E-01	0.3750	1.558E+14
Cs-134	4.8693E-01	10,135.95	15,792.50	0.00E+00	4.94E+03	7.69E+03	0.5750	2.140E+15
Cs-135	3.4477E-06	10,135.95	15,792.50	0.00E+00	3.49E-02	5.44E-02	0.8500	2.998E+14
Cs-137	2.8731E+00	10,135.95	15,792.50	0.00E+00	2.91E+04	4.54E+04	1.2500	5.575E+13
Eu-154	8.2053E-02	10,135.95	15,792.50	0.00E+00	8.32E+02	1.30E+03	1.7500	2.338E+12
Eu-155	3.9134E-02	10,135.95	15,792.50	0.00E+00	3.97E+02	6.18E+02	2.2500	4.903E+12
Fe-55	6.7429E-03	10,135.95	15,792.50	0.00E+00	6.83E+01	1.06E+02	2.7500	2.821E+10
H-3	1.0599E-02	10,135.95	15,792.50	0.00E+00	1.07E+02	1.67E+02	3.5000	3.129E+09
I-129	7.5300E-07	10,135.95	15,792.50	0.00E+00	7.63E-03	1.19E-02	5.0000	9.354E+03
Kr-85	2.8595E-01	10,135.95	15,792.50	0.00E+00	2.90E+03	4.52E+03	7.0000	1.043E+03
Np-237	9.5479E-06	10,135.95	15,792.50	0.00E+00	9.68E-02	1.51E-01	11.0000	1.175E+02
Pa-231	8.9297E-10	10,135.95	15,792.50	0.00E+00	9.05E-06	1.41E-05		
Pb-210	3.7609E-12	10,135.95	15,792.50	0.00E+00	3.81E-08	5.94E-08		
Pm-147	2.5452E+00	10,135.95	15,792.50	0.00E+00	2.58E+04	4.02E+04		
Pu-238	2.0550E-02	10,135.95	15,792.50	0.00E+00	2.08E+02	3.25E+02		
Pu-239	4.2838E-04	10,135.95	15,792.50	0.00E+00	4.34E+00	6.77E+00		
Pu-240	2.4401E-04	10,135.95	15,792.50	0.00E+00	2.47E+00	3.85E+00		
Pu-241	6.8764E-02	10,135.95	15,792.50	0.00E+00	6.97E+02	1.09E+03		
Pu-242	3.6329E-07	10,135.95	15,792.50	0.00E+00	3.68E-03	5.74E-03		
Ra-226	3.8045E-11	10,135.95	15,792.50	0.00E+00	3.86E-07	6.01E-07		
Ra-228	2.9902E-15	10,135.95	15,792.50	0.00E+00	3.03E-11	4.72E-11		
Ru-106	1.9055E-01	10,135.95	15,792.50	0.00E+00	1.93E+03	3.01E+03		
Se-79	1.2936E-05	10,135.95	15,792.50	0.00E+00	1.31E-01	2.04E-01		
Sn-126	1.1574E-05	10,135.95	15,792.50	0.00E+00	1.17E-01	1.83E-01		
Sr-90	2.7505E+00	10,135.95	15,792.50	0.00E+00	2.79E+04	4.34E+04		
Tc-99	4.2239E-04	10,135.95	15,792.50	0.00E+00	4.28E+00	6.67E+00		
Th-229	1.8848E-12	10,135.95	15,792.50	0.00E+00	1.91E-08	2.98E-08		
Th-230	1.7042E-08	10,135.95	15,792.50	0.00E+00	1.73E-04	2.69E-04		
Th-232	7.8132E-15	10,135.95	15,792.50	0.00E+00	7.92E-11	1.23E-10		
Tl-208	4.4063E-08	10,135.95	15,792.50	0.00E+00	4.47E-04	6.96E-04		
U-232	1.3151E-07	10,135.95	15,792.50	0.00E+00	1.33E-03	2.08E-03	Thermal Power	
U-233	1.9564E-09	10,135.95	15,792.50	0.00E+00	1.98E-05	3.09E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8371E-04	10,135.95	15,792.50	0.00E+00	1.86E+00	2.90E+00	5.14E+02	8.01E+02
U-235	-2.7235E-06	10,135.95	0.00	3.35E-02	5.91E-03	3.35E-02	Total	Total
U-236	1.5493E-05	10,135.95	15,792.50	0.00E+00	1.57E-01	2.45E-01		
U-238	-4.2851E-09	10,135.95	0.00	3.92E-04	3.49E-04	3.92E-04		
Y-90	2.7505E+00	10,135.95	15,792.50	0.00E+00	2.79E+04	4.34E+04		
Other Radionuclides					5.21E+04	8.12E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93.00000816	60 to 100	

Burnup Summary (MWd)[2]	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		10,135.95	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		15,792.50	Bounding burnup calculated assuming all BOL heavy metal burned.

Checks	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	1.93		1.10
Bounding:	3.01		

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) TURKEY
SNF ID #: 644
Fuel Units & Descr: 18 - MTR TYPE
Heavy Metal Mass: BOL=5.42kg; EOL=2.9kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.75

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	2,386.49	4,772.98	0.00E+00	3.47E-07	6.94E-07
Am-241	1.1190E-03	2,386.49	4,772.98	0.00E+00	2.67E+00	5.34E+00
Am-242m	4.5425E-07	2,386.49	4,772.98	0.00E+00	1.08E-03	2.17E-03
Am-243	1.4921E-06	2,386.49	4,772.98	0.00E+00	3.56E-03	7.12E-03
C-14	5.7244E-09	2,386.49	4,772.98	0.00E+00	1.37E-05	2.73E-05
Cl-36	1.3124E-32	2,386.49	4,772.98	0.00E+00	3.13E-29	6.26E-29
Cm-243	2.3676E-07	2,386.49	4,772.98	0.00E+00	5.65E-04	1.13E-03
Cm-244	5.2042E-05	2,386.49	4,772.98	0.00E+00	1.24E-01	2.48E-01
Co-60	3.8208E-05	2,386.49	4,772.98	0.00E+00	9.12E-02	1.82E-01
Cs-134	4.8693E-01	2,386.49	4,772.98	0.00E+00	1.16E+03	2.32E+03
Cs-135	3.4477E-06	2,386.49	4,772.98	0.00E+00	8.23E-03	1.65E-02
Cs-137	2.8731E+00	2,386.49	4,772.98	0.00E+00	6.86E+03	1.37E+04
Eu-154	8.2053E-02	2,386.49	4,772.98	0.00E+00	1.96E+02	3.92E+02
Eu-155	3.9134E-02	2,386.49	4,772.98	0.00E+00	9.34E+01	1.87E+02
Fe-55	6.7429E-03	2,386.49	4,772.98	0.00E+00	1.61E+01	3.22E+01
H-3	1.0599E-02	2,386.49	4,772.98	0.00E+00	2.53E+01	5.06E+01
I-129	7.5300E-07	2,386.49	4,772.98	0.00E+00	1.80E-03	3.59E-03
Kr-85	2.8595E-01	2,386.49	4,772.98	0.00E+00	6.82E+02	1.36E+03
Np-237	9.5479E-06	2,386.49	4,772.98	0.00E+00	2.28E-02	4.56E-02
Pa-231	8.9297E-10	2,386.49	4,772.98	0.00E+00	2.13E-06	4.26E-06
Pb-210	3.7609E-12	2,386.49	4,772.98	0.00E+00	8.98E-09	1.80E-08
Pm-147	2.5452E+00	2,386.49	4,772.98	0.00E+00	6.07E+03	1.21E+04
Pu-238	2.0550E-02	2,386.49	4,772.98	0.00E+00	4.90E+01	9.81E+01
Pu-239	4.2838E-04	2,386.49	4,772.98	0.00E+00	1.02E+00	2.04E+00
Pu-240	2.4401E-04	2,386.49	4,772.98	0.00E+00	5.82E-01	1.16E+00
Pu-241	6.8764E-02	2,386.49	4,772.98	0.00E+00	1.64E+02	3.28E+02
Pu-242	3.6329E-07	2,386.49	4,772.98	0.00E+00	8.67E-04	1.73E-03
Ra-226	3.8045E-11	2,386.49	4,772.98	0.00E+00	9.08E-08	1.82E-07
Ra-228	2.9902E-15	2,386.49	4,772.98	0.00E+00	7.14E-12	1.43E-11
Ru-106	1.9055E-01	2,386.49	4,772.98	0.00E+00	4.55E+02	9.09E+02
Se-79	1.2936E-05	2,386.49	4,772.98	0.00E+00	3.09E-02	6.17E-02
Sn-126	1.1574E-05	2,386.49	4,772.98	0.00E+00	2.76E-02	5.52E-02
Sr-90	2.7505E+00	2,386.49	4,772.98	0.00E+00	6.56E+03	1.31E+04
Tc-99	4.2239E-04	2,386.49	4,772.98	0.00E+00	1.01E+00	2.02E+00
Th-229	1.8848E-12	2,386.49	4,772.98	0.00E+00	4.50E-09	9.00E-09
Th-230	1.7042E-08	2,386.49	4,772.98	0.00E+00	4.07E-05	8.13E-05
Th-232	7.8132E-15	2,386.49	4,772.98	0.00E+00	1.86E-11	3.73E-11
Tl-208	4.4063E-06	2,386.49	4,772.98	0.00E+00	1.05E-04	2.10E-04
U-232	1.3151E-07	2,386.49	4,772.98	0.00E+00	3.14E-04	6.28E-04
U-233	1.9564E-09	2,386.49	4,772.98	0.00E+00	4.67E-06	9.34E-06
U-234	1.8371E-04	2,386.49	4,772.98	0.00E+00	4.38E-01	8.77E-01
U-235	-2.7235E-06	2,386.49	0.00	1.09E-02	4.39E-03	1.09E-02
U-236	1.5493E-05	2,386.49	4,772.98	0.00E+00	3.70E-02	7.39E-02
U-238	-4.2851E-09	2,386.49	0.00	1.28E-04	1.17E-04	1.28E-04
Y-90	2.7505E+00	2,386.49	4,772.98	0.00E+00	6.56E+03	1.31E+04
Other Radionuclides					1.23E+04	2.45E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.208E+14
0.0250	1.984E+14
0.0375	1.831E+14
0.0575	1.800E+14
0.0850	1.148E+14
0.1250	9.937E+13
0.2250	9.726E+13
0.3750	4.708E+13
0.5750	6.467E+14
0.8500	9.056E+13
1.2500	1.685E+13
1.7500	7.066E+11
2.2500	1.482E+12
2.7500	8.526E+09
3.5000	9.456E+08
5.0000	2.827E+03
7.0000	3.152E+02
11.0000	3.552E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.21E+02	2.42E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99998782	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2,386.49
Bounding:		4,772.98

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.40	
Bounding:	2.80	

Estimated EOL HM/Given EOL HM: 1.05

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-LEU) JAPAN
SNF ID #: 553
Fuel Units & Descr: 476 - ASSEMBLY
Heavy Metal Mass: BOL=714kg; EOL=632.461kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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: 5 years

Estimated Canister usage: 18"x18' 19.83

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	1.7533E-10	77,499.76	154,999.52	0.00E+00	1.36E-05	2.72E-05
Am-241	1.2780E-02	77,499.76	154,999.52	0.00E+00	9.90E+02	1.98E+03
Am-242m	9.5467E-06	77,499.76	154,999.52	0.00E+00	7.40E-01	1.48E+00
Am-243	6.4100E-06	77,499.76	154,999.52	0.00E+00	4.97E-01	9.94E-01
C-14	2.9673E-06	77,499.76	154,999.52	0.00E+00	2.30E-03	4.60E-03
Cl-36	5.9513E-35	77,499.76	154,999.52	0.00E+00	4.61E-30	9.22E-30
Cm-243	3.1807E-06	77,499.76	154,999.52	0.00E+00	2.47E-01	4.93E-01
Cm-244	1.9540E-04	77,499.76	154,999.52	0.00E+00	1.51E+01	3.03E+01
Co-60	1.1753E-04	77,499.76	154,999.52	0.00E+00	9.11E+00	1.82E+01
Cs-134	3.3060E-01	77,499.76	154,999.52	0.00E+00	2.56E+04	5.12E+04
Cs-135	4.8607E-06	77,499.76	154,999.52	0.00E+00	3.77E-01	7.53E-01
Cs-137	2.8607E+00	77,499.76	154,999.52	0.00E+00	2.22E+05	4.43E+05
Eu-154	6.9933E-02	77,499.76	154,999.52	0.00E+00	5.42E+03	1.08E+04
Eu-155	3.3253E-02	77,499.76	154,999.52	0.00E+00	2.58E+03	5.15E+03
Fe-55	7.7267E-02	77,499.76	154,999.52	0.00E+00	5.99E+03	1.20E+04
H-3	1.0827E-02	77,499.76	154,999.52	0.00E+00	8.39E+02	1.68E+03
I-129	7.1600E-07	77,499.76	154,999.52	0.00E+00	5.55E-02	1.11E-01
Kr-85	2.7007E-01	77,499.76	154,999.52	0.00E+00	2.09E+04	4.19E+04
Np-237	3.6327E-06	77,499.76	154,999.52	0.00E+00	2.82E-01	5.63E-01
Pa-231	1.1267E-09	77,499.76	154,999.52	0.00E+00	8.73E-05	1.75E-04
Pb-210	1.9773E-15	77,499.76	154,999.52	0.00E+00	1.53E-10	3.06E-10
Pm-147	2.4367E+00	77,499.76	154,999.52	0.00E+00	1.89E+05	3.78E+05
Pu-238	6.2213E-03	77,499.76	154,999.52	0.00E+00	4.82E+02	9.64E+02
Pu-239	1.0320E-02	77,499.76	154,999.52	0.00E+00	8.00E+02	1.60E+03
Pu-240	5.4260E-03	77,499.76	154,999.52	0.00E+00	4.21E+02	8.41E+02
Pu-241	7.7333E-01	77,499.76	154,999.52	0.00E+00	5.99E+04	1.20E+05
Pu-242	3.0713E-06	77,499.76	154,999.52	0.00E+00	2.38E-01	4.76E-01
Ra-226	2.2027E-14	77,499.76	154,999.52	0.00E+00	1.71E-09	3.41E-09
Ra-228	2.6333E-15	77,499.76	154,999.52	0.00E+00	2.04E-10	4.08E-10
Ru-106	2.5580E-01	77,499.76	154,999.52	0.00E+00	1.98E+04	3.96E+04
Se-79	1.2540E-05	77,499.76	154,999.52	0.00E+00	9.72E-01	1.94E+00
Sn-126	1.1393E-05	77,499.76	154,999.52	0.00E+00	8.83E-01	1.77E+00
Sr-90	2.6293E+00	77,499.76	154,999.52	0.00E+00	2.04E+05	4.08E+05
Tc-99	4.3540E-04	77,499.76	154,999.52	0.00E+00	3.37E+01	6.75E+01
Th-229	1.3653E-13	77,499.76	154,999.52	0.00E+00	1.06E-08	2.12E-08
Th-230	1.2607E-11	77,499.76	154,999.52	0.00E+00	9.77E-07	1.95E-06
Th-232	6.7400E-15	77,499.76	154,999.52	0.00E+00	5.22E-10	1.04E-09
Tl-208	7.4667E-09	77,499.76	154,999.52	0.00E+00	5.79E-04	1.16E-03
U-232	2.1927E-06	77,499.76	154,999.52	0.00E+00	1.70E-03	3.40E-03
U-233	1.9920E-10	77,499.76	154,999.52	0.00E+00	1.54E-05	3.09E-05
U-234	2.2487E-07	77,499.76	154,999.52	0.00E+00	1.74E-02	3.49E-02
U-235	-2.5341E-06	77,499.76	0.00	3.09E-01	1.12E-01	3.09E-01
U-236	1.3000E-05	77,499.76	154,999.52	0.00E+00	1.01E+00	2.01E+00
U-238	-1.4207E-06	77,499.76	0.00	1.92E-01	1.91E-01	1.92E-01
Y-90	2.6300E+00	77,499.76	154,999.52	0.00E+00	2.04E+05	4.08E+05
Other Radionuclides					3.66E+05	7.32E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.812E+16
0.0250	6.060E+15
0.0375	5.522E+15
0.0575	5.512E+15
0.0850	3.472E+15
0.1250	2.899E+15
0.2250	2.961E+15
0.3750	1.436E+15
0.5750	1.982E+16
0.8500	2.103E+15
1.2500	4.647E+14
1.7500	2.212E+13
2.2500	3.847E+13
2.7500	3.480E+11
3.5000	4.122E+10
5.0000	4.035E+05
7.0000	4.597E+04
11.0000	5.250E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.67E+03	7.34E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		77,499.76
Bounding:		154,999.52

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	2.48	
Bounding:	4.96	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-LEU) PORTUGAL
SNF ID #: 542
Fuel Units & Descr: 6 - ASSEMBLY
Heavy Metal Mass: BOL=5.4kg; EOL=5.152kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10" 0.25

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	1.4545E-10	235.24	470.48	0.00E+00	3.42E-08	6.84E-08
Am-241	1.1190E-03	235.24	470.48	0.00E+00	2.63E-01	5.26E-01
Am-242m	4.5425E-07	235.24	470.48	0.00E+00	1.07E-04	2.14E-04
Am-243	1.4921E-06	235.24	470.48	0.00E+00	3.51E-04	7.02E-04
C-14	5.7244E-09	235.24	470.48	0.00E+00	1.35E-06	2.69E-06
Cl-36	1.3124E-32	235.24	470.48	0.00E+00	3.09E-30	6.17E-30
Cm-243	2.3676E-07	235.24	470.48	0.00E+00	5.57E-05	1.11E-04
Cm-244	5.2042E-05	235.24	470.48	0.00E+00	1.22E-02	2.45E-02
Co-60	3.8208E-05	235.24	470.48	0.00E+00	8.99E-03	1.80E-02
Cs-134	4.8693E-01	235.24	470.48	0.00E+00	1.15E+02	2.29E+02
Cs-135	3.4477E-06	235.24	470.48	0.00E+00	8.11E-04	1.62E-03
Cs-137	2.8731E+00	235.24	470.48	0.00E+00	6.76E+02	1.35E+03
Eu-154	8.2063E-02	235.24	470.48	0.00E+00	1.93E+01	3.86E+01
Eu-155	3.9134E-02	235.24	470.48	0.00E+00	9.21E+00	1.84E+01
Fe-55	6.7429E-03	235.24	470.48	0.00E+00	1.59E+00	3.17E+00
H-3	1.0599E-02	235.24	470.48	0.00E+00	2.49E+00	4.99E+00
I-129	7.5300E-07	235.24	470.48	0.00E+00	1.77E-04	3.54E-04
Kr-85	2.8595E-01	235.24	470.48	0.00E+00	6.73E+01	1.35E+02
Np-237	9.5479E-06	235.24	470.48	0.00E+00	2.25E-03	4.49E-03
Pa-231	8.9297E-10	235.24	470.48	0.00E+00	2.10E-07	4.20E-07
Pb-210	3.7609E-12	235.24	470.48	0.00E+00	8.85E-10	1.77E-09
Pm-147	2.5452E+00	235.24	470.48	0.00E+00	5.99E+02	1.20E+03
Pu-238	2.0550E-02	235.24	470.48	0.00E+00	4.83E+00	9.67E+00
Pu-239	4.2838E-04	235.24	470.48	0.00E+00	1.01E-01	2.02E-01
Pu-240	2.4401E-04	235.24	470.48	0.00E+00	5.74E-02	1.15E-01
Pu-241	6.8764E-02	235.24	470.48	0.00E+00	1.62E+01	3.24E+01
Pu-242	3.6329E-07	235.24	470.48	0.00E+00	8.55E-05	1.71E-04
Ra-226	3.8045E-11	235.24	470.48	0.00E+00	8.95E-09	1.79E-08
Ra-228	2.9902E-15	235.24	470.48	0.00E+00	7.03E-13	1.41E-12
Ru-106	1.9055E-01	235.24	470.48	0.00E+00	4.48E+01	8.96E+01
Se-79	1.2936E-05	235.24	470.48	0.00E+00	3.04E-03	6.09E-03
Sn-126	1.1574E-05	235.24	470.48	0.00E+00	2.72E-03	5.45E-03
Sr-90	2.7505E+00	235.24	470.48	0.00E+00	6.47E+02	1.29E+03
Tc-99	4.2239E-04	235.24	470.48	0.00E+00	9.94E-02	1.99E-01
Th-229	1.8848E-12	235.24	470.48	0.00E+00	4.43E-10	8.87E-10
Th-230	1.7042E-06	235.24	470.48	0.00E+00	4.01E-06	8.02E-06
Th-232	7.8132E-15	235.24	470.48	0.00E+00	1.84E-12	3.68E-12
Tl-208	4.4063E-08	235.24	470.48	0.00E+00	1.04E-05	2.07E-05
U-232	1.3151E-07	235.24	470.48	0.00E+00	3.09E-05	6.19E-05
U-233	1.9564E-09	235.24	470.48	0.00E+00	4.60E-07	9.20E-07
U-234	1.8371E-04	235.24	470.48	0.00E+00	4.32E-02	8.64E-02
U-235	-2.7235E-06	235.24	0.00	2.33E-03	1.69E-03	2.33E-03
U-236	1.5493E-05	235.24	470.48	0.00E+00	3.64E-03	7.29E-03
U-238	-4.2851E-09	235.24	0.00	1.45E-03	1.45E-03	1.45E-03
Y-90	2.7505E+00	235.24	470.48	0.00E+00	6.47E+02	1.29E+03
Other Radionuclides					1.21E+03	2.42E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.077E+13
0.0250	1.955E+13
0.0375	1.804E+13
0.0575	1.774E+13
0.0850	1.131E+13
0.1250	9.796E+12
0.2250	9.587E+12
0.3750	4.641E+12
0.5750	6.374E+13
0.8500	8.927E+12
1.2500	1.661E+12
1.7500	6.965E+10
2.2500	1.461E+11
2.7500	8.404E+08
3.5000	9.321E+07
5.0000	2.820E+02
7.0000	3.145E+01
11.0000	3.546E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.19E+01	2.39E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000132	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		235.24
Bounding:		470.48

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.14	
Bounding:	0.28	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-MEU) GERMANY
SNF ID #: 1068
Fuel Units & Descr: 28 - MTR TYPE
Heavy Metal Mass: BOL=12.88kg; EOL=9.17kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.17

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	3,513.44	7,026.88	0.00E+00	5.11E-07	1.02E-06
Am-241	1.1190E-03	3,513.44	7,026.88	0.00E+00	3.93E+00	7.86E+00
Am-242m	4.5425E-07	3,513.44	7,026.88	0.00E+00	1.60E-03	3.19E-03
Am-243	1.4921E-06	3,513.44	7,026.88	0.00E+00	5.24E-03	1.05E-02
C-14	5.7244E-09	3,513.44	7,026.88	0.00E+00	2.01E-05	4.02E-05
Cl-36	1.3124E-32	3,513.44	7,026.88	0.00E+00	4.61E-29	9.22E-29
Cm-243	2.3676E-07	3,513.44	7,026.88	0.00E+00	8.32E-04	1.66E-03
Cm-244	5.2042E-05	3,513.44	7,026.88	0.00E+00	1.83E-01	3.66E-01
Co-60	3.8208E-05	3,513.44	7,026.88	0.00E+00	1.34E-01	2.68E-01
Cs-134	4.8693E-01	3,513.44	7,026.88	0.00E+00	1.71E+03	3.42E+03
Cs-135	3.4477E-06	3,513.44	7,026.88	0.00E+00	1.21E-02	2.42E-02
Cs-137	2.8731E+00	3,513.44	7,026.88	0.00E+00	1.01E+04	2.02E+04
Eu-154	8.2053E-02	3,513.44	7,026.88	0.00E+00	2.88E+02	5.77E+02
Eu-155	3.9134E-02	3,513.44	7,026.88	0.00E+00	1.37E+02	2.75E+02
Fe-55	6.7429E-03	3,513.44	7,026.88	0.00E+00	2.37E+01	4.74E+01
H-3	1.0599E-02	3,513.44	7,026.88	0.00E+00	3.72E+01	7.45E+01
I-129	7.5300E-07	3,513.44	7,026.88	0.00E+00	2.65E-03	5.29E-03
Kr-85	2.8595E-01	3,513.44	7,026.88	0.00E+00	1.00E+03	2.01E+03
Np-237	9.5479E-06	3,513.44	7,026.88	0.00E+00	3.35E-02	6.71E-02
Pa-231	8.9297E-10	3,513.44	7,026.88	0.00E+00	3.14E-06	6.27E-06
Pb-210	3.7609E-12	3,513.44	7,026.88	0.00E+00	1.32E-08	2.64E-08
Pm-147	2.5452E+00	3,513.44	7,026.88	0.00E+00	8.94E+03	1.79E+04
Pu-238	2.0550E-02	3,513.44	7,026.88	0.00E+00	7.22E+01	1.44E+02
Pu-239	4.2838E-04	3,513.44	7,026.88	0.00E+00	1.51E+00	3.01E+00
Pu-240	2.4401E-04	3,513.44	7,026.88	0.00E+00	8.57E-01	1.71E+00
Pu-241	6.8764E-02	3,513.44	7,026.88	0.00E+00	2.42E+02	4.83E+02
Pu-242	3.6329E-07	3,513.44	7,026.88	0.00E+00	1.28E-03	2.55E-03
Ra-226	3.8045E-11	3,513.44	7,026.88	0.00E+00	1.34E-07	2.67E-07
Ra-228	2.9902E-15	3,513.44	7,026.88	0.00E+00	1.05E-11	2.10E-11
Ru-106	1.9055E-01	3,513.44	7,026.88	0.00E+00	6.69E+02	1.34E+03
Se-79	1.2936E-05	3,513.44	7,026.88	0.00E+00	4.54E-02	9.09E-02
Sn-126	1.1574E-05	3,513.44	7,026.88	0.00E+00	4.07E-02	8.13E-02
Sr-90	2.7505E+00	3,513.44	7,026.88	0.00E+00	9.66E+03	1.93E+04
Tc-99	4.2239E-04	3,513.44	7,026.88	0.00E+00	1.48E+00	2.97E+00
Th-229	1.8848E-12	3,513.44	7,026.88	0.00E+00	6.62E-09	1.32E-08
Th-230	1.7042E-08	3,513.44	7,026.88	0.00E+00	5.99E-05	1.20E-04
Th-232	7.8132E-15	3,513.44	7,026.88	0.00E+00	2.75E-11	5.49E-11
Tl-208	4.4063E-08	3,513.44	7,026.88	0.00E+00	1.55E-04	3.10E-04
U-232	1.3151E-07	3,513.44	7,026.88	0.00E+00	4.62E-04	9.24E-04
U-233	1.9564E-09	3,513.44	7,026.88	0.00E+00	6.87E-06	1.37E-05
U-234	1.8371E-04	3,513.44	7,026.88	0.00E+00	6.45E-01	1.29E+00
U-235	-2.7235E-06	3,513.44	0.00	1.25E-02	2.98E-03	1.25E-02
U-236	1.5493E-05	3,513.44	7,026.88	0.00E+00	5.44E-02	1.09E-01
U-238	-4.2851E-09	3,513.44	0.00	2.38E-03	2.36E-03	2.38E-03
Y-90	2.7505E+00	3,513.44	7,026.88	0.00E+00	9.66E+03	1.93E+04
Other Radionuclides					1.81E+04	3.61E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.356E+15
0.0250	2.921E+14
0.0375	2.695E+14
0.0575	2.650E+14
0.0850	1.689E+14
0.1250	1.463E+14
0.2250	1.432E+14
0.3750	6.931E+13
0.5750	9.521E+14
0.8500	1.333E+14
1.2500	2.481E+13
1.7500	1.040E+12
2.2500	2.182E+12
2.7500	1.255E+10
3.5000	1.392E+09
5.0000	4.167E+03
7.0000	4.646E+02
11.0000	5.237E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.78E+02	3.56E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	45.07	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3,513.44
Bounding:		7,026.88

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.87	
Bounding:	1.73	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR PIN CLUSTER U3SI2-LEU CANADA
SNF ID #: 660
Fuel Units & Descr: 1527 - MULTI-PIN CLUSTER
Heavy Metal Mass: BOL=3796.275kg; EOL=3226.396kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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: 5 years

Estimated Canister usage: 18"x15" 127.25

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	1.7533E-10	541,647.53	1,083,295.06	0.00E+00	9.50E-05	1.90E-04
Am-241	1.2780E-02	541,647.53	1,083,295.06	0.00E+00	6.92E+03	1.38E+04
Am-242m	9.5467E-06	541,647.53	1,083,295.06	0.00E+00	5.17E+00	1.03E+01
Am-243	6.4100E-06	541,647.53	1,083,295.06	0.00E+00	3.47E+00	6.94E+00
C-14	2.9673E-08	541,647.53	1,083,295.06	0.00E+00	1.61E-02	3.21E-02
Cl-36	5.9513E-35	541,647.53	1,083,295.06	0.00E+00	3.22E-29	6.45E-29
Cm-243	3.1807E-06	541,647.53	1,083,295.06	0.00E+00	1.72E+00	3.45E+00
Cm-244	1.9540E-04	541,647.53	1,083,295.06	0.00E+00	1.06E+02	2.12E+02
Co-60	1.1753E-04	541,647.53	1,083,295.06	0.00E+00	6.37E+01	1.27E+02
Cs-134	3.3060E-01	541,647.53	1,083,295.06	0.00E+00	1.79E+05	3.58E+05
Cs-135	4.8607E-06	541,647.53	1,083,295.06	0.00E+00	2.63E+00	5.27E+00
Cs-137	2.8607E+00	541,647.53	1,083,295.06	0.00E+00	1.55E+06	3.10E+06
Eu-154	6.9933E-02	541,647.53	1,083,295.06	0.00E+00	3.79E+04	7.58E+04
Eu-155	3.3253E-02	541,647.53	1,083,295.06	0.00E+00	1.80E+04	3.60E+04
Fe-55	7.7267E-02	541,647.53	1,083,295.06	0.00E+00	4.19E+04	8.37E+04
H-3	1.0827E-02	541,647.53	1,083,295.06	0.00E+00	5.86E+03	1.17E+04
I-129	7.1600E-07	541,647.53	1,083,295.06	0.00E+00	3.88E-01	7.76E-01
Kr-85	2.7007E-01	541,647.53	1,083,295.06	0.00E+00	1.46E+05	2.93E+05
Np-237	3.6327E-06	541,647.53	1,083,295.06	0.00E+00	1.97E+00	3.94E+00
Pa-231	1.1267E-09	541,647.53	1,083,295.06	0.00E+00	6.10E-04	1.22E-03
Pb-210	1.9773E-15	541,647.53	1,083,295.06	0.00E+00	1.07E-09	2.14E-09
Pm-147	2.4367E+00	541,647.53	1,083,295.06	0.00E+00	1.32E+06	2.64E+06
Pu-238	6.2213E-03	541,647.53	1,083,295.06	0.00E+00	3.37E+03	6.74E+03
Pu-239	1.0320E-02	541,647.53	1,083,295.06	0.00E+00	5.59E+03	1.12E+04
Pu-240	5.4260E-03	541,647.53	1,083,295.06	0.00E+00	2.94E+03	5.88E+03
Pu-241	7.7333E-01	541,647.53	1,083,295.06	0.00E+00	4.19E+05	8.38E+05
Pu-242	3.0713E-06	541,647.53	1,083,295.06	0.00E+00	1.66E+00	3.33E+00
Ra-226	2.2027E-14	541,647.53	1,083,295.06	0.00E+00	1.19E-08	2.39E-08
Ra-228	2.6333E-15	541,647.53	1,083,295.06	0.00E+00	1.43E-09	2.85E-09
Ru-106	2.5580E-01	541,647.53	1,083,295.06	0.00E+00	1.39E+05	2.77E+05
Se-79	1.2540E-05	541,647.53	1,083,295.06	0.00E+00	6.79E+00	1.36E+01
Sn-126	1.1393E-05	541,647.53	1,083,295.06	0.00E+00	6.17E+00	1.23E+01
Sr-90	2.6293E+00	541,647.53	1,083,295.06	0.00E+00	1.42E+06	2.85E+06
Tc-99	4.3540E-04	541,647.53	1,083,295.06	0.00E+00	2.36E+02	4.72E+02
Th-229	1.3653E-13	541,647.53	1,083,295.06	0.00E+00	7.40E-08	1.48E-07
Th-230	1.2607E-11	541,647.53	1,083,295.06	0.00E+00	6.83E-06	1.37E-05
Th-232	6.7400E-15	541,647.53	1,083,295.06	0.00E+00	3.65E-09	7.30E-09
Tl-208	7.4667E-09	541,647.53	1,083,295.06	0.00E+00	4.04E-03	8.09E-03
U-232	2.1927E-08	541,647.53	1,083,295.06	0.00E+00	1.19E-02	2.38E-02
U-233	1.9920E-10	541,647.53	1,083,295.06	0.00E+00	1.08E-04	2.16E-04
U-234	2.2487E-07	541,647.53	1,083,295.06	0.00E+00	1.22E-01	2.44E-01
U-235	-2.5341E-06	541,647.53	0.00	1.62E+00	2.48E-01	1.62E+00
U-236	1.3000E-05	541,647.53	1,083,295.06	0.00E+00	7.04E+00	1.41E+01
U-238	-1.4207E-08	541,647.53	0.00	1.02E+00	1.02E+00	1.02E+00
Y-90	2.6300E+00	541,647.53	1,083,295.06	0.00E+00	1.42E+06	2.85E+06
Other Radionuclides					2.56E+06	5.12E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.965E+17
0.0250	4.235E+16
0.0375	3.859E+16
0.0575	3.853E+16
0.0850	2.426E+16
0.1250	2.026E+16
0.2250	2.069E+16
0.3750	1.003E+16
0.5750	1.385E+17
0.8500	1.470E+16
1.2500	3.248E+15
1.7500	1.546E+14
2.2500	2.689E+14
2.7500	2.432E+12
3.5000	2.881E+11
5.0000	2.819E+06
7.0000	3.212E+05
11.0000	3.669E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.86E+04	5.13E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.75000043	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		541,647.53
Bounding:		1,083,295.06

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.26	
Bounding:	6.52	

Estimated EOL HM/Given EOL HM: 1.04

[1]*Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.*

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR PIN CLUSTER U3Si2-LEU SO. KOREA
SNF ID #: 293
Fuel Units & Descr: 48 - MULTI-PIN CLUSTER
Heavy Metal Mass: BOL=59.52kg; EOL=52.138kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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"x15' 4.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	6,991.28	13,982.55	0.00E+00	1.02E-06	2.03E-06	Avg. MeV	
Am-241	1.1190E-03	6,991.28	13,982.55	0.00E+00	7.82E+00	1.56E+01	0.0150	2.698E+15
Am-242m	4.5425E-07	6,991.28	13,982.55	0.00E+00	3.18E-03	6.35E-03	0.0250	5.812E+14
Am-243	1.4921E-06	6,991.28	13,982.55	0.00E+00	1.04E-02	2.09E-02	0.0375	5.363E+14
C-14	5.7244E-09	6,991.28	13,982.55	0.00E+00	4.00E-05	8.00E-05	0.0575	5.273E+14
Cl-36	1.3124E-32	6,991.28	13,982.55	0.00E+00	9.18E-29	1.84E-28	0.0850	3.362E+14
Cm-243	2.3676E-07	6,991.28	13,982.55	0.00E+00	1.66E-03	3.31E-03	0.1250	2.911E+14
Cm-244	5.2042E-05	6,991.28	13,982.55	0.00E+00	3.64E-01	7.28E-01	0.2250	2.849E+14
Co-60	3.8208E-05	6,991.28	13,982.55	0.00E+00	2.67E-01	5.34E-01	0.3750	1.379E+14
Cs-134	4.8693E-01	6,991.28	13,982.55	0.00E+00	3.40E+03	6.81E+03	0.5750	1.894E+15
Cs-135	3.4477E-06	6,991.28	13,982.55	0.00E+00	2.41E-02	4.82E-02	0.8500	2.853E+14
Cs-137	2.8731E+00	6,991.28	13,982.55	0.00E+00	2.01E+04	4.02E+04	1.2500	4.936E+13
Eu-154	8.2053E-02	6,991.28	13,982.55	0.00E+00	5.74E+02	1.15E+03	1.7500	2.070E+12
Eu-155	3.9134E-02	6,991.28	13,982.55	0.00E+00	2.74E+02	5.47E+02	2.2500	4.341E+12
Fe-55	6.7429E-03	6,991.28	13,982.55	0.00E+00	4.71E+01	9.43E+01	2.7500	2.498E+10
H-3	1.0599E-02	6,991.28	13,982.55	0.00E+00	7.41E+01	1.48E+02	3.5000	2.770E+09
I-129	7.5300E-07	6,991.28	13,982.55	0.00E+00	5.26E-03	1.05E-02	5.0000	8.318E+03
Kr-85	2.8595E-01	6,991.28	13,982.55	0.00E+00	2.00E+03	4.00E+03	7.0000	9.274E+02
Np-237	9.5479E-06	6,991.28	13,982.55	0.00E+00	6.68E-02	1.34E-01	11.0000	1.045E+02
Pa-231	8.9297E-10	6,991.28	13,982.55	0.00E+00	6.24E-06	1.25E-05		
Pb-210	3.7609E-12	6,991.28	13,982.55	0.00E+00	2.63E-08	5.26E-08		
Pm-147	2.5452E+00	6,991.28	13,982.55	0.00E+00	1.78E+04	3.56E+04		
Pu-238	2.0550E-02	6,991.28	13,982.55	0.00E+00	1.44E+02	2.87E+02		
Pu-239	4.2838E-04	6,991.28	13,982.55	0.00E+00	2.99E+00	5.99E+00		
Pu-240	2.4401E-04	6,991.28	13,982.55	0.00E+00	1.71E+00	3.41E+00		
Pu-241	6.8764E-02	6,991.28	13,982.55	0.00E+00	4.81E+02	9.61E+02		
Pu-242	3.6329E-07	6,991.28	13,982.55	0.00E+00	2.54E-03	5.08E-03		
Ra-226	3.8045E-11	6,991.28	13,982.55	0.00E+00	2.66E-07	5.32E-07		
Ra-228	2.9902E-15	6,991.28	13,982.55	0.00E+00	2.09E-11	4.18E-11		
Ru-106	1.9055E-01	6,991.28	13,982.55	0.00E+00	1.33E+03	2.66E+03		
Se-79	1.2936E-05	6,991.28	13,982.55	0.00E+00	9.04E-02	1.81E-01		
Sn-126	1.1574E-05	6,991.28	13,982.55	0.00E+00	8.09E-02	1.62E-01		
Sr-90	2.7505E+00	6,991.28	13,982.55	0.00E+00	1.92E+04	3.85E+04		
Tc-99	4.2239E-04	6,991.28	13,982.55	0.00E+00	2.95E+00	5.91E+00		
Th-229	1.8848E-12	6,991.28	13,982.55	0.00E+00	1.32E-08	2.64E-08		
Th-230	1.7042E-08	6,991.28	13,982.55	0.00E+00	1.19E-04	2.38E-04		
Th-232	7.8132E-15	6,991.28	13,982.55	0.00E+00	5.46E-11	1.09E-10		
Tl-208	4.4063E-08	6,991.28	13,982.55	0.00E+00	3.08E-04	6.16E-04		
U-232	1.3151E-07	6,991.28	13,982.55	0.00E+00	9.19E-04	1.84E-03	Thermal Power	
U-233	1.9564E-09	6,991.28	13,982.55	0.00E+00	1.37E-05	2.74E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8371E-04	6,991.28	13,982.55	0.00E+00	1.28E+00	2.57E+00		
U-235	-2.7235E-06	6,991.28	0.00	2.57E-02	6.68E-03	2.57E-02		
U-238	1.5493E-05	6,991.28	13,982.55	0.00E+00	1.08E-01	2.17E-01	3.54E+02	7.09E+02
U-238	-4.2851E-09	6,991.28	0.00	1.60E-02	1.60E-02	1.60E-02	Total	Total
Y-90	2.7505E+00	6,991.28	13,982.55	0.00E+00	1.92E+04	3.85E+04		
Other Radionuclides					3.60E+04	7.19E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.99999952	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		6,991.28
Bounding:		13,982.55

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.37	
Bounding:	0.75	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR PIN CLUSTER U3SI2-LEU SO. KOREA
SNF ID #: 659
Fuel Units & Descr: 158 - MULTI-PIN CLUSTER
Heavy Metal Mass: BOL=343.65kg; EOL=298.288kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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"x15' 13.17

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	42,958.50	85,917.00	0.00E+00	6.25E-06	1.25E-05
Am-241	1.1190E-03	42,958.50	85,917.00	0.00E+00	4.81E+01	9.61E+01
Am-242m	4.5425E-07	42,958.50	85,917.00	0.00E+00	1.95E-02	3.90E-02
Am-243	1.4921E-06	42,958.50	85,917.00	0.00E+00	6.41E-02	1.28E-01
C-14	5.7244E-09	42,958.50	85,917.00	0.00E+00	2.46E-04	4.92E-04
Cl-36	1.3124E-32	42,958.50	85,917.00	0.00E+00	5.64E-28	1.13E-27
Cm-243	2.3676E-07	42,958.50	85,917.00	0.00E+00	1.02E-02	2.03E-02
Cm-244	5.2042E-05	42,958.50	85,917.00	0.00E+00	2.24E+00	4.47E+00
Co-60	3.8208E-05	42,958.50	85,917.00	0.00E+00	1.64E+00	3.28E+00
Cs-134	4.8693E-01	42,958.50	85,917.00	0.00E+00	2.09E+04	4.18E+04
Cs-135	3.4477E-06	42,958.50	85,917.00	0.00E+00	1.48E-01	2.96E-01
Cs-137	2.8731E+00	42,958.50	85,917.00	0.00E+00	1.23E+05	2.47E+05
Eu-154	8.2053E-02	42,958.50	85,917.00	0.00E+00	3.52E+03	7.05E+03
Eu-155	3.9134E-02	42,958.50	85,917.00	0.00E+00	1.68E+03	3.36E+03
Fe-55	6.7429E-03	42,958.50	85,917.00	0.00E+00	2.90E+02	5.79E+02
H-3	1.0599E-02	42,958.50	85,917.00	0.00E+00	4.55E+02	9.11E+02
I-129	7.5300E-07	42,958.50	85,917.00	0.00E+00	3.23E-02	6.47E-02
Kr-85	2.8595E-01	42,958.50	85,917.00	0.00E+00	1.23E+04	2.46E+04
Np-237	9.5479E-06	42,958.50	85,917.00	0.00E+00	4.10E-01	8.20E-01
Pa-231	8.9297E-10	42,958.50	85,917.00	0.00E+00	3.84E-05	7.67E-05
Pb-210	3.7609E-12	42,958.50	85,917.00	0.00E+00	1.62E-07	3.23E-07
Pm-147	2.5452E+00	42,958.50	85,917.00	0.00E+00	1.09E+05	2.19E+05
Pu-238	2.0550E-02	42,958.50	85,917.00	0.00E+00	8.83E+02	1.77E+03
Pu-239	4.2838E-04	42,958.50	85,917.00	0.00E+00	1.84E+01	3.68E+01
Pu-240	2.4401E-04	42,958.50	85,917.00	0.00E+00	1.05E+01	2.10E+01
Pu-241	6.8764E-02	42,958.50	85,917.00	0.00E+00	2.95E+03	5.91E+03
Pu-242	3.6329E-07	42,958.50	85,917.00	0.00E+00	1.56E-02	3.12E-02
Ra-226	3.8045E-11	42,958.50	85,917.00	0.00E+00	1.63E-06	3.27E-06
Ra-228	2.9902E-15	42,958.50	85,917.00	0.00E+00	1.28E-10	2.57E-10
Ru-106	1.9055E-01	42,958.50	85,917.00	0.00E+00	8.19E+03	1.64E+04
Se-79	1.2936E-05	42,958.50	85,917.00	0.00E+00	5.56E-01	1.11E+00
Sn-126	1.1574E-05	42,958.50	85,917.00	0.00E+00	4.97E-01	9.94E-01
Sr-90	2.7505E+00	42,958.50	85,917.00	0.00E+00	1.18E+05	2.36E+05
Tc-99	4.2239E-04	42,958.50	85,917.00	0.00E+00	1.81E+01	3.63E+01
Th-229	1.8848E-12	42,958.50	85,917.00	0.00E+00	8.10E-08	1.62E-07
Th-230	1.7042E-08	42,958.50	85,917.00	0.00E+00	7.32E-04	1.46E-03
Th-232	7.8132E-15	42,958.50	85,917.00	0.00E+00	3.36E-10	6.71E-10
Tl-208	4.4063E-08	42,958.50	85,917.00	0.00E+00	1.89E-03	3.79E-03
U-232	1.3151E-07	42,958.50	85,917.00	0.00E+00	5.65E-03	1.13E-02
U-233	1.9564E-09	42,958.50	85,917.00	0.00E+00	8.40E-05	1.68E-04
U-234	1.8371E-04	42,958.50	85,917.00	0.00E+00	7.89E+00	1.58E+01
U-235	-2.7235E-06	42,958.50	0.00	1.49E-01	3.15E-02	1.49E-01
U-236	1.5493E-05	42,958.50	85,917.00	0.00E+00	6.66E-01	1.33E+00
U-238	-4.2851E-09	42,958.50	0.00	9.24E-02	9.22E-02	9.24E-02
Y-90	2.7505E+00	42,958.50	85,917.00	0.00E+00	1.18E+05	2.36E+05
Other Radionuclides					2.21E+05	4.42E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.658E+16
0.0250	3.571E+15
0.0375	3.295E+15
0.0575	3.240E+15
0.0850	2.066E+15
0.1250	1.789E+15
0.2250	1.751E+15
0.3750	8.475E+14
0.5750	1.164E+16
0.8500	1.630E+15
1.2500	3.033E+14
1.7500	1.272E+13
2.2500	2.668E+13
2.7500	1.535E+11
3.5000	1.702E+10
5.0000	5.110E+04
7.0000	5.697E+03
11.0000	6.422E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.18E+03	4.36E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000055	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		42,958.50
Bounding:		85,917.00

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.40	
Bounding:	0.79	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR PIN CLUSTER UALX HEU CANADA
SNF ID #: 661
Fuel Units & Descr: 225 - MULTI-PIN CLUSTER
Heavy Metal Mass: BOL=118.597kg; EOL=34.627kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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"x15' 18.75

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	1.4545E-10	79,521.22	112,314.13	0.00E+00	1.16E-05	1.63E-05
Am-241	1.1190E-03	79,521.22	112,314.13	0.00E+00	8.90E+01	1.26E+02
Am-242m	4.5425E-07	79,521.22	112,314.13	0.00E+00	3.61E-02	5.10E-02
Am-243	1.4921E-06	79,521.22	112,314.13	0.00E+00	1.19E-01	1.68E-01
C-14	5.7244E-09	79,521.22	112,314.13	0.00E+00	4.55E-04	6.43E-04
Cl-36	1.3124E-32	79,521.22	112,314.13	0.00E+00	1.04E-27	1.47E-27
Cm-243	2.3676E-07	79,521.22	112,314.13	0.00E+00	1.88E-02	2.66E-02
Cm-244	5.2042E-05	79,521.22	112,314.13	0.00E+00	4.14E+00	5.85E+00
Co-60	3.8208E-05	79,521.22	112,314.13	0.00E+00	3.04E+00	4.29E+00
Cs-134	4.8693E-01	79,521.22	112,314.13	0.00E+00	3.87E+04	5.47E+04
Cs-135	3.4477E-08	79,521.22	112,314.13	0.00E+00	2.74E-01	3.87E-01
Cs-137	2.8731E+00	79,521.22	112,314.13	0.00E+00	2.28E+05	3.23E+05
Eu-154	8.2053E-02	79,521.22	112,314.13	0.00E+00	6.52E+03	9.22E+03
Eu-155	3.9134E-02	79,521.22	112,314.13	0.00E+00	3.11E+03	4.40E+03
Fe-55	6.7429E-03	79,521.22	112,314.13	0.00E+00	5.36E+02	7.57E+02
H-3	1.0599E-02	79,521.22	112,314.13	0.00E+00	8.43E+02	1.19E+03
I-129	7.5300E-07	79,521.22	112,314.13	0.00E+00	5.99E-02	8.46E-02
Kr-85	2.8595E-01	79,521.22	112,314.13	0.00E+00	2.27E+04	3.21E+04
Np-237	9.5479E-08	79,521.22	112,314.13	0.00E+00	7.59E-01	1.07E+00
Pa-231	8.9297E-10	79,521.22	112,314.13	0.00E+00	7.10E-05	1.00E-04
Pb-210	3.7609E-12	79,521.22	112,314.13	0.00E+00	2.99E-07	4.22E-07
Pm-147	2.5452E+00	79,521.22	112,314.13	0.00E+00	2.02E+05	2.86E+05
Pu-238	2.0550E-02	79,521.22	112,314.13	0.00E+00	1.63E+03	2.31E+03
Pu-239	4.2838E-04	79,521.22	112,314.13	0.00E+00	3.41E+01	4.81E+01
Pu-240	2.4401E-04	79,521.22	112,314.13	0.00E+00	1.94E+01	2.74E+01
Pu-241	6.8764E-02	79,521.22	112,314.13	0.00E+00	5.47E+03	7.72E+03
Pu-242	3.6329E-07	79,521.22	112,314.13	0.00E+00	2.89E-02	4.08E-02
Ra-226	3.8045E-11	79,521.22	112,314.13	0.00E+00	3.03E-06	4.27E-06
Ra-228	2.9902E-15	79,521.22	112,314.13	0.00E+00	2.38E-10	3.36E-10
Ru-106	1.9055E-01	79,521.22	112,314.13	0.00E+00	1.52E+04	2.14E+04
Se-79	1.2936E-05	79,521.22	112,314.13	0.00E+00	1.03E+00	1.45E+00
Sn-126	1.1574E-05	79,521.22	112,314.13	0.00E+00	9.20E-01	1.30E+00
Sr-90	2.7505E+00	79,521.22	112,314.13	0.00E+00	2.19E+05	3.09E+05
Tc-99	4.2239E-04	79,521.22	112,314.13	0.00E+00	3.36E+01	4.74E+01
Th-229	1.8848E-12	79,521.22	112,314.13	0.00E+00	1.50E-07	2.12E-07
Th-230	1.7042E-08	79,521.22	112,314.13	0.00E+00	1.36E-03	1.91E-03
Th-232	7.8132E-15	79,521.22	112,314.13	0.00E+00	6.21E-10	8.78E-10
Tl-208	4.4063E-08	79,521.22	112,314.13	0.00E+00	3.50E-03	4.95E-03
U-232	1.3151E-07	79,521.22	112,314.13	0.00E+00	1.05E-02	1.48E-02
U-233	1.9564E-09	79,521.22	112,314.13	0.00E+00	1.56E-04	2.20E-04
U-234	1.8371E-04	79,521.22	112,314.13	0.00E+00	1.46E+01	2.06E+01
U-235	-2.7235E-06	79,521.22	0.00	2.39E-01	2.22E-02	2.39E-01
U-236	1.5493E-05	79,521.22	112,314.13	0.00E+00	1.23E+00	1.74E+00
U-238	-4.2851E-09	79,521.22	0.00	2.73E-03	2.39E-03	2.73E-03
Y-90	2.7505E+00	79,521.22	112,314.13	0.00E+00	2.19E+05	3.09E+05
Other Radionuclides					4.09E+05	5.78E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.167E+16
0.0250	4.668E+15
0.0375	4.308E+15
0.0575	4.236E+15
0.0850	2.700E+15
0.1250	2.338E+15
0.2250	2.289E+15
0.3750	1.108E+15
0.5750	1.522E+16
0.8500	2.131E+15
1.2500	3.965E+14
1.7500	1.663E+13
2.2500	3.487E+13
2.7500	2.006E+11
3.5000	2.225E+10
5.0000	6.653E+04
7.0000	7.416E+03
11.0000	8.359E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.03E+03	5.59E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.14999856	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		79,521.22
Bounding:		112,314.13

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	2.13	
Bounding:	3.01	

Estimated EOL HM/Given EOL HM: 1.14

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR PIN CLUSTER UALX HEU CANADA
SNF ID #: 662
Fuel Units & Descr: 741 - MULTI-PIN CLUSTER
Heavy Metal Mass: BOL=395.694kg; EOL=97.59kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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: 5 years

Estimated Canister usage: 16"x15' = 61.75

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6950E-11	274,584.76	364,474.92	0.00E+00	1.84E-05	2.44E-05
Am-241	4.4557E-03	274,584.76	364,474.92	0.00E+00	1.22E+03	1.62E+03
Am-242m	1.4666E-06	274,584.76	364,474.92	0.00E+00	4.03E-01	5.35E-01
Am-243	3.7151E-05	274,584.76	364,474.92	0.00E+00	1.02E+01	1.35E+01
C-14	2.6513E-08	274,584.76	364,474.92	0.00E+00	7.28E-03	9.66E-03
Cl-36	4.4441E-31	274,584.76	364,474.92	0.00E+00	1.22E-25	1.62E-25
Cm-243	8.2139E-06	274,584.76	364,474.92	0.00E+00	2.26E+00	2.99E+00
Cm-244	8.2625E-03	274,584.76	364,474.92	0.00E+00	2.27E+03	3.01E+03
Co-60	3.4951E-04	274,584.76	364,474.92	0.00E+00	9.60E+01	1.27E+02
Cs-134	1.6409E+00	274,584.76	364,474.92	0.00E+00	4.51E+05	5.98E+05
Cs-135	4.2564E-06	274,584.76	364,474.92	0.00E+00	1.17E+00	1.55E+00
Cs-137	2.8791E+00	274,584.76	364,474.92	0.00E+00	7.91E+05	1.05E+06
Eu-154	1.7388E-01	274,584.76	364,474.92	0.00E+00	4.77E+04	6.34E+04
Eu-155	1.1616E-01	274,584.76	364,474.92	0.00E+00	3.19E+04	4.23E+04
Fe-55	7.3755E-02	274,584.76	364,474.92	0.00E+00	2.03E+04	2.69E+04
H-3	1.0729E-02	274,584.76	364,474.92	0.00E+00	2.95E+03	3.91E+03
I-129	6.6403E-07	274,584.76	364,474.92	0.00E+00	1.82E-01	2.42E-01
Kr-85	2.8487E-01	274,584.76	364,474.92	0.00E+00	7.82E+04	1.04E+05
Np-237	3.1507E-05	274,584.76	364,474.92	0.00E+00	8.65E+00	1.15E+01
Pa-231	4.1938E-10	274,584.76	364,474.92	0.00E+00	1.15E-04	1.53E-04
Pb-210	8.4083E-13	274,584.76	364,474.92	0.00E+00	2.31E-07	3.06E-07
Pm-147	1.2807E+00	274,584.76	364,474.92	0.00E+00	3.52E+05	4.67E+05
Pu-238	1.7290E-01	274,584.76	364,474.92	0.00E+00	4.75E+04	6.30E+04
Pu-239	6.9563E-04	274,584.76	364,474.92	0.00E+00	1.91E+02	2.54E+02
Pu-240	3.6865E-04	274,584.76	364,474.92	0.00E+00	1.01E+02	1.34E+02
Pu-241	2.7643E-01	274,584.76	364,474.92	0.00E+00	7.59E+04	1.01E+05
Pu-242	3.0911E-06	274,584.76	364,474.92	0.00E+00	8.49E-01	1.13E+00
Ra-226	8.6330E-12	274,584.76	364,474.92	0.00E+00	2.37E-06	3.15E-06
Ra-228	3.1817E-15	274,584.76	364,474.92	0.00E+00	8.74E-10	1.16E-09
Ru-106	2.1981E-01	274,584.76	364,474.92	0.00E+00	6.04E+04	8.01E+04
Se-79	1.2339E-05	274,584.76	364,474.92	0.00E+00	3.39E+00	4.50E+00
Sn-126	1.0194E-05	274,584.76	364,474.92	0.00E+00	2.80E+00	3.72E+00
Sr-90	2.7242E+00	274,584.76	364,474.92	0.00E+00	7.48E+05	9.93E+05
Tc-99	3.8056E-04	274,584.76	364,474.92	0.00E+00	1.04E+02	1.39E+02
Th-229	1.0413E-12	274,584.76	364,474.92	0.00E+00	2.86E-07	3.80E-07
Th-230	3.9648E-09	274,584.76	364,474.92	0.00E+00	1.09E-03	1.45E-03
Th-232	8.3536E-15	274,584.76	364,474.92	0.00E+00	2.29E-09	3.04E-09
Tl-208	4.3888E-08	274,584.76	364,474.92	0.00E+00	1.21E-02	1.60E-02
U-232	1.3645E-07	274,584.76	364,474.92	0.00E+00	3.75E-02	4.97E-02
U-233	1.7023E-09	274,584.76	364,474.92	0.00E+00	4.67E-04	6.20E-04
U-234	4.5389E-05	274,584.76	364,474.92	0.00E+00	1.25E+01	1.65E+01
U-235	-2.8661E-06	274,584.76	0.00	7.95E-01	8.24E-03	7.95E-01
U-236	1.6701E-05	274,584.76	364,474.92	0.00E+00	4.59E+00	6.09E+00
U-238	-9.4194E-09	274,584.76	0.00	9.31E-03	6.72E-03	9.31E-03
Y-90	2.7248E+00	274,584.76	364,474.92	0.00E+00	7.48E+05	9.93E+05
Other Radionuclides					1.46E+06	1.94E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.241E+16
0.0250	1.543E+16
0.0375	1.489E+16
0.0575	1.421E+16
0.0850	9.306E+15
0.1250	8.490E+15
0.2250	7.866E+15
0.3750	3.631E+15
0.5750	6.948E+16
0.8500	2.125E+16
1.2500	2.901E+15
1.7500	7.628E+13
2.2500	1.206E+14
2.7500	7.421E+11
3.5000	8.334E+10
5.0000	1.896E+07
7.0000	2.181E+06
11.0000	2.501E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.90E+04	2.52E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99999565	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		274,584.76
Bounding:		364,474.92

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.59	
Bounding:	2.11	

Estimated EOL HM/Given EOL HM: 1.07

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR PIN CLUSTER UALX HEU CANADA
SNF ID #: 663
Fuel Units & Descr: 131 - MULTI-PIN CLUSTER
Heavy Metal Mass: BOL=76.648kg; EOL=32.383kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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: 5 years

Estimated Canister usage: 18"x15' = 10.92

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6950E-11	40,772.53	70,600.79	0.00E+00	2.73E-06	4.73E-06
Am-241	4.4557E-03	40,772.53	70,600.79	0.00E+00	1.82E+02	3.15E+02
Am-242m	1.4666E-06	40,772.53	70,600.79	0.00E+00	5.98E-02	1.04E-01
Am-243	3.7151E-05	40,772.53	70,600.79	0.00E+00	1.51E+00	2.62E+00
C-14	2.6513E-08	40,772.53	70,600.79	0.00E+00	1.08E-03	1.87E-03
Cl-36	4.4441E-31	40,772.53	70,600.79	0.00E+00	1.81E-26	3.14E-26
Cm-243	8.2139E-06	40,772.53	70,600.79	0.00E+00	3.35E-01	5.80E-01
Cm-244	8.2625E-03	40,772.53	70,600.79	0.00E+00	3.37E+02	5.83E+02
Co-60	3.4951E-04	40,772.53	70,600.79	0.00E+00	1.43E+01	2.47E+01
Cs-134	1.6409E+00	40,772.53	70,600.79	0.00E+00	6.69E+04	1.16E+05
Cs-135	4.2564E-06	40,772.53	70,600.79	0.00E+00	1.74E-01	3.01E-01
Cs-137	2.8791E+00	40,772.53	70,600.79	0.00E+00	1.17E+05	2.03E+05
Eu-154	1.7388E-01	40,772.53	70,600.79	0.00E+00	7.09E+03	1.23E+04
Eu-155	1.1616E-01	40,772.53	70,600.79	0.00E+00	4.74E+03	8.20E+03
Fe-55	7.3755E-02	40,772.53	70,600.79	0.00E+00	3.01E+03	5.21E+03
H-3	1.0729E-02	40,772.53	70,600.79	0.00E+00	4.37E+02	7.57E+02
I-129	6.6403E-07	40,772.53	70,600.79	0.00E+00	2.71E-02	4.69E-02
Kr-85	2.8487E-01	40,772.53	70,600.79	0.00E+00	1.16E+04	2.01E+04
Np-237	3.1507E-05	40,772.53	70,600.79	0.00E+00	1.28E+00	2.22E+00
Pa-231	4.1938E-10	40,772.53	70,600.79	0.00E+00	1.71E-05	2.96E-05
Pb-210	8.4083E-13	40,772.53	70,600.79	0.00E+00	3.43E-08	5.94E-08
Pm-147	1.2807E+00	40,772.53	70,600.79	0.00E+00	5.22E+04	9.04E+04
Pu-238	1.7290E-01	40,772.53	70,600.79	0.00E+00	7.05E+03	1.22E+04
Pu-239	6.9563E-04	40,772.53	70,600.79	0.00E+00	2.84E+01	4.91E+01
Pu-240	3.6865E-04	40,772.53	70,600.79	0.00E+00	1.50E+01	2.60E+01
Pu-241	2.7643E-01	40,772.53	70,600.79	0.00E+00	1.13E+04	1.95E+04
Pu-242	3.0911E-06	40,772.53	70,600.79	0.00E+00	1.26E-01	2.18E-01
Ra-226	8.6330E-12	40,772.53	70,600.79	0.00E+00	3.52E-07	6.10E-07
Ra-228	3.1817E-15	40,772.53	70,600.79	0.00E+00	1.30E-10	2.25E-10
Ru-106	2.1981E-01	40,772.53	70,600.79	0.00E+00	8.96E+03	1.55E+04
Se-79	1.2339E-05	40,772.53	70,600.79	0.00E+00	5.03E-01	8.71E-01
Sn-126	1.0194E-05	40,772.53	70,600.79	0.00E+00	4.16E-01	7.20E-01
Sr-90	2.7242E+00	40,772.53	70,600.79	0.00E+00	1.11E+05	1.92E+05
Tc-99	3.8056E-04	40,772.53	70,600.79	0.00E+00	1.55E+01	2.69E+01
Th-229	1.0413E-12	40,772.53	70,600.79	0.00E+00	4.25E-08	7.35E-08
Th-230	3.9648E-09	40,772.53	70,600.79	0.00E+00	1.62E-04	2.80E-04
Th-232	8.3536E-15	40,772.53	70,600.79	0.00E+00	3.41E-10	5.90E-10
Tl-208	4.3888E-08	40,772.53	70,600.79	0.00E+00	1.79E-03	3.10E-03
U-232	1.3645E-07	40,772.53	70,600.79	0.00E+00	5.56E-03	9.63E-03
U-233	1.7023E-09	40,772.53	70,600.79	0.00E+00	6.94E-05	1.20E-04
U-234	4.5389E-05	40,772.53	70,600.79	0.00E+00	1.85E+00	3.20E+00
U-235	-2.8661E-06	40,772.53	0.00	1.54E-01	3.74E-02	1.54E-01
U-236	1.6701E-05	40,772.53	70,600.79	0.00E+00	6.81E-01	1.18E+00
U-238	-9.4194E-09	40,772.53	0.00	1.76E-03	1.38E-03	1.76E-03
Y-90	2.7248E+00	40,772.53	70,600.79	0.00E+00	1.11E+05	1.92E+05
Other Radionuclides					2.17E+05	3.76E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.403E+16
0.0250	2.988E+15
0.0375	2.885E+15
0.0575	2.752E+15
0.0850	1.803E+15
0.1250	1.645E+15
0.2250	1.485E+15
0.3750	7.033E+14
0.5750	1.346E+16
0.8500	4.115E+15
1.2500	5.619E+14
1.7500	1.478E+13
2.2500	2.337E+13
2.7500	1.438E+11
3.5000	1.614E+10
5.0000	3.673E+08
7.0000	4.224E+05
11.0000	4.845E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.82E+03	4.88E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.15000501	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		40,772.53
Bounding:		70,600.79

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.22	
Bounding:	2.11	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR SLOWPOKE (HEU) CANADA
SNF ID #: 665
Fuel Units & Descr: 2 - 297 ROD ARRAY
Heavy Metal Mass: BOL=1.772kg; EOL=1.742kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10'
0.08

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	28.24	56.48	0.00E+00	4.11E-09	8.22E-09	Avg. MeV	
Am-241	1.1190E-03	28.24	56.48	0.00E+00	3.16E-02	6.32E-02	0.0150	1.090E+13
Am-242m	4.5425E-07	28.24	56.48	0.00E+00	1.28E-05	2.57E-05	0.0250	2.347E+12
Am-243	1.4921E-06	28.24	56.48	0.00E+00	4.21E-05	8.43E-05	0.0375	2.166E+12
C-14	5.7244E-09	28.24	56.48	0.00E+00	1.62E-07	3.23E-07	0.0575	2.130E+12
Cl-36	1.3124E-32	28.24	56.48	0.00E+00	3.71E-31	7.41E-31	0.0850	1.358E+12
Cm-243	2.3676E-07	28.24	56.48	0.00E+00	6.69E-06	1.34E-05	0.1250	1.176E+12
Cm-244	5.2042E-05	28.24	56.48	0.00E+00	1.47E-03	2.94E-03	0.2250	1.151E+12
Co-60	3.8208E-05	28.24	56.48	0.00E+00	1.08E-03	2.16E-03	0.3750	5.571E+11
Cs-134	4.8693E-01	28.24	56.48	0.00E+00	1.38E+01	2.75E+01	0.5750	7.652E+12
Cs-135	3.4477E-06	28.24	56.48	0.00E+00	9.74E-05	1.95E-04	0.8500	1.072E+12
Cs-137	2.8731E+00	28.24	56.48	0.00E+00	8.11E+01	1.62E+02	1.2500	1.994E+11
Eu-154	8.2063E-02	28.24	56.48	0.00E+00	2.32E+00	4.63E+00	1.7500	8.361E+09
Eu-155	3.9134E-02	28.24	56.48	0.00E+00	1.11E+00	2.21E+00	2.2500	1.754E+10
Fe-55	6.7429E-03	28.24	56.48	0.00E+00	1.90E-01	3.81E-01	2.7500	1.009E+08
H-3	1.0599E-02	28.24	56.48	0.00E+00	2.99E-01	5.99E-01	3.5000	1.119E+07
I-129	7.5300E-07	28.24	56.48	0.00E+00	2.13E-05	4.25E-05	5.0000	3.359E+01
Kr-85	2.8595E-01	28.24	56.48	0.00E+00	8.08E+00	1.62E+01	7.0000	3.745E+00
Np-237	9.5479E-06	28.24	56.48	0.00E+00	2.70E-04	5.39E-04	11.0000	4.221E-01
Pa-231	8.9297E-10	28.24	56.48	0.00E+00	2.52E-08	5.04E-08		
Pb-210	3.7609E-12	28.24	56.48	0.00E+00	1.06E-10	2.12E-10		
Pm-147	2.5452E+00	28.24	56.48	0.00E+00	7.19E+01	1.44E+02		
Pu-238	2.0550E-02	28.24	56.48	0.00E+00	5.80E-01	1.16E+00		
Pu-239	4.2838E-04	28.24	56.48	0.00E+00	1.21E-02	2.42E-02		
Pu-240	2.4401E-04	28.24	56.48	0.00E+00	6.89E-03	1.38E-02		
Pu-241	6.8764E-02	28.24	56.48	0.00E+00	1.94E+00	3.88E+00		
Pu-242	3.6329E-07	28.24	56.48	0.00E+00	1.03E-05	2.05E-05		
Ra-226	3.8045E-11	28.24	56.48	0.00E+00	1.07E-09	2.15E-09		
Ra-228	2.9902E-15	28.24	56.48	0.00E+00	8.44E-14	1.69E-13		
Ru-106	1.9055E-01	28.24	56.48	0.00E+00	5.38E+00	1.08E+01		
Se-79	1.2936E-05	28.24	56.48	0.00E+00	3.65E-04	7.31E-04		
Sn-126	1.1574E-05	28.24	56.48	0.00E+00	3.27E-04	6.54E-04		
Sr-90	2.7505E+00	28.24	56.48	0.00E+00	7.77E+01	1.55E+02		
Tc-99	4.2239E-04	28.24	56.48	0.00E+00	1.19E-02	2.39E-02		
Th-229	1.8848E-12	28.24	56.48	0.00E+00	5.32E-11	1.06E-10		
Th-230	1.7042E-08	28.24	56.48	0.00E+00	4.81E-07	9.63E-07		
Th-232	7.8132E-15	28.24	56.48	0.00E+00	2.21E-13	4.41E-13		
Tl-208	4.4063E-08	28.24	56.48	0.00E+00	1.24E-06	2.49E-06		
U-232	1.3151E-07	28.24	56.48	0.00E+00	3.71E-06	7.43E-06		
U-233	1.9564E-09	28.24	56.48	0.00E+00	5.52E-08	1.10E-07		
U-234	1.8371E-04	28.24	56.48	0.00E+00	5.19E-03	1.04E-02		
U-235	-2.7235E-06	28.24	0.00	3.57E-03	3.49E-03	3.57E-03		
U-236	1.5493E-05	28.24	56.48	0.00E+00	4.38E-04	8.75E-04		
U-238	-4.2851E-09	28.24	0.00	4.10E-05	4.09E-05	4.10E-05		
Y-90	2.7505E+00	28.24	56.48	0.00E+00	7.77E+01	1.55E+02		
Other Radionuclides					1.45E+02	2.90E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.43E+00	2.86E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.11512415	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		28.24	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		56.48	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.05	
Bounding:	0.10	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR SLOWPOKE (HEU) CANADA
SNF ID #: 666
Fuel Units & Descr: 2 - 297 ROD ARRAY
Heavy Metal Mass: BOL=1.772kg; EOL=1.742kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.08

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	28.24	56.48	0.00E+00	4.11E-09	8.22E-09	Avg. MeV	
Am-241	1.1190E-03	28.24	56.48	0.00E+00	3.16E-02	6.32E-02	0.0150	1.090E+13
Am-242m	4.5425E-07	28.24	56.48	0.00E+00	1.28E-05	2.57E-05	0.0250	2.347E+12
Am-243	1.4921E-06	28.24	56.48	0.00E+00	4.21E-05	8.43E-05	0.0375	2.166E+12
C-14	5.7244E-09	28.24	56.48	0.00E+00	1.62E-07	3.23E-07	0.0575	2.130E+12
Cl-36	1.3124E-32	28.24	56.48	0.00E+00	3.71E-31	7.41E-31	0.0850	1.358E+12
Cm-243	2.3676E-07	28.24	56.48	0.00E+00	6.69E-06	1.34E-05	0.1250	1.176E+12
Cm-244	5.2042E-05	28.24	56.48	0.00E+00	1.47E-03	2.94E-03	0.2250	1.151E+12
Co-60	3.8208E-05	28.24	56.48	0.00E+00	1.08E-03	2.16E-03	0.3750	5.571E+11
Cs-134	4.8693E-01	28.24	56.48	0.00E+00	1.38E+01	2.75E+01	0.5750	7.652E+12
Cs-135	3.4477E-06	28.24	56.48	0.00E+00	9.74E-05	1.95E-04	0.8500	1.072E+12
Cs-137	2.8731E+00	28.24	56.48	0.00E+00	8.11E+01	1.62E+02	1.2500	1.994E+11
Eu-154	8.2053E-02	28.24	56.48	0.00E+00	2.32E+00	4.63E+00	1.7500	8.361E+09
Eu-155	3.9134E-02	28.24	56.48	0.00E+00	1.11E+00	2.21E+00	2.2500	1.754E+10
Fe-55	6.7429E-03	28.24	56.48	0.00E+00	1.90E-01	3.81E-01	2.7500	1.009E+08
H-3	1.0599E-02	28.24	56.48	0.00E+00	2.99E-01	5.99E-01	3.5000	1.119E+07
I-129	7.5300E-07	28.24	56.48	0.00E+00	2.13E-05	4.25E-05	5.0000	3.359E+01
Kr-85	2.8595E-01	28.24	56.48	0.00E+00	8.08E+00	1.62E+01	7.0000	3.745E+00
Np-237	9.5479E-06	28.24	56.48	0.00E+00	2.70E-04	5.39E-04	11.0000	4.221E-01
Pa-231	8.9297E-10	28.24	56.48	0.00E+00	2.52E-08	5.04E-08		
Pb-210	3.7609E-12	28.24	56.48	0.00E+00	1.06E-10	2.12E-10		
Pm-147	2.5452E+00	28.24	56.48	0.00E+00	7.19E+01	1.44E+02		
Pu-238	2.0550E-02	28.24	56.48	0.00E+00	5.80E-01	1.16E+00		
Pu-239	4.2838E-04	28.24	56.48	0.00E+00	1.21E-02	2.42E-02		
Pu-240	2.4401E-04	28.24	56.48	0.00E+00	6.89E-03	1.38E-02		
Pu-241	6.8764E-02	28.24	56.48	0.00E+00	1.94E+00	3.88E+00		
Pu-242	3.6329E-07	28.24	56.48	0.00E+00	1.03E-05	2.05E-05		
Ra-226	3.8045E-11	28.24	56.48	0.00E+00	1.07E-09	2.15E-09		
Ra-228	2.9902E-15	28.24	56.48	0.00E+00	8.44E-14	1.69E-13		
Ru-106	1.9055E-01	28.24	56.48	0.00E+00	5.38E+00	1.08E+01		
Se-79	1.2938E-05	28.24	56.48	0.00E+00	3.65E-04	7.31E-04		
Sn-126	1.1574E-05	28.24	56.48	0.00E+00	3.27E-04	6.54E-04		
Sr-90	2.7505E+00	28.24	56.48	0.00E+00	7.77E+01	1.55E+02		
Tc-99	4.2239E-04	28.24	56.48	0.00E+00	1.19E-02	2.39E-02		
Th-229	1.8848E-12	28.24	56.48	0.00E+00	5.32E-11	1.06E-10		
Th-230	1.7042E-08	28.24	56.48	0.00E+00	4.81E-07	9.63E-07		
Th-232	7.8132E-15	28.24	56.48	0.00E+00	2.21E-13	4.41E-13		
Tl-208	4.4063E-08	28.24	56.48	0.00E+00	1.24E-06	2.49E-06		
U-232	1.3151E-07	28.24	56.48	0.00E+00	3.71E-06	7.43E-06	Thermal Power	
U-233	1.9564E-09	28.24	56.48	0.00E+00	5.52E-08	1.10E-07	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8371E-04	28.24	56.48	0.00E+00	5.19E-03	1.04E-02		
U-235	-2.7235E-06	28.24	0.00	3.57E-03	3.49E-03	3.57E-03		
U-236	1.5493E-05	28.24	56.48	0.00E+00	4.38E-04	8.75E-04	1.43E+00	2.86E+00
U-238	-4.2851E-09	28.24	0.00	4.10E-05	4.09E-05	4.10E-05	Total	Total
Y-90	2.7505E+00	28.24	56.48	0.00E+00	7.77E+01	1.55E+02		
Other Radionuclides					1.45E+02	2.90E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.11512415	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		28.24
Bounding:		56.48

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.05	
Bounding:	0.10	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for *all* fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR SLOWPOKE (HEU) CANADA
SNF ID #: 668
Fuel Units & Descr: 2 - 297 ROD ARRAY
Heavy Metal Mass: BOL=1.772kg; EOL=1.742kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10'
0.08

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	28.24	56.48	0.00E+00	4.11E-09	8.22E-09
Am-241	1.1190E-03	28.24	56.48	0.00E+00	3.16E-02	6.32E-02
Am-242m	4.5425E-07	28.24	56.48	0.00E+00	1.28E-05	2.57E-05
Am-243	1.4921E-06	28.24	56.48	0.00E+00	4.21E-05	8.43E-05
C-14	5.7244E-09	28.24	56.48	0.00E+00	1.62E-07	3.23E-07
Cl-36	1.3124E-32	28.24	56.48	0.00E+00	3.71E-31	7.41E-31
Cm-243	2.3676E-07	28.24	56.48	0.00E+00	6.69E-06	1.34E-05
Cm-244	5.2042E-05	28.24	56.48	0.00E+00	1.47E-03	2.94E-03
Co-60	3.8208E-05	28.24	56.48	0.00E+00	1.08E-03	2.16E-03
Cs-134	4.8693E-01	28.24	56.48	0.00E+00	1.38E+01	2.75E+01
Cs-135	3.4477E-06	28.24	56.48	0.00E+00	9.74E-05	1.95E-04
Cs-137	2.8731E+00	28.24	56.48	0.00E+00	8.11E+01	1.62E+02
Eu-154	8.2053E-02	28.24	56.48	0.00E+00	2.32E+00	4.63E+00
Eu-155	3.9134E-02	28.24	56.48	0.00E+00	1.11E+00	2.21E+00
Fe-55	6.7429E-03	28.24	56.48	0.00E+00	1.90E-01	3.81E-01
H-3	1.0599E-02	28.24	56.48	0.00E+00	2.99E-01	5.99E-01
I-129	7.5300E-07	28.24	56.48	0.00E+00	2.13E-05	4.25E-05
Kr-85	2.8595E-01	28.24	56.48	0.00E+00	8.08E+00	1.62E+01
Np-237	9.5479E-06	28.24	56.48	0.00E+00	2.70E-04	5.39E-04
Pa-231	8.9297E-10	28.24	56.48	0.00E+00	2.52E-08	5.04E-08
Pb-210	3.7609E-12	28.24	56.48	0.00E+00	1.06E-10	2.12E-10
Pm-147	2.5452E+00	28.24	56.48	0.00E+00	7.19E+01	1.44E+02
Pu-238	2.0550E-02	28.24	56.48	0.00E+00	5.80E-01	1.16E+00
Pu-239	4.2838E-04	28.24	56.48	0.00E+00	1.21E-02	2.42E-02
Pu-240	2.4401E-04	28.24	56.48	0.00E+00	6.89E-03	1.38E-02
Pu-241	6.8764E-02	28.24	56.48	0.00E+00	1.94E+00	3.88E+00
Pu-242	3.6329E-07	28.24	56.48	0.00E+00	1.03E-05	2.05E-05
Ra-226	3.8045E-11	28.24	56.48	0.00E+00	1.07E-09	2.15E-09
Ra-228	2.9902E-15	28.24	56.48	0.00E+00	8.44E-14	1.69E-13
Ru-106	1.9055E-01	28.24	56.48	0.00E+00	5.38E+00	1.08E+01
Se-79	1.2936E-05	28.24	56.48	0.00E+00	3.65E-04	7.31E-04
Sn-126	1.1574E-05	28.24	56.48	0.00E+00	3.27E-04	6.54E-04
Sr-90	2.7505E+00	28.24	56.48	0.00E+00	7.77E+01	1.55E+02
Tc-99	4.2239E-04	28.24	56.48	0.00E+00	1.19E-02	2.39E-02
Th-229	1.8848E-12	28.24	56.48	0.00E+00	5.32E-11	1.06E-10
Th-230	1.7042E-08	28.24	56.48	0.00E+00	4.81E-07	9.63E-07
Th-232	7.8132E-15	28.24	56.48	0.00E+00	2.21E-13	4.41E-13
Tl-208	4.4063E-08	28.24	56.48	0.00E+00	1.24E-06	2.49E-06
U-232	1.3151E-07	28.24	56.48	0.00E+00	3.71E-06	7.43E-06
U-233	1.9564E-09	28.24	56.48	0.00E+00	5.52E-08	1.10E-07
U-234	1.8371E-04	28.24	56.48	0.00E+00	5.19E-03	1.04E-02
U-235	-2.7235E-06	28.24	0.00	3.57E-03	3.49E-03	3.57E-03
U-236	1.5493E-05	28.24	56.48	0.00E+00	4.38E-04	8.75E-04
U-238	-4.2851E-09	28.24	0.00	4.10E-05	4.09E-05	4.10E-05
Y-90	2.7505E+00	28.24	56.48	0.00E+00	7.77E+01	1.55E+02
Other Radionuclides					1.45E+02	2.90E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.090E+13
0.0250	2.347E+12
0.0375	2.166E+12
0.0575	2.130E+12
0.0850	1.358E+12
0.1250	1.176E+12
0.2250	1.151E+12
0.3750	5.571E+11
0.5750	7.652E+12
0.8500	1.072E+12
1.2500	1.994E+11
1.7500	8.361E+09
2.2500	1.754E+10
2.7500	1.009E+08
3.5000	1.119E+07
5.0000	3.359E+01
7.0000	3.745E+00
11.0000	4.221E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.43E+00	2.86E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.11512415	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		28.24
Bounding:		56.48

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.05	
Bounding:	0.10	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR SLOWPOKE (HEU) CANADA
SNF ID #: 669
Fuel Units & Descr: 2 - 297 ROD ARRAY
Heavy Metal Mass: BOL=1.772kg; EOL=1.742kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.06

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	28.22	56.44	0.00E+00	4.10E-09	8.21E-09	Avg. MeV	
Am-241	1.1190E-03	28.22	56.44	0.00E+00	3.16E-02	6.32E-02	0.0150	1.089E+13
Am-242m	4.5425E-07	28.22	56.44	0.00E+00	1.28E-05	2.56E-05	0.0250	2.346E+12
Am-243	1.4921E-06	28.22	56.44	0.00E+00	4.21E-05	8.42E-05	0.0375	2.165E+12
C-14	5.7244E-09	28.22	56.44	0.00E+00	1.62E-07	3.23E-07	0.0575	2.129E+12
Cl-36	1.3124E-32	28.22	56.44	0.00E+00	3.70E-31	7.41E-31	0.0850	1.357E+12
Cm-243	2.3676E-07	28.22	56.44	0.00E+00	6.68E-06	1.34E-05	0.1250	1.175E+12
Cm-244	5.2042E-05	28.22	56.44	0.00E+00	1.47E-03	2.94E-03	0.2250	1.150E+12
Co-60	3.8208E-05	28.22	56.44	0.00E+00	1.08E-03	2.16E-03	0.3750	5.567E+11
Cs-134	4.8693E-01	28.22	56.44	0.00E+00	1.37E+01	2.75E+01	0.5750	7.647E+12
Cs-135	3.4477E-06	28.22	56.44	0.00E+00	9.73E-05	1.95E-04	0.8500	1.071E+12
Cs-137	2.8731E+00	28.22	56.44	0.00E+00	8.11E+01	1.62E+02	1.2500	1.992E+11
Eu-154	8.2053E-02	28.22	56.44	0.00E+00	2.32E+00	4.63E+00	1.7500	8.355E+09
Eu-155	3.9134E-02	28.22	56.44	0.00E+00	1.10E+00	2.21E+00	2.2500	1.752E+10
Fe-55	6.7429E-03	28.22	56.44	0.00E+00	1.90E-01	3.81E-01	2.7500	1.008E+08
H-3	1.0599E-02	28.22	56.44	0.00E+00	2.99E-01	5.98E-01	3.5000	1.118E+07
I-129	7.5300E-07	28.22	56.44	0.00E+00	2.13E-05	4.25E-05	5.0000	3.357E+01
Kr-85	2.8595E-01	28.22	56.44	0.00E+00	8.07E+00	1.61E+01	7.0000	3.742E+00
Np-237	9.5479E-06	28.22	56.44	0.00E+00	2.69E-04	5.39E-04	11.0000	4.218E-01
Pa-231	8.9297E-10	28.22	56.44	0.00E+00	2.52E-08	5.04E-08		
Pb-210	3.7609E-12	28.22	56.44	0.00E+00	1.06E-10	2.12E-10		
Pm-147	2.5452E+00	28.22	56.44	0.00E+00	7.18E+01	1.44E+02		
Pu-238	2.0550E-02	28.22	56.44	0.00E+00	5.80E-01	1.16E+00		
Pu-239	4.2838E-04	28.22	56.44	0.00E+00	1.21E-02	2.42E-02		
Pu-240	2.4401E-04	28.22	56.44	0.00E+00	6.89E-03	1.38E-02		
Pu-241	6.8764E-02	28.22	56.44	0.00E+00	1.94E+00	3.88E+00		
Pu-242	3.6329E-07	28.22	56.44	0.00E+00	1.03E-05	2.05E-05		
Ra-226	3.8045E-11	28.22	56.44	0.00E+00	1.07E-09	2.15E-09		
Ra-228	2.9902E-15	28.22	56.44	0.00E+00	8.44E-14	1.69E-13		
Ru-106	1.9055E-01	28.22	56.44	0.00E+00	5.38E+00	1.08E+01		
Se-79	1.2936E-05	28.22	56.44	0.00E+00	3.65E-04	7.30E-04		
Sn-126	1.1574E-05	28.22	56.44	0.00E+00	3.27E-04	6.53E-04		
Sr-90	2.7505E+00	28.22	56.44	0.00E+00	7.76E+01	1.55E+02		
Tc-99	4.2239E-04	28.22	56.44	0.00E+00	1.19E-02	2.38E-02		
Th-229	1.8848E-12	28.22	56.44	0.00E+00	5.32E-11	1.06E-10		
Th-230	1.7042E-08	28.22	56.44	0.00E+00	4.81E-07	9.62E-07		
Th-232	7.8132E-15	28.22	56.44	0.00E+00	2.20E-13	4.41E-13		
Tl-208	4.4063E-08	28.22	56.44	0.00E+00	1.24E-06	2.49E-06		
U-232	1.3151E-07	28.22	56.44	0.00E+00	3.71E-06	7.42E-06		
U-233	1.9564E-09	28.22	56.44	0.00E+00	5.52E-08	1.10E-07		
U-234	1.8371E-04	28.22	56.44	0.00E+00	5.18E-03	1.04E-02		
U-235	-2.7235E-08	28.22	0.00	3.57E-03	3.49E-03	3.57E-03		
U-236	1.5493E-05	28.22	56.44	0.00E+00	4.37E-04	8.74E-04		
U-238	-4.2851E-09	28.22	0.00	4.10E-05	4.09E-05	4.10E-05		
Y-90	2.7505E+00	28.22	56.44	0.00E+00	7.76E+01	1.55E+02		
Other Radionuclides					1.45E+02	2.90E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.43E+00	2.86E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.11512415	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		28.22
Bounding:		56.44

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.05	
Bounding:	0.10	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR SLOWPOKE (HEU) MONTREAL
SNF ID #: 667
Fuel Units & Descr: 2 - 297 ROD ARRAY
Heavy Metal Mass: BOL=1.772kg; EOL=1.742kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.08

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	28.24	56.48	0.00E+00	4.11E-09	8.22E-09
Am-241	1.1190E-03	28.24	56.48	0.00E+00	3.16E-02	6.32E-02
Am-242m	4.5425E-07	28.24	56.48	0.00E+00	1.28E-05	2.57E-05
Am-243	1.4921E-06	28.24	56.48	0.00E+00	4.21E-05	8.43E-05
C-14	5.7244E-09	28.24	56.48	0.00E+00	1.62E-07	3.23E-07
Cl-36	1.3124E-32	28.24	56.48	0.00E+00	3.71E-31	7.41E-31
Cm-243	2.3676E-07	28.24	56.48	0.00E+00	6.69E-06	1.34E-05
Cm-244	5.2042E-05	28.24	56.48	0.00E+00	1.47E-03	2.94E-03
Co-60	3.8208E-05	28.24	56.48	0.00E+00	1.08E-03	2.16E-03
Cs-134	4.8693E-01	28.24	56.48	0.00E+00	1.38E+01	2.75E+01
Cs-135	3.4477E-06	28.24	56.48	0.00E+00	9.74E-05	1.95E-04
Cs-137	2.8731E+00	28.24	56.48	0.00E+00	8.11E+01	1.62E+02
Eu-154	8.2053E-02	28.24	56.48	0.00E+00	2.32E+00	4.63E+00
Eu-155	3.9134E-02	28.24	56.48	0.00E+00	1.11E+00	2.21E+00
Fe-55	6.7429E-03	28.24	56.48	0.00E+00	1.90E-01	3.81E-01
H-3	1.0599E-02	28.24	56.48	0.00E+00	2.99E-01	5.99E-01
I-129	7.5300E-07	28.24	56.48	0.00E+00	2.13E-05	4.25E-05
Kr-85	2.8595E-01	28.24	56.48	0.00E+00	8.08E+00	1.62E+01
Np-237	9.5479E-06	28.24	56.48	0.00E+00	2.70E-04	5.39E-04
Pa-231	8.9297E-10	28.24	56.48	0.00E+00	2.52E-08	5.04E-08
Pb-210	3.7609E-12	28.24	56.48	0.00E+00	1.06E-10	2.12E-10
Pm-147	2.5452E+00	28.24	56.48	0.00E+00	7.19E+01	1.44E+02
Pu-238	2.0550E-02	28.24	56.48	0.00E+00	5.80E-01	1.16E+00
Pu-239	4.2838E-04	28.24	56.48	0.00E+00	1.21E-02	2.42E-02
Pu-240	2.4401E-04	28.24	56.48	0.00E+00	6.89E-03	1.38E-02
Pu-241	6.8764E-02	28.24	56.48	0.00E+00	1.94E+00	3.88E+00
Pu-242	3.6329E-07	28.24	56.48	0.00E+00	1.03E-05	2.05E-05
Ra-226	3.8045E-11	28.24	56.48	0.00E+00	1.07E-09	2.15E-09
Ra-228	2.9902E-15	28.24	56.48	0.00E+00	8.44E-14	1.69E-13
Ru-106	1.9055E-01	28.24	56.48	0.00E+00	5.38E+00	1.08E+01
Se-79	1.2936E-05	28.24	56.48	0.00E+00	3.65E-04	7.31E-04
Sn-126	1.1574E-05	28.24	56.48	0.00E+00	3.27E-04	6.54E-04
Sr-90	2.7505E+00	28.24	56.48	0.00E+00	7.77E+01	1.55E+02
Tc-99	4.2239E-04	28.24	56.48	0.00E+00	1.19E-02	2.39E-02
Th-229	1.8848E-12	28.24	56.48	0.00E+00	5.32E-11	1.06E-10
Th-230	1.7042E-06	28.24	56.48	0.00E+00	4.81E-07	9.63E-07
Th-232	7.8132E-15	28.24	56.48	0.00E+00	2.21E-13	4.41E-13
Tl-208	4.4063E-08	28.24	56.48	0.00E+00	1.24E-06	2.49E-06
U-232	1.3151E-07	28.24	56.48	0.00E+00	3.71E-06	7.43E-06
U-233	1.9564E-09	28.24	56.48	0.00E+00	5.52E-08	1.10E-07
U-234	1.8371E-04	28.24	56.48	0.00E+00	5.19E-03	1.04E-02
U-235	-2.7235E-06	28.24	0.00	3.57E-03	3.49E-03	3.57E-03
U-236	1.5493E-05	28.24	56.48	0.00E+00	4.38E-04	8.75E-04
U-238	-4.2851E-09	28.24	0.00	4.10E-05	4.09E-05	4.10E-05
Y-90	2.7505E+00	28.24	56.48	0.00E+00	7.77E+01	1.55E+02
Other Radionuclides					1.45E+02	2.90E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.090E+13
0.0250	2.347E+12
0.0375	2.166E+12
0.0575	2.130E+12
0.0850	1.358E+12
0.1250	1.176E+12
0.2250	1.151E+12
0.3750	5.571E+11
0.5750	7.652E+12
0.8500	1.072E+12
1.2500	1.994E+11
1.7500	8.361E+09
2.2500	1.754E+10
2.7500	1.009E+08
3.5000	1.119E+07
5.0000	3.359E+01
7.0000	3.745E+00
11.0000	4.221E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.43E+00	2.86E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.11512415	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		28.24
Bounding:		56.48

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.05	
Bounding:	0.10	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TARGET ARGENTINA
SNF ID #: 297
Fuel Units & Descr: 48 - PARTICULATE
Heavy Metal Mass: BOL=3.97kg; EOL=3.97kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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" 1.33

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.9667E-09	75.00	149.99	0.00E+00	1.47E-07	2.95E-07	Avg. MeV	
Am-241	4.9468E-05	75.00	149.99	0.00E+00	3.71E-03	7.42E-03	0.0150	2.949E+13
Am-242m	9.7537E-09	75.00	149.99	0.00E+00	7.32E-07	1.46E-06	0.0250	6.291E+12
Am-243	9.8802E-10	75.00	149.99	0.00E+00	7.41E-08	1.48E-07	0.0375	5.614E+12
C-14	2.3095E-04	75.00	149.99	0.00E+00	1.73E-02	3.46E-02	0.0575	5.644E+12
Cl-36	1.2261E-06	75.00	149.99	0.00E+00	9.20E-05	1.84E-04	0.0850	3.577E+12
Cm-243	5.1581E-10	75.00	149.99	0.00E+00	3.87E-08	7.74E-08	0.1250	2.854E+12
Cm-244	7.3012E-09	75.00	149.99	0.00E+00	5.48E-07	1.10E-06	0.2250	2.962E+12
Co-60	3.6556E+00	75.00	149.99	0.00E+00	2.74E+02	5.48E+02	0.3750	1.438E+12
Cs-134	7.2063E-02	75.00	149.99	0.00E+00	5.40E+00	1.08E+01	0.5750	1.743E+13
Cs-135	3.0316E-05	75.00	149.99	0.00E+00	2.27E-03	4.55E-03	0.8500	8.438E+11
Cs-137	2.9002E+00	75.00	149.99	0.00E+00	2.18E+02	4.35E+02	1.2500	4.075E+13
Eu-154	7.5025E-03	75.00	149.99	0.00E+00	5.63E-01	1.13E+00	1.7500	1.438E+10
Eu-155	4.6123E-02	75.00	149.99	0.00E+00	3.46E+00	6.92E+00	2.2500	4.118E+10
Fe-55	3.6439E+00	75.00	149.99	0.00E+00	2.73E+02	5.47E+02	2.7500	2.335E+08
H-3	1.3524E-02	75.00	149.99	0.00E+00	1.01E+00	2.03E+00	3.5000	2.578E+07
I-129	7.3195E-07	75.00	149.99	0.00E+00	5.49E-05	1.10E-04	5.0000	5.411E+00
Kr-85	2.8686E-01	75.00	149.99	0.00E+00	2.15E+01	4.30E+01	7.0000	6.051E-01
Np-237	1.1478E-06	75.00	149.99	0.00E+00	8.61E-05	1.72E-04	11.0000	6.841E-02
Pa-231	1.0990E-06	75.00	149.99	0.00E+00	8.24E-07	1.65E-06		
Pb-210	8.0782E-15	75.00	149.99	0.00E+00	6.06E-13	1.21E-12		
Pm-147	3.2097E+00	75.00	149.99	0.00E+00	2.41E+02	4.81E+02		
Pu-238	3.7404E-04	75.00	149.99	0.00E+00	2.81E-02	5.61E-02		
Pu-239	6.6839E-04	75.00	149.99	0.00E+00	5.01E-02	1.00E-01		
Pu-240	8.7121E-05	75.00	149.99	0.00E+00	6.53E-03	1.31E-02		
Pu-241	3.0283E-03	75.00	149.99	0.00E+00	2.27E-01	4.54E-01		
Pu-242	1.9717E-09	75.00	149.99	0.00E+00	1.48E-07	2.96E-07		
Ra-226	7.3527E-14	75.00	149.99	0.00E+00	5.51E-12	1.10E-11		
Ra-228	6.0965E-12	75.00	149.99	0.00E+00	4.57E-10	9.14E-10		
Ru-106	1.6531E-01	75.00	149.99	0.00E+00	1.24E+01	2.48E+01		
Se-79	1.3228E-05	75.00	149.99	0.00E+00	9.92E-04	1.98E-03		
Sn-126	1.1494E-05	75.00	149.99	0.00E+00	8.62E-04	1.72E-03		
Sr-90	2.7854E+00	75.00	149.99	0.00E+00	2.09E+02	4.18E+02		
Tc-99	4.6656E-04	75.00	149.99	0.00E+00	3.50E-02	7.00E-02		
Th-229	2.9368E-12	75.00	149.99	0.00E+00	2.20E-10	4.41E-10		
Th-230	3.2662E-11	75.00	149.99	0.00E+00	2.45E-09	4.90E-09		
Th-232	8.3045E-12	75.00	149.99	0.00E+00	6.23E-10	1.25E-09		
Tl-208	2.6722E-08	75.00	149.99	0.00E+00	2.00E-06	4.01E-06		
U-232	7.7720E-08	75.00	149.99	0.00E+00	5.83E-06	1.17E-05		
U-233	2.9834E-09	75.00	149.99	0.00E+00	2.24E-07	4.47E-07		
U-234	3.5275E-07	75.00	149.99	0.00E+00	2.65E-05	5.29E-05		
U-235	-2.7761E-08	75.00	0.00	4.15E-03	3.94E-03	4.15E-03		
U-236	1.6190E-05	75.00	149.99	0.00E+00	1.21E-03	2.43E-03		
U-238	-2.8547E-09	75.00	0.00	6.89E-04	6.89E-04	6.89E-04		
Y-90	2.7870E+00	75.00	149.99	0.00E+00	2.09E+02	4.18E+02		
Other Radionuclides					3.95E+02	7.89E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.96E+00	1.59E+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:	NONE	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	48.34531901	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches Pathfinder Template except enrichment and cladding (but substituting Stainless Steel is a good conservative assumption).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		75.00
Bounding:		149.99

Basis for burnup used in estimate:
Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.40	
Bounding:	0.81	

Estimated EOL HM/Given EOL HM: 0.98

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TARGET CANADA
SNF ID #: 671
Fuel Units & Descr: 5952 - PARTICULATE
Heavy Metal Mass: BOL=492.23kg; EOL=492.23kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' 165.33

II. Estimates	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.9667E-09	9,299.68	18,599.37	0.00E+00	1.83E-05	3.66E-05	Avg. MeV	
Am-241	4.9468E-05	9,299.68	18,599.37	0.00E+00	4.60E-01	9.20E-01	0.0150	3.657E+15
Am-242m	9.7537E-09	9,299.68	18,599.37	0.00E+00	9.07E-05	1.81E-04	0.0250	7.801E+14
Am-243	9.8802E-10	9,299.68	18,599.37	0.00E+00	9.19E-06	1.84E-05	0.0375	6.961E+14
C-14	2.3095E-04	9,299.68	18,599.37	0.00E+00	2.15E+00	4.30E+00	0.0575	6.998E+14
Cl-36	1.2261E-06	9,299.68	18,599.37	0.00E+00	1.14E-02	2.28E-02	0.0850	4.435E+14
Cm-243	5.1581E-10	9,299.68	18,599.37	0.00E+00	4.80E-06	9.59E-06	0.1250	3.539E+14
Cm-244	7.3012E-09	9,299.68	18,599.37	0.00E+00	6.79E-05	1.36E-04	0.2250	3.673E+14
Co-60	3.6556E+00	9,299.68	18,599.37	0.00E+00	3.40E+04	6.80E+04	0.3750	1.783E+14
Cs-134	7.2063E-02	9,299.68	18,599.37	0.00E+00	6.70E+02	1.34E+03	0.5750	2.161E+15
Cs-135	3.0316E-05	9,299.68	18,599.37	0.00E+00	2.82E-01	5.64E-01	0.8500	1.046E+14
Cs-137	2.9002E+00	9,299.68	18,599.37	0.00E+00	2.70E+04	5.39E+04	1.2500	5.053E+15
Eu-154	7.5025E-03	9,299.68	18,599.37	0.00E+00	6.98E+01	1.40E+02	1.7500	1.784E+12
Eu-155	4.6123E-02	9,299.68	18,599.37	0.00E+00	4.29E+02	8.58E+02	2.2500	5.104E+12
Fe-55	3.6439E+00	9,299.68	18,599.37	0.00E+00	3.39E+04	6.78E+04	2.7500	2.896E+10
H-3	1.3524E-02	9,299.68	18,599.37	0.00E+00	1.26E+02	2.52E+02	3.5000	3.197E+09
I-129	7.3195E-07	9,299.68	18,599.37	0.00E+00	6.81E-03	1.36E-02	5.0000	6.710E+02
Kr-85	2.8686E-01	9,299.68	18,599.37	0.00E+00	2.67E+03	5.34E+03	7.0000	7.503E+01
Np-237	1.1478E-06	9,299.68	18,599.37	0.00E+00	1.07E-02	2.13E-02	11.0000	8.483E+00
Pa-231	1.0990E-08	9,299.68	18,599.37	0.00E+00	1.02E-04	2.04E-04		
Pb-210	8.0782E-15	9,299.68	18,599.37	0.00E+00	7.51E-11	1.50E-10		
Pm-147	3.2097E+00	9,299.68	18,599.37	0.00E+00	2.98E+04	5.97E+04		
Pu-238	3.7404E-04	9,299.68	18,599.37	0.00E+00	3.48E+00	6.96E+00		
Pu-239	6.6839E-04	9,299.68	18,599.37	0.00E+00	6.22E+00	1.24E+01		
Pu-240	8.7121E-05	9,299.68	18,599.37	0.00E+00	8.10E-01	1.62E+00		
Pu-241	3.0283E-03	9,299.68	18,599.37	0.00E+00	2.82E+01	5.63E+01		
Pu-242	1.9717E-09	9,299.68	18,599.37	0.00E+00	1.83E-05	3.67E-05		
Ra-226	7.3527E-14	9,299.68	18,599.37	0.00E+00	6.84E-10	1.37E-09		
Ra-228	6.0965E-12	9,299.68	18,599.37	0.00E+00	5.67E-08	1.13E-07		
Ru-106	1.6531E-01	9,299.68	18,599.37	0.00E+00	1.54E+03	3.07E+03		
Se-79	1.3228E-05	9,299.68	18,599.37	0.00E+00	1.23E-01	2.46E-01		
Sn-126	1.1494E-05	9,299.68	18,599.37	0.00E+00	1.07E-01	2.14E-01		
Sr-90	2.7854E+00	9,299.68	18,599.37	0.00E+00	2.59E+04	5.18E+04		
Tc-99	4.6656E-04	9,299.68	18,599.37	0.00E+00	4.34E+00	8.68E+00		
Th-229	2.9368E-12	9,299.68	18,599.37	0.00E+00	2.73E-08	5.46E-08		
Th-230	3.2662E-11	9,299.68	18,599.37	0.00E+00	3.04E-07	6.07E-07		
Th-232	8.3045E-12	9,299.68	18,599.37	0.00E+00	7.72E-08	1.54E-07		
Tl-208	2.6722E-08	9,299.68	18,599.37	0.00E+00	2.49E-04	4.97E-04		
U-232	7.7720E-08	9,299.68	18,599.37	0.00E+00	7.23E-04	1.45E-03		
U-233	2.9834E-09	9,299.68	18,599.37	0.00E+00	2.77E-05	5.55E-05		
U-234	3.5275E-07	9,299.68	18,599.37	0.00E+00	3.28E-03	6.56E-03		
U-235	-2.7761E-06	9,299.68	0.00	5.14E-01	4.88E-01	5.14E-01		
U-236	1.6190E-05	9,299.68	18,599.37	0.00E+00	1.51E-01	3.01E-01		
U-238	-2.8547E-09	9,299.68	0.00	8.55E-02	8.54E-02	8.55E-02		
Y-90	2.7870E+00	9,299.68	18,599.37	0.00E+00	2.59E+04	5.18E+04		
Other Radionuclides					4.89E+04	9.78E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.57E+02	1.97E+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:	NONE	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	48.34531901	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches Pathfinder Template except enrichment and cladding (but substituting Stainless Steel is a good conservative assumption).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		9,299.68
Bounding:		18,599.37

Basis for burnup used in estimate:
Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.40	
Bounding:	0.81	

Estimated EOL HM/Given EOL HM: 0.96

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TARGET INDONESIA
SNF ID #: 672
Fuel Units & Descr: 48 - PARTICULATE
Heavy Metal Mass: BOL=3.97kg; EOL=3.97kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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' 1.33

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.9667E-09	75.00	149.99	0.00E+00	1.47E-07	2.95E-07
Am-241	4.9468E-05	75.00	149.99	0.00E+00	3.71E-03	7.42E-03
Am-242m	9.7537E-09	75.00	149.99	0.00E+00	7.32E-07	1.46E-06
Am-243	9.8802E-10	75.00	149.99	0.00E+00	7.41E-08	1.48E-07
C-14	2.3095E-04	75.00	149.99	0.00E+00	1.73E-02	3.46E-02
Cl-36	1.2261E-06	75.00	149.99	0.00E+00	9.20E-05	1.84E-04
Cm-243	5.1581E-10	75.00	149.99	0.00E+00	3.87E-08	7.74E-08
Cm-244	7.3012E-09	75.00	149.99	0.00E+00	5.48E-07	1.10E-06
Co-60	3.6556E+00	75.00	149.99	0.00E+00	2.74E+02	5.48E+02
Cs-134	7.2063E-02	75.00	149.99	0.00E+00	5.40E+00	1.08E+01
Cs-135	3.0316E-05	75.00	149.99	0.00E+00	2.27E-03	4.55E-03
Cs-137	2.9002E+00	75.00	149.99	0.00E+00	2.18E+02	4.35E+02
Eu-154	7.5025E-03	75.00	149.99	0.00E+00	5.63E-01	1.13E+00
Eu-155	4.6123E-02	75.00	149.99	0.00E+00	3.46E+00	6.92E+00
Fe-55	3.6439E+00	75.00	149.99	0.00E+00	2.73E+02	5.47E+02
H-3	1.3524E-02	75.00	149.99	0.00E+00	1.01E+00	2.03E+00
I-129	7.3195E-07	75.00	149.99	0.00E+00	5.49E-05	1.10E-04
Kr-85	2.8686E-01	75.00	149.99	0.00E+00	2.15E+01	4.30E+01
Np-237	1.1478E-06	75.00	149.99	0.00E+00	8.61E-05	1.72E-04
Pa-231	1.0990E-08	75.00	149.99	0.00E+00	8.24E-07	1.65E-06
Pb-210	8.0782E-15	75.00	149.99	0.00E+00	6.06E-13	1.21E-12
Pm-147	3.2097E+00	75.00	149.99	0.00E+00	2.41E+02	4.81E+02
Pu-238	3.7404E-04	75.00	149.99	0.00E+00	2.81E-02	5.61E-02
Pu-239	6.6839E-04	75.00	149.99	0.00E+00	5.01E-02	1.00E-01
Pu-240	8.7121E-05	75.00	149.99	0.00E+00	6.53E-03	1.31E-02
Pu-241	3.0283E-03	75.00	149.99	0.00E+00	2.27E-01	4.54E-01
Pu-242	1.9717E-09	75.00	149.99	0.00E+00	1.48E-07	2.96E-07
Ra-226	7.3527E-14	75.00	149.99	0.00E+00	5.51E-12	1.10E-11
Ra-228	6.0965E-12	75.00	149.99	0.00E+00	4.57E-10	9.14E-10
Ru-106	1.6531E-01	75.00	149.99	0.00E+00	1.24E+01	2.48E+01
Se-79	1.3228E-05	75.00	149.99	0.00E+00	9.92E-04	1.98E-03
Sn-126	1.1494E-05	75.00	149.99	0.00E+00	8.62E-04	1.72E-03
Sr-90	2.7854E+00	75.00	149.99	0.00E+00	2.09E+02	4.18E+02
Tc-99	4.6656E-04	75.00	149.99	0.00E+00	3.50E-02	7.00E-02
Th-229	2.9368E-12	75.00	149.99	0.00E+00	2.20E-10	4.41E-10
Th-230	3.2662E-11	75.00	149.99	0.00E+00	2.45E-09	4.90E-09
Th-232	8.3045E-12	75.00	149.99	0.00E+00	6.23E-10	1.25E-09
Tl-208	2.6722E-08	75.00	149.99	0.00E+00	2.00E-06	4.01E-06
U-232	7.7720E-08	75.00	149.99	0.00E+00	5.83E-06	1.17E-05
U-233	2.9834E-09	75.00	149.99	0.00E+00	2.24E-07	4.47E-07
U-234	3.5275E-07	75.00	149.99	0.00E+00	2.65E-05	5.29E-05
U-235	-2.7761E-06	75.00	0.00	4.15E-03	3.94E-03	4.15E-03
U-238	1.6190E-05	75.00	149.99	0.00E+00	1.21E-03	2.43E-03
U-238	-2.8547E-09	75.00	0.00	6.89E-04	6.89E-04	6.89E-04
Y-90	2.7870E+00	75.00	149.99	0.00E+00	2.09E+02	4.18E+02
Other Radionuclides					3.95E+02	7.89E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.949E+13
0.0250	6.291E+12
0.0375	5.614E+12
0.0575	5.644E+12
0.0850	3.577E+12
0.1250	2.854E+12
0.2250	2.962E+12
0.3750	1.439E+12
0.5750	1.743E+13
0.8500	8.438E+11
1.2500	4.075E+13
1.7500	1.438E+10
2.2500	4.116E+10
2.7500	2.335E+08
3.5000	2.578E+07
5.0000	5.411E+00
7.0000	6.051E-01
11.0000	6.841E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.96E+00	1.59E+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:	NONE	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	48.34531901	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches Pathfinder Template except enrichment and cladding (but substituting Stainless Steel is a good conservative assumption).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		75.00
Bounding:		149.99

Basis for burnup used in estimate:
Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.40	
Bounding:	0.81	

Estimated EOL HM/Given EOL HM: 0.98

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (U3Si2 LEU) DENMARK
SNF ID #: 298
Fuel Units & Descr: 184 - ASSEMBLY
Heavy Metal Mass: BOL=165.6kg; EOL=142.618kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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: 5 years

Estimated Canister usage: 18"x10' = 5.11

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.7533E-10	21,843.20	43,686.40	0.00E+00	3.83E-06	7.66E-06
Am-241	1.2780E-02	21,843.20	43,686.40	0.00E+00	2.79E+02	5.58E+02
Am-242m	9.5467E-06	21,843.20	43,686.40	0.00E+00	2.09E-01	4.17E-01
Am-243	6.4100E-06	21,843.20	43,686.40	0.00E+00	1.40E-01	2.80E-01
C-14	2.9673E-08	21,843.20	43,686.40	0.00E+00	6.48E-04	1.30E-03
Cl-36	5.9513E-35	21,843.20	43,686.40	0.00E+00	1.30E-30	2.60E-30
Cm-243	3.1807E-06	21,843.20	43,686.40	0.00E+00	6.95E-02	1.39E-01
Cm-244	1.9540E-04	21,843.20	43,686.40	0.00E+00	4.27E+00	8.54E+00
Co-60	1.1753E-04	21,843.20	43,686.40	0.00E+00	2.57E+00	5.13E+00
Cs-134	3.3060E-01	21,843.20	43,686.40	0.00E+00	7.22E+03	1.44E+04
Cs-135	4.8607E-06	21,843.20	43,686.40	0.00E+00	1.06E-01	2.12E-01
Cs-137	2.8607E+00	21,843.20	43,686.40	0.00E+00	6.25E+04	1.25E+05
Eu-154	6.9933E-02	21,843.20	43,686.40	0.00E+00	1.53E+03	3.06E+03
Eu-155	3.3253E-02	21,843.20	43,686.40	0.00E+00	7.26E+02	1.45E+03
Fe-55	7.7267E-02	21,843.20	43,686.40	0.00E+00	1.69E+03	3.38E+03
H-3	1.0827E-02	21,843.20	43,686.40	0.00E+00	2.36E+02	4.73E+02
I-129	7.1600E-07	21,843.20	43,686.40	0.00E+00	1.56E-02	3.13E-02
Kr-85	2.7007E-01	21,843.20	43,686.40	0.00E+00	5.90E+03	1.18E+04
Np-237	3.6327E-06	21,843.20	43,686.40	0.00E+00	7.93E-02	1.59E-01
Pa-231	1.1267E-09	21,843.20	43,686.40	0.00E+00	2.46E-05	4.92E-05
Pb-210	1.9773E-15	21,843.20	43,686.40	0.00E+00	4.32E-11	8.64E-11
Pm-147	2.4367E+00	21,843.20	43,686.40	0.00E+00	5.32E+04	1.06E+05
Pu-238	6.2213E-03	21,843.20	43,686.40	0.00E+00	1.36E+02	2.72E+02
Pu-239	1.0320E-02	21,843.20	43,686.40	0.00E+00	2.25E+02	4.51E+02
Pu-240	5.4260E-03	21,843.20	43,686.40	0.00E+00	1.19E+02	2.37E+02
Pu-241	7.7333E-01	21,843.20	43,686.40	0.00E+00	1.69E+04	3.38E+04
Pu-242	3.0713E-06	21,843.20	43,686.40	0.00E+00	6.71E-02	1.34E-01
Ra-226	2.2027E-14	21,843.20	43,686.40	0.00E+00	4.81E-10	9.62E-10
Ra-228	2.6333E-15	21,843.20	43,686.40	0.00E+00	5.75E-11	1.15E-10
Ru-106	2.5580E-01	21,843.20	43,686.40	0.00E+00	5.59E+03	1.12E+04
Se-79	1.2540E-05	21,843.20	43,686.40	0.00E+00	2.74E-01	5.48E-01
Sn-126	1.1393E-05	21,843.20	43,686.40	0.00E+00	2.49E-01	4.98E-01
Sr-90	2.6293E+00	21,843.20	43,686.40	0.00E+00	5.74E+04	1.15E+05
Tc-99	4.3540E-04	21,843.20	43,686.40	0.00E+00	9.51E+00	1.90E+01
Th-229	1.3653E-13	21,843.20	43,686.40	0.00E+00	2.98E-09	5.96E-09
Th-230	1.2607E-11	21,843.20	43,686.40	0.00E+00	2.75E-07	5.51E-07
Th-232	6.7400E-15	21,843.20	43,686.40	0.00E+00	1.47E-10	2.94E-10
Tl-208	7.4667E-09	21,843.20	43,686.40	0.00E+00	1.63E-04	3.26E-04
U-232	2.1927E-08	21,843.20	43,686.40	0.00E+00	4.79E-04	9.58E-04
U-233	1.9920E-10	21,843.20	43,686.40	0.00E+00	4.35E-06	8.70E-06
U-234	2.2487E-07	21,843.20	43,686.40	0.00E+00	4.91E-03	9.82E-03
U-235	-2.5341E-06	21,843.20	0.00	7.16E-02	1.62E-02	7.16E-02
U-236	1.3000E-05	21,843.20	43,686.40	0.00E+00	2.84E-01	5.68E-01
U-238	-1.4207E-06	21,843.20	0.00	4.45E-02	4.42E-02	4.45E-02
Y-90	2.6300E+00	21,843.20	43,686.40	0.00E+00	5.74E+04	1.15E+05
Other Radionuclides					1.03E+05	2.06E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.926E+15
0.0250	1.708E+15
0.0375	1.556E+15
0.0575	1.554E+15
0.0850	9.785E+14
0.1250	8.170E+14
0.2250	8.344E+14
0.3750	4.046E+14
0.5750	5.587E+15
0.8500	5.926E+14
1.2500	1.310E+14
1.7500	6.234E+12
2.2500	1.084E+13
2.7500	9.808E+10
3.5000	1.162E+10
5.0000	1.137E+05
7.0000	1.295E+04
11.0000	1.480E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.03E+03	2.07E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		21,843.20
Bounding:		43,686.40

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	3.01	
Bounding:	6.02	

Estimated EOL HM/Given EOL HM: 1.04

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (U3Si2 LEU) GERMANY
SNF ID #: 673
Fuel Units & Deer: 135 - ASSEMBLY
Heavy Metal Mass: BOL=121.5kg; EOL=109.35kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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: 5 years

Estimated Canister usage: 18"x10' 3.75

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.7533E-10	11,548.15	23,096.29	0.00E+00	2.02E-06	4.05E-06
Am-241	1.2780E-02	11,548.15	23,096.29	0.00E+00	1.48E+02	2.95E+02
Am-242m	9.5467E-06	11,548.15	23,096.29	0.00E+00	1.10E-01	2.20E-01
Am-243	6.4100E-06	11,548.15	23,096.29	0.00E+00	7.40E-02	1.48E-01
C-14	2.9673E-08	11,548.15	23,096.29	0.00E+00	3.43E-04	6.85E-04
Cl-36	5.9513E-35	11,548.15	23,096.29	0.00E+00	6.87E-31	1.37E-30
Cm-243	3.1807E-06	11,548.15	23,096.29	0.00E+00	3.67E-02	7.35E-02
Cm-244	1.9540E-04	11,548.15	23,096.29	0.00E+00	2.26E+00	4.51E+00
Co-60	1.1753E-04	11,548.15	23,096.29	0.00E+00	1.36E+00	2.71E+00
Cs-134	3.3060E-01	11,548.15	23,096.29	0.00E+00	3.82E+03	7.64E+03
Cs-135	4.8607E-06	11,548.15	23,096.29	0.00E+00	5.61E-02	1.12E-01
Cs-137	2.8607E+00	11,548.15	23,096.29	0.00E+00	3.30E+04	6.61E+04
Eu-154	6.9933E-02	11,548.15	23,096.29	0.00E+00	8.08E+02	1.62E+03
Eu-155	3.3253E-02	11,548.15	23,096.29	0.00E+00	3.84E+02	7.68E+02
Fe-55	7.7267E-02	11,548.15	23,096.29	0.00E+00	8.92E+02	1.78E+03
H-3	1.0827E-02	11,548.15	23,096.29	0.00E+00	1.25E+02	2.50E+02
I-129	7.1600E-07	11,548.15	23,096.29	0.00E+00	8.27E-03	1.65E-02
Kr-85	2.7007E-01	11,548.15	23,096.29	0.00E+00	3.12E+03	6.24E+03
Np-237	3.6327E-06	11,548.15	23,096.29	0.00E+00	4.20E-02	8.39E-02
Pa-231	1.1267E-09	11,548.15	23,096.29	0.00E+00	1.30E-05	2.60E-05
Pb-210	1.9773E-15	11,548.15	23,096.29	0.00E+00	2.28E-11	4.57E-11
Pm-147	2.4367E+00	11,548.15	23,096.29	0.00E+00	2.81E+04	5.63E+04
Pu-238	6.2213E-03	11,548.15	23,096.29	0.00E+00	7.18E+01	1.44E+02
Pu-239	1.0320E-02	11,548.15	23,096.29	0.00E+00	1.19E+02	2.38E+02
Pu-240	5.4260E-03	11,548.15	23,096.29	0.00E+00	6.27E+01	1.25E+02
Pu-241	7.7333E-01	11,548.15	23,096.29	0.00E+00	8.93E+03	1.79E+04
Pu-242	3.0713E-06	11,548.15	23,096.29	0.00E+00	3.55E-02	7.09E-02
Ra-226	2.2027E-14	11,548.15	23,096.29	0.00E+00	2.54E-10	5.09E-10
Ra-228	2.6333E-15	11,548.15	23,096.29	0.00E+00	3.04E-11	6.08E-11
Ru-106	2.5580E-01	11,548.15	23,096.29	0.00E+00	2.95E+03	5.91E+03
Se-79	1.2540E-05	11,548.15	23,096.29	0.00E+00	1.45E-01	2.90E-01
Sn-126	1.1393E-05	11,548.15	23,096.29	0.00E+00	1.32E-01	2.63E-01
Sr-90	2.6293E+00	11,548.15	23,096.29	0.00E+00	3.04E+04	6.07E+04
Tc-99	4.3540E-04	11,548.15	23,096.29	0.00E+00	5.03E+00	1.01E+01
Th-229	1.3653E-13	11,548.15	23,096.29	0.00E+00	1.58E-09	3.15E-09
Th-230	1.2607E-11	11,548.15	23,096.29	0.00E+00	1.46E-07	2.91E-07
Th-232	6.7400E-15	11,548.15	23,096.29	0.00E+00	7.78E-11	1.56E-10
Tl-208	7.4667E-09	11,548.15	23,096.29	0.00E+00	8.62E-05	1.72E-04
U-232	2.1927E-06	11,548.15	23,096.29	0.00E+00	2.53E-04	5.06E-04
U-233	1.9920E-10	11,548.15	23,096.29	0.00E+00	2.30E-06	4.60E-06
U-234	2.2487E-07	11,548.15	23,096.29	0.00E+00	2.60E-03	5.19E-03
U-235	-2.5341E-06	11,548.15	0.00	5.25E-02	2.32E-02	5.25E-02
U-236	1.3000E-05	11,548.15	23,096.29	0.00E+00	1.50E-01	3.00E-01
U-238	-1.4207E-06	11,548.15	0.00	3.27E-02	3.25E-02	3.27E-02
Y-90	2.6300E+00	11,548.15	23,096.29	0.00E+00	3.04E+04	6.07E+04
Other Radionuclides					5.45E+04	1.09E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.190E+15
0.0250	9.029E+14
0.0375	8.228E+14
0.0575	8.214E+14
0.0850	5.173E+14
0.1250	4.319E+14
0.2250	4.412E+14
0.3750	2.139E+14
0.5750	2.954E+15
0.8500	3.133E+14
1.2500	6.924E+13
1.7500	3.296E+12
2.2500	5.732E+12
2.7500	5.185E+10
3.5000	6.143E+09
5.0000	6.013E+04
7.0000	6.851E+03
11.0000	7.825E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.47E+02	1.09E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		11,548.15	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		23,096.29	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	2.17		1.03
Bounding:	4.34		

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (U3SI2 LEU) GERMANY
SNF ID #: 674
Fuel Units & Descr: 18 - ASSEMBLY
Heavy Metal Mass: BOL=18kg; EOL=16.2kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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: 5 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	1.7533E-10	1,710.84	3,421.67	0.00E+00	3.00E-07	6.00E-07
Am-241	1.2780E-02	1,710.84	3,421.67	0.00E+00	2.19E+01	4.37E+01
Am-242m	9.5467E-06	1,710.84	3,421.67	0.00E+00	1.63E-02	3.27E-02
Am-243	6.4100E-06	1,710.84	3,421.67	0.00E+00	1.10E-02	2.19E-02
C-14	2.9673E-08	1,710.84	3,421.67	0.00E+00	5.08E-05	1.02E-04
Cl-36	5.9513E-35	1,710.84	3,421.67	0.00E+00	1.02E-31	2.04E-31
Cm-243	3.1807E-06	1,710.84	3,421.67	0.00E+00	5.44E-03	1.09E-02
Cm-244	1.9540E-04	1,710.84	3,421.67	0.00E+00	3.34E-01	6.69E-01
Co-60	1.1753E-04	1,710.84	3,421.67	0.00E+00	2.01E-01	4.02E-01
Cs-134	3.3060E-01	1,710.84	3,421.67	0.00E+00	5.66E+02	1.13E+03
Cs-135	4.8607E-06	1,710.84	3,421.67	0.00E+00	8.32E-03	1.66E-02
Cs-137	2.8607E+00	1,710.84	3,421.67	0.00E+00	4.89E+03	9.79E+03
Eu-154	6.9933E-02	1,710.84	3,421.67	0.00E+00	1.20E+02	2.39E+02
Eu-155	3.3253E-02	1,710.84	3,421.67	0.00E+00	5.69E+01	1.14E+02
Fe-55	7.7267E-02	1,710.84	3,421.67	0.00E+00	1.32E+02	2.64E+02
H-3	1.0827E-02	1,710.84	3,421.67	0.00E+00	1.85E+01	3.70E+01
I-129	7.1600E-07	1,710.84	3,421.67	0.00E+00	1.22E-03	2.45E-03
Kr-85	2.7007E-01	1,710.84	3,421.67	0.00E+00	4.62E+02	9.24E+02
Np-237	3.6327E-06	1,710.84	3,421.67	0.00E+00	6.21E-03	1.24E-02
Pa-231	1.1267E-09	1,710.84	3,421.67	0.00E+00	1.93E-06	3.86E-06
Pb-210	1.9773E-15	1,710.84	3,421.67	0.00E+00	3.38E-12	6.77E-12
Pm-147	2.4367E+00	1,710.84	3,421.67	0.00E+00	4.17E+03	8.34E+03
Pu-238	6.2213E-03	1,710.84	3,421.67	0.00E+00	1.06E+01	2.13E+01
Pu-239	1.0320E-02	1,710.84	3,421.67	0.00E+00	1.77E+01	3.53E+01
Pu-240	5.4260E-03	1,710.84	3,421.67	0.00E+00	9.28E+00	1.86E+01
Pu-241	7.7333E-01	1,710.84	3,421.67	0.00E+00	1.32E+03	2.65E+03
Pu-242	3.0713E-06	1,710.84	3,421.67	0.00E+00	5.25E-03	1.05E-02
Ra-226	2.2027E-14	1,710.84	3,421.67	0.00E+00	3.77E-11	7.54E-11
Ra-228	2.6333E-15	1,710.84	3,421.67	0.00E+00	4.51E-12	9.01E-12
Ru-106	2.5580E-01	1,710.84	3,421.67	0.00E+00	4.38E+02	8.75E+02
Se-79	1.2540E-05	1,710.84	3,421.67	0.00E+00	2.15E-02	4.29E-02
Sn-126	1.1393E-05	1,710.84	3,421.67	0.00E+00	1.95E-02	3.90E-02
Sr-90	2.6293E+00	1,710.84	3,421.67	0.00E+00	4.50E+03	9.00E+03
Tc-99	4.3540E-04	1,710.84	3,421.67	0.00E+00	7.45E-01	1.49E+00
Th-229	1.3653E-13	1,710.84	3,421.67	0.00E+00	2.34E-10	4.67E-10
Th-230	1.2607E-11	1,710.84	3,421.67	0.00E+00	2.16E-08	4.31E-08
Th-232	6.7400E-15	1,710.84	3,421.67	0.00E+00	1.15E-11	2.31E-11
Tl-208	7.4667E-09	1,710.84	3,421.67	0.00E+00	1.28E-05	2.55E-05
U-232	2.1927E-08	1,710.84	3,421.67	0.00E+00	3.75E-05	7.50E-05
U-233	1.9920E-10	1,710.84	3,421.67	0.00E+00	3.41E-07	6.82E-07
U-234	2.2487E-07	1,710.84	3,421.67	0.00E+00	3.85E-04	7.69E-04
U-235	-2.5341E-06	1,710.84	0.00	7.78E-03	3.44E-03	7.78E-03
U-236	1.3000E-05	1,710.84	3,421.67	0.00E+00	2.22E-02	4.45E-02
U-238	-1.4207E-08	1,710.84	0.00	4.84E-03	4.82E-03	4.84E-03
Y-90	2.6300E+00	1,710.84	3,421.67	0.00E+00	4.50E+03	9.00E+03
Other Radionuclides					6.08E+03	1.62E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.208E+14
0.0250	1.338E+14
0.0375	1.219E+14
0.0575	1.217E+14
0.0850	7.664E+13
0.1250	6.399E+13
0.2250	6.536E+13
0.3750	3.169E+13
0.5750	4.376E+14
0.8500	4.642E+13
1.2500	1.026E+13
1.7500	4.883E+11
2.2500	8.492E+11
2.7500	7.682E+09
3.5000	9.100E+08
5.0000	8.909E+03
7.0000	1.015E+03
11.0000	1.159E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.10E+01	1.62E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,710.84
Bounding:		3,421.67

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	2.17	
Bounding:	4.34	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (U3Si2 LEU) GERMANY
SNF ID #: 675
Fuel Units & Descr: 135 - ASSEMBLY
Heavy Metal Mass: BOL=151.875kg; EOL=136.688kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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: 5 years

Estimated Canister usage: 18"x10' 3.75

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.7533E-10	14,435.18	28,870.37	0.00E+00	2.53E-06	5.06E-06	Avg. MeV	
Am-241	1.2780E-02	14,435.18	28,870.37	0.00E+00	1.84E+02	3.69E+02	0.0150	5.238E+15
Am-242m	9.5467E-06	14,435.18	28,870.37	0.00E+00	1.38E-01	2.76E-01	0.0250	1.129E+15
Am-243	6.4100E-06	14,435.18	28,870.37	0.00E+00	9.25E-02	1.85E-01	0.0375	1.028E+15
C-14	2.9673E-08	14,435.18	28,870.37	0.00E+00	4.28E-04	8.57E-04	0.0575	1.027E+15
Cl-36	5.9513E-35	14,435.18	28,870.37	0.00E+00	8.59E-31	1.72E-30	0.0850	6.466E+14
Cm-243	3.1807E-06	14,435.18	28,870.37	0.00E+00	4.59E-02	9.18E-02	0.1250	5.399E+14
Cm-244	1.9540E-04	14,435.18	28,870.37	0.00E+00	2.82E+00	5.64E+00	0.2250	5.514E+14
Co-60	1.1753E-04	14,435.18	28,870.37	0.00E+00	1.70E+00	3.39E+00	0.3750	2.674E+14
Cs-134	3.3060E-01	14,435.18	28,870.37	0.00E+00	4.77E+03	9.54E+03	0.5750	3.692E+15
Cs-135	4.8607E-06	14,435.18	28,870.37	0.00E+00	7.02E-02	1.40E-01	0.8500	3.918E+14
Cs-137	2.8607E+00	14,435.18	28,870.37	0.00E+00	4.13E+04	8.26E+04	1.2500	8.655E+13
Eu-154	6.9933E-02	14,435.18	28,870.37	0.00E+00	1.01E+03	2.02E+03	1.7500	4.120E+12
Eu-155	3.3253E-02	14,435.18	28,870.37	0.00E+00	4.80E+02	9.60E+02	2.2500	7.165E+12
Fe-55	7.7267E-02	14,435.18	28,870.37	0.00E+00	1.12E+03	2.23E+03	2.7500	6.482E+10
H-3	1.0827E-02	14,435.18	28,870.37	0.00E+00	1.56E+02	3.13E+02	3.5000	7.678E+09
I-129	7.1600E-07	14,435.18	28,870.37	0.00E+00	1.03E-02	2.07E-02	5.0000	7.517E+04
Kr-85	2.7007E-01	14,435.18	28,870.37	0.00E+00	3.90E+03	7.80E+03	7.0000	8.563E+03
Np-237	3.6327E-06	14,435.18	28,870.37	0.00E+00	5.24E-02	1.05E-01	11.0000	9.781E+02
Pa-231	1.1267E-09	14,435.18	28,870.37	0.00E+00	1.63E-05	3.25E-05		
Pb-210	1.9773E-15	14,435.18	28,870.37	0.00E+00	2.85E-11	5.71E-11		
Pm-147	2.4367E+00	14,435.18	28,870.37	0.00E+00	3.52E+04	7.03E+04		
Pu-238	6.2213E-03	14,435.18	28,870.37	0.00E+00	8.98E+01	1.80E+02		
Pu-239	1.0320E-02	14,435.18	28,870.37	0.00E+00	1.49E+02	2.98E+02		
Pu-240	5.4260E-03	14,435.18	28,870.37	0.00E+00	7.83E+01	1.57E+02		
Pu-241	7.7333E-01	14,435.18	28,870.37	0.00E+00	1.12E+04	2.23E+04		
Pu-242	3.0713E-06	14,435.18	28,870.37	0.00E+00	4.43E-02	8.87E-02		
Ra-226	2.2027E-14	14,435.18	28,870.37	0.00E+00	3.18E-10	6.36E-10		
Ra-228	2.6333E-15	14,435.18	28,870.37	0.00E+00	3.80E-11	7.60E-11		
Ru-106	2.5580E-01	14,435.18	28,870.37	0.00E+00	3.69E+03	7.39E+03		
Se-79	1.2540E-05	14,435.18	28,870.37	0.00E+00	1.81E-01	3.62E-01		
Sn-126	1.1393E-05	14,435.18	28,870.37	0.00E+00	1.64E-01	3.29E-01		
Sr-90	2.6293E+00	14,435.18	28,870.37	0.00E+00	3.80E+04	7.59E+04		
Tc-99	4.3540E-04	14,435.18	28,870.37	0.00E+00	6.29E+00	1.26E+01		
Th-229	1.3653E-13	14,435.18	28,870.37	0.00E+00	1.97E-09	3.94E-09		
Th-230	1.2607E-11	14,435.18	28,870.37	0.00E+00	1.82E-07	3.64E-07		
Th-232	6.7400E-15	14,435.18	28,870.37	0.00E+00	9.73E-11	1.95E-10		
Tl-208	7.4667E-09	14,435.18	28,870.37	0.00E+00	1.08E-04	2.16E-04		
U-232	2.1927E-08	14,435.18	28,870.37	0.00E+00	3.17E-04	6.33E-04		
U-233	1.9920E-10	14,435.18	28,870.37	0.00E+00	2.88E-06	5.75E-06		
U-234	2.2487E-07	14,435.18	28,870.37	0.00E+00	3.25E-03	6.49E-03		
U-235	-2.5341E-06	14,435.18	0.00	6.56E-02	2.91E-02	6.56E-02		
U-236	1.3000E-05	14,435.18	28,870.37	0.00E+00	1.88E-01	3.75E-01		
U-238	-1.4207E-08	14,435.18	0.00	4.08E-02	4.06E-02	4.08E-02		
Y-90	2.6300E+00	14,435.18	28,870.37	0.00E+00	3.80E+04	7.59E+04		
Other Radionuclides					6.82E+04	1.36E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.83E+02	1.37E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		14,435.18	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		28,870.37	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	2.17	
Bounding:	4.34	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX LEU) AUSTRALIA
SNF ID #: 299
Fuel Units & Descr: 289 - ASSEMBLY
Heavy Metal Mass: BOL=289kg; EOL=260.1kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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: 5 years

Estimated Canister usage: 18"x10' 8.03

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	1.7533E-10	27,468.45	54,936.90	0.00E+00	4.82E-06	9.63E-06
Am-241	1.2780E-02	27,468.45	54,936.90	0.00E+00	3.51E+02	7.02E+02
Am-242m	9.5467E-06	27,468.45	54,936.90	0.00E+00	2.62E-01	5.24E-01
Am-243	6.4100E-06	27,468.45	54,936.90	0.00E+00	1.76E-01	3.52E-01
C-14	2.9673E-08	27,468.45	54,936.90	0.00E+00	8.15E-04	1.63E-03
Cl-36	5.9513E-35	27,468.45	54,936.90	0.00E+00	1.63E-30	3.27E-30
Cm-243	3.1807E-06	27,468.45	54,936.90	0.00E+00	8.74E-02	1.75E-01
Cm-244	1.9540E-04	27,468.45	54,936.90	0.00E+00	5.37E+00	1.07E+01
Co-60	1.1753E-04	27,468.45	54,936.90	0.00E+00	3.23E+00	6.46E+00
Cs-134	3.3060E-01	27,468.45	54,936.90	0.00E+00	9.08E+03	1.82E+04
Cs-135	4.8607E-06	27,468.45	54,936.90	0.00E+00	1.34E-01	2.67E-01
Cs-137	2.8607E+00	27,468.45	54,936.90	0.00E+00	7.86E+04	1.57E+05
Eu-154	6.9933E-02	27,468.45	54,936.90	0.00E+00	1.92E+03	3.84E+03
Eu-155	3.3253E-02	27,468.45	54,936.90	0.00E+00	9.13E+02	1.83E+03
Fe-55	7.7267E-02	27,468.45	54,936.90	0.00E+00	2.12E+03	4.24E+03
H-3	1.0827E-02	27,468.45	54,936.90	0.00E+00	2.97E+02	5.95E+02
I-129	7.1600E-07	27,468.45	54,936.90	0.00E+00	1.97E-02	3.93E-02
Kr-85	2.7007E-01	27,468.45	54,936.90	0.00E+00	7.42E+03	1.48E+04
Np-237	3.6327E-06	27,468.45	54,936.90	0.00E+00	9.98E-02	2.00E-01
Pa-231	1.1267E-09	27,468.45	54,936.90	0.00E+00	3.09E-05	6.19E-05
Pb-210	1.9773E-15	27,468.45	54,936.90	0.00E+00	5.43E-11	1.09E-10
Pm-147	2.4367E+00	27,468.45	54,936.90	0.00E+00	6.69E+04	1.34E+05
Pu-238	6.2213E-03	27,468.45	54,936.90	0.00E+00	1.71E+02	3.42E+02
Pu-239	1.0320E-02	27,468.45	54,936.90	0.00E+00	2.83E+02	5.67E+02
Pu-240	5.4260E-03	27,468.45	54,936.90	0.00E+00	1.49E+02	2.98E+02
Pu-241	7.7333E-01	27,468.45	54,936.90	0.00E+00	2.12E+04	4.25E+04
Pu-242	3.0713E-06	27,468.45	54,936.90	0.00E+00	8.44E-02	1.69E-01
Ra-226	2.2027E-14	27,468.45	54,936.90	0.00E+00	6.05E-10	1.21E-09
Ra-228	2.6333E-15	27,468.45	54,936.90	0.00E+00	7.23E-11	1.45E-10
Ru-106	2.5580E-01	27,468.45	54,936.90	0.00E+00	7.03E+03	1.41E+04
Se-79	1.2540E-05	27,468.45	54,936.90	0.00E+00	3.44E-01	6.89E-01
Sn-126	1.1393E-05	27,468.45	54,936.90	0.00E+00	3.13E-01	6.26E-01
Sr-90	2.6293E+00	27,468.45	54,936.90	0.00E+00	7.22E+04	1.44E+05
Tc-99	4.3540E-04	27,468.45	54,936.90	0.00E+00	1.20E+01	2.39E+01
Th-229	1.3653E-13	27,468.45	54,936.90	0.00E+00	3.75E-09	7.50E-09
Th-230	1.2607E-11	27,468.45	54,936.90	0.00E+00	3.46E-07	6.93E-07
Th-232	6.7400E-15	27,468.45	54,936.90	0.00E+00	1.85E-10	3.70E-10
Tl-208	7.4667E-09	27,468.45	54,936.90	0.00E+00	2.05E-04	4.10E-04
U-232	2.1927E-08	27,468.45	54,936.90	0.00E+00	6.02E-04	1.20E-03
U-233	1.9920E-10	27,468.45	54,936.90	0.00E+00	5.47E-06	1.09E-05
U-234	2.2487E-07	27,468.45	54,936.90	0.00E+00	6.18E-03	1.24E-02
U-235	-2.5341E-06	27,468.45	0.00	1.25E-01	5.53E-02	1.25E-01
U-236	1.3000E-05	27,468.45	54,936.90	0.00E+00	3.57E-01	7.14E-01
U-238	-1.4207E-08	27,468.45	0.00	7.77E-02	7.73E-02	7.77E-02
Y-90	2.6300E+00	27,468.45	54,936.90	0.00E+00	7.22E+04	1.44E+05
Other Radionuclides					1.30E+05	2.59E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.968E+15
0.0250	2.148E+15
0.0375	1.957E+15
0.0575	1.954E+15
0.0850	1.230E+15
0.1250	1.027E+15
0.2250	1.049E+15
0.3750	5.088E+14
0.5750	7.026E+15
0.8500	7.452E+14
1.2500	1.647E+14
1.7500	7.840E+12
2.2500	1.363E+13
2.7500	1.233E+11
3.5000	1.461E+10
5.0000	1.430E+05
7.0000	1.629E+04
11.0000	1.861E+03

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:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.0000003	10 to 20

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		27,468.45
Bounding:		54,936.90

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	2.17	
Bounding:	4.34	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX-HEU) AUSTRALIA
SNF ID #: 300
Fuel Units & Descr: 266 - ASSEMBLY
Heavy Metal Mass: BOL=38.251kg; EOL=22.025kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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: 5 years

Estimated Canister usage: 18"x10' = 7.39

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6950E-11	14,945.82	29,891.64	0.00E+00	1.00E-06	2.00E-06
Am-241	4.4557E-03	14,945.82	29,891.64	0.00E+00	6.66E+01	1.33E+02
Am-242m	1.4666E-06	14,945.82	29,891.64	0.00E+00	2.19E-02	4.38E-02
Am-243	3.7151E-05	14,945.82	29,891.64	0.00E+00	5.55E-01	1.11E+00
C-14	2.6513E-06	14,945.82	29,891.64	0.00E+00	3.96E-04	7.93E-04
Cl-36	4.4441E-31	14,945.82	29,891.64	0.00E+00	6.64E-27	1.33E-26
Cm-243	8.2139E-06	14,945.82	29,891.64	0.00E+00	1.23E-01	2.46E-01
Cm-244	8.2625E-03	14,945.82	29,891.64	0.00E+00	1.23E+02	2.47E+02
Co-60	3.4951E-04	14,945.82	29,891.64	0.00E+00	5.22E+00	1.04E+01
Cs-134	1.6409E+00	14,945.82	29,891.64	0.00E+00	2.45E+04	4.91E+04
Cs-135	4.2564E-06	14,945.82	29,891.64	0.00E+00	6.36E-02	1.27E-01
Cs-137	2.8791E+00	14,945.82	29,891.64	0.00E+00	4.30E+04	8.61E+04
Eu-154	1.7388E-01	14,945.82	29,891.64	0.00E+00	2.60E+03	5.20E+03
Eu-155	1.1616E-01	14,945.82	29,891.64	0.00E+00	1.74E+03	3.47E+03
Fe-55	7.3755E-02	14,945.82	29,891.64	0.00E+00	1.10E+03	2.20E+03
H-3	1.0729E-02	14,945.82	29,891.64	0.00E+00	1.60E+02	3.21E+02
I-129	6.6403E-07	14,945.82	29,891.64	0.00E+00	9.92E-03	1.98E-02
Kr-85	2.8487E-01	14,945.82	29,891.64	0.00E+00	4.26E+03	8.52E+03
Np-237	3.1507E-05	14,945.82	29,891.64	0.00E+00	4.71E-01	9.42E-01
Pa-231	4.1938E-10	14,945.82	29,891.64	0.00E+00	6.27E-06	1.25E-05
Pb-210	8.4083E-13	14,945.82	29,891.64	0.00E+00	1.26E-08	2.51E-08
Pm-147	1.2807E+00	14,945.82	29,891.64	0.00E+00	1.91E+04	3.83E+04
Pu-238	1.7290E-01	14,945.82	29,891.64	0.00E+00	2.58E+03	5.17E+03
Pu-239	6.9563E-04	14,945.82	29,891.64	0.00E+00	1.04E+01	2.08E+01
Pu-240	3.6865E-04	14,945.82	29,891.64	0.00E+00	5.51E+00	1.10E+01
Pu-241	2.7643E-01	14,945.82	29,891.64	0.00E+00	4.13E+03	8.26E+03
Pu-242	3.0911E-06	14,945.82	29,891.64	0.00E+00	4.62E-02	9.24E-02
Ra-226	8.6330E-12	14,945.82	29,891.64	0.00E+00	1.29E-07	2.58E-07
Ra-228	3.1817E-15	14,945.82	29,891.64	0.00E+00	4.76E-11	9.51E-11
Ru-106	2.1981E-01	14,945.82	29,891.64	0.00E+00	3.29E+03	6.57E+03
Se-79	1.2339E-05	14,945.82	29,891.64	0.00E+00	1.84E-01	3.69E-01
Sn-126	1.0194E-05	14,945.82	29,891.64	0.00E+00	1.52E-01	3.05E-01
Sr-90	2.7242E+00	14,945.82	29,891.64	0.00E+00	4.07E+04	8.14E+04
Tc-99	3.8056E-04	14,945.82	29,891.64	0.00E+00	5.69E+00	1.14E+01
Th-229	1.0413E-12	14,945.82	29,891.64	0.00E+00	1.56E-08	3.11E-08
Th-230	3.9648E-09	14,945.82	29,891.64	0.00E+00	5.93E-05	1.19E-04
Th-232	8.3536E-15	14,945.82	29,891.64	0.00E+00	1.25E-10	2.50E-10
Tl-208	4.3888E-06	14,945.82	29,891.64	0.00E+00	6.56E-04	1.31E-03
U-232	1.3645E-07	14,945.82	29,891.64	0.00E+00	2.04E-03	4.08E-03
U-233	1.7023E-09	14,945.82	29,891.64	0.00E+00	2.54E-05	5.09E-05
U-234	4.5389E-05	14,945.82	29,891.64	0.00E+00	6.78E-01	1.36E+00
U-235	-2.8681E-06	14,945.82	0.00	6.61E-02	2.33E-02	6.61E-02
U-236	1.6701E-05	14,945.82	29,891.64	0.00E+00	2.50E-01	4.99E-01
U-238	-9.4194E-09	14,945.82	0.00	2.57E-03	2.43E-03	2.57E-03
Y-90	2.7248E+00	14,945.82	29,891.64	0.00E+00	4.07E+04	8.14E+04
Other Radionuclides					7.95E+04	1.59E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.938E+15
0.0250	1.265E+15
0.0375	1.222E+15
0.0575	1.165E+15
0.0850	7.632E+14
0.1250	6.963E+14
0.2250	6.287E+14
0.3750	2.978E+14
0.5750	5.698E+15
0.8500	1.742E+15
1.2500	2.379E+14
1.7500	6.256E+12
2.2500	9.894E+12
2.7500	6.086E+10
3.5000	6.835E+09
5.0000	1.555E+08
7.0000	1.788E+05
11.0000	2.051E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.03E+03	2.07E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	80.00000311	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		14,945.82	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		29,891.64	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.89	
Bounding:	1.79	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX-HEU) AUSTRALIA
SNF ID #: 684
Fuel Units & Descr: 169 - ASSEMBLY
Heavy Metal Mass: BOL=47.878kg; EOL=32.651kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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: 5 years

Estimated Canister usage: 18"x10" 4.69

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6950E-11	14,025.54	28,051.09	0.00E+00	9.39E-07	1.88E-06
Am-241	4.4557E-03	14,025.54	28,051.09	0.00E+00	6.25E+01	1.25E+02
Am-242m	1.4666E-06	14,025.54	28,051.09	0.00E+00	2.06E-02	4.11E-02
Am-243	3.7151E-05	14,025.54	28,051.09	0.00E+00	5.21E-01	1.04E+00
C-14	2.6513E-06	14,025.54	28,051.09	0.00E+00	3.72E-04	7.44E-04
Cl-36	4.4441E-31	14,025.54	28,051.09	0.00E+00	6.23E-27	1.25E-26
Cm-243	8.2139E-06	14,025.54	28,051.09	0.00E+00	1.15E-01	2.30E-01
Cm-244	8.2625E-03	14,025.54	28,051.09	0.00E+00	1.16E+02	2.32E+02
Co-60	3.4951E-04	14,025.54	28,051.09	0.00E+00	4.90E+00	9.80E+00
Cs-134	1.6409E+00	14,025.54	28,051.09	0.00E+00	2.30E+04	4.60E+04
Cs-135	4.2564E-06	14,025.54	28,051.09	0.00E+00	5.97E-02	1.19E-01
Cs-137	2.8791E+00	14,025.54	28,051.09	0.00E+00	4.04E+04	8.08E+04
Eu-154	1.7388E-01	14,025.54	28,051.09	0.00E+00	2.44E+03	4.88E+03
Eu-155	1.1616E-01	14,025.54	28,051.09	0.00E+00	1.63E+03	3.26E+03
Fe-55	7.3755E-02	14,025.54	28,051.09	0.00E+00	1.03E+03	2.07E+03
H-3	1.0729E-02	14,025.54	28,051.09	0.00E+00	1.50E+02	3.01E+02
I-129	6.6403E-07	14,025.54	28,051.09	0.00E+00	9.31E-03	1.86E-02
Kr-85	2.8487E-01	14,025.54	28,051.09	0.00E+00	4.00E+03	7.99E+03
Np-237	3.1507E-05	14,025.54	28,051.09	0.00E+00	4.42E-01	8.84E-01
Pa-231	4.1938E-10	14,025.54	28,051.09	0.00E+00	5.88E-06	1.18E-05
Pb-210	8.4083E-13	14,025.54	28,051.09	0.00E+00	1.18E-08	2.36E-08
Pm-147	1.2807E+00	14,025.54	28,051.09	0.00E+00	1.80E+04	3.59E+04
Pu-238	1.7290E-01	14,025.54	28,051.09	0.00E+00	2.43E+03	4.85E+03
Pu-239	6.9563E-04	14,025.54	28,051.09	0.00E+00	9.76E+00	1.95E+01
Pu-240	3.6865E-04	14,025.54	28,051.09	0.00E+00	5.17E+00	1.03E+01
Pu-241	2.7643E-01	14,025.54	28,051.09	0.00E+00	3.88E+03	7.75E+03
Pu-242	3.0911E-06	14,025.54	28,051.09	0.00E+00	4.34E-02	8.67E-02
Ra-226	8.6330E-12	14,025.54	28,051.09	0.00E+00	1.21E-07	2.42E-07
Ra-228	3.1817E-15	14,025.54	28,051.09	0.00E+00	4.46E-11	8.92E-11
Ru-106	2.1981E-01	14,025.54	28,051.09	0.00E+00	3.08E+03	6.17E+03
Se-79	1.2339E-05	14,025.54	28,051.09	0.00E+00	1.73E-01	3.46E-01
Sn-126	1.0194E-05	14,025.54	28,051.09	0.00E+00	1.43E-01	2.86E-01
Sr-90	2.7242E+00	14,025.54	28,051.09	0.00E+00	3.82E+04	7.64E+04
Tc-99	3.8056E-04	14,025.54	28,051.09	0.00E+00	5.34E+00	1.07E+01
Th-229	1.0413E-12	14,025.54	28,051.09	0.00E+00	1.46E-08	2.92E-08
Th-230	3.9648E-09	14,025.54	28,051.09	0.00E+00	5.56E-05	1.11E-04
Th-232	8.3536E-15	14,025.54	28,051.09	0.00E+00	1.17E-10	2.34E-10
Tl-208	4.3888E-08	14,025.54	28,051.09	0.00E+00	6.16E-04	1.23E-03
U-232	1.3645E-07	14,025.54	28,051.09	0.00E+00	1.91E-03	3.83E-03
U-233	1.7023E-09	14,025.54	28,051.09	0.00E+00	2.39E-05	4.78E-05
U-234	4.5389E-05	14,025.54	28,051.09	0.00E+00	6.37E-01	1.27E+00
U-235	-2.8661E-06	14,025.54	0.00	6.21E-02	2.19E-02	6.21E-02
U-236	1.6701E-05	14,025.54	28,051.09	0.00E+00	2.34E-01	4.68E-01
U-238	-9.4194E-09	14,025.54	0.00	6.44E-03	6.30E-03	6.44E-03
Y-90	2.7248E+00	14,025.54	28,051.09	0.00E+00	3.82E+04	7.64E+04
Other Radionuclides					7.46E+04	1.49E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.573E+15
0.0250	1.187E+15
0.0375	1.146E+15
0.0575	1.093E+15
0.0850	7.162E+14
0.1250	6.534E+14
0.2250	5.900E+14
0.3750	2.794E+14
0.5750	5.347E+15
0.8500	1.635E+15
1.2500	2.233E+14
1.7500	5.871E+12
2.2500	9.285E+12
2.7500	5.712E+10
3.5000	6.414E+09
5.0000	1.460E+06
7.0000	1.678E+05
11.0000	1.925E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.89E+02	1.94E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	60.00000706	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		14,025.54
Bounding:		28,051.09

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.67	
Bounding:	1.34	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX-HEU) DENMARK
SNF ID #: 676
Fuel Units & Descr: 5 - ASSEMBLY
Heavy Metal Mass: BOL=0.64kg; EOL=0.336kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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: 5 years

Estimated Canister usage: 18"x10' = 0.14

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6950E-11	279.55	559.11	0.00E+00	1.87E-08	3.74E-08
Am-241	4.4557E-03	279.55	559.11	0.00E+00	1.25E+00	2.49E+00
Am-242m	1.4666E-06	279.55	559.11	0.00E+00	4.10E-04	8.20E-04
Am-243	3.7151E-05	279.55	559.11	0.00E+00	1.04E-02	2.08E-02
C-14	2.6513E-06	279.55	559.11	0.00E+00	7.41E-06	1.48E-05
Cl-36	4.4441E-31	279.55	559.11	0.00E+00	1.24E-28	2.48E-28
Cm-243	8.2139E-06	279.55	559.11	0.00E+00	2.30E-03	4.59E-03
Cm-244	8.2625E-03	279.55	559.11	0.00E+00	2.31E+00	4.62E+00
Co-60	3.4951E-04	279.55	559.11	0.00E+00	9.77E-02	1.95E-01
Cs-134	1.6409E+00	279.55	559.11	0.00E+00	4.59E+02	9.17E+02
Cs-135	4.2564E-06	279.55	559.11	0.00E+00	1.19E-03	2.38E-03
Cs-137	2.8791E+00	279.55	559.11	0.00E+00	8.05E+02	1.61E+03
Eu-154	1.7388E-01	279.55	559.11	0.00E+00	4.86E+01	9.72E+01
Eu-155	1.1616E-01	279.55	559.11	0.00E+00	3.25E+01	6.49E+01
Fe-55	7.3755E-02	279.55	559.11	0.00E+00	2.06E+01	4.12E+01
H-3	1.0729E-02	279.55	559.11	0.00E+00	3.00E+00	6.00E+00
I-129	6.6403E-07	279.55	559.11	0.00E+00	1.86E-04	3.71E-04
Kr-85	2.8487E-01	279.55	559.11	0.00E+00	7.96E+01	1.59E+02
Np-237	3.1507E-05	279.55	559.11	0.00E+00	8.81E-03	1.76E-02
Pa-231	4.1938E-10	279.55	559.11	0.00E+00	1.17E-07	2.34E-07
Pb-210	8.4083E-13	279.55	559.11	0.00E+00	2.35E-10	4.70E-10
Pm-147	1.2807E+00	279.55	559.11	0.00E+00	3.58E+02	7.16E+02
Pu-238	1.7290E-01	279.55	559.11	0.00E+00	4.83E+01	9.67E+01
Pu-239	6.9563E-04	279.55	559.11	0.00E+00	1.94E-01	3.89E-01
Pu-240	3.6865E-04	279.55	559.11	0.00E+00	1.03E-01	2.06E-01
Pu-241	2.7643E-01	279.55	559.11	0.00E+00	7.73E+01	1.55E+02
Pu-242	3.0911E-06	279.55	559.11	0.00E+00	8.64E-04	1.73E-03
Ra-226	8.6330E-12	279.55	559.11	0.00E+00	2.41E-09	4.83E-09
Ra-228	3.1817E-15	279.55	559.11	0.00E+00	8.89E-13	1.78E-12
Ru-106	2.1981E-01	279.55	559.11	0.00E+00	6.14E+01	1.23E+02
Se-79	1.2339E-05	279.55	559.11	0.00E+00	3.45E-03	6.90E-03
Sn-126	1.0194E-05	279.55	559.11	0.00E+00	2.85E-03	5.70E-03
Sr-90	2.7242E+00	279.55	559.11	0.00E+00	7.62E+02	1.52E+03
Tc-99	3.8056E-04	279.55	559.11	0.00E+00	1.06E-01	2.13E-01
Th-229	1.0413E-12	279.55	559.11	0.00E+00	2.91E-10	5.82E-10
Th-230	3.9648E-09	279.55	559.11	0.00E+00	1.11E-06	2.22E-06
Th-232	8.3536E-15	279.55	559.11	0.00E+00	2.34E-12	4.67E-12
Tl-206	4.3888E-08	279.55	559.11	0.00E+00	1.23E-05	2.45E-05
U-232	1.3645E-07	279.55	559.11	0.00E+00	3.81E-05	7.63E-05
U-233	1.7023E-09	279.55	559.11	0.00E+00	4.76E-07	9.52E-07
U-234	4.5389E-05	279.55	559.11	0.00E+00	1.27E-02	2.54E-02
U-235	-2.8661E-06	279.55	0.00	1.29E-03	4.85E-04	1.29E-03
U-236	1.6701E-05	279.55	559.11	0.00E+00	4.67E-03	9.34E-03
U-238	-9.4194E-09	279.55	0.00	1.51E-05	1.24E-05	1.51E-05
Y-90	2.7248E+00	279.55	559.11	0.00E+00	7.62E+02	1.52E+03
Other Radionuclides					1.49E+03	2.97E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.111E+14
0.0250	2.366E+13
0.0375	2.285E+13
0.0575	2.179E+13
0.0850	1.428E+13
0.1250	1.302E+13
0.2250	1.176E+13
0.3750	5.569E+12
0.5750	1.066E+14
0.8500	3.259E+13
1.2500	4.450E+12
1.7500	1.170E+11
2.2500	1.851E+11
2.7500	1.138E+09
3.5000	1.278E+08
5.0000	2.909E+04
7.0000	3.345E+03
11.0000	3.837E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.93E+01	3.86E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.99999218	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		279.55
Bounding:		559.11

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.00	
Bounding:	2.00	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX-HEU) DENMARK
SNF ID #: 678
Fuel Units & Descr: 5 - ASSEMBLY
Heavy Metal Mass: BOL=0.79kg; EOL=0.423kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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: 5 years

Estimated Canister usage: 18"x10' = 0.14

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6950E-11	338.51	677.01	0.00E+00	2.27E-08	4.53E-08
Am-241	4.4557E-03	338.51	677.01	0.00E+00	1.51E+00	3.02E+00
Am-242m	1.4666E-06	338.51	677.01	0.00E+00	4.96E-04	9.93E-04
Am-243	3.7151E-05	338.51	677.01	0.00E+00	1.26E-02	2.52E-02
C-14	2.6513E-08	338.51	677.01	0.00E+00	8.97E-06	1.79E-05
Cl-36	4.4441E-31	338.51	677.01	0.00E+00	1.50E-28	3.01E-28
Cm-243	8.2139E-06	338.51	677.01	0.00E+00	2.78E-03	5.56E-03
Cm-244	8.2625E-03	338.51	677.01	0.00E+00	2.80E+00	5.59E+00
Co-60	3.4951E-04	338.51	677.01	0.00E+00	1.18E-01	2.37E-01
Cs-134	1.6409E+00	338.51	677.01	0.00E+00	5.55E+02	1.11E+03
Cs-135	4.2564E-06	338.51	677.01	0.00E+00	1.44E-03	2.88E-03
Cs-137	2.8791E+00	338.51	677.01	0.00E+00	9.75E+02	1.95E+03
Eu-154	1.7388E-01	338.51	677.01	0.00E+00	5.89E+01	1.18E+02
Eu-155	1.1616E-01	338.51	677.01	0.00E+00	3.93E+01	7.86E+01
Fe-55	7.3755E-02	338.51	677.01	0.00E+00	2.50E+01	4.99E+01
H-3	1.0729E-02	338.51	677.01	0.00E+00	3.63E+00	7.26E+00
I-129	6.6403E-07	338.51	677.01	0.00E+00	2.25E-04	4.50E-04
Kr-85	2.8487E-01	338.51	677.01	0.00E+00	9.64E+01	1.93E+02
Np-237	3.1507E-05	338.51	677.01	0.00E+00	1.07E-02	2.13E-02
Pa-231	4.1938E-10	338.51	677.01	0.00E+00	1.42E-07	2.84E-07
Pb-210	8.4083E-13	338.51	677.01	0.00E+00	2.85E-10	5.69E-10
Pm-147	1.2807E+00	338.51	677.01	0.00E+00	4.34E+02	8.67E+02
Pu-238	1.7290E-01	338.51	677.01	0.00E+00	5.85E+01	1.17E+02
Pu-239	6.9563E-04	338.51	677.01	0.00E+00	2.35E-01	4.71E-01
Pu-240	3.6865E-04	338.51	677.01	0.00E+00	1.25E-01	2.50E-01
Pu-241	2.7643E-01	338.51	677.01	0.00E+00	9.36E+01	1.87E+02
Pu-242	3.0911E-06	338.51	677.01	0.00E+00	1.05E-03	2.09E-03
Ra-226	8.6330E-12	338.51	677.01	0.00E+00	2.92E-09	5.84E-09
Ra-228	3.1817E-15	338.51	677.01	0.00E+00	1.08E-12	2.15E-12
Ru-106	2.1981E-01	338.51	677.01	0.00E+00	7.44E+01	1.49E+02
Se-79	1.2339E-05	338.51	677.01	0.00E+00	4.18E-03	8.35E-03
Sn-126	1.0194E-05	338.51	677.01	0.00E+00	3.45E-03	6.90E-03
Sr-90	2.7242E+00	338.51	677.01	0.00E+00	9.22E+02	1.84E+03
Tc-99	3.8056E-04	338.51	677.01	0.00E+00	1.29E-01	2.58E-01
Th-229	1.0413E-12	338.51	677.01	0.00E+00	3.52E-10	7.05E-10
Th-230	3.9648E-09	338.51	677.01	0.00E+00	1.34E-06	2.68E-06
Th-232	8.3536E-15	338.51	677.01	0.00E+00	2.83E-12	5.66E-12
Tl-208	4.3888E-08	338.51	677.01	0.00E+00	1.49E-05	2.97E-05
U-232	1.3645E-07	338.51	677.01	0.00E+00	4.62E-05	9.24E-05
U-233	1.7023E-09	338.51	677.01	0.00E+00	5.76E-07	1.15E-06
U-234	4.5389E-05	338.51	677.01	0.00E+00	1.54E-02	3.07E-02
U-235	-2.8661E-06	338.51	0.00	1.59E-03	6.18E-04	1.59E-03
U-236	1.6701E-05	338.51	677.01	0.00E+00	5.65E-03	1.13E-02
U-238	-9.4194E-09	338.51	0.00	1.86E-05	1.54E-05	1.86E-05
Y-90	2.7248E+00	338.51	677.01	0.00E+00	9.22E+02	1.84E+03
Other Radionuclides					1.80E+03	3.60E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.345E+14
0.0250	2.865E+13
0.0375	2.767E+13
0.0575	2.639E+13
0.0850	1.729E+13
0.1250	1.577E+13
0.2250	1.424E+13
0.3750	6.744E+12
0.5750	1.291E+14
0.8500	3.946E+13
1.2500	5.388E+12
1.7500	1.417E+11
2.2500	2.241E+11
2.7500	1.378E+09
3.5000	1.548E+08
5.0000	3.523E+04
7.0000	4.051E+03
11.0000	4.646E+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:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.00000949	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		338.51
Bounding:		677.01

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.98	
Bounding:	1.96	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX-HEU) GERMANY
SNF ID #: 683
Fuel Units & Descr: 105 - ASSEMBLY
Heavy Metal Mass: BOL=19.688kg; EOL=13.388kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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: 5 years

Estimated Canister usage: 18"x10' 2.92

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6950E-11	5,802.95	11,605.90	0.00E+00	3.89E-07	7.77E-07
Am-241	4.4557E-03	5,802.95	11,605.90	0.00E+00	2.59E+01	5.17E+01
Am-242m	1.4666E-06	5,802.95	11,605.90	0.00E+00	8.51E-03	1.70E-02
Am-243	3.7151E-05	5,802.95	11,605.90	0.00E+00	2.16E-01	4.31E-01
C-14	2.6513E-08	5,802.95	11,605.90	0.00E+00	1.54E-04	3.08E-04
Cl-36	4.4441E-31	5,802.95	11,605.90	0.00E+00	2.58E-27	5.16E-27
Cm-243	8.2139E-06	5,802.95	11,605.90	0.00E+00	4.77E-02	9.53E-02
Cm-244	8.2625E-03	5,802.95	11,605.90	0.00E+00	4.79E+01	9.59E+01
Co-60	3.4951E-04	5,802.95	11,605.90	0.00E+00	2.03E+00	4.06E+00
Cs-134	1.6409E+00	5,802.95	11,605.90	0.00E+00	9.52E+03	1.90E+04
Cs-135	4.2564E-06	5,802.95	11,605.90	0.00E+00	2.47E-02	4.94E-02
Cs-137	2.8791E+00	5,802.95	11,605.90	0.00E+00	1.67E+04	3.34E+04
Eu-154	1.7388E-01	5,802.95	11,605.90	0.00E+00	1.01E+03	2.02E+03
Eu-155	1.1616E-01	5,802.95	11,605.90	0.00E+00	6.74E+02	1.35E+03
Fe-55	7.3755E-02	5,802.95	11,605.90	0.00E+00	4.28E+02	8.56E+02
H-3	1.0729E-02	5,802.95	11,605.90	0.00E+00	6.23E+01	1.25E+02
I-129	6.6403E-07	5,802.95	11,605.90	0.00E+00	3.85E-03	7.71E-03
Kr-85	2.8487E-01	5,802.95	11,605.90	0.00E+00	1.65E+03	3.31E+03
Np-237	3.1507E-05	5,802.95	11,605.90	0.00E+00	1.83E-01	3.66E-01
Pa-231	4.1938E-10	5,802.95	11,605.90	0.00E+00	2.43E-06	4.87E-06
Pb-210	8.4083E-13	5,802.95	11,605.90	0.00E+00	4.88E-09	9.76E-09
Pm-147	1.2807E+00	5,802.95	11,605.90	0.00E+00	7.43E+03	1.49E+04
Pu-238	1.7290E-01	5,802.95	11,605.90	0.00E+00	1.00E+03	2.01E+03
Pu-239	6.9563E-04	5,802.95	11,605.90	0.00E+00	4.04E+00	8.07E+00
Pu-240	3.6865E-04	5,802.95	11,605.90	0.00E+00	2.14E+00	4.28E+00
Pu-241	2.7643E-01	5,802.95	11,605.90	0.00E+00	1.60E+03	3.21E+03
Pu-242	3.0911E-06	5,802.95	11,605.90	0.00E+00	1.79E-02	3.59E-02
Ra-226	8.6330E-12	5,802.95	11,605.90	0.00E+00	5.01E-08	1.00E-07
Ra-228	3.1817E-15	5,802.95	11,605.90	0.00E+00	1.85E-11	3.69E-11
Ru-106	2.1981E-01	5,802.95	11,605.90	0.00E+00	1.28E+03	2.55E+03
Se-79	1.2339E-05	5,802.95	11,605.90	0.00E+00	7.16E-02	1.43E-01
Sn-126	1.0194E-05	5,802.95	11,605.90	0.00E+00	5.92E-02	1.18E-01
Sr-90	2.7242E+00	5,802.95	11,605.90	0.00E+00	1.58E+04	3.16E+04
Tc-99	3.8056E-04	5,802.95	11,605.90	0.00E+00	2.21E+00	4.42E+00
Th-229	1.0413E-12	5,802.95	11,605.90	0.00E+00	6.04E-09	1.21E-08
Th-230	3.9648E-09	5,802.95	11,605.90	0.00E+00	2.30E-05	4.60E-05
Th-232	8.3536E-15	5,802.95	11,605.90	0.00E+00	4.85E-11	9.70E-11
Tl-208	4.3888E-08	5,802.95	11,605.90	0.00E+00	2.55E-04	5.09E-04
U-232	1.3645E-07	5,802.95	11,605.90	0.00E+00	7.92E-04	1.58E-03
U-233	1.7023E-09	5,802.95	11,605.90	0.00E+00	9.88E-06	1.98E-05
U-234	4.5389E-05	5,802.95	11,605.90	0.00E+00	2.63E-01	5.27E-01
U-235	-2.8661E-06	5,802.95	0.00	3.40E-02	1.74E-02	3.40E-02
U-236	1.6701E-05	5,802.95	11,605.90	0.00E+00	9.69E-02	1.94E-01
U-238	-9.4194E-09	5,802.95	0.00	1.32E-03	1.27E-03	1.32E-03
Y-90	2.7248E+00	5,802.95	11,605.90	0.00E+00	1.58E+04	3.16E+04
Other Radionuclides					3.09E+04	6.17E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.306E+15
0.0250	4.912E+14
0.0375	4.743E+14
0.0575	4.523E+14
0.0850	2.963E+14
0.1250	2.703E+14
0.2250	2.441E+14
0.3750	1.156E+14
0.5750	2.212E+15
0.8500	6.765E+14
1.2500	9.237E+13
1.7500	2.429E+12
2.2500	3.841E+12
2.7500	2.363E+10
3.5000	2.654E+09
5.0000	6.039E+05
7.0000	6.944E+04
11.0000	7.965E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.01E+02	8.02E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	80	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		5,802.95
Bounding:		11,605.90

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.68	
Bounding:	1.35	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX-HEU) GERMANY
SNF ID #: 685
Fuel Units & Descr: 130 - ASSEMBLY
Heavy Metal Mass: BOL=27.625kg; EOL=18.785kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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: 5 years

Estimated Canister usage: 18"x10' = 3.61

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6950E-11	8,142.55	16,285.10	0.00E+00	5.45E-07	1.09E-06
Am-241	4.4557E-03	8,142.55	16,285.10	0.00E+00	3.63E+01	7.26E+01
Am-242m	1.4666E-06	8,142.55	16,285.10	0.00E+00	1.19E-02	2.39E-02
Am-243	3.7151E-05	8,142.55	16,285.10	0.00E+00	3.03E-01	6.05E-01
C-14	2.6513E-06	8,142.55	16,285.10	0.00E+00	2.16E-04	4.32E-04
Cl-36	4.4441E-31	8,142.55	16,285.10	0.00E+00	3.62E-27	7.24E-27
Cm-243	8.2139E-06	8,142.55	16,285.10	0.00E+00	6.69E-02	1.34E-01
Cm-244	8.2625E-03	8,142.55	16,285.10	0.00E+00	6.73E+01	1.35E+02
Co-60	3.4951E-04	8,142.55	16,285.10	0.00E+00	2.85E+00	5.69E+00
Cs-134	1.6409E+00	8,142.55	16,285.10	0.00E+00	1.34E+04	2.67E+04
Cs-135	4.2564E-06	8,142.55	16,285.10	0.00E+00	3.47E-02	6.93E-02
Cs-137	2.8791E+00	8,142.55	16,285.10	0.00E+00	2.34E+04	4.69E+04
Eu-154	1.7388E-01	8,142.55	16,285.10	0.00E+00	1.42E+03	2.83E+03
Eu-155	1.1616E-01	8,142.55	16,285.10	0.00E+00	9.46E+02	1.89E+03
Fe-55	7.3755E-02	8,142.55	16,285.10	0.00E+00	6.01E+02	1.20E+03
H-3	1.0729E-02	8,142.55	16,285.10	0.00E+00	8.74E+01	1.75E+02
I-129	6.6403E-07	8,142.55	16,285.10	0.00E+00	5.41E-03	1.08E-02
Kr-85	2.8487E-01	8,142.55	16,285.10	0.00E+00	2.32E+03	4.64E+03
Np-237	3.1507E-05	8,142.55	16,285.10	0.00E+00	2.57E-01	5.13E-01
Pa-231	4.1938E-10	8,142.55	16,285.10	0.00E+00	3.41E-06	6.83E-06
Pb-210	8.4083E-13	8,142.55	16,285.10	0.00E+00	6.85E-09	1.37E-08
Pm-147	1.2807E+00	8,142.55	16,285.10	0.00E+00	1.04E+04	2.09E+04
Pu-238	1.7290E-01	8,142.55	16,285.10	0.00E+00	1.41E+03	2.82E+03
Pu-239	6.9563E-04	8,142.55	16,285.10	0.00E+00	5.66E+00	1.13E+01
Pu-240	3.6865E-04	8,142.55	16,285.10	0.00E+00	3.00E+00	6.00E+00
Pu-241	2.7643E-01	8,142.55	16,285.10	0.00E+00	2.25E+03	4.50E+03
Pu-242	3.0911E-06	8,142.55	16,285.10	0.00E+00	2.52E-02	5.03E-02
Ra-226	8.6330E-12	8,142.55	16,285.10	0.00E+00	7.03E-08	1.41E-07
Ra-228	3.1817E-15	8,142.55	16,285.10	0.00E+00	2.59E-11	5.18E-11
Ru-106	2.1981E-01	8,142.55	16,285.10	0.00E+00	1.79E+03	3.58E+03
Se-79	1.2339E-05	8,142.55	16,285.10	0.00E+00	1.00E-01	2.01E-01
Sn-126	1.0194E-05	8,142.55	16,285.10	0.00E+00	8.30E-02	1.66E-01
Sr-90	2.7242E+00	8,142.55	16,285.10	0.00E+00	2.22E+04	4.44E+04
Tc-99	3.8056E-04	8,142.55	16,285.10	0.00E+00	3.10E+00	6.20E+00
Th-229	1.0413E-12	8,142.55	16,285.10	0.00E+00	8.48E-09	1.70E-08
Th-230	3.9648E-09	8,142.55	16,285.10	0.00E+00	3.23E-05	6.46E-05
Th-232	8.3536E-15	8,142.55	16,285.10	0.00E+00	6.80E-11	1.36E-10
Tl-208	4.3888E-08	8,142.55	16,285.10	0.00E+00	3.57E-04	7.15E-04
U-232	1.3645E-07	8,142.55	16,285.10	0.00E+00	1.11E-03	2.22E-03
U-233	1.7023E-09	8,142.55	16,285.10	0.00E+00	1.39E-05	2.77E-05
U-234	4.5389E-05	8,142.55	16,285.10	0.00E+00	3.70E-01	7.39E-01
U-235	-2.8661E-06	8,142.55	0.00	4.78E-02	2.44E-02	4.78E-02
U-236	1.6701E-05	8,142.55	16,285.10	0.00E+00	1.36E-01	2.72E-01
U-238	-9.4194E-09	8,142.55	0.00	1.86E-03	1.78E-03	1.86E-03
Y-90	2.7248E+00	8,142.55	16,285.10	0.00E+00	2.22E+04	4.44E+04
Other Radionuclides					4.33E+04	8.66E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.235E+15
0.0250	6.892E+14
0.0375	6.655E+14
0.0575	6.347E+14
0.0850	4.158E+14
0.1250	3.793E+14
0.2250	3.425E+14
0.3750	1.622E+14
0.5750	3.104E+15
0.8500	9.493E+14
1.2500	1.296E+14
1.7500	3.408E+12
2.2500	5.390E+12
2.7500	3.316E+10
3.5000	3.724E+09
5.0000	8.473E+05
7.0000	9.744E+04
11.0000	1.118E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.83E+02	1.13E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	80	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		8,142.55
Bounding:		16,285.10

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.68	
Bounding:	1.35	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GCRE (1B SERIES)
SNF ID #: 745
Fuel Units & Descr: 69 - 19 ROD ASSEMBLY
Heavy Metal Mass: BOL=60.541kg; EOL=59.864kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1960
Estimates as of: 2010
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 50 years

Estimated Canister usage: 18"x10' 2.88

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	3.4276E-08	638.77	1,277.54	0.00E+00	2.19E-05	4.38E-05
Am-241	1.1458E-04	638.77	1,277.54	0.00E+00	7.32E-02	1.46E-01
Am-242m	7.9468E-09	638.77	1,277.54	0.00E+00	5.08E-06	1.02E-05
Am-243	9.8386E-10	638.77	1,277.54	0.00E+00	6.28E-07	1.26E-06
C-14	2.2978E-04	638.77	1,277.54	0.00E+00	1.47E-01	2.94E-01
Cl-36	1.2261E-06	638.77	1,277.54	0.00E+00	7.83E-04	1.57E-03
Cm-243	1.7271E-10	638.77	1,277.54	0.00E+00	1.10E-07	2.21E-07
Cm-244	1.3058E-09	638.77	1,277.54	0.00E+00	8.34E-07	1.67E-06
Co-60	9.8636E-03	638.77	1,277.54	0.00E+00	6.30E+00	1.26E+01
Cs-134	1.9617E-08	638.77	1,277.54	0.00E+00	1.25E-05	2.51E-05
Cs-135	3.0316E-05	638.77	1,277.54	0.00E+00	1.94E-02	3.87E-02
Cs-137	1.0263E+00	638.77	1,277.54	0.00E+00	6.56E+02	1.31E+03
Eu-154	2.0017E-04	638.77	1,277.54	0.00E+00	1.28E-01	2.56E-01
Eu-155	8.5957E-05	638.77	1,277.54	0.00E+00	5.49E-02	1.10E-01
Fe-55	2.2646E-05	638.77	1,277.54	0.00E+00	1.45E-02	2.89E-02
H-3	1.0835E-03	638.77	1,277.54	0.00E+00	6.92E-01	1.38E+00
I-129	7.3195E-07	638.77	1,277.54	0.00E+00	4.68E-04	9.35E-04
Kr-85	1.5661E-02	638.77	1,277.54	0.00E+00	1.00E+01	2.00E+01
Np-237	1.1494E-06	638.77	1,277.54	0.00E+00	7.34E-04	1.47E-03
Pa-231	5.8070E-08	638.77	1,277.54	0.00E+00	3.71E-05	7.42E-05
Pb-210	1.2985E-12	638.77	1,277.54	0.00E+00	8.29E-10	1.66E-09
Pm-147	2.2196E-05	638.77	1,277.54	0.00E+00	1.42E-02	2.84E-02
Pu-238	2.6223E-04	638.77	1,277.54	0.00E+00	1.68E-01	3.35E-01
Pu-239	6.6739E-04	638.77	1,277.54	0.00E+00	4.26E-01	8.53E-01
Pu-240	8.6705E-05	638.77	1,277.54	0.00E+00	5.54E-02	1.11E-01
Pu-241	3.4759E-04	638.77	1,277.54	0.00E+00	2.22E-01	4.44E-01
Pu-242	1.9717E-09	638.77	1,277.54	0.00E+00	1.26E-06	2.52E-06
Ra-226	3.0000E-12	638.77	1,277.54	0.00E+00	1.92E-09	3.83E-09
Ra-228	8.3328E-12	638.77	1,277.54	0.00E+00	5.32E-09	1.06E-08
Ru-106	6.1464E-15	638.77	1,277.54	0.00E+00	3.93E-12	7.85E-12
Se-79	1.3221E-05	638.77	1,277.54	0.00E+00	8.45E-03	1.69E-02
Sn-126	1.1491E-05	638.77	1,277.54	0.00E+00	7.34E-03	1.47E-02
Sr-90	9.5541E-01	638.77	1,277.54	0.00E+00	6.10E+02	1.22E+03
Tc-99	4.6656E-04	638.77	1,277.54	0.00E+00	2.98E-01	5.96E-01
Th-229	1.9085E-11	638.77	1,277.54	0.00E+00	1.22E-08	2.44E-08
Th-230	2.1913E-10	638.77	1,277.54	0.00E+00	1.40E-07	2.80E-07
Th-232	8.3478E-12	638.77	1,277.54	0.00E+00	5.33E-09	1.07E-08
Tl-208	1.8752E-08	638.77	1,277.54	0.00E+00	1.20E-05	2.40E-05
U-232	5.0782E-08	638.77	1,277.54	0.00E+00	3.24E-05	6.49E-05
U-233	3.2596E-09	638.77	1,277.54	0.00E+00	2.08E-06	4.16E-06
U-234	3.9817E-07	638.77	1,277.54	0.00E+00	2.54E-04	5.09E-04
U-235	-2.7761E-06	638.77	0.00	1.21E-01	1.19E-01	1.21E-01
U-236	1.6190E-05	638.77	1,277.54	0.00E+00	1.03E-02	2.07E-02
U-238	-2.8547E-09	638.77	0.00	1.59E-03	1.58E-03	1.59E-03
Y-90	9.5557E-01	638.77	1,277.54	0.00E+00	6.10E+02	1.22E+03
Other Radionuclides					7.79E+02	1.56E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.662E+13
0.0250	1.384E+13
0.0375	1.200E+13
0.0575	1.291E+13
0.0850	7.798E+12
0.1250	5.060E+12
0.2250	6.723E+12
0.3750	2.931E+12
0.5750	4.881E+13
0.8500	4.819E+11
1.2500	1.097E+12
1.7500	1.241E+10
2.2500	6.288E+06
2.7500	8.566E+05
3.5000	8.688E+01
5.0000	3.587E+01
7.0000	3.986E+00
11.0000	4.482E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.46E+00	1.49E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	HASTELLOY	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	92.20234775	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except cladding (SST is conservative).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		638.77
Bounding:		1,277.54

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.23	
Bounding:	0.45	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GCRE (1Z SERIES)
SNF ID #: 916
Fuel Units & Descr: 3 - 4 CONCENTRIC TUBES
Heavy Metal Mass: BOL=1.067kg; EOL=1.018kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1960
Estimates as of: 2010
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' 0.08

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.4276E-08	46.19	92.39	0.00E+00	1.58E-06	3.17E-06	Avg. MeV	
Am-241	1.1458E-04	46.19	92.39	0.00E+00	5.29E-03	1.06E-02	0.0150	4.817E+12
Am-242m	7.9468E-09	46.19	92.39	0.00E+00	3.67E-07	7.34E-07	0.0250	1.001E+12
Am-243	9.8386E-10	46.19	92.39	0.00E+00	4.54E-08	9.09E-08	0.0375	8.680E+11
C-14	2.2978E-04	46.19	92.39	0.00E+00	1.06E-02	2.12E-02	0.0575	9.336E+11
Cl-36	1.2261E-06	46.19	92.39	0.00E+00	5.66E-05	1.13E-04	0.0850	5.639E+11
Cm-243	1.7271E-10	46.19	92.39	0.00E+00	7.98E-09	1.60E-08	0.1250	3.659E+11
Cm-244	1.3058E-09	46.19	92.39	0.00E+00	6.03E-08	1.21E-07	0.2250	4.860E+11
Co-60	9.8636E-03	46.19	92.39	0.00E+00	4.56E-01	9.11E-01	0.3750	2.120E+11
Cs-134	1.9617E-08	46.19	92.39	0.00E+00	9.06E-07	1.81E-06	0.5750	3.529E+12
Cs-135	3.0316E-05	46.19	92.39	0.00E+00	1.40E-03	2.80E-03	0.8500	3.485E+10
Cs-137	1.0263E+00	46.19	92.39	0.00E+00	4.74E+01	9.48E+01	1.2500	7.937E+10
Eu-154	2.0017E-04	46.19	92.39	0.00E+00	9.25E-03	1.85E-02	1.7500	8.972E+08
Eu-155	8.5957E-05	46.19	92.39	0.00E+00	3.97E-03	7.94E-03	2.2500	4.547E+05
Fe-55	2.2646E-05	46.19	92.39	0.00E+00	1.05E-03	2.09E-03	2.7500	6.194E+04
H-3	1.0835E-03	46.19	92.39	0.00E+00	5.01E-02	1.00E-01	3.5000	5.571E+00
I-129	7.3195E-07	46.19	92.39	0.00E+00	3.38E-05	6.76E-05	5.0000	2.301E+00
Kr-85	1.5661E-02	46.19	92.39	0.00E+00	7.23E-01	1.45E+00	7.0000	2.543E-01
Np-237	1.1494E-06	46.19	92.39	0.00E+00	5.31E-05	1.06E-04	11.0000	2.855E-02
Pa-231	5.8070E-08	46.19	92.39	0.00E+00	2.68E-06	5.36E-06		
Pb-210	1.2985E-12	46.19	92.39	0.00E+00	6.00E-11	1.20E-10		
Pm-147	2.2196E-05	46.19	92.39	0.00E+00	1.03E-03	2.05E-03		
Pu-238	2.6223E-04	46.19	92.39	0.00E+00	1.21E-02	2.42E-02		
Pu-239	6.6739E-04	46.19	92.39	0.00E+00	3.08E-02	6.17E-02		
Pu-240	8.6705E-05	46.19	92.39	0.00E+00	4.01E-03	8.01E-03		
Pu-241	3.4759E-04	46.19	92.39	0.00E+00	1.61E-02	3.21E-02		
Pu-242	1.9717E-09	46.19	92.39	0.00E+00	9.11E-08	1.82E-07		
Ra-226	3.0000E-12	46.19	92.39	0.00E+00	1.39E-10	2.77E-10		
Ra-228	8.3328E-12	46.19	92.39	0.00E+00	3.85E-10	7.70E-10		
Ru-106	6.1464E-15	46.19	92.39	0.00E+00	2.84E-13	5.68E-13		
Se-79	1.3221E-05	46.19	92.39	0.00E+00	6.11E-04	1.22E-03		
Sn-126	1.1491E-05	46.19	92.39	0.00E+00	5.31E-04	1.06E-03		
Sr-90	9.5541E-01	46.19	92.39	0.00E+00	4.41E+01	8.83E+01		
Tc-99	4.6656E-04	46.19	92.39	0.00E+00	2.16E-02	4.31E-02		
Th-229	1.9085E-11	46.19	92.39	0.00E+00	8.82E-10	1.76E-09		
Th-230	2.1913E-10	46.19	92.39	0.00E+00	1.01E-08	2.02E-08		
Th-232	8.3478E-12	46.19	92.39	0.00E+00	3.86E-10	7.71E-10		
Tl-208	1.8752E-08	46.19	92.39	0.00E+00	8.66E-07	1.73E-06		
U-232	5.0782E-08	46.19	92.39	0.00E+00	2.35E-06	4.69E-06		
U-233	3.2596E-09	46.19	92.39	0.00E+00	1.51E-07	3.01E-07		
U-234	3.9817E-07	46.19	92.39	0.00E+00	1.84E-05	3.68E-05		
U-235	-2.7761E-06	46.19	0.00	2.16E-03	2.03E-03	2.16E-03		
U-236	1.6190E-05	46.19	92.39	0.00E+00	7.48E-04	1.50E-03		
U-238	-2.8547E-09	46.19	0.00	2.27E-05	2.26E-05	2.27E-05		
Y-90	9.5557E-01	46.19	92.39	0.00E+00	4.41E+01	8.83E+01		
Other Radionuclides					5.63E+01	1.13E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.39E-01	1.68E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.671	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		46.19
Bounding:		92.39

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.93	
Bounding:	1.86	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GENTR
SNF ID #: 97
Fuel Units & Descr: 16 - STACKED DISKS
Heavy Metal Mass: BOL=3.992kg; EOL=3.984kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00118689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 0.44

II. Estimates	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	7.58	15.15	0.00E+00	1.10E-09	2.20E-09	Avg. MeV	
Am-241	1.1190E-03	7.58	15.15	0.00E+00	8.48E-03	1.70E-02	0.0150	2.923E+12
Am-242m	4.5425E-07	7.58	15.15	0.00E+00	3.44E-06	6.88E-06	0.0250	6.298E+11
Am-243	1.4921E-06	7.58	15.15	0.00E+00	1.13E-05	2.26E-05	0.0375	5.812E+11
C-14	5.7244E-09	7.58	15.15	0.00E+00	4.34E-08	8.67E-08	0.0575	5.714E+11
Cl-36	1.3124E-32	7.58	15.15	0.00E+00	9.94E-32	1.99E-31	0.0850	3.643E+11
Cm-243	2.3676E-07	7.58	15.15	0.00E+00	1.79E-06	3.59E-06	0.1250	3.155E+11
Cm-244	5.2042E-05	7.58	15.15	0.00E+00	3.94E-04	7.89E-04	0.2250	3.089E+11
Co-60	3.8208E-05	7.58	15.15	0.00E+00	2.89E-04	5.79E-04	0.3750	1.495E+11
Cs-134	4.8693E-01	7.58	15.15	0.00E+00	3.69E+00	7.38E+00	0.5750	2.053E+12
Cs-135	3.4477E-06	7.58	15.15	0.00E+00	2.61E-05	5.22E-05	0.8500	2.875E+11
Cs-137	2.8731E+00	7.58	15.15	0.00E+00	2.18E+01	4.35E+01	1.2500	5.349E+10
Eu-154	8.2053E-02	7.58	15.15	0.00E+00	6.22E-01	1.24E+00	1.7500	2.243E+09
Eu-155	3.9134E-02	7.58	15.15	0.00E+00	2.96E-01	5.93E-01	2.2500	4.705E+09
Fe-55	6.7429E-03	7.58	15.15	0.00E+00	5.11E-02	1.02E-01	2.7500	2.707E+07
H-3	1.0599E-02	7.58	15.15	0.00E+00	8.03E-02	1.61E-01	3.5000	3.002E+06
I-129	7.5300E-07	7.58	15.15	0.00E+00	5.70E-06	1.14E-05	5.0000	9.270E+00
Kr-85	2.8595E-01	7.58	15.15	0.00E+00	2.17E+00	4.33E+00	7.0000	1.034E+00
Np-237	9.5479E-06	7.58	15.15	0.00E+00	7.23E-05	1.45E-04	11.0000	1.165E-01
Pa-231	8.9297E-10	7.58	15.15	0.00E+00	6.77E-09	1.35E-08		
Pb-210	3.7609E-12	7.58	15.15	0.00E+00	2.85E-11	5.70E-11		
Pm-147	2.5452E+00	7.58	15.15	0.00E+00	1.93E+01	3.86E+01		
Pu-238	2.0550E-02	7.58	15.15	0.00E+00	1.56E-01	3.11E-01		
Pu-239	4.2838E-04	7.58	15.15	0.00E+00	3.25E-03	6.49E-03		
Pu-240	2.4401E-04	7.58	15.15	0.00E+00	1.85E-03	3.70E-03		
Pu-241	6.8764E-02	7.58	15.15	0.00E+00	5.21E-01	1.04E+00		
Pu-242	3.6329E-07	7.58	15.15	0.00E+00	2.75E-06	5.50E-06		
Ra-226	3.8045E-11	7.58	15.15	0.00E+00	2.88E-10	5.76E-10		
Ra-228	2.9902E-15	7.58	15.15	0.00E+00	2.27E-14	4.53E-14		
Ru-106	1.9055E-01	7.58	15.15	0.00E+00	1.44E+00	2.89E+00		
Se-79	1.2936E-05	7.58	15.15	0.00E+00	9.80E-05	1.96E-04		
Sn-126	1.1574E-05	7.58	15.15	0.00E+00	8.77E-05	1.75E-04		
Sr-90	2.7505E+00	7.58	15.15	0.00E+00	2.08E+01	4.17E+01		
Tc-99	4.2239E-04	7.58	15.15	0.00E+00	3.20E-03	6.40E-03		
Th-229	1.8848E-12	7.58	15.15	0.00E+00	1.43E-11	2.86E-11		
Th-230	1.7042E-08	7.58	15.15	0.00E+00	1.29E-07	2.58E-07		
Th-232	7.8132E-15	7.58	15.15	0.00E+00	5.92E-14	1.18E-13		
Tl-208	4.4063E-08	7.58	15.15	0.00E+00	3.34E-07	6.68E-07		
U-232	1.3151E-07	7.58	15.15	0.00E+00	9.96E-07	1.99E-06		
U-233	1.9564E-09	7.58	15.15	0.00E+00	1.48E-08	2.96E-08		
U-234	1.8371E-04	7.58	15.15	0.00E+00	1.39E-03	2.78E-03		
U-235	-2.7235E-06	7.58	0.00	8.10E-03	8.08E-03	8.10E-03		
U-236	1.5493E-05	7.58	15.15	0.00E+00	1.17E-04	2.35E-04		
U-238	-4.2851E-09	7.58	0.00	8.13E-05	8.13E-05	8.13E-05		
Y-90	2.7505E+00	7.58	15.15	0.00E+00	2.08E+01	4.17E+01		
Other Radionuclides					3.90E+01	7.79E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.84E-01	7.68E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.93787575	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		7.58
Bounding:		15.15

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.01	
Bounding:	0.01	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GRR (UALX HEU) GREECE
SNF ID #: 440
Fuel Units & Descr: 106 - MTR TYPE
Heavy Metal Mass: BOL=18.76kg; EOL=14.72kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1993
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 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	4.5861E-10	3,825.20	7,650.40	0.00E+00	1.75E-06	3.51E-06
Am-241	1.7832E-03	3,825.20	7,650.40	0.00E+00	6.82E+00	1.36E+01
Am-242m	4.3410E-07	3,825.20	7,650.40	0.00E+00	1.66E-03	3.32E-03
Am-243	1.4907E-06	3,825.20	7,650.40	0.00E+00	5.70E-03	1.14E-02
C-14	5.7162E-09	3,825.20	7,650.40	0.00E+00	2.19E-05	4.37E-05
Cl-36	1.3124E-32	3,825.20	7,650.40	0.00E+00	5.02E-29	1.00E-28
Cm-243	1.8568E-07	3,825.20	7,650.40	0.00E+00	7.10E-04	1.42E-03
Cm-244	3.5512E-05	3,825.20	7,650.40	0.00E+00	1.36E-01	2.72E-01
Co-60	1.0261E-05	3,825.20	7,650.40	0.00E+00	3.93E-02	7.85E-02
Cs-134	1.6931E-02	3,825.20	7,650.40	0.00E+00	6.48E+01	1.30E+02
Cs-135	3.4477E-06	3,825.20	7,650.40	0.00E+00	1.32E-02	2.64E-02
Cs-137	2.2800E+00	3,825.20	7,650.40	0.00E+00	8.72E+03	1.74E+04
Eu-154	3.6656E-02	3,825.20	7,650.40	0.00E+00	1.40E+02	2.80E+02
Eu-155	9.6841E-03	3,825.20	7,650.40	0.00E+00	3.70E+01	7.41E+01
Fe-55	4.6977E-04	3,825.20	7,650.40	0.00E+00	1.80E+00	3.59E+00
H-3	6.0485E-03	3,825.20	7,650.40	0.00E+00	2.31E+01	4.63E+01
I-129	7.5300E-07	3,825.20	7,650.40	0.00E+00	2.88E-03	5.76E-03
Kr-85	1.4989E-01	3,825.20	7,650.40	0.00E+00	5.73E+02	1.15E+03
Np-237	9.5534E-06	3,825.20	7,650.40	0.00E+00	3.65E-02	7.31E-02
Pa-231	1.6550E-09	3,825.20	7,650.40	0.00E+00	6.33E-06	1.27E-05
Pb-210	2.6631E-11	3,825.20	7,650.40	0.00E+00	1.02E-07	2.04E-07
Pm-147	1.8156E-01	3,825.20	7,650.40	0.00E+00	6.95E+02	1.39E+03
Pu-238	1.8990E-02	3,825.20	7,650.40	0.00E+00	7.26E+01	1.45E+02
Pu-239	4.2838E-04	3,825.20	7,650.40	0.00E+00	1.64E+00	3.28E+00
Pu-240	2.4379E-04	3,825.20	7,650.40	0.00E+00	9.33E-01	1.87E+00
Pu-241	4.2511E-02	3,825.20	7,650.40	0.00E+00	1.63E+02	3.25E+02
Pu-242	3.6329E-07	3,825.20	7,650.40	0.00E+00	1.39E-03	2.78E-03
Ra-226	1.4725E-10	3,825.20	7,650.40	0.00E+00	5.63E-07	1.13E-06
Ra-228	8.9760E-15	3,825.20	7,650.40	0.00E+00	3.43E-11	6.87E-11
Ru-106	1.9752E-04	3,825.20	7,650.40	0.00E+00	7.56E-01	1.51E+00
Se-79	1.2933E-05	3,825.20	7,650.40	0.00E+00	4.95E-02	9.89E-02
Sn-126	1.1574E-05	3,825.20	7,650.40	0.00E+00	4.43E-02	8.85E-02
Sr-90	2.1680E+00	3,825.20	7,650.40	0.00E+00	8.29E+03	1.66E+04
Tc-99	4.2239E-04	3,825.20	7,650.40	0.00E+00	1.62E+00	3.23E+00
Th-229	3.9270E-12	3,825.20	7,650.40	0.00E+00	1.50E-08	3.00E-08
Th-230	3.3578E-08	3,825.20	7,650.40	0.00E+00	1.28E-04	2.57E-04
Th-232	1.5452E-14	3,825.20	7,650.40	0.00E+00	5.91E-11	1.18E-10
Tl-208	4.6705E-08	3,825.20	7,650.40	0.00E+00	1.79E-04	3.57E-04
U-232	1.3045E-07	3,825.20	7,650.40	0.00E+00	4.99E-04	9.98E-04
U-233	2.3739E-09	3,825.20	7,650.40	0.00E+00	9.08E-06	1.82E-05
U-234	1.8423E-04	3,825.20	7,650.40	0.00E+00	7.05E-01	1.41E+00
U-235	-2.7235E-06	3,825.20	0.00	3.73E-02	2.69E-02	3.73E-02
U-236	1.5493E-05	3,825.20	7,650.40	0.00E+00	5.93E-02	1.19E-01
U-238	-4.2851E-09	3,825.20	0.00	5.08E-04	4.92E-04	5.08E-04
Y-90	2.1686E+00	3,825.20	7,650.40	0.00E+00	8.30E+03	1.66E+04
Other Radionuclides					8.32E+03	1.66E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.126E+14
0.0250	1.903E+14
0.0375	1.662E+14
0.0575	1.772E+14
0.0850	1.073E+14
0.1250	7.359E+13
0.2250	9.248E+13
0.3750	4.051E+13
0.5750	6.576E+14
0.8500	1.562E+13
1.2500	7.890E+12
1.7500	3.306E+11
2.2500	4.136E+08
2.7500	2.486E+07
3.5000	1.580E+06
5.0000	3.655E+03
7.0000	4.048E+02
11.0000	4.545E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.94E+02	2.07E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	91.93720219	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3,825.20
Bounding:		7,650.40

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.65	
Bounding:	1.30	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GRR (UALX HEU) GREECE
SNF ID #: 1069
Fuel Units & Descr: 46 - MTR TYPE
Heavy Metal Mass: BOL=7.99kg; EOL=6.27kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1993
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 1.28

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.5861E-10	1,629.25	3,258.50	0.00E+00	7.47E-07	1.49E-06
Am-241	1.7832E-03	1,629.25	3,258.50	0.00E+00	2.91E+00	5.81E+00
Am-242m	4.3410E-07	1,629.25	3,258.50	0.00E+00	7.07E-04	1.41E-03
Am-243	1.4907E-06	1,629.25	3,258.50	0.00E+00	2.43E-03	4.86E-03
C-14	5.7162E-09	1,629.25	3,258.50	0.00E+00	9.31E-06	1.86E-05
Cl-36	1.3124E-32	1,629.25	3,258.50	0.00E+00	2.14E-29	4.28E-29
Cm-243	1.8568E-07	1,629.25	3,258.50	0.00E+00	3.03E-04	6.05E-04
Cm-244	3.5512E-05	1,629.25	3,258.50	0.00E+00	5.79E-02	1.16E-01
Co-60	1.0261E-05	1,629.25	3,258.50	0.00E+00	1.67E-02	3.34E-02
Cs-134	1.6931E-02	1,629.25	3,258.50	0.00E+00	2.76E+01	5.52E+01
Cs-135	3.4477E-06	1,629.25	3,258.50	0.00E+00	5.62E-03	1.12E-02
Cs-137	2.2800E+00	1,629.25	3,258.50	0.00E+00	3.71E+03	7.43E+03
Eu-154	3.6656E-02	1,629.25	3,258.50	0.00E+00	5.97E+01	1.19E+02
Eu-155	9.6841E-03	1,629.25	3,258.50	0.00E+00	1.58E+01	3.16E+01
Fe-55	4.6977E-04	1,629.25	3,258.50	0.00E+00	7.65E-01	1.53E+00
H-3	6.0485E-03	1,629.25	3,258.50	0.00E+00	9.85E+00	1.97E+01
I-129	7.5300E-07	1,629.25	3,258.50	0.00E+00	1.23E-03	2.45E-03
Kr-85	1.4989E-01	1,629.25	3,258.50	0.00E+00	2.44E+02	4.88E+02
Np-237	9.5534E-06	1,629.25	3,258.50	0.00E+00	1.56E-02	3.11E-02
Pa-231	1.6550E-09	1,629.25	3,258.50	0.00E+00	2.70E-06	5.39E-06
Pb-210	2.6631E-11	1,629.25	3,258.50	0.00E+00	4.34E-08	8.68E-08
Pm-147	1.8156E-01	1,629.25	3,258.50	0.00E+00	2.96E+02	5.92E+02
Pu-238	1.8990E-02	1,629.25	3,258.50	0.00E+00	3.09E+01	6.19E+01
Pu-239	4.2838E-04	1,629.25	3,258.50	0.00E+00	6.98E-01	1.40E+00
Pu-240	2.4379E-04	1,629.25	3,258.50	0.00E+00	3.97E-01	7.94E-01
Pu-241	4.2511E-02	1,629.25	3,258.50	0.00E+00	6.93E+01	1.39E+02
Pu-242	3.6329E-07	1,629.25	3,258.50	0.00E+00	5.92E-04	1.18E-03
Ra-226	1.4725E-10	1,629.25	3,258.50	0.00E+00	2.40E-07	4.80E-07
Ra-228	8.9760E-15	1,629.25	3,258.50	0.00E+00	1.46E-11	2.92E-11
Ru-106	1.9752E-04	1,629.25	3,258.50	0.00E+00	3.22E-01	6.44E-01
Se-79	1.2933E-05	1,629.25	3,258.50	0.00E+00	2.11E-02	4.21E-02
Sn-126	1.1574E-05	1,629.25	3,258.50	0.00E+00	1.89E-02	3.77E-02
Sr-90	2.1680E+00	1,629.25	3,258.50	0.00E+00	3.53E+03	7.06E+03
Tc-99	4.2239E-04	1,629.25	3,258.50	0.00E+00	6.88E-01	1.38E+00
Th-229	3.9270E-12	1,629.25	3,258.50	0.00E+00	6.40E-09	1.28E-08
Th-230	3.3578E-06	1,629.25	3,258.50	0.00E+00	5.47E-05	1.09E-04
Th-232	1.5452E-14	1,629.25	3,258.50	0.00E+00	2.52E-11	5.04E-11
Tl-208	4.6705E-06	1,629.25	3,258.50	0.00E+00	7.61E-05	1.52E-04
U-232	1.3045E-07	1,629.25	3,258.50	0.00E+00	2.13E-04	4.25E-04
U-233	2.3739E-09	1,629.25	3,258.50	0.00E+00	3.87E-06	7.74E-06
U-234	1.8423E-04	1,629.25	3,258.50	0.00E+00	3.00E-01	6.00E-01
U-235	-2.7235E-06	1,629.25	0.00	1.59E-02	1.14E-02	1.59E-02
U-236	1.5493E-05	1,629.25	3,258.50	0.00E+00	2.52E-02	5.05E-02
U-238	-4.2851E-09	1,629.25	0.00	2.17E-04	2.10E-04	2.17E-04
Y-90	2.1686E+00	1,629.25	3,258.50	0.00E+00	3.53E+03	7.07E+03
Other Radionuclides					3.54E+03	7.09E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.887E+14
0.0250	8.107E+13
0.0375	7.079E+13
0.0575	7.548E+13
0.0850	4.572E+13
0.1250	3.135E+13
0.2250	3.939E+13
0.3750	1.726E+13
0.5750	2.801E+14
0.8500	8.853E+12
1.2500	3.361E+12
1.7500	1.408E+11
2.2500	1.762E+08
2.7500	1.069E+07
3.5000	6.729E+05
5.0000	1.557E+03
7.0000	1.724E+02
11.0000	1.936E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.41E+01	8.82E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	91.93720219	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,629.25
Bounding:		3,258.50

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:	0.85	
Bounding:	1.30	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GTRR
SNF ID #: 87
Fuel Units & Descr: 25 - ASSEMBLY
Heavy Metal Mass: BOL=5.05kg; EOL=4.47kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' 0.69

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3262E-10	534.24	1,068.48	0.00E+00	7.09E-08	1.42E-07	Avg. MeV	
Am-241	5.9611E-03	534.24	1,068.48	0.00E+00	3.18E+00	6.37E+00	0.0150	1.460E+14
Am-242m	1.4332E-06	534.24	1,068.48	0.00E+00	7.66E-04	1.53E-03	0.0250	3.044E+13
Am-243	3.7132E-05	534.24	1,068.48	0.00E+00	1.98E-02	3.97E-02	0.0375	2.754E+13
C-14	2.6501E-06	534.24	1,068.48	0.00E+00	1.42E-05	2.83E-05	0.0575	2.834E+13
Cl-36	4.4441E-31	534.24	1,068.48	0.00E+00	2.37E-28	4.75E-28	0.0850	1.756E+13
Cm-243	7.2722E-06	534.24	1,068.48	0.00E+00	3.89E-03	7.77E-03	0.1250	1.318E+13
Cm-244	6.8226E-03	534.24	1,068.48	0.00E+00	3.64E+00	7.29E+00	0.2250	1.482E+13
Co-60	1.8117E-04	534.24	1,068.48	0.00E+00	9.68E-02	1.94E-01	0.3750	6.547E+12
Cs-134	3.0595E-01	534.24	1,068.48	0.00E+00	1.63E+02	3.27E+02	0.5750	1.183E+14
Cs-135	4.2564E-06	534.24	1,068.48	0.00E+00	2.27E-03	4.55E-03	0.8500	1.387E+13
Cs-137	2.5650E+00	534.24	1,068.48	0.00E+00	1.37E+03	2.74E+03	1.2500	3.486E+12
Eu-154	1.1628E-01	534.24	1,068.48	0.00E+00	6.21E+01	1.24E+02	1.7500	1.004E+11
Eu-155	5.7776E-02	534.24	1,068.48	0.00E+00	3.09E+01	6.17E+01	2.2500	4.395E+09
Fe-55	1.9465E-02	534.24	1,068.48	0.00E+00	1.04E+01	2.08E+01	2.7500	6.568E+07
H-3	8.1045E-03	534.24	1,068.48	0.00E+00	4.33E+00	8.66E+00	3.5000	7.971E+06
I-129	6.6403E-07	534.24	1,068.48	0.00E+00	3.55E-04	7.10E-04	5.0000	4.624E+04
Kr-85	2.0620E-01	534.24	1,068.48	0.00E+00	1.10E+02	2.20E+02	7.0000	5.315E+03
Np-237	3.1513E-05	534.24	1,068.48	0.00E+00	1.68E-02	3.37E-02	11.0000	6.095E+02
Pa-231	6.0304E-10	534.24	1,068.48	0.00E+00	3.22E-07	6.44E-07		
Pb-210	2.7017E-12	534.24	1,068.48	0.00E+00	1.44E-09	2.89E-09		
Pm-147	3.4210E-01	534.24	1,068.48	0.00E+00	1.83E+02	3.66E+02		
Pu-238	1.6622E-01	534.24	1,068.48	0.00E+00	8.88E+01	1.78E+02		
Pu-239	6.9563E-04	534.24	1,068.48	0.00E+00	3.72E-01	7.43E-01		
Pu-240	3.7169E-04	534.24	1,068.48	0.00E+00	1.99E-01	3.97E-01		
Pu-241	2.1731E-01	534.24	1,068.48	0.00E+00	1.16E+02	2.32E+02		
Pu-242	3.0911E-06	534.24	1,068.48	0.00E+00	1.65E-03	3.30E-03		
Ra-226	1.9435E-11	534.24	1,068.48	0.00E+00	1.04E-08	2.08E-08		
Ra-228	6.1725E-15	534.24	1,068.48	0.00E+00	3.30E-12	6.60E-12		
Ru-106	7.0778E-03	534.24	1,068.48	0.00E+00	3.78E+00	7.56E+00		
Se-79	1.2339E-05	534.24	1,068.48	0.00E+00	6.59E-03	1.32E-02		
Sn-126	1.0194E-05	534.24	1,068.48	0.00E+00	5.45E-03	1.09E-02		
Sr-90	2.4186E+00	534.24	1,068.48	0.00E+00	1.29E+03	2.58E+03		
Tc-99	3.8056E-04	534.24	1,068.48	0.00E+00	2.03E-01	4.07E-01		
Th-229	2.0097E-12	534.24	1,068.48	0.00E+00	1.07E-09	2.15E-09		
Th-230	6.0577E-09	534.24	1,068.48	0.00E+00	3.24E-06	6.47E-06		
Th-232	1.2473E-14	534.24	1,068.48	0.00E+00	6.66E-12	1.33E-11		
Tl-208	4.8791E-08	534.24	1,068.48	0.00E+00	2.61E-05	5.21E-05		
U-232	1.3821E-07	534.24	1,068.48	0.00E+00	7.38E-05	1.48E-04		
U-233	2.3906E-09	534.24	1,068.48	0.00E+00	1.28E-06	2.55E-06		
U-234	4.7697E-05	534.24	1,068.48	0.00E+00	2.55E-02	5.10E-02		
U-235	-2.8661E-06	534.24	0.00	1.02E-02	8.63E-03	1.02E-02		
U-236	1.6701E-05	534.24	1,068.48	0.00E+00	8.92E-03	1.78E-02		
U-238	-9.4194E-09	534.24	0.00	1.18E-04	1.13E-04	1.18E-04		
Y-90	2.4192E+00	534.24	1,068.48	0.00E+00	1.29E+03	2.58E+03		
Other Radionuclides					1.34E+03	2.67E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.11E+01	4.22E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.06930693	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		534.24	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,068.48	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.24	
Bounding:	0.48	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: H. B. ROBINSON
SNF ID #: 99
Fuel Units & Descr: 1 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=0.547kg; EOL=0.52kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
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' = 0.04

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.3072E-06	25.85	51.70	0.00E+00	5.96E-05	1.19E-04
Am-241	8.4448E+00	25.85	51.70	0.00E+00	2.18E+02	4.37E+02
Am-242m	1.6848E-02	25.85	51.70	0.00E+00	4.36E-01	8.71E-01
Am-243	1.6320E-02	25.85	51.70	0.00E+00	4.22E-01	8.44E-01
C-14	1.2090E-01	25.85	51.70	0.00E+00	3.13E+00	6.25E+00
Cl-36	2.2849E-03	25.85	51.70	0.00E+00	5.91E-02	1.18E-01
Cm-243	8.6624E-04	25.85	51.70	0.00E+00	2.24E-02	4.48E-02
Cm-244	1.6848E-01	25.85	51.70	0.00E+00	4.36E+00	8.71E+00
Co-60	2.8086E+01	25.85	51.70	0.00E+00	7.26E+02	1.45E+03
Cs-134	3.4148E-04	25.85	51.70	0.00E+00	8.83E-03	1.77E-02
Cs-135	4.3976E-04	25.85	51.70	0.00E+00	1.14E-02	2.27E-02
Cs-137	2.1049E+01	25.85	51.70	0.00E+00	5.44E+02	1.09E+03
Eu-154	1.2500E+00	25.85	51.70	0.00E+00	3.23E+01	6.46E+01
Eu-155	6.8986E-02	25.85	51.70	0.00E+00	1.78E+00	3.57E+00
Fe-55	2.9308E-01	25.85	51.70	0.00E+00	7.58E+00	1.52E+01
H-3	2.4311E-01	25.85	51.70	0.00E+00	6.28E+00	1.26E+01
I-129	1.0618E-05	25.85	51.70	0.00E+00	2.74E-04	5.49E-04
Kr-85	5.9882E-01	25.85	51.70	0.00E+00	1.55E+01	3.10E+01
Np-237	1.5668E-04	25.85	51.70	0.00E+00	4.05E-03	8.10E-03
Pa-231	2.8656E-06	25.85	51.70	0.00E+00	7.41E-05	1.48E-04
Pb-210	2.3918E-06	25.85	51.70	0.00E+00	6.18E-07	1.24E-06
Pm-147	1.6900E-02	25.85	51.70	0.00E+00	4.37E-01	8.74E-01
Pu-238	-8.6120E-01	25.85	0.00	7.03E+01	4.81E+01	7.03E+01
Pu-239	-4.8440E-02	25.85	0.00	8.51E+00	7.26E+00	8.51E+00
Pu-240	-3.0095E-01	25.85	0.00	1.09E+01	3.08E+00	1.09E+01
Pu-241	-1.0411E+02	25.85	0.00	2.80E+03	1.06E+02	2.80E+03
Pu-242	-1.1381E-04	25.85	0.00	4.70E-02	4.41E-02	4.70E-02
Ra-226	6.4400E-06	25.85	51.70	0.00E+00	1.66E-06	3.33E-06
Ra-228	5.9952E-07	25.85	51.70	0.00E+00	1.55E-06	3.10E-06
Ru-106	8.5526E-07	25.85	51.70	0.00E+00	2.21E-05	4.42E-05
Se-79	1.9181E-04	25.85	51.70	0.00E+00	4.96E-03	9.92E-03
Sn-126	1.6671E-04	25.85	51.70	0.00E+00	4.31E-03	8.62E-03
Sr-90	1.9799E+01	25.85	51.70	0.00E+00	5.12E+02	1.02E+03
Tc-99	6.7678E-03	25.85	51.70	0.00E+00	1.75E-01	3.50E-01
Th-229	1.7488E-06	25.85	51.70	0.00E+00	4.52E-05	9.04E-05
Th-230	5.8704E-06	25.85	51.70	0.00E+00	1.52E-04	3.03E-04
Th-232	6.0208E-07	25.85	51.70	0.00E+00	1.56E-05	3.11E-05
Tl-208	8.7573E-05	25.85	51.70	0.00E+00	2.26E-03	4.53E-03
U-232	2.3706E-04	25.85	51.70	0.00E+00	6.13E-03	1.23E-02
U-233	3.6128E-04	25.85	51.70	0.00E+00	9.34E-03	1.87E-02
U-234	1.2788E-02	25.85	51.70	0.00E+00	3.31E-01	6.61E-01
U-235	5.7486E-04	25.85	51.70	2.35E-04	1.51E-02	3.00E-02
U-236	2.3485E-04	25.85	51.70	0.00E+00	6.07E-03	1.21E-02
U-238	1.1581E-04	25.85	51.70	2.93E-06	3.02E-03	6.02E-03
Y-90	1.9804E+01	25.85	51.70	0.00E+00	5.12E+02	1.02E+03
Other Radionuclides					1.59E+03	3.19E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.381E+13
0.0250	1.261E+13
0.0375	1.101E+13
0.0575	1.733E+13
0.0850	6.763E+12
0.1250	5.301E+12
0.2250	5.859E+12
0.3750	2.506E+12
0.5750	4.075E+13
0.8500	1.557E+12
1.2500	1.089E+14
1.7500	4.815E+10
2.2500	5.709E+08
2.7500	1.609E+08
3.5000	1.370E+05
5.0000	5.818E+04
7.0000	6.657E+03
11.0000	7.615E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.74E+01	5.40E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	(Worst Case)
Fuel Cladding:	ZIRC	SST/Inconel
BOL HM Constituents:	Pu and U	U, Th, & Pu
BOL Enrichment %:	2.897	0 to 100

Basis for Parameter Differences:
This fuel didn't closely match any existing templates, therefore the worst case template was used.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		25.85
Bounding:	16.42	51.70

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.41	
Bounding:	2.82	3.15

Estimated EOL HM/Given EOL HM: 31.57

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HFBR
SNF ID #: 706
Fuel Units & Descr: 1050 - 18 CURVED PLATES
Heavy Metal Mass: BOL=394.8kg; EOL=282.24kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1982
Estimates as of: 2010
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]Template Burnup(MWd): 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 25 years

Estimated Canister usage: 18"x10' 29.17

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	5.4520E-10	103,679.35	207,358.71	0.00E+00	5.65E-05	1.13E-04
Am-241	9.2284E-03	103,679.35	207,358.71	0.00E+00	9.57E+02	1.91E+03
Am-242m	1.3390E-06	103,679.35	207,358.71	0.00E+00	1.39E-01	2.78E-01
Am-243	3.7084E-05	103,679.35	207,358.71	0.00E+00	3.84E+00	7.69E+00
C-14	2.6452E-08	103,679.35	207,358.71	0.00E+00	2.74E-03	5.49E-03
Cl-36	4.4441E-31	103,679.35	207,358.71	0.00E+00	4.61E-26	9.22E-26
Cm-243	5.0498E-06	103,679.35	207,358.71	0.00E+00	5.24E-01	1.05E+00
Cm-244	3.8451E-03	103,679.35	207,358.71	0.00E+00	3.99E+02	7.97E+02
Co-60	2.5225E-05	103,679.35	207,358.71	0.00E+00	2.62E+00	5.23E+00
Cs-134	1.9830E-03	103,679.35	207,358.71	0.00E+00	2.06E+02	4.11E+02
Cs-135	4.2564E-06	103,679.35	207,358.71	0.00E+00	4.41E-01	8.83E-01
Cs-137	1.8141E+00	103,679.35	207,358.71	0.00E+00	1.88E+05	3.76E+05
Eu-154	3.4733E-02	103,679.35	207,358.71	0.00E+00	3.60E+03	7.20E+03
Eu-155	7.1061E-03	103,679.35	207,358.71	0.00E+00	7.37E+02	1.47E+03
Fe-55	3.5790E-04	103,679.35	207,358.71	0.00E+00	3.71E+01	7.42E+01
H-3	3.4945E-03	103,679.35	207,358.71	0.00E+00	3.62E+02	7.25E+02
I-129	6.6403E-07	103,679.35	207,358.71	0.00E+00	6.88E-02	1.38E-01
Kr-85	7.8250E-02	103,679.35	207,358.71	0.00E+00	8.11E+03	1.62E+04
Np-237	3.1567E-05	103,679.35	207,358.71	0.00E+00	3.27E+00	6.55E+00
Pa-231	1.3372E-09	103,679.35	207,358.71	0.00E+00	1.39E-04	2.77E-04
Pb-210	3.0644E-11	103,679.35	207,358.71	0.00E+00	3.18E-06	6.35E-06
Pm-147	6.5188E-03	103,679.35	207,358.71	0.00E+00	6.76E+02	1.35E+03
Pu-238	1.4769E-01	103,679.35	207,358.71	0.00E+00	1.53E+04	3.06E+04
Pu-239	6.9502E-04	103,679.35	207,358.71	0.00E+00	7.21E+01	1.44E+02
Pu-240	3.7928E-04	103,679.35	207,358.71	0.00E+00	3.93E+01	7.86E+01
Pu-241	1.0565E-01	103,679.35	207,358.71	0.00E+00	1.10E+04	2.19E+04
Pu-242	3.0911E-06	103,679.35	207,358.71	0.00E+00	3.20E-01	6.41E-01
Ra-226	1.1081E-10	103,679.35	207,358.71	0.00E+00	1.15E-05	2.30E-05
Ra-228	2.1185E-14	103,679.35	207,358.71	0.00E+00	2.20E-09	4.39E-09
Ru-106	2.3621E-07	103,679.35	207,358.71	0.00E+00	2.45E-02	4.90E-02
Se-79	1.2339E-05	103,679.35	207,358.71	0.00E+00	1.28E+00	2.56E+00
Sn-126	1.0194E-05	103,679.35	207,358.71	0.00E+00	1.06E+00	2.11E+00
Sr-90	1.6932E+00	103,679.35	207,358.71	0.00E+00	1.76E+05	3.51E+05
Tc-99	3.8056E-04	103,679.35	207,358.71	0.00E+00	3.95E+01	7.89E+01
Th-229	9.1252E-12	103,679.35	207,358.71	0.00E+00	9.46E-07	1.89E-06
Th-230	1.5407E-06	103,679.35	207,358.71	0.00E+00	1.60E-03	3.19E-03
Th-232	2.8937E-14	103,679.35	207,358.71	0.00E+00	3.00E-09	6.00E-09
Tl-208	4.7272E-06	103,679.35	207,358.71	0.00E+00	4.90E-03	9.80E-03
U-232	1.2855E-07	103,679.35	207,358.71	0.00E+00	1.33E-02	2.67E-02
U-233	5.1470E-09	103,679.35	207,358.71	0.00E+00	5.34E-04	1.07E-03
U-234	5.6069E-05	103,679.35	207,358.71	0.00E+00	5.81E+00	1.16E+01
U-235	-2.8661E-06	103,679.35	0.00	7.94E-01	4.97E-01	7.94E-01
U-236	1.6701E-05	103,679.35	207,358.71	0.00E+00	1.73E+00	3.46E+00
U-238	-9.4194E-09	103,679.35	0.00	9.18E-03	8.20E-03	9.18E-03
Y-90	1.6932E+00	103,679.35	207,358.71	0.00E+00	1.76E+05	3.51E+05
Other Radionuclides					1.80E+05	3.60E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.944E+16
0.0250	4.001E+15
0.0375	3.533E+15
0.0575	3.768E+15
0.0850	2.268E+15
0.1250	1.574E+15
0.2250	1.958E+15
0.3750	8.475E+14
0.5750	1.405E+16
0.8500	2.768E+14
1.2500	1.868E+14
1.7500	7.731E+12
2.2500	4.167E+06
2.7500	3.582E+08
3.5000	1.230E+07
5.0000	5.213E+06
7.0000	5.960E+05
11.0000	6.850E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.89E+03	5.38E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.08510638	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		103,679.35
Bounding:		207,358.71

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.60	
Bounding:	1.20	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HFIR (INNER)
SNF ID #: 103
Fuel Units & Descr: 442 - 171 CURVED PLATES
Heavy Metal Mass: BOL=1234.506kg; EOL=823.667kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1986
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' = 147.33

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	6.6313E-10	389,072.50	778,145.01	0.00E+00	2.58E-04	5.16E-04
Am-241	2.0060E-03	389,072.50	778,145.01	0.00E+00	7.80E+02	1.56E+03
Am-242m	4.2429E-07	389,072.50	778,145.01	0.00E+00	1.65E-01	3.30E-01
Am-243	1.4899E-06	389,072.50	778,145.01	0.00E+00	5.80E-01	1.16E+00
C-14	5.7135E-09	389,072.50	778,145.01	0.00E+00	2.22E-03	4.45E-03
Cl-36	1.3124E-32	389,072.50	778,145.01	0.00E+00	5.11E-27	1.02E-26
Cm-243	1.6443E-07	389,072.50	778,145.01	0.00E+00	6.40E-02	1.28E-01
Cm-244	2.9330E-05	389,072.50	778,145.01	0.00E+00	1.14E+01	2.28E+01
Co-60	5.3186E-06	389,072.50	778,145.01	0.00E+00	2.07E+00	4.14E+00
Cs-134	3.1563E-03	389,072.50	778,145.01	0.00E+00	1.23E+03	2.46E+03
Cs-135	3.4477E-06	389,072.50	778,145.01	0.00E+00	1.34E+00	2.68E+00
Cs-137	2.0313E+00	389,072.50	778,145.01	0.00E+00	7.90E+05	1.58E+06
Eu-154	2.4513E-02	389,072.50	778,145.01	0.00E+00	9.54E+03	1.91E+04
Eu-155	4.8175E-03	389,072.50	778,145.01	0.00E+00	1.87E+03	3.75E+03
Fe-55	1.2397E-04	389,072.50	778,145.01	0.00E+00	4.82E+01	9.65E+01
H-3	4.5697E-03	389,072.50	778,145.01	0.00E+00	1.78E+03	3.56E+03
I-129	7.5300E-07	389,072.50	778,145.01	0.00E+00	2.93E-01	5.86E-01
Kr-85	1.0850E-01	389,072.50	778,145.01	0.00E+00	4.22E+04	8.44E+04
Np-237	9.5561E-06	389,072.50	778,145.01	0.00E+00	3.72E+00	7.44E+00
Pa-231	2.0359E-09	389,072.50	778,145.01	0.00E+00	7.92E-04	1.58E-03
Pb-210	4.9728E-11	389,072.50	778,145.01	0.00E+00	1.93E-05	3.87E-05
Pm-147	4.8502E-02	389,072.50	778,145.01	0.00E+00	1.89E+04	3.77E+04
Pu-238	1.8254E-02	389,072.50	778,145.01	0.00E+00	7.10E+03	1.42E+04
Pu-239	4.2810E-04	389,072.50	778,145.01	0.00E+00	1.67E+02	3.33E+02
Pu-240	2.4368E-04	389,072.50	778,145.01	0.00E+00	9.48E+01	1.90E+02
Pu-241	3.3415E-02	389,072.50	778,145.01	0.00E+00	1.30E+04	2.60E+04
Pu-242	3.6329E-07	389,072.50	778,145.01	0.00E+00	1.41E-01	2.83E-01
Ra-226	2.2854E-10	389,072.50	778,145.01	0.00E+00	8.89E-05	1.78E-04
Ra-228	1.2426E-14	389,072.50	778,145.01	0.00E+00	4.83E-09	9.67E-09
Ru-106	6.3589E-06	389,072.50	778,145.01	0.00E+00	2.47E+00	4.95E+00
Se-79	1.2933E-05	389,072.50	778,145.01	0.00E+00	5.03E+00	1.01E+01
Sn-126	1.1574E-05	389,072.50	778,145.01	0.00E+00	4.50E+00	9.01E+00
Sr-90	1.9248E+00	389,072.50	778,145.01	0.00E+00	7.49E+05	1.50E+06
Tc-99	4.2239E-04	389,072.50	778,145.01	0.00E+00	1.64E+02	3.29E+02
Th-229	5.0953E-12	389,072.50	778,145.01	0.00E+00	1.98E-06	3.96E-06
Th-230	4.1885E-08	389,072.50	778,145.01	0.00E+00	1.63E-02	3.26E-02
Th-232	1.9270E-14	389,072.50	778,145.01	0.00E+00	7.50E-09	1.50E-08
Tl-208	4.6024E-08	389,072.50	778,145.01	0.00E+00	1.79E-02	3.58E-02
U-232	1.2582E-07	389,072.50	778,145.01	0.00E+00	4.90E-02	9.79E-02
U-233	2.5825E-09	389,072.50	778,145.01	0.00E+00	1.00E-03	2.01E-03
U-234	1.8450E-04	389,072.50	778,145.01	0.00E+00	7.18E+01	1.44E+02
U-235	-2.7235E-06	389,072.50	0.00	2.48E+00	1.42E+00	2.48E+00
U-236	1.5493E-05	389,072.50	778,145.01	0.00E+00	6.03E+00	1.21E+01
U-238	-4.2851E-09	389,072.50	0.00	2.92E-02	2.76E-02	2.92E-02
Y-90	1.9254E+00	389,072.50	778,145.01	0.00E+00	7.49E+05	1.50E+06
Other Radionuclides					7.52E+05	1.50E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.214E+16
0.0250	1.708E+16
0.0375	1.490E+16
0.0575	1.596E+16
0.0850	9.643E+15
0.1250	6.525E+15
0.2250	8.320E+15
0.3750	3.622E+15
0.5750	5.908E+16
0.8500	9.988E+14
1.2500	5.703E+14
1.7500	2.618E+13
2.2500	2.296E+09
2.7500	1.298E+09
3.5000	5.963E+06
5.0000	3.372E+05
7.0000	3.722E+04
11.0000	4.172E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.28E+03	1.86E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.954	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	283,936.38	389,072.50	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		778,145.01	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.00	1.37
Bounding:	2.00	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HFIR (INNER)
SNF ID #: 1083
Fuel Units & Descr: 54 - 171 CURVED PLATES
Heavy Metal Mass: BOL=148.446kg; EOL=115.285kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1986
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage:
18"x10'
18.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	34,142.58	68,285.16	0.00E+00	2.26E-05	4.53E-05
Am-241	2.0060E-03	34,142.58	68,285.16	0.00E+00	6.85E+01	1.37E+02
Am-242m	4.2429E-07	34,142.58	68,285.16	0.00E+00	1.45E-02	2.90E-02
Am-243	1.4899E-06	34,142.58	68,285.16	0.00E+00	5.09E-02	1.02E-01
C-14	5.7135E-09	34,142.58	68,285.16	0.00E+00	1.95E-04	3.90E-04
Cl-36	1.3124E-32	34,142.58	68,285.16	0.00E+00	4.48E-28	8.96E-28
Cm-243	1.6443E-07	34,142.58	68,285.16	0.00E+00	5.61E-03	1.12E-02
Cm-244	2.9330E-05	34,142.58	68,285.16	0.00E+00	1.00E+00	2.00E+00
Co-60	5.3186E-06	34,142.58	68,285.16	0.00E+00	1.82E-01	3.63E-01
Cs-134	3.1563E-03	34,142.58	68,285.16	0.00E+00	1.08E+02	2.16E+02
Cs-135	3.4477E-06	34,142.58	68,285.16	0.00E+00	1.18E-01	2.35E-01
Cs-137	2.0313E+00	34,142.58	68,285.16	0.00E+00	6.94E+04	1.39E+05
Eu-154	2.4513E-02	34,142.58	68,285.16	0.00E+00	8.37E+02	1.67E+03
Eu-155	4.8175E-03	34,142.58	68,285.16	0.00E+00	1.64E+02	3.29E+02
Fe-55	1.2397E-04	34,142.58	68,285.16	0.00E+00	4.23E+00	8.46E+00
H-3	4.5697E-03	34,142.58	68,285.16	0.00E+00	1.56E+02	3.12E+02
I-129	7.5300E-07	34,142.58	68,285.16	0.00E+00	2.57E-02	5.14E-02
Kr-85	1.0850E-01	34,142.58	68,285.16	0.00E+00	3.70E+03	7.41E+03
Np-237	9.5561E-06	34,142.58	68,285.16	0.00E+00	3.26E-01	6.53E-01
Pa-231	2.0359E-09	34,142.58	68,285.16	0.00E+00	6.95E-05	1.39E-04
Pb-210	4.9728E-11	34,142.58	68,285.16	0.00E+00	1.70E-06	3.40E-06
Pm-147	4.8502E-02	34,142.58	68,285.16	0.00E+00	1.66E+03	3.31E+03
Pu-238	1.8254E-02	34,142.58	68,285.16	0.00E+00	6.23E+02	1.25E+03
Pu-239	4.2810E-04	34,142.58	68,285.16	0.00E+00	1.46E+01	2.92E+01
Pu-240	2.4368E-04	34,142.58	68,285.16	0.00E+00	8.32E+00	1.66E+01
Pu-241	3.3415E-02	34,142.58	68,285.16	0.00E+00	1.14E+03	2.28E+03
Pu-242	3.6329E-07	34,142.58	68,285.16	0.00E+00	1.24E-02	2.48E-02
Ra-226	2.2854E-10	34,142.58	68,285.16	0.00E+00	7.80E-06	1.56E-05
Ra-228	1.2426E-14	34,142.58	68,285.16	0.00E+00	4.24E-10	8.49E-10
Ru-106	6.3589E-06	34,142.58	68,285.16	0.00E+00	2.17E-01	4.34E-01
Se-79	1.2933E-05	34,142.58	68,285.16	0.00E+00	4.42E-01	8.83E-01
Sn-126	1.1574E-05	34,142.58	68,285.16	0.00E+00	3.95E-01	7.90E-01
Sr-90	1.9248E+00	34,142.58	68,285.16	0.00E+00	6.57E+04	1.31E+05
Tc-99	4.2239E-04	34,142.58	68,285.16	0.00E+00	1.44E+01	2.88E+01
Th-229	5.0953E-12	34,142.58	68,285.16	0.00E+00	1.74E-07	3.48E-07
Th-230	4.1885E-08	34,142.58	68,285.16	0.00E+00	1.43E-03	2.86E-03
Th-232	1.9270E-14	34,142.58	68,285.16	0.00E+00	6.58E-10	1.32E-09
Tl-208	4.6024E-08	34,142.58	68,285.16	0.00E+00	1.57E-03	3.14E-03
U-232	1.2582E-07	34,142.58	68,285.16	0.00E+00	4.30E-03	8.59E-03
U-233	2.5825E-09	34,142.58	68,285.16	0.00E+00	8.82E-05	1.76E-04
U-234	1.8450E-04	34,142.58	68,285.16	0.00E+00	6.30E+00	1.26E+01
U-235	-2.7235E-06	34,142.58	0.00	2.99E-01	2.06E-01	2.99E-01
U-236	1.5493E-05	34,142.58	68,285.16	0.00E+00	5.29E-01	1.06E+00
U-238	-4.2851E-09	34,142.58	0.00	3.42E-03	3.28E-03	3.42E-03
Y-90	1.9254E+00	34,142.58	68,285.16	0.00E+00	6.57E+04	1.31E+05
Other Radionuclides					6.60E+04	1.32E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.208E+15
0.0250	1.499E+15
0.0375	1.307E+15
0.0575	1.400E+15
0.0850	8.462E+14
0.1250	5.726E+14
0.2250	7.301E+14
0.3750	3.178E+14
0.5750	5.184E+15
0.8500	8.765E+13
1.2500	5.005E+13
1.7500	2.297E+12
2.2500	2.015E+08
2.7500	1.139E+08
3.5000	5.233E+05
5.0000	2.959E+04
7.0000	3.267E+03
11.0000	3.661E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.14E+02	1.63E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.141	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	34,142.58	31,404.49
Bounding:		68,285.16

Basis for burnup used in estimate:
Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.73	0.92
Bounding:	1.46	

Estimated EOL HM/Given EOL HM: 0.99

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HFIR (OUTER)
SNF ID #: 707
Fuel Units & Descr: 54 - 369 CURVED PLATES
Heavy Metal Mass: BOL=388.687kg; EOL=322.364kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1986
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 24"x10' 18.00

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	89,397.92	178,795.84	0.00E+00	5.93E-05	1.19E-04
Am-241	2.0060E-03	89,397.92	178,795.84	0.00E+00	1.79E+02	3.59E+02
Am-242m	4.2429E-07	89,397.92	178,795.84	0.00E+00	3.79E-02	7.59E-02
Am-243	1.4899E-06	89,397.92	178,795.84	0.00E+00	1.33E-01	2.66E-01
C-14	5.7135E-09	89,397.92	178,795.84	0.00E+00	5.11E-04	1.02E-03
Cl-36	1.3124E-32	89,397.92	178,795.84	0.00E+00	1.17E-27	2.35E-27
Cm-243	1.6443E-07	89,397.92	178,795.84	0.00E+00	1.47E-02	2.94E-02
Cm-244	2.9330E-05	89,397.92	178,795.84	0.00E+00	2.62E+00	5.24E+00
Co-60	5.3186E-06	89,397.92	178,795.84	0.00E+00	4.75E-01	9.51E-01
Cs-134	3.1563E-03	89,397.92	178,795.84	0.00E+00	2.82E+02	5.64E+02
Cs-135	3.4477E-06	89,397.92	178,795.84	0.00E+00	3.08E-01	6.16E-01
Cs-137	2.0313E+00	89,397.92	178,795.84	0.00E+00	1.82E+05	3.63E+05
Eu-154	2.4513E-02	89,397.92	178,795.84	0.00E+00	2.19E+03	4.38E+03
Eu-155	4.8175E-03	89,397.92	178,795.84	0.00E+00	4.31E+02	8.61E+02
Fe-55	1.2397E-04	89,397.92	178,795.84	0.00E+00	1.11E+01	2.22E+01
H-3	4.5697E-03	89,397.92	178,795.84	0.00E+00	4.09E+02	8.17E+02
I-129	7.5300E-07	89,397.92	178,795.84	0.00E+00	6.73E-02	1.35E-01
Kr-85	1.0850E-01	89,397.92	178,795.84	0.00E+00	9.70E+03	1.94E+04
Np-237	9.5561E-06	89,397.92	178,795.84	0.00E+00	8.54E-01	1.71E+00
Pa-231	2.0359E-09	89,397.92	178,795.84	0.00E+00	1.82E-04	3.64E-04
Pb-210	4.9728E-11	89,397.92	178,795.84	0.00E+00	4.45E-06	8.89E-06
Pm-147	4.8502E-02	89,397.92	178,795.84	0.00E+00	4.34E+03	8.67E+03
Pu-238	1.8254E-02	89,397.92	178,795.84	0.00E+00	1.63E+03	3.26E+03
Pu-239	4.2810E-04	89,397.92	178,795.84	0.00E+00	3.83E+01	7.65E+01
Pu-240	2.4368E-04	89,397.92	178,795.84	0.00E+00	2.18E+01	4.36E+01
Pu-241	3.3415E-02	89,397.92	178,795.84	0.00E+00	2.99E+03	5.97E+03
Pu-242	3.6329E-07	89,397.92	178,795.84	0.00E+00	3.25E-02	6.50E-02
Ra-226	2.2854E-10	89,397.92	178,795.84	0.00E+00	2.04E-05	4.09E-05
Ra-228	1.2426E-14	89,397.92	178,795.84	0.00E+00	1.11E-09	2.22E-09
Ru-106	6.3589E-06	89,397.92	178,795.84	0.00E+00	5.68E-01	1.14E+00
Se-79	1.2933E-05	89,397.92	178,795.84	0.00E+00	1.16E+00	2.31E+00
Sn-126	1.1574E-05	89,397.92	178,795.84	0.00E+00	1.03E+00	2.07E+00
Sr-90	1.9248E+00	89,397.92	178,795.84	0.00E+00	1.72E+05	3.44E+05
Tc-99	4.2239E-04	89,397.92	178,795.84	0.00E+00	3.78E+01	7.55E+01
Th-229	5.0953E-12	89,397.92	178,795.84	0.00E+00	4.56E-07	9.11E-07
Th-230	4.1885E-08	89,397.92	178,795.84	0.00E+00	3.74E-03	7.49E-03
Th-232	1.9270E-14	89,397.92	178,795.84	0.00E+00	1.72E-09	3.45E-09
Tl-208	4.6024E-06	89,397.92	178,795.84	0.00E+00	4.11E-03	8.23E-03
U-232	1.2582E-07	89,397.92	178,795.84	0.00E+00	1.12E-02	2.25E-02
U-233	2.5825E-09	89,397.92	178,795.84	0.00E+00	2.31E-04	4.62E-04
U-234	1.8450E-04	89,397.92	178,795.84	0.00E+00	1.65E+01	3.30E+01
U-235	-2.7235E-06	89,397.92	0.00	7.82E-01	5.39E-01	7.82E-01
U-236	1.5493E-05	89,397.92	178,795.84	0.00E+00	1.39E+00	2.77E+00
U-238	-4.2851E-09	89,397.92	0.00	8.96E-03	8.58E-03	8.96E-03
Y-90	1.9254E+00	89,397.92	178,795.84	0.00E+00	1.72E+05	3.44E+05
Other Radionuclides					1.73E+05	3.46E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.887E+16
0.0250	3.925E+15
0.0375	3.423E+15
0.0575	3.666E+15
0.0850	2.216E+15
0.1250	1.499E+15
0.2250	1.912E+15
0.3750	8.322E+14
0.5750	1.357E+16
0.8500	2.295E+14
1.2500	1.310E+14
1.7500	6.015E+12
2.2500	5.276E+08
2.7500	2.983E+08
3.5000	1.370E+08
5.0000	7.748E+04
7.0000	8.553E+03
11.0000	9.586E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.13E+03	4.26E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.141	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	89,397.92	62,808.98	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:		178,795.84	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.73	0.70
Bounding:	1.46	

Estimated EOL HM/Given EOL HM: 0.93

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HFIR (OUTER)
SNF ID #: 1084
Fuel Units & Descr: 442 - 369 CURVED PLATES
Heavy Metal Mass: BOL=3232.39kg; EOL=2303.174kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1986
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 24"x10' 147.33

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	6.6313E-10	879,986.15	1,759,972.29	0.00E+00	5.84E-04	1.17E-03
Am-241	2.0060E-03	879,986.15	1,759,972.29	0.00E+00	1.77E+03	3.53E+03
Am-242m	4.2429E-07	879,986.15	1,759,972.29	0.00E+00	3.73E-01	7.47E-01
Am-243	1.4899E-06	879,986.15	1,759,972.29	0.00E+00	1.31E+00	2.62E+00
C-14	5.7135E-09	879,986.15	1,759,972.29	0.00E+00	5.03E-03	1.01E-02
Cl-36	1.3124E-32	879,986.15	1,759,972.29	0.00E+00	1.15E-26	2.31E-26
Cm-243	1.6443E-07	879,986.15	1,759,972.29	0.00E+00	1.45E-01	2.89E-01
Cm-244	2.9330E-05	879,986.15	1,759,972.29	0.00E+00	2.58E+01	5.16E+01
Co-60	5.3186E-06	879,986.15	1,759,972.29	0.00E+00	4.68E+00	9.36E+00
Cs-134	3.1563E-03	879,986.15	1,759,972.29	0.00E+00	2.78E+03	5.56E+03
Cs-135	3.4477E-06	879,986.15	1,759,972.29	0.00E+00	3.03E+00	6.07E+00
Cs-137	2.0313E+00	879,986.15	1,759,972.29	0.00E+00	1.79E+06	3.58E+06
Eu-154	2.4513E-02	879,986.15	1,759,972.29	0.00E+00	2.16E+04	4.31E+04
Eu-155	4.8175E-03	879,986.15	1,759,972.29	0.00E+00	4.24E+03	8.48E+03
Fe-55	1.2397E-04	879,986.15	1,759,972.29	0.00E+00	1.09E+02	2.18E+02
H-3	4.5697E-03	879,986.15	1,759,972.29	0.00E+00	4.02E+03	8.04E+03
I-129	7.5300E-07	879,986.15	1,759,972.29	0.00E+00	6.63E-01	1.33E+00
Kr-85	1.0850E-01	879,986.15	1,759,972.29	0.00E+00	9.55E+04	1.91E+05
Np-237	9.5561E-06	879,986.15	1,759,972.29	0.00E+00	8.41E+00	1.68E+01
Pa-231	2.0359E-09	879,986.15	1,759,972.29	0.00E+00	1.79E-03	3.58E-03
Pb-210	4.9728E-11	879,986.15	1,759,972.29	0.00E+00	4.38E-05	8.75E-05
Pm-147	4.8502E-02	879,986.15	1,759,972.29	0.00E+00	4.27E+04	8.54E+04
Pu-238	1.8254E-02	879,986.15	1,759,972.29	0.00E+00	1.61E+04	3.21E+04
Pu-239	4.2810E-04	879,986.15	1,759,972.29	0.00E+00	3.77E+02	7.53E+02
Pu-240	2.4368E-04	879,986.15	1,759,972.29	0.00E+00	2.14E+02	4.29E+02
Pu-241	3.3415E-02	879,986.15	1,759,972.29	0.00E+00	2.94E+04	5.88E+04
Pu-242	3.6329E-07	879,986.15	1,759,972.29	0.00E+00	3.20E-01	6.39E-01
Ra-226	2.2854E-10	879,986.15	1,759,972.29	0.00E+00	2.01E-04	4.02E-04
Ra-228	1.2426E-14	879,986.15	1,759,972.29	0.00E+00	1.09E-08	2.19E-08
Ru-106	6.3589E-06	879,986.15	1,759,972.29	0.00E+00	5.60E+00	1.12E+01
Se-79	1.2933E-05	879,986.15	1,759,972.29	0.00E+00	1.14E+01	2.28E+01
Sn-126	1.1574E-05	879,986.15	1,759,972.29	0.00E+00	1.02E+01	2.04E+01
Sr-90	1.9248E+00	879,986.15	1,759,972.29	0.00E+00	1.69E+06	3.39E+06
Tc-99	4.2239E-04	879,986.15	1,759,972.29	0.00E+00	3.72E+02	7.43E+02
Th-229	5.0953E-12	879,986.15	1,759,972.29	0.00E+00	4.48E-06	8.97E-06
Th-230	4.1885E-06	879,986.15	1,759,972.29	0.00E+00	3.69E-02	7.37E-02
Th-232	1.9270E-14	879,986.15	1,759,972.29	0.00E+00	1.70E-08	3.39E-08
Tl-208	4.6024E-08	879,986.15	1,759,972.29	0.00E+00	4.05E-02	8.10E-02
U-232	1.2582E-07	879,986.15	1,759,972.29	0.00E+00	1.11E-01	2.21E-01
U-233	2.5825E-09	879,986.15	1,759,972.29	0.00E+00	2.27E-03	4.55E-03
U-234	1.8450E-04	879,986.15	1,759,972.29	0.00E+00	1.62E+02	3.25E+02
U-235	-2.7235E-06	879,986.15	0.00	6.49E+00	4.10E+00	6.49E+00
U-236	1.5493E-05	879,986.15	1,759,972.29	0.00E+00	1.36E+01	2.73E+01
U-238	-4.2851E-09	879,986.15	0.00	7.65E-02	7.28E-02	7.65E-02
Y-90	1.9254E+00	879,986.15	1,759,972.29	0.00E+00	1.69E+06	3.39E+06
Other Radionuclides					1.70E+06	3.40E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.858E+17
0.0250	3.863E+16
0.0375	3.370E+16
0.0575	3.609E+16
0.0850	2.181E+16
0.1250	1.476E+16
0.2250	1.882E+16
0.3750	8.192E+15
0.5750	1.336E+17
0.8500	2.259E+15
1.2500	1.290E+15
1.7500	5.921E+13
2.2500	5.193E+09
2.7500	2.936E+09
3.5000	1.349E+07
5.0000	7.826E+05
7.0000	8.419E+04
11.0000	9.435E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.10E+04	4.20E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.954	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	743,449.75	879,986.15	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,759,972.29	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.87	1.18	1.02
Bounding:	1.73		

[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: HIFAR (UALX-HEU) AUSTRALIA
SNF ID #: 680
Fuel Units & Descr: 240 - 12 CURVED PLATES
Heavy Metal Mass: BOL=45.192kg; EOL=33.624kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' = 6.67

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.3262E-10	10,655.32	21,310.64	0.00E+00	1.41E-06	2.83E-06
Am-241	5.9611E-03	10,655.32	21,310.64	0.00E+00	6.35E+01	1.27E+02
Am-242m	1.4332E-06	10,655.32	21,310.64	0.00E+00	1.53E-02	3.05E-02
Am-243	3.7132E-05	10,655.32	21,310.64	0.00E+00	3.96E-01	7.91E-01
C-14	2.6501E-06	10,655.32	21,310.64	0.00E+00	2.82E-04	5.65E-04
Cl-36	4.4441E-31	10,655.32	21,310.64	0.00E+00	4.74E-27	9.47E-27
Cm-243	7.2722E-06	10,655.32	21,310.64	0.00E+00	7.75E-02	1.55E-01
Cm-244	6.8226E-03	10,655.32	21,310.64	0.00E+00	7.27E+01	1.45E+02
Co-60	1.8117E-04	10,655.32	21,310.64	0.00E+00	1.93E+00	3.86E+00
Cs-134	3.0595E-01	10,655.32	21,310.64	0.00E+00	3.26E+03	6.52E+03
Cs-135	4.2564E-06	10,655.32	21,310.64	0.00E+00	4.54E-02	9.07E-02
Cs-137	2.5650E+00	10,655.32	21,310.64	0.00E+00	2.73E+04	5.47E+04
Eu-154	1.1628E-01	10,655.32	21,310.64	0.00E+00	1.24E+03	2.48E+03
Eu-155	5.7776E-02	10,655.32	21,310.64	0.00E+00	6.16E+02	1.23E+03
Fe-55	1.9465E-02	10,655.32	21,310.64	0.00E+00	2.07E+02	4.15E+02
H-3	8.1045E-03	10,655.32	21,310.64	0.00E+00	8.64E+01	1.73E+02
I-129	6.6403E-07	10,655.32	21,310.64	0.00E+00	7.08E-03	1.42E-02
Kr-85	2.0620E-01	10,655.32	21,310.64	0.00E+00	2.20E+03	4.39E+03
Np-237	3.1513E-05	10,655.32	21,310.64	0.00E+00	3.36E-01	6.72E-01
Pa-231	6.0304E-10	10,655.32	21,310.64	0.00E+00	6.43E-06	1.29E-05
Pb-210	2.7017E-12	10,655.32	21,310.64	0.00E+00	2.88E-08	5.76E-08
Pm-147	3.4210E-01	10,655.32	21,310.64	0.00E+00	3.65E+03	7.29E+03
Pu-238	1.6622E-01	10,655.32	21,310.64	0.00E+00	1.77E+03	3.54E+03
Pu-239	6.9563E-04	10,655.32	21,310.64	0.00E+00	7.41E+00	1.48E+01
Pu-240	3.7169E-04	10,655.32	21,310.64	0.00E+00	3.96E+00	7.92E+00
Pu-241	2.1731E-01	10,655.32	21,310.64	0.00E+00	2.32E+03	4.63E+03
Pu-242	3.0911E-06	10,655.32	21,310.64	0.00E+00	3.29E-02	6.59E-02
Ra-226	1.9435E-11	10,655.32	21,310.64	0.00E+00	2.07E-07	4.14E-07
Ra-228	6.1725E-15	10,655.32	21,310.64	0.00E+00	6.58E-11	1.32E-10
Ru-106	7.0778E-03	10,655.32	21,310.64	0.00E+00	7.54E+01	1.51E+02
Se-79	1.2339E-05	10,655.32	21,310.64	0.00E+00	1.31E-01	2.63E-01
Sn-126	1.0194E-05	10,655.32	21,310.64	0.00E+00	1.09E-01	2.17E-01
Sr-90	2.4186E+00	10,655.32	21,310.64	0.00E+00	2.58E+04	5.15E+04
Tc-99	3.8056E-04	10,655.32	21,310.64	0.00E+00	4.05E+00	8.11E+00
Th-229	2.0097E-12	10,655.32	21,310.64	0.00E+00	2.14E-08	4.28E-08
Th-230	6.0577E-09	10,655.32	21,310.64	0.00E+00	6.45E-05	1.29E-04
Th-232	1.2473E-14	10,655.32	21,310.64	0.00E+00	1.33E-10	2.66E-10
Tl-208	4.8791E-08	10,655.32	21,310.64	0.00E+00	5.20E-04	1.04E-03
U-232	1.3821E-07	10,655.32	21,310.64	0.00E+00	1.47E-03	2.95E-03
U-233	2.3906E-09	10,655.32	21,310.64	0.00E+00	2.55E-05	5.09E-05
U-234	4.7697E-05	10,655.32	21,310.64	0.00E+00	5.08E-01	1.02E+00
U-235	-2.8661E-06	10,655.32	0.00	7.80E-02	4.74E-02	7.80E-02
U-236	1.6701E-05	10,655.32	21,310.64	0.00E+00	1.78E-01	3.56E-01
U-238	-9.4194E-09	10,655.32	0.00	3.06E-03	2.96E-03	3.06E-03
Y-90	2.4192E+00	10,655.32	21,310.64	0.00E+00	2.58E+04	5.16E+04
Other Radionuclides					2.67E+04	5.33E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.913E+15
0.0250	6.071E+14
0.0375	5.493E+14
0.0575	5.652E+14
0.0850	3.502E+14
0.1250	2.629E+14
0.2250	2.956E+14
0.3750	1.306E+14
0.5750	2.359E+15
0.8500	2.767E+14
1.2500	6.953E+13
1.7500	2.003E+12
2.2500	8.766E+10
2.7500	1.310E+09
3.5000	1.590E+08
5.0000	9.223E+06
7.0000	1.060E+05
11.0000	1.216E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.20E+02	8.41E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	79.82555821	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		10,655.32
Bounding:		21,310.64

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.54	
Bounding:	1.08	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HOR (NETHERLANDS)
SNF ID #: 713
Fuel Units & Descr: 33 - ASSEMBLY
Heavy Metal Mass: BOL=6.55kg; EOL=4.01kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1988
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' = 1.38

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	2,406.38	4,812.75	0.00E+00	1.60E-06	3.19E-06
Am-241	2.0060E-03	2,406.38	4,812.75	0.00E+00	4.83E+00	9.65E+00
Am-242m	4.2429E-07	2,406.38	4,812.75	0.00E+00	1.02E-03	2.04E-03
Am-243	1.4899E-06	2,406.38	4,812.75	0.00E+00	3.59E-03	7.17E-03
C-14	5.7135E-09	2,406.38	4,812.75	0.00E+00	1.37E-05	2.75E-05
Cl-36	1.3124E-32	2,406.38	4,812.75	0.00E+00	3.16E-29	6.32E-29
Cm-243	1.6443E-07	2,406.38	4,812.75	0.00E+00	3.96E-04	7.91E-04
Cm-244	2.9330E-05	2,406.38	4,812.75	0.00E+00	7.06E-02	1.41E-01
Co-60	5.3186E-06	2,406.38	4,812.75	0.00E+00	1.28E-02	2.56E-02
Cs-134	3.1563E-03	2,406.38	4,812.75	0.00E+00	7.60E+00	1.52E+01
Cs-135	3.4477E-06	2,406.38	4,812.75	0.00E+00	8.30E-03	1.66E-02
Cs-137	2.0313E+00	2,406.38	4,812.75	0.00E+00	4.89E+03	9.78E+03
Eu-154	2.4513E-02	2,406.38	4,812.75	0.00E+00	5.90E+01	1.18E+02
Eu-155	4.8175E-03	2,406.38	4,812.75	0.00E+00	1.16E+01	2.32E+01
Fe-55	1.2397E-04	2,406.38	4,812.75	0.00E+00	2.98E-01	5.97E-01
H-3	4.5697E-03	2,406.38	4,812.75	0.00E+00	1.10E+01	2.20E+01
I-129	7.5300E-07	2,406.38	4,812.75	0.00E+00	1.81E-03	3.62E-03
Kr-85	1.0850E-01	2,406.38	4,812.75	0.00E+00	2.61E+02	5.22E+02
Np-237	9.5561E-06	2,406.38	4,812.75	0.00E+00	2.30E-02	4.60E-02
Pa-231	2.0359E-09	2,406.38	4,812.75	0.00E+00	4.90E-06	9.80E-06
Pb-210	4.9728E-11	2,406.38	4,812.75	0.00E+00	1.20E-07	2.39E-07
Pm-147	4.8502E-02	2,406.38	4,812.75	0.00E+00	1.17E+02	2.33E+02
Pu-238	1.8254E-02	2,406.38	4,812.75	0.00E+00	4.39E+01	8.79E+01
Pu-239	4.2810E-04	2,406.38	4,812.75	0.00E+00	1.03E+00	2.06E+00
Pu-240	2.4368E-04	2,406.38	4,812.75	0.00E+00	5.86E-01	1.17E+00
Pu-241	3.3415E-02	2,406.38	4,812.75	0.00E+00	8.04E+01	1.61E+02
Pu-242	3.6329E-07	2,406.38	4,812.75	0.00E+00	8.74E-04	1.75E-03
Ra-226	2.2854E-10	2,406.38	4,812.75	0.00E+00	5.50E-07	1.10E-06
Ra-228	1.2426E-14	2,406.38	4,812.75	0.00E+00	2.99E-11	5.98E-11
Ru-106	6.3589E-06	2,406.38	4,812.75	0.00E+00	1.53E-02	3.06E-02
Se-79	1.2933E-05	2,406.38	4,812.75	0.00E+00	3.11E-02	6.22E-02
Sn-126	1.1574E-05	2,406.38	4,812.75	0.00E+00	2.79E-02	5.57E-02
Sr-90	1.9248E+00	2,406.38	4,812.75	0.00E+00	4.63E+03	9.26E+03
Tc-99	4.2239E-04	2,406.38	4,812.75	0.00E+00	1.02E+00	2.03E+00
Th-229	5.0953E-12	2,406.38	4,812.75	0.00E+00	1.23E-08	2.45E-08
Th-230	4.1885E-08	2,406.38	4,812.75	0.00E+00	1.01E-04	2.02E-04
Th-232	1.9270E-14	2,406.38	4,812.75	0.00E+00	4.64E-11	9.27E-11
Tl-208	4.6024E-08	2,406.38	4,812.75	0.00E+00	1.11E-04	2.22E-04
U-232	1.2582E-07	2,406.38	4,812.75	0.00E+00	3.03E-04	6.06E-04
U-233	2.5825E-09	2,406.38	4,812.75	0.00E+00	6.21E-06	1.24E-05
U-234	1.8450E-04	2,406.38	4,812.75	0.00E+00	4.44E-01	8.88E-01
U-235	-2.7235E-06	2,406.38	0.00	1.32E-02	6.63E-03	1.32E-02
U-236	1.5493E-05	2,406.38	4,812.75	0.00E+00	3.73E-02	7.46E-02
U-238	-4.2851E-09	2,406.38	0.00	1.51E-04	1.41E-04	1.51E-04
Y-90	1.9254E+00	2,406.38	4,812.75	0.00E+00	4.63E+03	9.27E+03
Other Radionuclides					4.65E+03	9.31E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.080E+14
0.0250	1.056E+14
0.0375	9.214E+13
0.0575	9.869E+13
0.0850	5.964E+13
0.1250	4.036E+13
0.2250	5.146E+13
0.3750	2.240E+13
0.5750	3.654E+14
0.8500	6.177E+12
1.2500	3.527E+12
1.7500	1.619E+11
2.2500	1.420E+07
2.7500	8.029E+06
3.5000	3.688E+04
5.0000	2.065E+03
7.0000	2.302E+02
11.0000	2.580E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.74E+01	1.15E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.13082871	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2,406.38
Bounding:		4,812.75

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.17	
Bounding:	2.33	

Estimated EOL HM/Given EOL HM: 1.04

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HTRE (ANP)
SNF ID #: 105
Fuel Units & Descr: 13 - CANISTER OF SCRAP
Heavy Metal Mass: BOL=4.55kg; EOL=4.039kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1961
Estimates as of: 2010
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"x10' = 0.36

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.3344E-08	482.62	965.24	0.00E+00	1.13E-05	2.25E-05
Am-241	1.1135E-04	482.62	965.24	0.00E+00	5.37E-02	1.07E-01
Am-242m	8.5075E-09	482.62	965.24	0.00E+00	4.11E-06	8.21E-06
Am-243	9.8519E-10	482.62	965.24	0.00E+00	4.75E-07	9.51E-07
C-14	2.3012E-04	482.62	965.24	0.00E+00	1.11E-01	2.22E-01
Cl-36	1.2261E-06	482.62	965.24	0.00E+00	5.92E-04	1.18E-03
Cm-243	2.4875E-10	482.62	965.24	0.00E+00	1.20E-07	2.40E-07
Cm-244	2.3178E-09	482.62	965.24	0.00E+00	1.12E-06	2.24E-06
Co-60	7.0849E-02	482.62	965.24	0.00E+00	3.42E+01	6.84E+01
Cs-134	3.0266E-06	482.62	965.24	0.00E+00	1.46E-03	2.92E-03
Cs-135	3.0316E-05	482.62	965.24	0.00E+00	1.46E-02	2.93E-02
Cs-137	1.4511E+00	482.62	965.24	0.00E+00	7.00E+02	1.40E+03
Eu-154	6.6955E-04	482.62	965.24	0.00E+00	3.23E-01	6.46E-01
Eu-155	6.9850E-04	482.62	965.24	0.00E+00	3.37E-01	6.74E-01
Fe-55	1.2318E-03	482.62	965.24	0.00E+00	5.94E-01	1.19E+00
H-3	2.5141E-03	482.62	965.24	0.00E+00	1.21E+00	2.43E+00
I-129	7.3195E-07	482.62	965.24	0.00E+00	3.53E-04	7.07E-04
Kr-85	4.1281E-02	482.62	965.24	0.00E+00	1.99E+01	3.98E+01
Np-237	1.1489E-06	482.62	965.24	0.00E+00	5.54E-04	1.11E-03
Pa-231	4.5241E-08	482.62	965.24	0.00E+00	2.18E-05	4.37E-05
Pb-210	6.4476E-13	482.62	965.24	0.00E+00	3.11E-10	6.22E-10
Pm-147	1.1651E-03	482.62	965.24	0.00E+00	5.62E-01	1.12E+00
Pu-238	2.9517E-04	482.62	965.24	0.00E+00	1.42E-01	2.85E-01
Pu-239	6.6772E-04	482.62	965.24	0.00E+00	3.22E-01	6.45E-01
Pu-240	8.6839E-05	482.62	965.24	0.00E+00	4.19E-02	8.38E-02
Pu-241	7.1514E-04	482.62	965.24	0.00E+00	3.45E-01	6.90E-01
Pu-242	1.9717E-09	482.62	965.24	0.00E+00	9.52E-07	1.90E-06
Ra-226	1.7654E-12	482.62	965.24	0.00E+00	8.52E-10	1.70E-09
Ra-228	8.2928E-12	482.62	965.24	0.00E+00	4.00E-09	8.00E-09
Ru-106	1.8419E-10	482.62	965.24	0.00E+00	8.89E-08	1.78E-07
Se-79	1.3223E-05	482.62	965.24	0.00E+00	6.38E-03	1.28E-02
Sn-126	1.1493E-05	482.62	965.24	0.00E+00	5.55E-03	1.11E-02
Sr-90	1.3649E+00	482.62	965.24	0.00E+00	6.59E+02	1.32E+03
Tc-99	4.6656E-04	482.62	965.24	0.00E+00	2.25E-01	4.50E-01
Th-229	1.4547E-11	482.62	965.24	0.00E+00	7.02E-09	1.40E-08
Th-230	1.6617E-10	482.62	965.24	0.00E+00	8.02E-08	1.60E-07
Th-232	8.3361E-12	482.62	965.24	0.00E+00	4.02E-09	8.05E-09
Tl-208	2.1664E-08	482.62	965.24	0.00E+00	1.05E-05	2.09E-05
U-232	5.8669E-08	482.62	965.24	0.00E+00	2.83E-05	5.66E-05
U-233	3.1847E-09	482.62	965.24	0.00E+00	1.54E-06	3.07E-06
U-234	3.8769E-07	482.62	965.24	0.00E+00	1.87E-04	3.74E-04
U-235	-2.7761E-06	482.62	0.00	9.16E-03	7.82E-03	9.16E-03
U-236	1.6190E-05	482.62	965.24	0.00E+00	7.81E-03	1.56E-02
U-238	-2.8547E-09	482.62	0.00	1.05E-04	1.03E-04	1.05E-04
Y-90	1.3652E+00	482.62	965.24	0.00E+00	6.59E+02	1.32E+03
Other Radionuclides					7.97E+02	1.59E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	7.204E+13
0.0250	1.497E+13
0.0375	1.295E+13
0.0575	1.396E+13
0.0850	8.434E+12
0.1250	5.476E+12
0.2250	7.259E+12
0.3750	3.166E+12
0.5750	5.216E+13
0.8500	5.280E+11
1.2500	5.248E+12
1.7500	1.362E+10
2.2500	2.827E+07
2.7500	8.173E+05
3.5000	5.812E+01
5.0000	2.391E+01
7.0000	2.640E+00
11.0000	2.963E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.43E+00	1.69E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	NICHROME	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.15	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except cladding (SST is conservative).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		482.62
Bounding:		965.24

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	2.27	
Bounding:	4.55	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR 3EMT-2 (UMO)
SNF ID #: 118
Fuel Units & Descr: 7 - TUBE
Heavy Metal Mass: BOL= ; EOL=8.108kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2010
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: 35 years

Estimated Canister usage: 18"x10' = 0.16

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.6920E-09	7,772.05	7,772.05	0.00E+00	3.65E-05	3.65E-05
Am-241	2.2880E-02	7,772.05	7,772.05	0.00E+00	1.78E+02	1.78E+02
Am-242m	3.5400E-06	7,772.05	7,772.05	0.00E+00	2.75E-02	2.75E-02
Am-243	2.0580E-06	7,772.05	7,772.05	0.00E+00	1.60E-02	1.60E-02
C-14	1.1264E-03	7,772.05	7,772.05	0.00E+00	8.75E+00	8.75E+00
Cl-36	8.3760E-11	7,772.05	7,772.05	0.00E+00	6.51E-07	6.51E-07
Cm-243	5.0340E-07	7,772.05	7,772.05	0.00E+00	3.91E-03	3.91E-03
Cm-244	1.0450E-05	7,772.05	7,772.05	0.00E+00	8.12E-02	8.12E-02
Co-60	6.4420E-02	7,772.05	7,772.05	0.00E+00	5.01E+02	5.01E+02
Cs-134	7.9240E-06	7,772.05	7,772.05	0.00E+00	6.16E-02	6.16E-02
Cs-135	7.9140E-06	7,772.05	7,772.05	0.00E+00	6.15E-02	6.15E-02
Cs-137	1.4316E+00	7,772.05	7,772.05	0.00E+00	1.11E+04	1.11E+04
Eu-154	6.7900E-03	7,772.05	7,772.05	0.00E+00	5.28E+01	5.28E+01
Eu-155	6.2800E-04	7,772.05	7,772.05	0.00E+00	4.88E+00	4.88E+00
Fe-55	5.7480E-05	7,772.05	7,772.05	0.00E+00	4.47E-01	4.47E-01
H-3	2.3800E-02	7,772.05	7,772.05	0.00E+00	1.85E+02	1.85E+02
I-129	7.5020E-07	7,772.05	7,772.05	0.00E+00	5.83E-03	5.83E-03
Kr-85	3.8220E-02	7,772.05	7,772.05	0.00E+00	2.97E+02	2.97E+02
Np-237	5.5780E-06	7,772.05	7,772.05	0.00E+00	4.34E-02	4.34E-02
Pa-231	7.8820E-09	7,772.05	7,772.05	0.00E+00	6.13E-05	6.13E-05
Pb-210	4.3840E-09	7,772.05	7,772.05	0.00E+00	3.41E-05	3.41E-05
Pm-147	9.9500E-04	7,772.05	7,772.05	0.00E+00	7.73E+00	7.73E+00
Pu-238	6.4240E-03	7,772.05	7,772.05	0.00E+00	4.99E+01	4.99E+01
Pu-239	1.8744E-02	7,772.05	7,772.05	0.00E+00	1.46E+02	1.46E+02
Pu-240	8.3540E-03	7,772.05	7,772.05	0.00E+00	6.49E+01	6.49E+01
Pu-241	1.4606E-01	7,772.05	7,772.05	0.00E+00	1.14E+03	1.14E+03
Pu-242	2.0400E-06	7,772.05	7,772.05	0.00E+00	1.59E-02	1.59E-02
Ra-226	1.1804E-08	7,772.05	7,772.05	0.00E+00	9.17E-05	9.17E-05
Ra-228	1.1864E-09	7,772.05	7,772.05	0.00E+00	9.22E-06	9.22E-06
Ru-106	3.2580E-10	7,772.05	7,772.05	0.00E+00	2.53E-06	2.53E-06
Se-79	1.2524E-05	7,772.05	7,772.05	0.00E+00	9.73E-02	9.73E-02
Sn-126	1.2052E-05	7,772.05	7,772.05	0.00E+00	9.37E-02	9.37E-02
Sr-90	1.2638E+00	7,772.05	7,772.05	0.00E+00	9.82E+03	9.82E+03
Tc-99	4.4140E-04	7,772.05	7,772.05	0.00E+00	3.43E+00	3.43E+00
Th-229	4.3480E-09	7,772.05	7,772.05	0.00E+00	3.38E-05	3.38E-05
Th-230	1.0760E-06	7,772.05	7,772.05	0.00E+00	8.36E-03	8.36E-03
Th-232	1.1926E-09	7,772.05	7,772.05	0.00E+00	9.27E-06	9.27E-06
Tl-208	4.6200E-08	7,772.05	7,772.05	0.00E+00	3.59E-04	3.59E-04
U-232	1.2406E-07	7,772.05	7,772.05	0.00E+00	9.64E-04	9.64E-04
U-233	9.1620E-07	7,772.05	7,772.05	0.00E+00	7.12E-03	7.12E-03
U-234	2.3440E-03	7,772.05	7,772.05	0.00E+00	1.82E+01	1.82E+01
U-235	-2.3296E-06	7,772.05	0.00	1.75E-03	0.00E+00	1.75E-03
U-236	2.6620E-05	7,772.05	7,772.05	0.00E+00	2.07E-01	2.07E-01
U-238	-1.3291E-07	7,772.05	0.00	5.13E-03	4.09E-03	5.13E-03
Y-90	1.2642E+00	7,772.05	7,772.05	0.00E+00	9.83E+03	9.83E+03
Other Radionuclides					1.06E+04	1.06E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.422E+14
0.0250	1.123E+14
0.0375	9.880E+13
0.0575	1.070E+14
0.0850	6.309E+13
0.1250	4.163E+13
0.2250	5.435E+13
0.3750	2.364E+13
0.5750	4.137E+14
0.8500	4.775E+12
1.2500	3.934E+13
1.7500	1.294E+11
2.2500	2.073E+08
2.7500	1.326E+07
3.5000	4.000E+04
5.0000	1.679E+04
7.0000	1.888E+03
11.0000	2.143E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.43E+02	1.43E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:		0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		7,772.05
Bounding:		7,772.05

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	32.83	
Bounding:	32.83	

Estimated EOL HM/Given EOL HM: 2.59

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).*

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR DRIVER (U-ZR) HEU
SNF ID #: 117
Fuel Units & Descr: 76 - TUBE
Heavy Metal Mass: BOL= ; EOL=36.13kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2010
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: 35 years

Estimated Canister usage: 18"x15" = 3.45

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.6920E-09	34,632.91	34,632.91	0.00E+00	1.62E-04	1.62E-04	Avg. MeV	
Am-241	2.2880E-02	34,632.91	34,632.91	0.00E+00	7.92E+02	7.92E+02	0.0150	2.416E+15
Am-242m	3.5400E-06	34,632.91	34,632.91	0.00E+00	1.23E-01	1.23E-01	0.0250	5.005E+14
Am-243	2.0580E-06	34,632.91	34,632.91	0.00E+00	7.13E-02	7.13E-02	0.0375	4.403E+14
C-14	1.1264E-03	34,632.91	34,632.91	0.00E+00	3.90E+01	3.90E+01	0.0575	4.767E+14
Cl-36	8.3760E-11	34,632.91	34,632.91	0.00E+00	2.90E-06	2.90E-06	0.0850	2.811E+14
Cm-243	5.0340E-07	34,632.91	34,632.91	0.00E+00	1.74E-02	1.74E-02	0.1250	1.855E+14
Cm-244	1.0450E-05	34,632.91	34,632.91	0.00E+00	3.62E-01	3.62E-01	0.2250	2.422E+14
Co-60	6.4420E-02	34,632.91	34,632.91	0.00E+00	2.23E+03	2.23E+03	0.3750	1.053E+14
Cs-134	7.9240E-06	34,632.91	34,632.91	0.00E+00	2.74E-01	2.74E-01	0.5750	1.843E+15
Cs-135	7.9140E-06	34,632.91	34,632.91	0.00E+00	2.74E-01	2.74E-01	0.8500	2.128E+13
Cs-137	1.4316E+00	34,632.91	34,632.91	0.00E+00	4.96E+04	4.96E+04	1.2500	1.753E+14
Eu-154	6.7900E-03	34,632.91	34,632.91	0.00E+00	2.35E+02	2.35E+02	1.7500	5.766E+11
Eu-155	6.2800E-04	34,632.91	34,632.91	0.00E+00	2.17E+01	2.17E+01	2.2500	9.236E+08
Fe-55	5.7480E-05	34,632.91	34,632.91	0.00E+00	1.99E+00	1.99E+00	2.7500	5.909E+07
H-3	2.3800E-02	34,632.91	34,632.91	0.00E+00	8.24E+02	8.24E+02	3.5000	1.782E+05
I-129	7.5020E-07	34,632.91	34,632.91	0.00E+00	2.60E-02	2.60E-02	5.0000	7.481E+04
Kr-85	3.8220E-02	34,632.91	34,632.91	0.00E+00	1.32E+03	1.32E+03	7.0000	8.414E+03
Np-237	5.5780E-06	34,632.91	34,632.91	0.00E+00	1.93E-01	1.93E-01	11.0000	9.549E+02
Pa-231	7.8820E-09	34,632.91	34,632.91	0.00E+00	2.73E-04	2.73E-04		
Pb-210	4.3840E-09	34,632.91	34,632.91	0.00E+00	1.52E-04	1.52E-04		
Pm-147	9.9500E-04	34,632.91	34,632.91	0.00E+00	3.45E+01	3.45E+01		
Pu-238	6.4240E-03	34,632.91	34,632.91	0.00E+00	2.22E+02	2.22E+02		
Pu-239	1.8744E-02	34,632.91	34,632.91	0.00E+00	6.49E+02	6.49E+02		
Pu-240	8.3540E-03	34,632.91	34,632.91	0.00E+00	2.89E+02	2.89E+02		
Pu-241	1.4606E-01	34,632.91	34,632.91	0.00E+00	5.06E+03	5.06E+03		
Pu-242	2.0400E-06	34,632.91	34,632.91	0.00E+00	7.07E-02	7.07E-02		
Ra-226	1.1804E-08	34,632.91	34,632.91	0.00E+00	4.09E-04	4.09E-04		
Ra-228	1.1864E-09	34,632.91	34,632.91	0.00E+00	4.11E-05	4.11E-05		
Ru-106	3.2580E-10	34,632.91	34,632.91	0.00E+00	1.13E-05	1.13E-05		
Se-79	1.2524E-05	34,632.91	34,632.91	0.00E+00	4.34E-01	4.34E-01		
Sn-126	1.2052E-05	34,632.91	34,632.91	0.00E+00	4.17E-01	4.17E-01		
Sr-90	1.2638E+00	34,632.91	34,632.91	0.00E+00	4.38E+04	4.38E+04		
Tc-99	4.4140E-04	34,632.91	34,632.91	0.00E+00	1.53E+01	1.53E+01		
Th-229	4.3480E-09	34,632.91	34,632.91	0.00E+00	1.51E-04	1.51E-04		
Th-230	1.0760E-06	34,632.91	34,632.91	0.00E+00	3.73E-02	3.73E-02		
Th-232	1.1926E-09	34,632.91	34,632.91	0.00E+00	4.13E-05	4.13E-05		
Tl-208	4.6200E-08	34,632.91	34,632.91	0.00E+00	1.60E-03	1.60E-03		
U-232	1.2406E-07	34,632.91	34,632.91	0.00E+00	4.30E-03	4.30E-03	Thermal Power	
U-233	9.1620E-07	34,632.91	34,632.91	0.00E+00	3.17E-02	3.17E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	2.3440E-03	34,632.91	34,632.91	0.00E+00	8.12E+01	8.12E+01	8.36E+02	8.36E+02
U-235	-2.3296E-06	34,632.91	0.00	7.81E-03	0.00E+00	7.81E-03	Total	Total
U-236	2.6620E-05	34,632.91	34,632.91	0.00E+00	9.22E-01	9.22E-01		
U-238	-1.3291E-07	34,632.91	0.00	2.28E-02	1.82E-02	2.28E-02		
Y-90	1.2642E+00	34,632.91	34,632.91	0.00E+00	4.38E+04	4.38E+04		
Other Radionuclides					4.72E+04	4.72E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:		0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		34,632.91
Bounding:		34,632.91

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	32.83	
Bounding:	32.83	

Estimated EOL HM/Given EOL HM: 2.59

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR ETWO (U METAL) LEU
SNF ID #: 867
Fuel Units & Descr: 6 - TUBE
Heavy Metal Mass: BOL= ; EOL=45.456kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2010
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: 35 years

Estimated Canister usage: 18"x15" 0.27

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.6920E-09	43,572.00	43,572.00	0.00E+00	2.04E-04	2.04E-04
Am-241	2.2880E-02	43,572.00	43,572.00	0.00E+00	9.97E+02	9.97E+02
Am-242m	3.5400E-06	43,572.00	43,572.00	0.00E+00	1.54E-01	1.54E-01
Am-243	2.0580E-06	43,572.00	43,572.00	0.00E+00	8.97E-02	8.97E-02
C-14	1.1264E-03	43,572.00	43,572.00	0.00E+00	4.91E+01	4.91E+01
Cl-36	8.3760E-11	43,572.00	43,572.00	0.00E+00	3.65E-06	3.65E-06
Cm-243	5.0340E-07	43,572.00	43,572.00	0.00E+00	2.19E-02	2.19E-02
Cm-244	1.0450E-05	43,572.00	43,572.00	0.00E+00	4.55E-01	4.55E-01
Co-60	6.4420E-02	43,572.00	43,572.00	0.00E+00	2.81E+03	2.81E+03
Cs-134	7.9240E-06	43,572.00	43,572.00	0.00E+00	3.45E-01	3.45E-01
Cs-135	7.9140E-06	43,572.00	43,572.00	0.00E+00	3.45E-01	3.45E-01
Cs-137	1.4316E+00	43,572.00	43,572.00	0.00E+00	6.24E+04	6.24E+04
Eu-154	6.7900E-03	43,572.00	43,572.00	0.00E+00	2.96E+02	2.96E+02
Eu-155	6.2800E-04	43,572.00	43,572.00	0.00E+00	2.74E+01	2.74E+01
Fe-55	5.7480E-05	43,572.00	43,572.00	0.00E+00	2.50E+00	2.50E+00
H-3	2.3800E-02	43,572.00	43,572.00	0.00E+00	1.04E+03	1.04E+03
I-129	7.5020E-07	43,572.00	43,572.00	0.00E+00	3.27E-02	3.27E-02
Kr-85	3.8220E-02	43,572.00	43,572.00	0.00E+00	1.67E+03	1.67E+03
Np-237	5.5780E-06	43,572.00	43,572.00	0.00E+00	2.43E-01	2.43E-01
Pa-231	7.8820E-09	43,572.00	43,572.00	0.00E+00	3.43E-04	3.43E-04
Pb-210	4.3840E-09	43,572.00	43,572.00	0.00E+00	1.91E-04	1.91E-04
Pm-147	9.9500E-04	43,572.00	43,572.00	0.00E+00	4.34E+01	4.34E+01
Pu-238	6.4240E-03	43,572.00	43,572.00	0.00E+00	2.80E+02	2.80E+02
Pu-239	1.8744E-02	43,572.00	43,572.00	0.00E+00	8.17E+02	8.17E+02
Pu-240	8.3540E-03	43,572.00	43,572.00	0.00E+00	3.64E+02	3.64E+02
Pu-241	1.4606E-01	43,572.00	43,572.00	0.00E+00	6.36E+03	6.36E+03
Pu-242	2.0400E-06	43,572.00	43,572.00	0.00E+00	8.89E-02	8.89E-02
Ra-226	1.1804E-08	43,572.00	43,572.00	0.00E+00	5.14E-04	5.14E-04
Ra-228	1.1864E-09	43,572.00	43,572.00	0.00E+00	5.17E-05	5.17E-05
Ru-106	3.2580E-10	43,572.00	43,572.00	0.00E+00	1.42E-05	1.42E-05
Se-79	1.2524E-05	43,572.00	43,572.00	0.00E+00	5.46E-01	5.46E-01
Sn-126	1.2052E-05	43,572.00	43,572.00	0.00E+00	5.25E-01	5.25E-01
Sr-90	1.2638E+00	43,572.00	43,572.00	0.00E+00	5.51E+04	5.51E+04
Tc-99	4.4140E-04	43,572.00	43,572.00	0.00E+00	1.92E+01	1.92E+01
Th-229	4.3480E-09	43,572.00	43,572.00	0.00E+00	1.89E-04	1.89E-04
Th-230	1.0760E-06	43,572.00	43,572.00	0.00E+00	4.69E-02	4.69E-02
Th-232	1.1926E-09	43,572.00	43,572.00	0.00E+00	5.20E-05	5.20E-05
Tl-208	4.6200E-08	43,572.00	43,572.00	0.00E+00	2.01E-03	2.01E-03
U-232	1.2406E-07	43,572.00	43,572.00	0.00E+00	5.41E-03	5.41E-03
U-233	9.1620E-07	43,572.00	43,572.00	0.00E+00	3.99E-02	3.99E-02
U-234	2.3440E-03	43,572.00	43,572.00	0.00E+00	1.02E+02	1.02E+02
U-235	-2.3296E-06	43,572.00	0.00	9.83E-03	0.00E+00	9.83E-03
U-236	2.6620E-05	43,572.00	43,572.00	0.00E+00	1.16E+00	1.16E+00
U-238	-1.3291E-07	43,572.00	0.00	2.87E-02	2.29E-02	2.87E-02
Y-90	1.2642E+00	43,572.00	43,572.00	0.00E+00	5.51E+04	5.51E+04
Other Radionuclides					5.94E+04	5.94E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.040E+15
0.0250	6.297E+14
0.0375	5.539E+14
0.0575	5.998E+14
0.0850	3.537E+14
0.1250	2.334E+14
0.2250	3.047E+14
0.3750	1.325E+14
0.5750	2.319E+15
0.8500	2.677E+13
1.2500	2.206E+14
1.7500	7.254E+11
2.2500	1.162E+09
2.7500	7.434E+07
3.5000	2.242E+05
5.0000	9.411E+04
7.0000	1.059E+04
11.0000	1.201E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.01E+02	8.01E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:		0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		43,572.00
Bounding:		43,572.00

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	32.83	
Bounding:	32.83	

Estimated EOL HM/Given EOL HM: 2.59

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).*

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR IMT (U METAL-SST) DU
SNF ID #: 113
Fuel Units & Descr: 82 - TUBE
Heavy Metal Mass: BOL= ; EOL=92.775kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2010
Template: HFBR (Heavy Water, SST, 0 to 5%, U)
[2]Template Burnup(MWd): 5
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 35 years

Estimated Canister usage: 18"x10" 1.15

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	5.6840E-09	88,573.24	88,573.24	0.00E+00	5.03E-04	5.03E-04	Avg. MeV	
Am-241	2.1380E-01	88,573.24	88,573.24	0.00E+00	1.89E+04	1.89E+04	0.0150	6.362E+15
Am-242m	1.0302E-04	88,573.24	88,573.24	0.00E+00	9.12E+00	9.12E+00	0.0250	1.244E+15
Am-243	5.2400E-05	88,573.24	88,573.24	0.00E+00	4.64E+00	4.64E+00	0.0375	1.082E+15
C-14	2.2160E-02	88,573.24	88,573.24	0.00E+00	1.96E+03	1.96E+03	0.0575	1.351E+15
Cl-36	4.1880E-04	88,573.24	88,573.24	0.00E+00	3.71E+01	3.71E+01	0.0850	6.359E+14
Cm-243	1.6766E-05	88,573.24	88,573.24	0.00E+00	1.49E+00	1.49E+00	0.1250	4.128E+14
Cm-244	7.3320E-04	88,573.24	88,573.24	0.00E+00	6.49E+01	6.49E+01	0.2250	5.168E+14
Co-60	5.1480E+00	88,573.24	88,573.24	0.00E+00	4.56E+05	4.56E+05	0.3750	2.230E+14
Cs-134	1.7300E-05	88,573.24	88,573.24	0.00E+00	1.53E+00	1.53E+00	0.5750	4.726E+15
Cs-135	3.7460E-06	88,573.24	88,573.24	0.00E+00	3.32E-01	3.32E-01	0.8500	5.263E+13
Cs-137	1.4426E+00	88,573.24	88,573.24	0.00E+00	1.28E+05	1.28E+05	1.2500	3.377E+16
Eu-154	9.2140E-03	88,573.24	88,573.24	0.00E+00	8.16E+02	8.16E+02	1.7500	1.399E+12
Eu-155	8.1360E-04	88,573.24	88,573.24	0.00E+00	7.21E+01	7.21E+01	2.2500	1.789E+11
Fe-55	5.3720E-02	88,573.24	88,573.24	0.00E+00	4.76E+03	4.76E+03	2.7500	1.031E+09
H-3	4.4560E-02	88,573.24	88,573.24	0.00E+00	3.95E+03	3.95E+03	3.5000	2.506E+08
I-129	9.1660E-07	88,573.24	88,573.24	0.00E+00	8.12E-02	8.12E-02	5.0000	1.049E+06
Kr-85	3.2380E-02	88,573.24	88,573.24	0.00E+00	2.87E+03	2.87E+03	7.0000	1.178E+05
Np-237	1.9674E-05	88,573.24	88,573.24	0.00E+00	1.74E+00	1.74E+00	11.0000	1.335E+04
Pa-231	9.3700E-09	88,573.24	88,573.24	0.00E+00	8.30E-04	8.30E-04		
Pb-210	4.0520E-09	88,573.24	88,573.24	0.00E+00	3.59E-04	3.59E-04		
Pm-147	7.8900E-04	88,573.24	88,573.24	0.00E+00	6.99E+01	6.99E+01		
Pu-238	3.6340E-02	88,573.24	88,573.24	0.00E+00	3.22E+03	3.22E+03		
Pu-239	6.5100E-02	88,573.24	88,573.24	0.00E+00	5.77E+03	5.77E+03		
Pu-240	2.6700E-02	88,573.24	88,573.24	0.00E+00	2.36E+03	2.36E+03		
Pu-241	1.3616E+00	88,573.24	88,573.24	0.00E+00	1.21E+05	1.21E+05		
Pu-242	1.6742E-05	88,573.24	88,573.24	0.00E+00	1.48E+00	1.48E+00		
Ra-226	1.0912E-08	88,573.24	88,573.24	0.00E+00	9.67E-04	9.67E-04		
Ra-228	2.0780E-10	88,573.24	88,573.24	0.00E+00	1.84E-05	1.84E-05		
Ru-106	7.4020E-10	88,573.24	88,573.24	0.00E+00	6.56E-05	6.56E-05		
Se-79	2.8500E-05	88,573.24	88,573.24	0.00E+00	2.52E+00	2.52E+00		
Sn-126	1.7794E-05	88,573.24	88,573.24	0.00E+00	1.58E+00	1.58E+00		
Sr-90	1.0372E+00	88,573.24	88,573.24	0.00E+00	9.19E+04	9.19E+04		
Tc-99	4.3360E-04	88,573.24	88,573.24	0.00E+00	3.84E+01	3.84E+01		
Th-229	1.9490E-09	88,573.24	88,573.24	0.00E+00	1.73E-04	1.73E-04		
Th-230	9.9520E-07	88,573.24	88,573.24	0.00E+00	8.81E-02	8.81E-02		
Th-232	2.0900E-10	88,573.24	88,573.24	0.00E+00	1.85E-05	1.85E-05		
Tl-208	1.5278E-07	88,573.24	88,573.24	0.00E+00	1.35E-02	1.35E-02		
U-232	4.1360E-07	88,573.24	88,573.24	0.00E+00	3.66E-02	3.66E-02		
U-233	4.1200E-07	88,573.24	88,573.24	0.00E+00	3.65E-02	3.65E-02		
U-234	2.1700E-03	88,573.24	88,573.24	0.00E+00	1.92E+02	1.92E+02		
U-235	-1.7036E-06	88,573.24	0.00	2.01E-02	0.00E+00	2.01E-02		
U-236	2.6080E-05	88,573.24	88,573.24	0.00E+00	2.31E+00	2.31E+00		
U-238	-5.1291E-07	88,573.24	0.00	5.87E-02	1.32E-02	5.87E-02		
Y-90	1.0374E+00	88,573.24	88,573.24	0.00E+00	9.19E+04	9.19E+04		
Other Radionuclides					7.62E+05	7.62E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.57E+03	9.57E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:		0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		88,573.24
Bounding:		88,573.24

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	32.70	
Bounding:	32.70	

Estimated EOL HM/Given EOL HM: 2.27

[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: HWCTR IRO (UO2) LEU
SNF ID #: 976
Fuel Units & Descr: 2 - TUBE
Heavy Metal Mass: BOL= ; EOL=5.407kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2010
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: 35 years

Estimated Canister usage: 18"x10'
0.02

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.6920E-09	5,183.09	5,183.09	0.00E+00	2.43E-05	2.43E-05
Am-241	2.2880E-02	5,183.09	5,183.09	0.00E+00	1.19E+02	1.19E+02
Am-242m	3.5400E-06	5,183.09	5,183.09	0.00E+00	1.83E-02	1.83E-02
Am-243	2.0580E-06	5,183.09	5,183.09	0.00E+00	1.07E-02	1.07E-02
C-14	1.1264E-03	5,183.09	5,183.09	0.00E+00	5.84E+00	5.84E+00
Cl-36	8.3760E-11	5,183.09	5,183.09	0.00E+00	4.34E-07	4.34E-07
Cm-243	5.0340E-07	5,183.09	5,183.09	0.00E+00	2.61E-03	2.61E-03
Cm-244	1.0450E-05	5,183.09	5,183.09	0.00E+00	5.42E-02	5.42E-02
Co-60	6.4420E-02	5,183.09	5,183.09	0.00E+00	3.34E+02	3.34E+02
Cs-134	7.9240E-06	5,183.09	5,183.09	0.00E+00	4.11E-02	4.11E-02
Cs-135	7.9140E-06	5,183.09	5,183.09	0.00E+00	4.10E-02	4.10E-02
Cs-137	1.4316E+00	5,183.09	5,183.09	0.00E+00	7.42E+03	7.42E+03
Eu-154	6.7900E-03	5,183.09	5,183.09	0.00E+00	3.52E+01	3.52E+01
Eu-155	6.2800E-04	5,183.09	5,183.09	0.00E+00	3.25E+00	3.25E+00
Fe-55	5.7480E-05	5,183.09	5,183.09	0.00E+00	2.98E-01	2.98E-01
H-3	2.3800E-02	5,183.09	5,183.09	0.00E+00	1.23E+02	1.23E+02
I-129	7.5020E-07	5,183.09	5,183.09	0.00E+00	3.89E-03	3.89E-03
Kr-85	3.8220E-02	5,183.09	5,183.09	0.00E+00	1.98E+02	1.98E+02
Np-237	5.5780E-06	5,183.09	5,183.09	0.00E+00	2.89E-02	2.89E-02
Pa-231	7.8820E-09	5,183.09	5,183.09	0.00E+00	4.09E-05	4.09E-05
Pb-210	4.3840E-09	5,183.09	5,183.09	0.00E+00	2.27E-05	2.27E-05
Pm-147	9.9500E-04	5,183.09	5,183.09	0.00E+00	5.16E+00	5.16E+00
Pu-238	6.4240E-03	5,183.09	5,183.09	0.00E+00	3.33E+01	3.33E+01
Pu-239	1.8744E-02	5,183.09	5,183.09	0.00E+00	9.72E+01	9.72E+01
Pu-240	8.3540E-03	5,183.09	5,183.09	0.00E+00	4.33E+01	4.33E+01
Pu-241	1.4606E-01	5,183.09	5,183.09	0.00E+00	7.57E+02	7.57E+02
Pu-242	2.0400E-06	5,183.09	5,183.09	0.00E+00	1.06E-02	1.06E-02
Ra-226	1.1804E-08	5,183.09	5,183.09	0.00E+00	6.12E-05	6.12E-05
Ra-228	1.1864E-09	5,183.09	5,183.09	0.00E+00	6.15E-06	6.15E-06
Ru-106	3.2580E-10	5,183.09	5,183.09	0.00E+00	1.69E-06	1.69E-06
Se-79	1.2524E-05	5,183.09	5,183.09	0.00E+00	6.49E-02	6.49E-02
Sn-126	1.2052E-05	5,183.09	5,183.09	0.00E+00	6.25E-02	6.25E-02
Sr-90	1.2638E+00	5,183.09	5,183.09	0.00E+00	6.55E+03	6.55E+03
Tc-99	4.4140E-04	5,183.09	5,183.09	0.00E+00	2.29E+00	2.29E+00
Th-229	4.3480E-09	5,183.09	5,183.09	0.00E+00	2.25E-05	2.25E-05
Th-230	1.0760E-06	5,183.09	5,183.09	0.00E+00	5.58E-03	5.58E-03
Th-232	1.1926E-09	5,183.09	5,183.09	0.00E+00	6.18E-06	6.18E-06
Tl-208	4.6200E-08	5,183.09	5,183.09	0.00E+00	2.39E-04	2.39E-04
U-232	1.2406E-07	5,183.09	5,183.09	0.00E+00	6.43E-04	6.43E-04
U-233	9.1620E-07	5,183.09	5,183.09	0.00E+00	4.75E-03	4.75E-03
U-234	2.3440E-03	5,183.09	5,183.09	0.00E+00	1.21E+01	1.21E+01
U-235	-2.3296E-06	5,183.09	0.00	1.17E-03	0.00E+00	1.17E-03
U-236	2.6620E-05	5,183.09	5,183.09	0.00E+00	1.38E-01	1.38E-01
U-238	-1.3291E-07	5,183.09	0.00	3.42E-03	2.73E-03	3.42E-03
Y-90	1.2642E+00	5,183.09	5,183.09	0.00E+00	6.55E+03	6.55E+03
Other Radionuclides					7.07E+03	7.07E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.616E+14
0.0250	7.490E+13
0.0375	6.589E+13
0.0575	7.135E+13
0.0850	4.207E+13
0.1250	2.776E+13
0.2250	3.624E+13
0.3750	1.577E+13
0.5750	2.759E+14
0.8500	3.184E+12
1.2500	2.624E+13
1.7500	8.629E+10
2.2500	1.382E+08
2.7500	8.844E+06
3.5000	2.667E+04
5.0000	1.120E+04
7.0000	1.259E+03
11.0000	1.429E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.82E+01	9.82E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	HEAVY WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:		0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		5,183.09
Bounding:		5,183.09

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	32.83	
Bounding:	32.83	

Estimated EOL HM/Given EOL HM: 2.59

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR IS (U-ZR) LEU
SNF ID #: 977
Fuel Units & Descr: 3 - TUBE
Heavy Metal Mass: BOL= ; EOL=15.776kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2010
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: 35 years

Estimated Canister usage: 18"x15" 0.14

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.6920E-09	15,122.23	15,122.23	0.00E+00	7.10E-05	7.10E-05
Am-241	2.2880E-02	15,122.23	15,122.23	0.00E+00	3.46E+02	3.46E+02
Am-242m	3.5400E-06	15,122.23	15,122.23	0.00E+00	5.35E-02	5.35E-02
Am-243	2.0580E-06	15,122.23	15,122.23	0.00E+00	3.11E-02	3.11E-02
C-14	1.1264E-03	15,122.23	15,122.23	0.00E+00	1.70E+01	1.70E+01
Cl-36	8.3760E-11	15,122.23	15,122.23	0.00E+00	1.27E-06	1.27E-06
Cm-243	5.0340E-07	15,122.23	15,122.23	0.00E+00	7.61E-03	7.61E-03
Cm-244	1.0450E-05	15,122.23	15,122.23	0.00E+00	1.58E-01	1.58E-01
Co-60	6.4420E-02	15,122.23	15,122.23	0.00E+00	9.74E+02	9.74E+02
Cs-134	7.9240E-06	15,122.23	15,122.23	0.00E+00	1.20E-01	1.20E-01
Cs-135	7.9140E-06	15,122.23	15,122.23	0.00E+00	1.20E-01	1.20E-01
Cs-137	1.4316E+00	15,122.23	15,122.23	0.00E+00	2.16E+04	2.16E+04
Eu-154	6.7900E-03	15,122.23	15,122.23	0.00E+00	1.03E+02	1.03E+02
Eu-155	6.2800E-04	15,122.23	15,122.23	0.00E+00	9.50E+00	9.50E+00
Fe-55	5.7480E-05	15,122.23	15,122.23	0.00E+00	8.69E-01	8.69E-01
H-3	2.3800E-02	15,122.23	15,122.23	0.00E+00	3.60E+02	3.60E+02
I-129	7.5020E-07	15,122.23	15,122.23	0.00E+00	1.13E-02	1.13E-02
Kr-85	3.8220E-02	15,122.23	15,122.23	0.00E+00	5.78E+02	5.78E+02
Np-237	5.5780E-06	15,122.23	15,122.23	0.00E+00	8.44E-02	8.44E-02
Pa-231	7.8820E-09	15,122.23	15,122.23	0.00E+00	1.19E-04	1.19E-04
Pb-210	4.3840E-09	15,122.23	15,122.23	0.00E+00	6.63E-05	6.63E-05
Pm-147	9.9500E-04	15,122.23	15,122.23	0.00E+00	1.50E+01	1.50E+01
Pu-238	6.4240E-03	15,122.23	15,122.23	0.00E+00	9.71E+01	9.71E+01
Pu-239	1.8744E-02	15,122.23	15,122.23	0.00E+00	2.83E+02	2.83E+02
Pu-240	8.3540E-03	15,122.23	15,122.23	0.00E+00	1.26E+02	1.26E+02
Pu-241	1.4606E-01	15,122.23	15,122.23	0.00E+00	2.21E+03	2.21E+03
Pu-242	2.0400E-06	15,122.23	15,122.23	0.00E+00	3.08E-02	3.08E-02
Ra-226	1.1804E-06	15,122.23	15,122.23	0.00E+00	1.79E-04	1.79E-04
Ra-228	1.1864E-09	15,122.23	15,122.23	0.00E+00	1.79E-05	1.79E-05
Ru-106	3.2580E-10	15,122.23	15,122.23	0.00E+00	4.93E-06	4.93E-06
Se-79	1.2524E-05	15,122.23	15,122.23	0.00E+00	1.89E-01	1.89E-01
Sn-126	1.2052E-05	15,122.23	15,122.23	0.00E+00	1.82E-01	1.82E-01
Sr-90	1.2638E+00	15,122.23	15,122.23	0.00E+00	1.91E+04	1.91E+04
Tc-99	4.4140E-04	15,122.23	15,122.23	0.00E+00	6.67E+00	6.67E+00
Th-229	4.3480E-09	15,122.23	15,122.23	0.00E+00	6.58E-05	6.58E-05
Th-230	1.0760E-06	15,122.23	15,122.23	0.00E+00	1.63E-02	1.63E-02
Th-232	1.1926E-09	15,122.23	15,122.23	0.00E+00	1.80E-05	1.80E-05
Tl-208	4.6200E-08	15,122.23	15,122.23	0.00E+00	6.99E-04	6.99E-04
U-232	1.2406E-07	15,122.23	15,122.23	0.00E+00	1.88E-03	1.88E-03
U-233	9.1620E-07	15,122.23	15,122.23	0.00E+00	1.39E-02	1.39E-02
U-234	2.3440E-03	15,122.23	15,122.23	0.00E+00	3.54E+01	3.54E+01
U-235	-2.3296E-06	15,122.23	0.00	3.41E-03	0.00E+00	3.41E-03
U-236	2.6620E-05	15,122.23	15,122.23	0.00E+00	4.03E-01	4.03E-01
U-238	-1.3291E-07	15,122.23	0.00	9.97E-03	7.96E-03	9.97E-03
Y-90	1.2642E+00	15,122.23	15,122.23	0.00E+00	1.91E+04	1.91E+04
Other Radionuclides					2.06E+04	2.06E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.055E+15
0.0250	2.185E+14
0.0375	1.922E+14
0.0575	2.082E+14
0.0850	1.228E+14
0.1250	8.099E+13
0.2250	1.057E+14
0.3750	4.600E+13
0.5750	8.049E+14
0.8500	9.291E+12
1.2500	7.655E+13
1.7500	2.518E+11
2.2500	4.033E+08
2.7500	2.580E+07
3.5000	7.782E+04
5.0000	3.266E+04
7.0000	3.674E+03
11.0000	4.169E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.78E+02	2.78E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:		0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		15,122.23
Bounding:		15,122.23

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	32.83	
Bounding:	32.83	

Estimated EOL HM/Given EOL HM: 2.59

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR OT (UO2) LEU
SNF ID #: 283
Fuel Units & Descr: 8 - TUBE
Heavy Metal Mass: BOL= ; EOL=139.532kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1963
Estimates as of: 2010
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" 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	8.7758E-10	209.63	209.63	0.00E+00	1.84E-07	1.84E-07
Am-241	1.4352E-01	209.63	209.63	0.00E+00	3.01E+01	3.01E+01
Am-242m	2.8698E-04	209.63	209.63	0.00E+00	6.02E-02	6.02E-02
Am-243	6.2565E-04	209.63	209.63	0.00E+00	1.31E-01	1.31E-01
C-14	4.7901E-05	209.63	209.63	0.00E+00	1.00E-02	1.00E-02
Cl-36	8.0297E-07	209.63	209.63	0.00E+00	1.68E-04	1.68E-04
Cm-243	2.5081E-04	209.63	209.63	0.00E+00	5.26E-02	5.26E-02
Cm-244	4.9015E-02	209.63	209.63	0.00E+00	1.03E+01	1.03E+01
Co-60	2.5581E-03	209.63	209.63	0.00E+00	5.36E-01	5.36E-01
Cs-134	4.0536E-05	209.63	209.63	0.00E+00	8.50E-03	8.50E-03
Cs-135	1.4433E-05	209.63	209.63	0.00E+00	3.03E-03	3.03E-03
Cs-137	1.3979E+00	209.63	209.63	0.00E+00	2.93E+02	2.93E+02
Eu-154	2.0203E-02	209.63	209.63	0.00E+00	4.24E+00	4.24E+00
Eu-155	1.7684E-03	209.63	209.63	0.00E+00	3.71E-01	3.71E-01
Fe-55	4.3136E-05	209.63	209.63	0.00E+00	9.04E-03	9.04E-03
H-3	2.0769E-02	209.63	209.63	0.00E+00	4.35E+00	4.35E+00
I-129	9.8288E-07	209.63	209.63	0.00E+00	2.06E-04	2.06E-04
Kr-85	2.8214E-02	209.63	209.63	0.00E+00	5.91E+00	5.91E+00
Np-237	1.1218E-05	209.63	209.63	0.00E+00	2.35E-03	2.35E-03
Pa-231	1.3036E-09	209.63	209.63	0.00E+00	2.73E-07	2.73E-07
Pb-210	8.5078E-11	209.63	209.63	0.00E+00	1.78E-08	1.78E-08
Pm-147	3.6531E-04	209.63	209.63	0.00E+00	7.66E-02	7.66E-02
Pu-238	7.4564E-02	209.63	209.63	0.00E+00	1.56E+01	1.56E+01
Pu-239	1.1623E-02	209.63	209.63	0.00E+00	2.44E+00	2.44E+00
Pu-240	1.5132E-02	209.63	209.63	0.00E+00	3.17E+00	3.17E+00
Pu-241	9.0036E-01	209.63	209.63	0.00E+00	1.89E+02	1.89E+02
Pu-242	6.4260E-05	209.63	209.63	0.00E+00	1.35E-02	1.35E-02
Ra-226	2.2804E-10	209.63	209.63	0.00E+00	4.78E-08	4.78E-08
Ra-228	5.2713E-12	209.63	209.63	0.00E+00	1.11E-09	1.11E-09
Ru-106	6.1160E-10	209.63	209.63	0.00E+00	1.28E-07	1.28E-07
Se-79	1.2377E-05	209.63	209.63	0.00E+00	2.59E-03	2.59E-03
Sn-126	2.5210E-05	209.63	209.63	0.00E+00	5.28E-03	5.28E-03
Sr-90	9.1667E-01	209.63	209.63	0.00E+00	1.92E+02	1.92E+02
Tc-99	3.9357E-04	209.63	209.63	0.00E+00	8.25E-02	8.25E-02
Th-229	1.2057E-10	209.63	209.63	0.00E+00	2.53E-08	2.53E-08
Th-230	2.1043E-08	209.63	209.63	0.00E+00	4.41E-06	4.41E-06
Th-232	5.2972E-12	209.63	209.63	0.00E+00	1.11E-09	1.11E-09
Tl-208	1.7474E-07	209.63	209.63	0.00E+00	3.66E-05	3.66E-05
U-232	4.7368E-07	209.63	209.63	0.00E+00	9.93E-05	9.93E-05
U-233	2.5097E-08	209.63	209.63	0.00E+00	5.26E-06	5.26E-06
U-234	5.0000E-05	209.63	209.63	0.00E+00	1.05E-02	1.05E-02
U-235	-1.4489E-06	209.63	0.00	9.66E-03	9.36E-03	9.66E-03
U-236	7.5824E-06	209.63	209.63	0.00E+00	1.59E-03	1.59E-03
U-238	-2.6129E-07	209.63	0.00	4.54E-02	4.54E-02	4.54E-02
Y-90	9.1699E-01	209.63	209.63	0.00E+00	1.92E+02	1.92E+02
Other Radionuclides					2.81E+02	2.81E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.128E+13
0.0250	2.274E+12
0.0375	2.169E+12
0.0575	2.506E+12
0.0850	1.262E+12
0.1250	8.758E+11
0.2250	1.082E+12
0.3750	4.654E+11
0.5750	1.082E+13
0.8500	1.497E+11
1.2500	1.471E+11
1.7500	4.405E+09
2.2500	7.097E+05
2.7500	1.453E+06
3.5000	1.499E+05
5.0000	6.407E+04
7.0000	7.385E+03
11.0000	8.482E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.82E+00	4.82E+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:		209.63
Bounding:		209.63

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup
Bounding burnup taken from SFD and converted to MWd using BOL=139.752kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.04	
Bounding:	0.04	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR RMT & SMT (U METAL) LEU
SNF ID #: 790
Fuel Units & Descr: 10 - TUBE
Heavy Metal Mass: BOL= ; EOL=63.746kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2010
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: 35 years

Estimated Canister usage: 18"x15' = 0.45

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.6920E-09	61,103.94	61,103.94	0.00E+00	2.87E-04	2.87E-04	Avg. MeV	
Am-241	2.2880E-02	61,103.94	61,103.94	0.00E+00	1.40E+03	1.40E+03	0.0150	4.263E+15
Am-242m	3.5400E-06	61,103.94	61,103.94	0.00E+00	2.16E-01	2.16E-01	0.0250	8.830E+14
Am-243	2.0580E-06	61,103.94	61,103.94	0.00E+00	1.26E-01	1.26E-01	0.0375	7.768E+14
C-14	1.1264E-03	61,103.94	61,103.94	0.00E+00	6.88E+01	6.88E+01	0.0575	8.411E+14
Cl-36	8.3760E-11	61,103.94	61,103.94	0.00E+00	5.12E-06	5.12E-06	0.0850	4.980E+14
Cm-243	5.0340E-07	61,103.94	61,103.94	0.00E+00	3.08E-02	3.08E-02	0.1250	3.273E+14
Cm-244	1.0450E-05	61,103.94	61,103.94	0.00E+00	6.39E-01	6.39E-01	0.2250	4.273E+14
Co-60	6.4420E-02	61,103.94	61,103.94	0.00E+00	3.94E+03	3.94E+03	0.3750	1.859E+14
Cs-134	7.9240E-06	61,103.94	61,103.94	0.00E+00	4.84E-01	4.84E-01	0.5750	3.252E+15
Cs-135	7.9140E-06	61,103.94	61,103.94	0.00E+00	4.84E-01	4.84E-01	0.8500	3.754E+13
Cs-137	1.4316E+00	61,103.94	61,103.94	0.00E+00	8.75E+04	8.75E+04	1.2500	3.093E+14
Eu-154	6.7900E-03	61,103.94	61,103.94	0.00E+00	4.15E+02	4.15E+02	1.7500	1.017E+12
Eu-155	6.2800E-04	61,103.94	61,103.94	0.00E+00	3.84E+01	3.84E+01	2.2500	1.630E+09
Fe-55	5.7480E-05	61,103.94	61,103.94	0.00E+00	3.51E+00	3.51E+00	2.7500	1.043E+08
H-3	2.3800E-02	61,103.94	61,103.94	0.00E+00	1.45E+03	1.45E+03	3.5000	3.144E+05
I-129	7.5020E-07	61,103.94	61,103.94	0.00E+00	4.58E-02	4.58E-02	5.0000	1.320E+05
Kr-85	3.8220E-02	61,103.94	61,103.94	0.00E+00	2.34E+03	2.34E+03	7.0000	1.485E+04
Np-237	5.5780E-06	61,103.94	61,103.94	0.00E+00	3.41E-01	3.41E-01	11.0000	1.685E+03
Pa-231	7.8820E-09	61,103.94	61,103.94	0.00E+00	4.82E-04	4.82E-04		
Pb-210	4.3840E-09	61,103.94	61,103.94	0.00E+00	2.68E-04	2.68E-04		
Pm-147	9.9500E-04	61,103.94	61,103.94	0.00E+00	6.08E+01	6.08E+01		
Pu-238	6.4240E-03	61,103.94	61,103.94	0.00E+00	3.93E+02	3.93E+02		
Pu-239	1.8744E-02	61,103.94	61,103.94	0.00E+00	1.15E+03	1.15E+03		
Pu-240	8.3540E-03	61,103.94	61,103.94	0.00E+00	5.10E+02	5.10E+02		
Pu-241	1.4606E-01	61,103.94	61,103.94	0.00E+00	8.92E+03	8.92E+03		
Pu-242	2.0400E-06	61,103.94	61,103.94	0.00E+00	1.25E-01	1.25E-01		
Ra-226	1.1804E-08	61,103.94	61,103.94	0.00E+00	7.21E-04	7.21E-04		
Ra-228	1.1864E-09	61,103.94	61,103.94	0.00E+00	7.25E-05	7.25E-05		
Ru-106	3.2580E-10	61,103.94	61,103.94	0.00E+00	1.99E-05	1.99E-05		
Se-79	1.2524E-05	61,103.94	61,103.94	0.00E+00	7.65E-01	7.65E-01		
Sn-126	1.2052E-05	61,103.94	61,103.94	0.00E+00	7.36E-01	7.36E-01		
Sr-90	1.2638E+00	61,103.94	61,103.94	0.00E+00	7.72E+04	7.72E+04		
Tc-99	4.4140E-04	61,103.94	61,103.94	0.00E+00	2.70E+01	2.70E+01		
Th-229	4.3480E-09	61,103.94	61,103.94	0.00E+00	2.66E-04	2.66E-04		
Th-230	1.0760E-06	61,103.94	61,103.94	0.00E+00	6.57E-02	6.57E-02		
Th-232	1.1926E-09	61,103.94	61,103.94	0.00E+00	7.29E-05	7.29E-05		
Tl-208	4.6200E-08	61,103.94	61,103.94	0.00E+00	2.82E-03	2.82E-03		
U-232	1.2406E-07	61,103.94	61,103.94	0.00E+00	7.58E-03	7.58E-03		
U-233	9.1620E-07	61,103.94	61,103.94	0.00E+00	5.60E-02	5.60E-02		
U-234	2.3440E-03	61,103.94	61,103.94	0.00E+00	1.43E+02	1.43E+02		
U-235	-2.3296E-06	61,103.94	0.00	1.38E-02	0.00E+00	1.38E-02		
U-236	2.6620E-05	61,103.94	61,103.94	0.00E+00	1.63E+00	1.63E+00		
U-238	-1.3291E-07	61,103.94	0.00	4.03E-02	3.22E-02	4.03E-02		
Y-90	1.2642E+00	61,103.94	61,103.94	0.00E+00	7.72E+04	7.72E+04		
Other Radionuclides					8.34E+04	8.34E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.12E+03	1.12E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:		0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		61,103.94
Bounding:		61,103.94

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	32.83	
Bounding:	32.83	

Estimated EOL HM/Given EOL HM: 2.59

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR SOT (UO2) LEU
SNF ID #: 120
Fuel Units & Descr: 96 - TUBE
Heavy Metal Mass: BOL= ; EOL=249.725kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2010
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: 35 years

Estimated Canister usage: 18"x10' 1.09

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.6920E-09	239,374.53	239,374.53	0.00E+00	1.12E-03	1.12E-03
Am-241	2.2880E-02	239,374.53	239,374.53	0.00E+00	5.48E+03	5.48E+03
Am-242m	3.5400E-06	239,374.53	239,374.53	0.00E+00	8.47E-01	8.47E-01
Am-243	2.0580E-06	239,374.53	239,374.53	0.00E+00	4.93E-01	4.93E-01
C-14	1.1264E-03	239,374.53	239,374.53	0.00E+00	2.70E+02	2.70E+02
Cl-36	8.3760E-11	239,374.53	239,374.53	0.00E+00	2.01E-05	2.01E-05
Cm-243	5.0340E-07	239,374.53	239,374.53	0.00E+00	1.21E-01	1.21E-01
Cm-244	1.0450E-05	239,374.53	239,374.53	0.00E+00	2.50E+00	2.50E+00
Co-60	6.4420E-02	239,374.53	239,374.53	0.00E+00	1.54E+04	1.54E+04
Cs-134	7.9240E-06	239,374.53	239,374.53	0.00E+00	1.90E+00	1.90E+00
Cs-135	7.9140E-06	239,374.53	239,374.53	0.00E+00	1.89E+00	1.89E+00
Cs-137	1.4316E+00	239,374.53	239,374.53	0.00E+00	3.43E+05	3.43E+05
Eu-154	6.7900E-03	239,374.53	239,374.53	0.00E+00	1.63E+03	1.63E+03
Eu-155	6.2800E-04	239,374.53	239,374.53	0.00E+00	1.50E+02	1.50E+02
Fe-55	5.7480E-05	239,374.53	239,374.53	0.00E+00	1.38E+01	1.38E+01
H-3	2.3800E-02	239,374.53	239,374.53	0.00E+00	5.70E+03	5.70E+03
I-129	7.5020E-07	239,374.53	239,374.53	0.00E+00	1.80E-01	1.80E-01
Kr-85	3.8220E-02	239,374.53	239,374.53	0.00E+00	9.15E+03	9.15E+03
Np-237	5.5780E-06	239,374.53	239,374.53	0.00E+00	1.34E+00	1.34E+00
Pa-231	7.8820E-09	239,374.53	239,374.53	0.00E+00	1.89E-03	1.89E-03
Pb-210	4.3840E-09	239,374.53	239,374.53	0.00E+00	1.05E-03	1.05E-03
Pm-147	9.9500E-04	239,374.53	239,374.53	0.00E+00	2.38E+02	2.38E+02
Pu-238	6.4240E-03	239,374.53	239,374.53	0.00E+00	1.54E+03	1.54E+03
Pu-239	1.8744E-02	239,374.53	239,374.53	0.00E+00	4.49E+03	4.49E+03
Pu-240	8.3540E-03	239,374.53	239,374.53	0.00E+00	2.00E+03	2.00E+03
Pu-241	1.4606E-01	239,374.53	239,374.53	0.00E+00	3.50E+04	3.50E+04
Pu-242	2.0400E-06	239,374.53	239,374.53	0.00E+00	4.88E-01	4.88E-01
Ra-226	1.1804E-08	239,374.53	239,374.53	0.00E+00	2.83E-03	2.83E-03
Ra-228	1.1864E-09	239,374.53	239,374.53	0.00E+00	2.84E-04	2.84E-04
Ru-106	3.2580E-10	239,374.53	239,374.53	0.00E+00	7.80E-05	7.80E-05
Se-79	1.2524E-05	239,374.53	239,374.53	0.00E+00	3.00E+00	3.00E+00
Sn-126	1.2052E-05	239,374.53	239,374.53	0.00E+00	2.88E+00	2.88E+00
Sr-90	1.2638E+00	239,374.53	239,374.53	0.00E+00	3.03E+05	3.03E+05
Tc-99	4.4140E-04	239,374.53	239,374.53	0.00E+00	1.06E+02	1.06E+02
Th-229	4.3480E-09	239,374.53	239,374.53	0.00E+00	1.04E-03	1.04E-03
Th-230	1.0760E-06	239,374.53	239,374.53	0.00E+00	2.58E-01	2.58E-01
Th-232	1.1926E-09	239,374.53	239,374.53	0.00E+00	2.85E-04	2.85E-04
Tl-208	4.6200E-08	239,374.53	239,374.53	0.00E+00	1.11E-02	1.11E-02
U-232	1.2406E-07	239,374.53	239,374.53	0.00E+00	2.97E-02	2.97E-02
U-233	9.1620E-07	239,374.53	239,374.53	0.00E+00	2.19E-01	2.19E-01
U-234	2.3440E-03	239,374.53	239,374.53	0.00E+00	5.61E+02	5.61E+02
U-235	-2.3296E-06	239,374.53	0.00	5.40E-02	0.00E+00	5.40E-02
U-236	2.6620E-05	239,374.53	239,374.53	0.00E+00	6.37E+00	6.37E+00
U-238	-1.3291E-07	239,374.53	0.00	1.58E-01	1.26E-01	1.58E-01
Y-90	1.2642E+00	239,374.53	239,374.53	0.00E+00	3.03E+05	3.03E+05
Other Radionuclides					3.27E+05	3.27E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.670E+16
0.0250	3.459E+15
0.0375	3.043E+15
0.0575	3.295E+15
0.0850	1.943E+15
0.1250	1.282E+15
0.2250	1.674E+15
0.3750	7.281E+14
0.5750	1.274E+16
0.8500	1.471E+14
1.2500	1.212E+15
1.7500	3.985E+12
2.2500	6.384E+09
2.7500	4.084E+08
3.5000	1.232E+06
5.0000	5.170E+05
7.0000	5.816E+04
11.0000	6.600E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.40E+03	4.40E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:		0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		239,374.53
Bounding:		239,374.53

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	32.83	
Bounding:	32.83	

Estimated EOL HM/Given EOL HM: 2.59

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR SPR (U-ZR) LEU
SNF ID #: 783
Fuel Units & Descr: 56 - TUBE
Heavy Metal Mass: BOL= ; EOL=437.679kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2010
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: 35 years

Estimated Canister usage: 18"x15' = 2.55

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.6920E-09	419,538.84	419,538.84	0.00E+00	1.97E-03	1.97E-03
Am-241	2.2880E-02	419,538.84	419,538.84	0.00E+00	9.60E+03	9.60E+03
Am-242m	3.5400E-06	419,538.84	419,538.84	0.00E+00	1.49E+00	1.49E+00
Am-243	2.0580E-06	419,538.84	419,538.84	0.00E+00	8.63E-01	8.63E-01
C-14	1.1264E-03	419,538.84	419,538.84	0.00E+00	4.73E+02	4.73E+02
Cl-36	8.3760E-11	419,538.84	419,538.84	0.00E+00	3.51E-05	3.51E-05
Cm-243	5.0340E-07	419,538.84	419,538.84	0.00E+00	2.11E-01	2.11E-01
Cm-244	1.0450E-05	419,538.84	419,538.84	0.00E+00	4.38E+00	4.38E+00
Co-60	6.4420E-02	419,538.84	419,538.84	0.00E+00	2.70E+04	2.70E+04
Cs-134	7.9240E-06	419,538.84	419,538.84	0.00E+00	3.32E+00	3.32E+00
Cs-135	7.9140E-06	419,538.84	419,538.84	0.00E+00	3.32E+00	3.32E+00
Cs-137	1.4316E+00	419,538.84	419,538.84	0.00E+00	6.01E+05	6.01E+05
Eu-154	6.7900E-03	419,538.84	419,538.84	0.00E+00	2.85E+03	2.85E+03
Eu-155	6.2800E-04	419,538.84	419,538.84	0.00E+00	2.63E+02	2.63E+02
Fe-55	5.7480E-05	419,538.84	419,538.84	0.00E+00	2.41E+01	2.41E+01
H-3	2.3800E-02	419,538.84	419,538.84	0.00E+00	9.99E+03	9.99E+03
I-129	7.5020E-07	419,538.84	419,538.84	0.00E+00	3.15E-01	3.15E-01
Kr-85	3.8220E-02	419,538.84	419,538.84	0.00E+00	1.60E+04	1.60E+04
Np-237	5.5780E-06	419,538.84	419,538.84	0.00E+00	2.34E+00	2.34E+00
Pa-231	7.8820E-09	419,538.84	419,538.84	0.00E+00	3.31E-03	3.31E-03
Pb-210	4.3840E-09	419,538.84	419,538.84	0.00E+00	1.84E-03	1.84E-03
Pm-147	9.9500E-04	419,538.84	419,538.84	0.00E+00	4.17E+02	4.17E+02
Pu-238	6.4240E-03	419,538.84	419,538.84	0.00E+00	2.70E+03	2.70E+03
Pu-239	1.8744E-02	419,538.84	419,538.84	0.00E+00	7.86E+03	7.86E+03
Pu-240	8.3540E-03	419,538.84	419,538.84	0.00E+00	3.50E+03	3.50E+03
Pu-241	1.4606E-01	419,538.84	419,538.84	0.00E+00	6.13E+04	6.13E+04
Pu-242	2.0400E-06	419,538.84	419,538.84	0.00E+00	8.56E-01	8.56E-01
Ra-226	1.1804E-08	419,538.84	419,538.84	0.00E+00	4.95E-03	4.95E-03
Ra-228	1.1864E-09	419,538.84	419,538.84	0.00E+00	4.98E-04	4.98E-04
Ru-106	3.2580E-10	419,538.84	419,538.84	0.00E+00	1.37E-04	1.37E-04
Se-79	1.2524E-05	419,538.84	419,538.84	0.00E+00	5.25E+00	5.25E+00
Sn-126	1.2052E-05	419,538.84	419,538.84	0.00E+00	5.06E+00	5.06E+00
Sr-90	1.2638E+00	419,538.84	419,538.84	0.00E+00	5.30E+05	5.30E+05
Tc-99	4.4140E-04	419,538.84	419,538.84	0.00E+00	1.85E+02	1.85E+02
Th-229	4.3480E-09	419,538.84	419,538.84	0.00E+00	1.82E-03	1.82E-03
Th-230	1.0760E-06	419,538.84	419,538.84	0.00E+00	4.51E-01	4.51E-01
Th-232	1.1926E-09	419,538.84	419,538.84	0.00E+00	5.00E-04	5.00E-04
Tl-208	4.6200E-08	419,538.84	419,538.84	0.00E+00	1.94E-02	1.94E-02
U-232	1.2406E-07	419,538.84	419,538.84	0.00E+00	5.20E-02	5.20E-02
U-233	9.1620E-07	419,538.84	419,538.84	0.00E+00	3.84E-01	3.84E-01
U-234	2.3440E-03	419,538.84	419,538.84	0.00E+00	9.83E+02	9.83E+02
U-235	-2.3296E-06	419,538.84	0.00	9.46E-02	0.00E+00	9.46E-02
U-236	2.6620E-05	419,538.84	419,538.84	0.00E+00	1.12E+01	1.12E+01
U-238	-1.3291E-07	419,538.84	0.00	2.77E-01	2.21E-01	2.77E-01
Y-90	1.2642E+00	419,538.84	419,538.84	0.00E+00	5.30E+05	5.30E+05
Other Radionuclides					5.72E+05	5.72E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.927E+16
0.0250	6.063E+15
0.0375	5.334E+15
0.0575	5.775E+15
0.0850	3.405E+15
0.1250	2.247E+15
0.2250	2.934E+15
0.3750	1.276E+15
0.5750	2.233E+16
0.8500	2.578E+14
1.2500	2.124E+15
1.7500	6.985E+12
2.2500	1.119E+10
2.7500	7.158E+06
3.5000	2.159E+06
5.0000	9.062E+05
7.0000	1.019E+05
11.0000	1.157E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.71E+03	7.71E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:		0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		419,538.84
Bounding:		419,538.84

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	32.83	
Bounding:	32.83	

Estimated EOL HM/Given EOL HM: 2.59

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR SPRO (U02) ALUM LEU
SNF ID #: 115
Fuel Units & Descr: 3 - TUBE
Heavy Metal Mass: BOL= ; EOL=6.499kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1964
Estimates as of: 2010
Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 15
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 35 years

Estimated Canister usage: 18"x10'
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	2.6507E-09	6,176.98	6,176.98	0.00E+00	1.64E-05	1.64E-05
Am-241	2.8587E-02	6,176.98	6,176.98	0.00E+00	1.77E+02	1.77E+02
Am-242m	6.3267E-06	6,176.98	6,176.98	0.00E+00	5.14E-02	5.14E-02
Am-243	6.3920E-06	6,176.98	6,176.98	0.00E+00	3.95E-02	3.95E-02
C-14	2.9567E-08	6,176.98	6,176.98	0.00E+00	1.83E-04	1.83E-04
Cl-36	5.9507E-35	6,176.98	6,176.98	0.00E+00	3.68E-31	3.68E-31
Cm-243	1.5333E-06	6,176.98	6,176.98	0.00E+00	9.47E-03	9.47E-03
Cm-244	6.1980E-05	6,176.98	6,176.98	0.00E+00	3.83E-01	3.83E-01
Co-60	2.2720E-06	6,176.98	6,176.98	0.00E+00	1.40E-02	1.40E-02
Cs-134	1.3787E-05	6,176.98	6,176.98	0.00E+00	8.52E-02	8.52E-02
Cs-135	4.8607E-06	6,176.98	6,176.98	0.00E+00	3.00E-02	3.00E-02
Cs-137	1.4300E+00	6,176.98	6,176.98	0.00E+00	8.83E+03	8.83E+03
Eu-154	6.2340E-03	6,176.98	6,176.98	0.00E+00	3.85E+01	3.85E+01
Eu-155	5.0213E-04	6,176.98	6,176.98	0.00E+00	3.10E+00	3.10E+00
Fe-55	2.5980E-05	6,176.98	6,176.98	0.00E+00	1.60E-01	1.60E-01
H-3	2.0100E-03	6,176.98	6,176.98	0.00E+00	1.24E+01	1.24E+01
I-129	7.1600E-07	6,176.98	6,176.98	0.00E+00	4.42E-03	4.42E-03
Kr-85	3.8813E-02	6,176.98	6,176.98	0.00E+00	2.40E+02	2.40E+02
Np-237	3.9360E-06	6,176.98	6,176.98	0.00E+00	2.43E-02	2.43E-02
Pa-231	5.2460E-09	6,176.98	6,176.98	0.00E+00	3.24E-05	3.24E-05
Pb-210	4.8933E-13	6,176.98	6,176.98	0.00E+00	3.02E-09	3.02E-09
Pm-147	8.8000E-04	6,176.98	6,176.98	0.00E+00	5.44E+00	5.44E+00
Pu-238	4.9107E-03	6,176.98	6,176.98	0.00E+00	3.03E+01	3.03E+01
Pu-239	1.0313E-02	6,176.98	6,176.98	0.00E+00	6.37E+01	6.37E+01
Pu-240	5.4093E-03	6,176.98	6,176.98	0.00E+00	3.34E+01	3.34E+01
Pu-241	1.8253E-01	6,176.98	6,176.98	0.00E+00	1.13E+03	1.13E+03
Pu-242	3.0713E-06	6,176.98	6,176.98	0.00E+00	1.90E-02	1.90E-02
Ra-226	1.5867E-12	6,176.98	6,176.98	0.00E+00	9.80E-09	9.80E-09
Ra-228	2.6227E-14	6,176.98	6,176.98	0.00E+00	1.62E-10	1.62E-10
Ru-106	2.8093E-10	6,176.98	6,176.98	0.00E+00	1.74E-06	1.74E-06
Se-79	1.2533E-05	6,176.98	6,176.98	0.00E+00	7.74E-02	7.74E-02
Sn-126	1.1393E-05	6,176.98	6,176.98	0.00E+00	7.04E-02	7.04E-02
Sr-90	1.2873E+00	6,176.98	6,176.98	0.00E+00	7.95E+03	7.95E+03
Tc-99	4.3533E-04	6,176.98	6,176.98	0.00E+00	2.69E+00	2.69E+00
Th-229	2.1167E-12	6,176.98	6,176.98	0.00E+00	1.31E-08	1.31E-08
Th-230	2.0387E-10	6,176.98	6,176.98	0.00E+00	1.26E-06	1.26E-06
Th-232	3.2393E-14	6,176.98	6,176.98	0.00E+00	2.00E-10	2.00E-10
Tl-208	6.6553E-09	6,176.98	6,176.98	0.00E+00	4.11E-05	4.11E-05
U-232	1.8033E-08	6,176.98	6,176.98	0.00E+00	1.11E-04	1.11E-04
U-233	8.5800E-10	6,176.98	6,176.98	0.00E+00	5.30E-06	5.30E-06
U-234	8.0733E-07	6,176.98	6,176.98	0.00E+00	4.99E-03	4.99E-03
U-235	-2.5335E-06	6,176.98	0.00	4.21E-03	0.00E+00	4.21E-03
U-236	1.3007E-05	6,176.98	6,176.98	0.00E+00	8.03E-02	8.03E-02
U-238	-1.4207E-08	6,176.98	0.00	3.67E-03	3.58E-03	3.67E-03
Y-90	1.2873E+00	6,176.98	6,176.98	0.00E+00	7.95E+03	7.95E+03
Other Radionuclides					8.39E+03	8.39E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.372E+14
0.0250	9.064E+13
0.0375	7.938E+13
0.0575	8.684E+13
0.0850	5.097E+13
0.1250	3.358E+13
0.2250	4.395E+13
0.3750	1.911E+13
0.5750	3.287E+14
0.8500	3.773E+12
1.2500	1.774E+12
1.7500	1.023E+11
2.2500	8.826E+06
2.7500	1.474E+06
3.5000	2.659E+04
5.0000	1.115E+04
7.0000	1.255E+03
11.0000	1.424E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.07E+02	1.07E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:		10 to 20

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		6,176.98
Bounding:		6,176.98

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	10.85	
Bounding:	10.85	

Estimated EOL HM/Given EOL HM: 2.02

[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: HWCTR SPRO (U02) SST LEU
SNF ID #: 978
Fuel Units & Descr: 5 - TUBE
Heavy Metal Mass: BOL= ; EOL=89.362kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2010
Template: HFBR (Heavy Water, SST, 0 to 5%, U)
[2]Template Burnup(MWd): 5
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 0.06

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	5.6840E-09	85,315.00	85,315.00	0.00E+00	4.85E-04	4.85E-04
Am-241	2.1380E-01	85,315.00	85,315.00	0.00E+00	1.82E+04	1.82E+04
Am-242m	1.0302E-04	85,315.00	85,315.00	0.00E+00	8.79E+00	8.79E+00
Am-243	5.2400E-05	85,315.00	85,315.00	0.00E+00	4.47E+00	4.47E+00
C-14	2.2160E-02	85,315.00	85,315.00	0.00E+00	1.89E+03	1.89E+03
Cl-36	4.1880E-04	85,315.00	85,315.00	0.00E+00	3.57E+01	3.57E+01
Cm-243	1.6766E-05	85,315.00	85,315.00	0.00E+00	1.43E+00	1.43E+00
Cm-244	7.3320E-04	85,315.00	85,315.00	0.00E+00	6.26E+01	6.26E+01
Co-60	5.1480E+00	85,315.00	85,315.00	0.00E+00	4.39E+05	4.39E+05
Cs-134	1.7300E-05	85,315.00	85,315.00	0.00E+00	1.48E+00	1.48E+00
Cs-135	3.7460E-06	85,315.00	85,315.00	0.00E+00	3.20E-01	3.20E-01
Cs-137	1.4426E+00	85,315.00	85,315.00	0.00E+00	1.23E+05	1.23E+05
Eu-154	9.2140E-03	85,315.00	85,315.00	0.00E+00	7.86E+02	7.86E+02
Eu-155	8.1360E-04	85,315.00	85,315.00	0.00E+00	6.94E+01	6.94E+01
Fe-55	5.3720E-02	85,315.00	85,315.00	0.00E+00	4.58E+03	4.58E+03
H-3	4.4560E-02	85,315.00	85,315.00	0.00E+00	3.80E+03	3.80E+03
I-129	9.1660E-07	85,315.00	85,315.00	0.00E+00	7.82E-02	7.82E-02
Kr-85	3.2380E-02	85,315.00	85,315.00	0.00E+00	2.76E+03	2.76E+03
Np-237	1.9674E-05	85,315.00	85,315.00	0.00E+00	1.68E+00	1.68E+00
Pa-231	9.3700E-09	85,315.00	85,315.00	0.00E+00	7.99E-04	7.99E-04
Pb-210	4.0520E-09	85,315.00	85,315.00	0.00E+00	3.46E-04	3.46E-04
Pm-147	7.8900E-04	85,315.00	85,315.00	0.00E+00	6.73E+01	6.73E+01
Pu-238	3.6340E-02	85,315.00	85,315.00	0.00E+00	3.10E+03	3.10E+03
Pu-239	6.5100E-02	85,315.00	85,315.00	0.00E+00	5.55E+03	5.55E+03
Pu-240	2.6700E-02	85,315.00	85,315.00	0.00E+00	2.28E+03	2.28E+03
Pu-241	1.3616E+00	85,315.00	85,315.00	0.00E+00	1.16E+05	1.16E+05
Pu-242	1.6742E-05	85,315.00	85,315.00	0.00E+00	1.43E+00	1.43E+00
Ra-226	1.0912E-08	85,315.00	85,315.00	0.00E+00	9.31E-04	9.31E-04
Ra-228	2.0780E-10	85,315.00	85,315.00	0.00E+00	1.77E-05	1.77E-05
Ru-106	7.4020E-10	85,315.00	85,315.00	0.00E+00	6.32E-05	6.32E-05
Se-79	2.8500E-05	85,315.00	85,315.00	0.00E+00	2.43E+00	2.43E+00
Sn-126	1.7794E-05	85,315.00	85,315.00	0.00E+00	1.52E+00	1.52E+00
Sr-90	1.0372E+00	85,315.00	85,315.00	0.00E+00	8.85E+04	8.85E+04
Tc-99	4.3360E-04	85,315.00	85,315.00	0.00E+00	3.70E+01	3.70E+01
Th-229	1.9490E-09	85,315.00	85,315.00	0.00E+00	1.66E-04	1.66E-04
Th-230	9.9520E-07	85,315.00	85,315.00	0.00E+00	8.49E-02	8.49E-02
Th-232	2.0900E-10	85,315.00	85,315.00	0.00E+00	1.78E-05	1.78E-05
Tl-208	1.5278E-07	85,315.00	85,315.00	0.00E+00	1.30E-02	1.30E-02
U-232	4.1360E-07	85,315.00	85,315.00	0.00E+00	3.53E-02	3.53E-02
U-233	4.1200E-07	85,315.00	85,315.00	0.00E+00	3.51E-02	3.51E-02
U-234	2.1700E-03	85,315.00	85,315.00	0.00E+00	1.85E+02	1.85E+02
U-235	-1.7036E-06	85,315.00	0.00	1.93E-02	0.00E+00	1.93E-02
U-236	2.6080E-05	85,315.00	85,315.00	0.00E+00	2.23E+00	2.23E+00
U-238	-5.1291E-07	85,315.00	0.00	5.65E-02	1.27E-02	5.65E-02
Y-90	1.0374E+00	85,315.00	85,315.00	0.00E+00	8.85E+04	8.85E+04
Other Radionuclides					7.34E+05	7.34E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.128E+15
0.0250	1.199E+15
0.0375	1.042E+15
0.0575	1.301E+15
0.0850	6.126E+14
0.1250	3.976E+14
0.2250	4.978E+14
0.3750	2.148E+14
0.5750	4.552E+15
0.8500	5.070E+13
1.2500	3.253E+16
1.7500	1.347E+12
2.2500	1.724E+11
2.7500	9.934E+08
3.5000	2.413E+08
5.0000	1.010E+08
7.0000	1.135E+05
11.0000	1.286E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.22E+03	9.22E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:		0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		85,315.00
Bounding:		85,315.00

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	32.70	
Bounding:	32.70	

Estimated EOL HM/Given EOL HM: 2.27

[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: HWCTR SPRO (UO2) ZR LEU
SNF ID #: 772
Fuel Units & Descr: 48 - TUBE
Heavy Metal Mass: BOL= ; EOL=180.922kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2010
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: 35 years

Estimated Canister usage: 18"x10' 0.55

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.6920E-09	173,423.00	173,423.00	0.00E+00	8.14E-04	8.14E-04
Am-241	2.2880E-02	173,423.00	173,423.00	0.00E+00	3.97E+03	3.97E+03
Am-242m	3.5400E-06	173,423.00	173,423.00	0.00E+00	6.14E-01	6.14E-01
Am-243	2.0580E-06	173,423.00	173,423.00	0.00E+00	3.57E-01	3.57E-01
C-14	1.1264E-03	173,423.00	173,423.00	0.00E+00	1.95E+02	1.95E+02
Cl-36	8.3760E-11	173,423.00	173,423.00	0.00E+00	1.45E-05	1.45E-05
Cm-243	5.0340E-07	173,423.00	173,423.00	0.00E+00	8.73E-02	8.73E-02
Cm-244	1.0450E-05	173,423.00	173,423.00	0.00E+00	1.81E+00	1.81E+00
Co-60	6.4420E-02	173,423.00	173,423.00	0.00E+00	1.12E+04	1.12E+04
Cs-134	7.9240E-06	173,423.00	173,423.00	0.00E+00	1.37E+00	1.37E+00
Cs-135	7.9140E-06	173,423.00	173,423.00	0.00E+00	1.37E+00	1.37E+00
Cs-137	1.4316E+00	173,423.00	173,423.00	0.00E+00	2.48E+05	2.48E+05
Eu-154	6.7900E-03	173,423.00	173,423.00	0.00E+00	1.18E+03	1.18E+03
Eu-155	6.2800E-04	173,423.00	173,423.00	0.00E+00	1.09E+02	1.09E+02
Fe-55	5.7480E-05	173,423.00	173,423.00	0.00E+00	9.97E+00	9.97E+00
H-3	2.3800E-02	173,423.00	173,423.00	0.00E+00	4.13E+03	4.13E+03
I-129	7.5020E-07	173,423.00	173,423.00	0.00E+00	1.30E-01	1.30E-01
Kr-85	3.8220E-02	173,423.00	173,423.00	0.00E+00	6.63E+03	6.63E+03
Np-237	5.5780E-06	173,423.00	173,423.00	0.00E+00	9.67E-01	9.67E-01
Pa-231	7.8820E-09	173,423.00	173,423.00	0.00E+00	1.37E-03	1.37E-03
Pb-210	4.3840E-09	173,423.00	173,423.00	0.00E+00	7.60E-04	7.60E-04
Pm-147	9.9500E-04	173,423.00	173,423.00	0.00E+00	1.73E+02	1.73E+02
Pu-238	6.4240E-03	173,423.00	173,423.00	0.00E+00	1.11E+03	1.11E+03
Pu-239	1.8744E-02	173,423.00	173,423.00	0.00E+00	3.25E+03	3.25E+03
Pu-240	8.3540E-03	173,423.00	173,423.00	0.00E+00	1.45E+03	1.45E+03
Pu-241	1.4606E-01	173,423.00	173,423.00	0.00E+00	2.53E+04	2.53E+04
Pu-242	2.0400E-06	173,423.00	173,423.00	0.00E+00	3.54E-01	3.54E-01
Ra-226	1.1804E-08	173,423.00	173,423.00	0.00E+00	2.05E-03	2.05E-03
Ra-228	1.1864E-09	173,423.00	173,423.00	0.00E+00	2.06E-04	2.06E-04
Ru-106	3.2580E-10	173,423.00	173,423.00	0.00E+00	5.65E-05	5.65E-05
Se-79	1.2524E-05	173,423.00	173,423.00	0.00E+00	2.17E+00	2.17E+00
Sn-126	1.2052E-05	173,423.00	173,423.00	0.00E+00	2.09E+00	2.09E+00
Sr-90	1.2638E+00	173,423.00	173,423.00	0.00E+00	2.19E+05	2.19E+05
Tc-99	4.4140E-04	173,423.00	173,423.00	0.00E+00	7.65E+01	7.65E+01
Th-229	4.3480E-09	173,423.00	173,423.00	0.00E+00	7.54E-04	7.54E-04
Th-230	1.0760E-06	173,423.00	173,423.00	0.00E+00	1.87E-01	1.87E-01
Th-232	1.1926E-09	173,423.00	173,423.00	0.00E+00	2.07E-04	2.07E-04
Tl-208	4.6200E-08	173,423.00	173,423.00	0.00E+00	8.01E-03	8.01E-03
U-232	1.2406E-07	173,423.00	173,423.00	0.00E+00	2.15E-02	2.15E-02
U-233	9.1620E-07	173,423.00	173,423.00	0.00E+00	1.59E-01	1.59E-01
U-234	2.3440E-03	173,423.00	173,423.00	0.00E+00	4.07E+02	4.07E+02
U-235	-2.3296E-06	173,423.00	0.00	3.91E-02	0.00E+00	3.91E-02
U-236	2.6620E-05	173,423.00	173,423.00	0.00E+00	4.62E+00	4.62E+00
U-238	-1.3291E-07	173,423.00	0.00	1.14E-01	9.13E-02	1.14E-01
Y-90	1.2642E+00	173,423.00	173,423.00	0.00E+00	2.19E+05	2.19E+05
Other Radionuclides					2.37E+05	2.37E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.210E+16
0.0250	2.506E+15
0.0375	2.205E+15
0.0575	2.387E+15
0.0850	1.408E+15
0.1250	9.288E+14
0.2250	1.213E+15
0.3750	5.275E+14
0.5750	9.231E+15
0.8500	1.065E+14
1.2500	8.779E+14
1.7500	2.887E+12
2.2500	4.625E+09
2.7500	2.959E+08
3.5000	8.924E+05
5.0000	3.746E+05
7.0000	4.213E+04
11.0000	4.781E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.19E+03	3.19E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:		0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		173,423.00
Bounding:		173,423.00

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	32.83	
Bounding:	32.83	

Estimated EOL HM/Given EOL HM: 2.59

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR TFEN (U-ZR) LEU
SNF ID #: 880
Fuel Units & Descr: 11 - TUBE
Heavy Metal Mass: BOL= ; EOL=162.082kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2010
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: 35 years

Estimated Canister usage: 18"x15' = 0.50

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.6920E-09	155,363.95	155,363.95	0.00E+00	7.29E-04	7.29E-04
Am-241	2.2880E-02	155,363.95	155,363.95	0.00E+00	3.55E+03	3.55E+03
Am-242m	3.5400E-06	155,363.95	155,363.95	0.00E+00	5.50E-01	5.50E-01
Am-243	2.0580E-06	155,363.95	155,363.95	0.00E+00	3.20E-01	3.20E-01
C-14	1.1264E-03	155,363.95	155,363.95	0.00E+00	1.75E+02	1.75E+02
Cl-36	8.3760E-11	155,363.95	155,363.95	0.00E+00	1.30E-05	1.30E-05
Cm-243	5.0340E-07	155,363.95	155,363.95	0.00E+00	7.82E-02	7.82E-02
Cm-244	1.0450E-05	155,363.95	155,363.95	0.00E+00	1.62E+00	1.62E+00
Co-60	6.4420E-02	155,363.95	155,363.95	0.00E+00	1.00E+04	1.00E+04
Cs-134	7.9240E-06	155,363.95	155,363.95	0.00E+00	1.23E+00	1.23E+00
Cs-135	7.9140E-06	155,363.95	155,363.95	0.00E+00	1.23E+00	1.23E+00
Cs-137	1.4316E+00	155,363.95	155,363.95	0.00E+00	2.22E+05	2.22E+05
Eu-154	6.7900E-03	155,363.95	155,363.95	0.00E+00	1.05E+03	1.05E+03
Eu-155	6.2800E-04	155,363.95	155,363.95	0.00E+00	9.76E+01	9.76E+01
Fe-55	5.7480E-05	155,363.95	155,363.95	0.00E+00	8.93E+00	8.93E+00
H-3	2.3800E-02	155,363.95	155,363.95	0.00E+00	3.70E+03	3.70E+03
I-129	7.5020E-07	155,363.95	155,363.95	0.00E+00	1.17E-01	1.17E-01
Kr-85	3.8220E-02	155,363.95	155,363.95	0.00E+00	5.94E+03	5.94E+03
Np-237	5.5780E-06	155,363.95	155,363.95	0.00E+00	8.67E-01	8.67E-01
Pa-231	7.8820E-09	155,363.95	155,363.95	0.00E+00	1.22E-03	1.22E-03
Pb-210	4.3840E-09	155,363.95	155,363.95	0.00E+00	6.81E-04	6.81E-04
Pm-147	9.9500E-04	155,363.95	155,363.95	0.00E+00	1.55E+02	1.55E+02
Pu-238	6.4240E-03	155,363.95	155,363.95	0.00E+00	9.98E+02	9.98E+02
Pu-239	1.8744E-02	155,363.95	155,363.95	0.00E+00	2.91E+03	2.91E+03
Pu-240	8.3540E-03	155,363.95	155,363.95	0.00E+00	1.30E+03	1.30E+03
Pu-241	1.4606E-01	155,363.95	155,363.95	0.00E+00	2.27E+04	2.27E+04
Pu-242	2.0400E-06	155,363.95	155,363.95	0.00E+00	3.17E-01	3.17E-01
Ra-226	1.1804E-08	155,363.95	155,363.95	0.00E+00	1.83E-03	1.83E-03
Ra-228	1.1864E-09	155,363.95	155,363.95	0.00E+00	1.84E-04	1.84E-04
Ru-106	3.2580E-10	155,363.95	155,363.95	0.00E+00	5.06E-05	5.06E-05
Se-79	1.2524E-05	155,363.95	155,363.95	0.00E+00	1.95E+00	1.95E+00
Sn-126	1.2052E-05	155,363.95	155,363.95	0.00E+00	1.87E+00	1.87E+00
Sr-90	1.2638E+00	155,363.95	155,363.95	0.00E+00	1.96E+05	1.96E+05
Tc-99	4.4140E-04	155,363.95	155,363.95	0.00E+00	6.86E+01	6.86E+01
Th-229	4.3480E-09	155,363.95	155,363.95	0.00E+00	6.76E-04	6.76E-04
Th-230	1.0760E-06	155,363.95	155,363.95	0.00E+00	1.67E-01	1.67E-01
Th-232	1.1926E-09	155,363.95	155,363.95	0.00E+00	1.85E-04	1.85E-04
Tl-208	4.6200E-08	155,363.95	155,363.95	0.00E+00	7.18E-03	7.18E-03
U-232	1.2406E-07	155,363.95	155,363.95	0.00E+00	1.93E-02	1.93E-02
U-233	9.1620E-07	155,363.95	155,363.95	0.00E+00	1.42E-01	1.42E-01
U-234	2.3440E-03	155,363.95	155,363.95	0.00E+00	3.64E+02	3.64E+02
U-235	-2.3296E-06	155,363.95	0.00	3.50E-02	0.00E+00	3.50E-02
U-236	2.6620E-05	155,363.95	155,363.95	0.00E+00	4.14E+00	4.14E+00
U-238	-1.3291E-07	155,363.95	0.00	1.02E-01	8.18E-02	1.02E-01
Y-90	1.2642E+00	155,363.95	155,363.95	0.00E+00	1.96E+05	1.96E+05
Other Radionuclides					2.12E+05	2.12E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.084E+16
0.0250	2.245E+15
0.0375	1.975E+15
0.0575	2.139E+15
0.0850	1.261E+15
0.1250	8.321E+14
0.2250	1.086E+15
0.3750	4.726E+14
0.5750	8.270E+15
0.8500	9.545E+13
1.2500	7.865E+14
1.7500	2.587E+12
2.2500	4.144E+09
2.7500	2.651E+08
3.5000	7.995E+05
5.0000	3.356E+05
7.0000	3.775E+04
11.0000	4.284E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.85E+03	2.85E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:		0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		155,363.95
Bounding:		155,363.95

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	32.83	
Bounding:	32.83	

Estimated EOL HM/Given EOL HM: 2.59

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR TMT-1-2 & 1-3 (U/TH)
SNF ID #: 112
Fuel Units & Descr: 2 - TUBE
Heavy Metal Mass: BOL= ; EOL=77.91kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2010
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' = 0.09

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.3072E-06	273.69	547.39	0.00E+00	6.31E-04	1.26E-03
Am-241	8.4448E+00	273.69	547.39	0.00E+00	2.31E+03	4.62E+03
Am-242m	1.6848E-02	273.69	547.39	0.00E+00	4.61E+00	9.22E+00
Am-243	1.6320E-02	273.69	547.39	0.00E+00	4.47E+00	8.93E+00
C-14	1.2090E-01	273.69	547.39	0.00E+00	3.31E+01	6.62E+01
Cl-36	2.2849E-03	273.69	547.39	0.00E+00	6.25E-01	1.25E+00
Cm-243	8.6624E-04	273.69	547.39	0.00E+00	2.37E-01	4.74E-01
Cm-244	1.6848E-01	273.69	547.39	0.00E+00	4.61E+01	9.22E+01
Co-60	2.8086E+01	273.69	547.39	0.00E+00	7.69E+03	1.54E+04
Cs-134	3.4148E-04	273.69	547.39	0.00E+00	9.35E-02	1.87E-01
Cs-135	4.3976E-04	273.69	547.39	0.00E+00	1.20E-01	2.41E-01
Cs-137	2.1049E+01	273.69	547.39	0.00E+00	5.76E+03	1.15E+04
Eu-154	1.2500E+00	273.69	547.39	0.00E+00	3.42E+02	6.84E+02
Eu-155	6.8986E-02	273.69	547.39	0.00E+00	1.89E+01	3.78E+01
Fe-55	2.9308E-01	273.69	547.39	0.00E+00	8.02E+01	1.60E+02
H-3	2.4311E-01	273.69	547.39	0.00E+00	6.65E+01	1.33E+02
I-129	1.0618E-05	273.69	547.39	0.00E+00	2.91E-03	5.81E-03
Kr-85	5.9882E-01	273.69	547.39	0.00E+00	1.64E+02	3.28E+02
Np-237	1.5668E-04	273.69	547.39	0.00E+00	4.29E-02	8.58E-02
Pa-231	2.8656E-06	273.69	547.39	0.00E+00	7.84E-04	1.57E-03
Pb-210	2.3918E-08	273.69	547.39	0.00E+00	6.55E-06	1.31E-05
Pm-147	1.6900E-02	273.69	547.39	0.00E+00	4.63E+00	9.25E+00
Pu-238	2.9608E+00	273.69	547.39	0.00E+00	8.16E+02	1.63E+03
Pu-239	4.1648E-01	273.69	547.39	0.00E+00	1.14E+02	2.28E+02
Pu-240	2.9264E-01	273.69	547.39	0.00E+00	8.01E+01	1.60E+02
Pu-241	4.8704E+01	273.69	547.39	0.00E+00	1.33E+04	2.67E+04
Pu-242	2.4560E-03	273.69	547.39	0.00E+00	6.72E-01	1.34E+00
Ra-226	6.4400E-08	273.69	547.39	0.00E+00	1.76E-05	3.53E-05
Ra-228	5.9952E-07	273.69	547.39	0.00E+00	1.64E-04	3.28E-04
Ru-106	8.5526E-07	273.69	547.39	0.00E+00	2.34E-04	4.68E-04
Se-79	1.9181E-04	273.69	547.39	0.00E+00	5.25E-02	1.05E-01
Sn-126	1.6671E-04	273.69	547.39	0.00E+00	4.56E-02	9.13E-02
Sr-90	1.9799E+01	273.69	547.39	0.00E+00	5.42E+03	1.08E+04
Tc-99	6.7678E-03	273.69	547.39	0.00E+00	1.85E+00	3.70E+00
Th-229	1.7488E-06	273.69	547.39	0.00E+00	4.79E-04	9.57E-04
Th-230	5.8704E-06	273.69	547.39	0.00E+00	1.61E-03	3.21E-03
Th-232	-4.2431E-09	273.69	0.00	1.59E-03	1.58E-03	1.59E-03
Tl-208	8.7573E-05	273.69	547.39	0.00E+00	2.40E-02	4.79E-02
U-232	2.3706E-04	273.69	547.39	0.00E+00	6.49E-02	1.30E-01
U-233	3.6128E-04	273.69	547.39	0.00E+00	9.89E-02	1.98E-01
U-234	1.2788E-02	273.69	547.39	0.00E+00	3.50E+00	7.00E+00
U-235	5.7486E-04	273.69	547.39	3.36E-02	1.91E-01	3.48E-01
U-236	2.3485E-04	273.69	547.39	0.00E+00	6.43E-02	1.29E-01
U-238	1.1581E-04	273.69	547.39	4.19E-03	3.59E-02	6.76E-02
Y-90	1.9804E+01	273.69	547.39	0.00E+00	5.42E+03	1.08E+04
Other Radionuclides					1.69E+04	3.38E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.812E+14
0.0250	1.335E+14
0.0375	1.166E+14
0.0575	1.835E+14
0.0850	7.161E+13
0.1250	5.613E+13
0.2250	6.204E+13
0.3750	2.653E+13
0.5750	4.315E+14
0.8500	1.649E+13
1.2500	1.153E+15
1.7500	5.099E+11
2.2500	6.045E+09
2.7500	1.704E+09
3.5000	1.548E+06
5.0000	6.566E+05
7.0000	7.506E+04
11.0000	8.582E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.03E+02	6.06E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	(Worst Case)
Fuel Cladding:	ZIRC	SST/Inconel
BOL HM Constituents:	Th and U	U, Th, & Pu
BOL Enrichment %:		0 to 100

Basis for Parameter Differences:
This fuel didn't closely match any existing templates, therefore the worst case template was used.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		273.69
Bounding:		547.39

Basis for burnup used in estimate:
Nominal burnup taken from SFD and converted to MWd using BOL=78.198kg
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.10	
Bounding:	0.21	

Estimated EOL HM/Given EOL HM: 2.74

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR TWNT (U METAL) LEU
SNF ID #: 791
Fuel Units & Descr: 15 - TUBE
Heavy Metal Mass: BOL= ; EOL=321.82kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1964
Estimates as of: 2010
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: 35 years

Estimated Canister usage: 18"x15' = 0.68

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.6920E-09	308,482.10	308,482.10	0.00E+00	1.45E-03	1.45E-03
Am-241	2.2880E-02	308,482.10	308,482.10	0.00E+00	7.06E+03	7.06E+03
Am-242m	3.5400E-06	308,482.10	308,482.10	0.00E+00	1.09E+00	1.09E+00
Am-243	2.0580E-06	308,482.10	308,482.10	0.00E+00	6.35E-01	6.35E-01
C-14	1.1264E-03	308,482.10	308,482.10	0.00E+00	3.47E+02	3.47E+02
Cl-36	8.3760E-11	308,482.10	308,482.10	0.00E+00	2.58E-05	2.58E-05
Cm-243	5.0340E-07	308,482.10	308,482.10	0.00E+00	1.55E-01	1.55E-01
Cm-244	1.0450E-05	308,482.10	308,482.10	0.00E+00	3.22E+00	3.22E+00
Co-60	6.4420E-02	308,482.10	308,482.10	0.00E+00	1.99E+04	1.99E+04
Cs-134	7.9240E-06	308,482.10	308,482.10	0.00E+00	2.44E+00	2.44E+00
Cs-135	7.9140E-06	308,482.10	308,482.10	0.00E+00	2.44E+00	2.44E+00
Cs-137	1.4316E+00	308,482.10	308,482.10	0.00E+00	4.42E+05	4.42E+05
Eu-154	6.7900E-03	308,482.10	308,482.10	0.00E+00	2.09E+03	2.09E+03
Eu-155	6.2800E-04	308,482.10	308,482.10	0.00E+00	1.94E+02	1.94E+02
Fe-55	5.7480E-05	308,482.10	308,482.10	0.00E+00	1.77E+01	1.77E+01
H-3	2.3800E-02	308,482.10	308,482.10	0.00E+00	7.34E+03	7.34E+03
I-129	7.5020E-07	308,482.10	308,482.10	0.00E+00	2.31E-01	2.31E-01
Kr-85	3.8220E-02	308,482.10	308,482.10	0.00E+00	1.18E+04	1.18E+04
Np-237	5.5780E-06	308,482.10	308,482.10	0.00E+00	1.72E+00	1.72E+00
Pa-231	7.8820E-09	308,482.10	308,482.10	0.00E+00	2.43E-03	2.43E-03
Pb-210	4.3840E-09	308,482.10	308,482.10	0.00E+00	1.35E-03	1.35E-03
Pm-147	9.9500E-04	308,482.10	308,482.10	0.00E+00	3.07E+02	3.07E+02
Pu-238	6.4240E-03	308,482.10	308,482.10	0.00E+00	1.98E+03	1.98E+03
Pu-239	1.8744E-02	308,482.10	308,482.10	0.00E+00	5.78E+03	5.78E+03
Pu-240	8.3540E-03	308,482.10	308,482.10	0.00E+00	2.58E+03	2.58E+03
Pu-241	1.4606E-01	308,482.10	308,482.10	0.00E+00	4.51E+04	4.51E+04
Pu-242	2.0400E-06	308,482.10	308,482.10	0.00E+00	6.29E-01	6.29E-01
Ra-226	1.1804E-06	308,482.10	308,482.10	0.00E+00	3.64E-03	3.64E-03
Ra-228	1.1864E-09	308,482.10	308,482.10	0.00E+00	3.66E-04	3.66E-04
Ru-106	3.2580E-10	308,482.10	308,482.10	0.00E+00	1.01E-04	1.01E-04
Se-79	1.2524E-05	308,482.10	308,482.10	0.00E+00	3.86E+00	3.86E+00
Sn-126	1.2052E-05	308,482.10	308,482.10	0.00E+00	3.72E+00	3.72E+00
Sr-90	1.2638E+00	308,482.10	308,482.10	0.00E+00	3.90E+05	3.90E+05
Tc-99	4.4140E-04	308,482.10	308,482.10	0.00E+00	1.36E+02	1.36E+02
Th-229	4.3480E-09	308,482.10	308,482.10	0.00E+00	1.34E-03	1.34E-03
Th-230	1.0760E-06	308,482.10	308,482.10	0.00E+00	3.32E-01	3.32E-01
Th-232	1.1926E-09	308,482.10	308,482.10	0.00E+00	3.68E-04	3.68E-04
Tl-208	4.6200E-06	308,482.10	308,482.10	0.00E+00	1.43E-02	1.43E-02
U-232	1.2406E-07	308,482.10	308,482.10	0.00E+00	3.83E-02	3.83E-02
U-233	9.1620E-07	308,482.10	308,482.10	0.00E+00	2.83E-01	2.83E-01
U-234	2.3440E-03	308,482.10	308,482.10	0.00E+00	7.23E+02	7.23E+02
U-235	-2.3296E-06	308,482.10	0.00	6.96E-02	0.00E+00	6.96E-02
U-236	2.6620E-05	308,482.10	308,482.10	0.00E+00	8.21E+00	8.21E+00
U-238	-1.3291E-07	308,482.10	0.00	2.03E-01	1.62E-01	2.03E-01
Y-90	1.2642E+00	308,482.10	308,482.10	0.00E+00	3.90E+05	3.90E+05
Other Radionuclides					4.21E+05	4.21E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.152E+16
0.0250	4.458E+15
0.0375	3.922E+15
0.0575	4.246E+15
0.0850	2.504E+15
0.1250	1.652E+15
0.2250	2.157E+15
0.3750	9.383E+14
0.5750	1.642E+16
0.8500	1.895E+14
1.2500	1.562E+15
1.7500	5.136E+12
2.2500	8.227E+09
2.7500	5.263E+08
3.5000	1.587E+06
5.0000	6.663E+05
7.0000	7.495E+04
11.0000	8.505E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.67E+03	8.67E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:		0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		308,482.10
Bounding:		308,482.10

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	32.83	
Bounding:	32.83	

Estimated EOL HM/Given EOL HM: 2.59

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IAN-R1 (COLUMBIA)
SNF ID #: 596
Fuel Units & Descr: 16 - MTR TYPE
Heavy Metal Mass: BOL=2.536kg; EOL=2.426kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1994
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' = 0.67

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.5861E-10	104.55	209.10	0.00E+00	4.79E-08	9.59E-08
Am-241	1.7832E-03	104.55	209.10	0.00E+00	1.86E-01	3.73E-01
Am-242m	4.3410E-07	104.55	209.10	0.00E+00	4.54E-05	9.08E-05
Am-243	1.4907E-06	104.55	209.10	0.00E+00	1.56E-04	3.12E-04
C-14	5.7162E-09	104.55	209.10	0.00E+00	5.98E-07	1.20E-06
Cl-36	1.3124E-32	104.55	209.10	0.00E+00	1.37E-30	2.74E-30
Cm-243	1.8568E-07	104.55	209.10	0.00E+00	1.94E-05	3.88E-05
Cm-244	3.5512E-05	104.55	209.10	0.00E+00	3.71E-03	7.43E-03
Co-60	1.0261E-05	104.55	209.10	0.00E+00	1.07E-03	2.15E-03
Cs-134	1.6931E-02	104.55	209.10	0.00E+00	1.77E+00	3.54E+00
Cs-135	3.4477E-06	104.55	209.10	0.00E+00	3.60E-04	7.21E-04
Cs-137	2.2800E+00	104.55	209.10	0.00E+00	2.38E+02	4.77E+02
Eu-154	3.6656E-02	104.55	209.10	0.00E+00	3.83E+00	7.66E+00
Eu-155	9.6841E-03	104.55	209.10	0.00E+00	1.01E+00	2.02E+00
Fe-55	4.6977E-04	104.55	209.10	0.00E+00	4.91E-02	9.82E-02
H-3	6.0485E-03	104.55	209.10	0.00E+00	6.32E-01	1.26E+00
I-129	7.5300E-07	104.55	209.10	0.00E+00	7.87E-05	1.57E-04
Kr-85	1.4989E-01	104.55	209.10	0.00E+00	1.57E+01	3.13E+01
Np-237	9.5534E-06	104.55	209.10	0.00E+00	9.99E-04	2.00E-03
Pa-231	1.6550E-09	104.55	209.10	0.00E+00	1.73E-07	3.46E-07
Pb-210	2.6631E-11	104.55	209.10	0.00E+00	2.78E-09	5.57E-09
Pm-147	1.8156E-01	104.55	209.10	0.00E+00	1.90E+01	3.80E+01
Pu-238	1.8990E-02	104.55	209.10	0.00E+00	1.99E+00	3.97E+00
Pu-239	4.2838E-04	104.55	209.10	0.00E+00	4.48E-02	8.96E-02
Pu-240	2.4379E-04	104.55	209.10	0.00E+00	2.55E-02	5.10E-02
Pu-241	4.2511E-02	104.55	209.10	0.00E+00	4.44E+00	8.89E+00
Pu-242	3.6329E-07	104.55	209.10	0.00E+00	3.80E-05	7.60E-05
Ra-226	1.4725E-10	104.55	209.10	0.00E+00	1.54E-08	3.08E-08
Ra-228	8.9760E-15	104.55	209.10	0.00E+00	9.38E-13	1.88E-12
Ru-106	1.9752E-04	104.55	209.10	0.00E+00	2.07E-02	4.13E-02
Se-79	1.2933E-05	104.55	209.10	0.00E+00	1.35E-03	2.70E-03
Sn-126	1.1574E-05	104.55	209.10	0.00E+00	1.21E-03	2.42E-03
Sr-90	2.1680E+00	104.55	209.10	0.00E+00	2.27E+02	4.53E+02
Tc-99	4.2239E-04	104.55	209.10	0.00E+00	4.42E-02	8.83E-02
Th-229	3.9270E-12	104.55	209.10	0.00E+00	4.11E-10	8.21E-10
Th-230	3.3578E-08	104.55	209.10	0.00E+00	3.51E-06	7.02E-06
Th-232	1.5452E-14	104.55	209.10	0.00E+00	1.62E-12	3.23E-12
Tl-208	4.6705E-08	104.55	209.10	0.00E+00	4.88E-06	9.77E-06
U-232	1.3045E-07	104.55	209.10	0.00E+00	1.36E-05	2.73E-05
U-233	2.3739E-09	104.55	209.10	0.00E+00	2.48E-07	4.96E-07
U-234	1.8423E-04	104.55	209.10	0.00E+00	1.93E-02	3.85E-02
U-235	-2.7235E-06	104.55	0.00	5.11E-03	4.82E-03	5.11E-03
U-236	1.5493E-05	104.55	209.10	0.00E+00	1.62E-03	3.24E-03
U-238	-4.2851E-09	104.55	0.00	5.79E-05	5.75E-05	5.79E-05
Y-90	2.1686E+00	104.55	209.10	0.00E+00	2.27E+02	4.53E+02
Other Radionuclides					2.27E+02	4.55E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.494E+13
0.0250	5.202E+12
0.0375	4.542E+12
0.0575	4.844E+12
0.0850	2.934E+12
0.1250	2.012E+12
0.2250	2.528E+12
0.3750	1.107E+12
0.5750	1.797E+13
0.8500	4.269E+11
1.2500	2.157E+11
1.7500	9.037E+09
2.2500	1.131E+07
2.7500	6.794E+05
3.5000	4.318E+04
5.0000	1.001E+02
7.0000	1.108E+01
11.0000	1.244E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.83E+00	5.66E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.20235261	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		104.55
Bounding:		209.10

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.13	
Bounding:	0.26	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IAN-R1 (COLUMBIA)
SNF ID #: 803
Fuel Units & Descr: 5 - MTR TYPE
Heavy Metal Mass: BOL=0.685kg; EOL=0.685kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' 0.21

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	2.8404E-10	12.97	25.95	0.00E+00	3.69E-09	7.37E-09
Am-241	1.4935E-03	12.97	25.95	0.00E+00	1.94E-02	3.88E-02
Am-242m	4.4390E-07	12.97	25.95	0.00E+00	5.76E-06	1.15E-05
Am-243	1.4913E-06	12.97	25.95	0.00E+00	1.93E-05	3.87E-05
C-14	5.7217E-09	12.97	25.95	0.00E+00	7.42E-08	1.48E-07
Cl-36	1.3124E-32	12.97	25.95	0.00E+00	1.70E-31	3.41E-31
Cm-243	2.0967E-07	12.97	25.95	0.00E+00	2.72E-06	5.44E-06
Cm-244	4.3001E-05	12.97	25.95	0.00E+00	5.58E-04	1.12E-03
Co-60	1.9798E-05	12.97	25.95	0.00E+00	2.57E-04	5.14E-04
Cs-134	9.0795E-02	12.97	25.95	0.00E+00	1.18E+00	2.36E+00
Cs-135	3.4477E-06	12.97	25.95	0.00E+00	4.47E-05	8.95E-05
Cs-137	2.5588E+00	12.97	25.95	0.00E+00	3.32E+01	6.64E+01
Eu-154	5.4847E-02	12.97	25.95	0.00E+00	7.12E-01	1.42E+00
Eu-155	1.9469E-02	12.97	25.95	0.00E+00	2.53E-01	5.05E-01
Fe-55	1.7797E-03	12.97	25.95	0.00E+00	2.31E-02	4.62E-02
H-3	8.0065E-03	12.97	25.95	0.00E+00	1.04E-01	2.08E-01
I-129	7.5300E-07	12.97	25.95	0.00E+00	9.77E-06	1.95E-05
Kr-85	2.0705E-01	12.97	25.95	0.00E+00	2.69E+00	5.37E+00
Np-237	9.5507E-06	12.97	25.95	0.00E+00	1.24E-04	2.48E-04
Pa-231	1.2740E-09	12.97	25.95	0.00E+00	1.65E-08	3.31E-08
Pb-210	1.1838E-11	12.97	25.95	0.00E+00	1.54E-10	3.07E-10
Pm-147	6.7974E-01	12.97	25.95	0.00E+00	8.82E+00	1.76E+01
Pu-238	1.9755E-02	12.97	25.95	0.00E+00	2.56E-01	5.13E-01
Pu-239	4.2838E-04	12.97	25.95	0.00E+00	5.56E-03	1.11E-02
Pu-240	2.4390E-04	12.97	25.95	0.00E+00	3.16E-03	6.33E-03
Pu-241	5.4058E-02	12.97	25.95	0.00E+00	7.01E-01	1.40E+00
Pu-242	3.6329E-07	12.97	25.95	0.00E+00	4.71E-06	9.43E-06
Ra-226	8.3742E-11	12.97	25.95	0.00E+00	1.09E-09	2.17E-09
Ra-228	5.7734E-15	12.97	25.95	0.00E+00	7.49E-14	1.50E-13
Ru-106	6.1356E-03	12.97	25.95	0.00E+00	7.96E-02	1.59E-01
Se-79	1.2936E-05	12.97	25.95	0.00E+00	1.68E-04	3.36E-04
Sn-126	1.1574E-05	12.97	25.95	0.00E+00	1.50E-04	3.00E-04
Sr-90	2.4417E+00	12.97	25.95	0.00E+00	3.17E+01	6.34E+01
Tc-99	4.2239E-04	12.97	25.95	0.00E+00	5.48E-03	1.10E-02
Th-229	2.8568E-12	12.97	25.95	0.00E+00	3.71E-11	7.41E-11
Th-230	2.5310E-06	12.97	25.95	0.00E+00	3.28E-07	6.57E-07
Th-232	1.1631E-14	12.97	25.95	0.00E+00	1.51E-13	3.02E-13
Tl-208	4.6705E-08	12.97	25.95	0.00E+00	6.06E-07	1.21E-06
U-232	1.3151E-07	12.97	25.95	0.00E+00	1.71E-06	3.41E-06
U-233	2.1650E-09	12.97	25.95	0.00E+00	2.81E-08	5.62E-08
U-234	1.8399E-04	12.97	25.95	0.00E+00	2.39E-03	4.77E-03
U-235	-2.7235E-06	12.97	0.00	1.38E-03	1.34E-03	1.38E-03
U-236	1.5493E-05	12.97	25.95	0.00E+00	2.01E-04	4.02E-04
U-238	-4.2851E-09	12.97	0.00	1.62E-05	1.62E-05	1.62E-05
Y-90	2.4423E+00	12.97	25.95	0.00E+00	3.17E+01	6.34E+01
Other Radionuclides					3.23E+01	6.45E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.529E+12
0.0250	7.427E+11
0.0375	6.475E+11
0.0575	6.840E+11
0.0850	4.162E+11
0.1250	2.911E+11
0.2250	3.574E+11
0.3750	1.602E+11
0.5750	2.600E+12
0.8500	1.268E+11
1.2500	4.128E+10
1.7500	1.507E+09
2.2500	9.966E+07
2.7500	1.391E+08
3.5000	1.656E+05
5.0000	1.381E+01
7.0000	1.534E+00
11.0000	1.726E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.11E-01	8.21E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.95939437	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		12.97
Bounding:		25.95

Basis for burnup used in estimate:
Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM: 0.98

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IEA-R1 (UALX HEU) BRAZIL
SNF ID #: 954
Fuel Units & Descr: 43 - ASSEMBLY
Heavy Metal Mass: BOL=8.295kg; EOL=4.975kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1998
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' = 1.19

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	2.8404E-10	3,143.73	6,287.45	0.00E+00	8.93E-07	1.79E-06
Am-241	1.4935E-03	3,143.73	6,287.45	0.00E+00	4.70E+00	9.39E+00
Am-242m	4.4390E-07	3,143.73	6,287.45	0.00E+00	1.40E-03	2.79E-03
Am-243	1.4913E-06	3,143.73	6,287.45	0.00E+00	4.69E-03	9.38E-03
C-14	5.7217E-09	3,143.73	6,287.45	0.00E+00	1.80E-05	3.60E-05
Cl-36	1.3124E-32	3,143.73	6,287.45	0.00E+00	4.13E-29	8.25E-29
Cm-243	2.0967E-07	3,143.73	6,287.45	0.00E+00	6.59E-04	1.32E-03
Cm-244	4.3001E-05	3,143.73	6,287.45	0.00E+00	1.35E-01	2.70E-01
Co-60	1.9798E-05	3,143.73	6,287.45	0.00E+00	6.22E-02	1.24E-01
Cs-134	9.0795E-02	3,143.73	6,287.45	0.00E+00	2.85E+02	5.71E+02
Cs-135	3.4477E-06	3,143.73	6,287.45	0.00E+00	1.08E-02	2.17E-02
Cs-137	2.5588E+00	3,143.73	6,287.45	0.00E+00	8.04E+03	1.61E+04
Eu-154	5.4847E-02	3,143.73	6,287.45	0.00E+00	1.72E+02	3.45E+02
Eu-155	1.9469E-02	3,143.73	6,287.45	0.00E+00	6.12E+01	1.22E+02
Fe-55	1.7797E-03	3,143.73	6,287.45	0.00E+00	5.59E+00	1.12E+01
H-3	8.0065E-03	3,143.73	6,287.45	0.00E+00	2.52E+01	5.03E+01
I-129	7.5300E-07	3,143.73	6,287.45	0.00E+00	2.37E-03	4.73E-03
Kr-85	2.0705E-01	3,143.73	6,287.45	0.00E+00	6.51E+02	1.30E+03
Np-237	9.5507E-06	3,143.73	6,287.45	0.00E+00	3.00E-02	6.00E-02
Pa-231	1.2740E-09	3,143.73	6,287.45	0.00E+00	4.00E-06	8.01E-06
Pb-210	1.1838E-11	3,143.73	6,287.45	0.00E+00	3.72E-08	7.44E-08
Pm-147	6.7974E-01	3,143.73	6,287.45	0.00E+00	2.14E+03	4.27E+03
Pu-238	1.9755E-02	3,143.73	6,287.45	0.00E+00	6.21E+01	1.24E+02
Pu-239	4.2838E-04	3,143.73	6,287.45	0.00E+00	1.35E+00	2.69E+00
Pu-240	2.4390E-04	3,143.73	6,287.45	0.00E+00	7.67E-01	1.53E+00
Pu-241	5.4058E-02	3,143.73	6,287.45	0.00E+00	1.70E+02	3.40E+02
Pu-242	3.6329E-07	3,143.73	6,287.45	0.00E+00	1.14E-03	2.28E-03
Ra-226	8.3742E-11	3,143.73	6,287.45	0.00E+00	2.63E-07	5.27E-07
Ra-228	5.7734E-15	3,143.73	6,287.45	0.00E+00	1.82E-11	3.63E-11
Ru-106	6.1356E-03	3,143.73	6,287.45	0.00E+00	1.93E+01	3.86E+01
Se-79	1.2936E-05	3,143.73	6,287.45	0.00E+00	4.07E-02	8.13E-02
Sn-126	1.1574E-05	3,143.73	6,287.45	0.00E+00	3.64E-02	7.28E-02
Sr-90	2.4417E+00	3,143.73	6,287.45	0.00E+00	7.68E+03	1.54E+04
Tc-99	4.2239E-04	3,143.73	6,287.45	0.00E+00	1.33E+00	2.66E+00
Th-229	2.8568E-12	3,143.73	6,287.45	0.00E+00	8.98E-09	1.80E-08
Th-230	2.5310E-08	3,143.73	6,287.45	0.00E+00	7.96E-05	1.59E-04
Th-232	1.1631E-14	3,143.73	6,287.45	0.00E+00	3.66E-11	7.31E-11
Tl-208	4.6705E-08	3,143.73	6,287.45	0.00E+00	1.47E-04	2.94E-04
U-232	1.3151E-07	3,143.73	6,287.45	0.00E+00	4.13E-04	8.27E-04
U-233	2.1650E-09	3,143.73	6,287.45	0.00E+00	6.81E-06	1.36E-05
U-234	1.8399E-04	3,143.73	6,287.45	0.00E+00	5.78E-01	1.16E+00
U-235	-2.7235E-06	3,143.73	0.00	1.67E-02	8.13E-03	1.67E-02
U-236	1.5493E-05	3,143.73	6,287.45	0.00E+00	4.87E-02	9.74E-02
U-238	-4.2851E-09	3,143.73	0.00	1.92E-04	1.79E-04	1.92E-04
Y-90	2.4423E+00	3,143.73	6,287.45	0.00E+00	7.68E+03	1.54E+04
Other Radionuclides					7.81E+03	1.56E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.551E+14
0.0250	1.800E+14
0.0375	1.569E+14
0.0575	1.657E+14
0.0850	1.006E+14
0.1250	7.054E+13
0.2250	8.660E+13
0.3750	3.881E+13
0.5750	6.301E+14
0.8500	3.074E+13
1.2500	1.000E+13
1.7500	3.652E+11
2.2500	2.415E+10
2.7500	3.369E+08
3.5000	4.012E+07
5.0000	3.333E+03
7.0000	3.703E+02
11.0000	4.166E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.95E+01	1.99E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.10655847	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3,143.73
Bounding:		6,287.45

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.20	
Bounding:	2.41	

Estimated EOL HM/Given EOL HM: 1.04

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IEA-R1 (UALX LEU) BRAZIL
SNF ID #: 545
Fuel Units & Descr: 84 - ASSEMBLY
Heavy Metal Mass: BOL=63.554kg; EOL=61.732kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1998
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' 3.50

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8404E-10	1,726.23	3,452.45	0.00E+00	4.90E-07	9.81E-07	Avg. MeV	
Am-241	1.4935E-03	1,726.23	3,452.45	0.00E+00	2.58E+00	5.16E+00	0.0150	4.695E+14
Am-242m	4.4390E-07	1,726.23	3,452.45	0.00E+00	7.66E-04	1.53E-03	0.0250	9.882E+13
Am-243	1.4913E-06	1,726.23	3,452.45	0.00E+00	2.57E-03	5.15E-03	0.0375	8.615E+13
C-14	5.7217E-09	1,726.23	3,452.45	0.00E+00	9.88E-06	1.98E-05	0.0575	9.101E+13
Cl-36	1.3124E-32	1,726.23	3,452.45	0.00E+00	2.27E-29	4.53E-29	0.0850	5.537E+13
Cm-243	2.0967E-07	1,726.23	3,452.45	0.00E+00	3.62E-04	7.24E-04	0.1250	3.873E+13
Cm-244	4.3001E-05	1,726.23	3,452.45	0.00E+00	7.42E-02	1.48E-01	0.2250	4.755E+13
Co-60	1.9798E-05	1,726.23	3,452.45	0.00E+00	3.42E-02	6.84E-02	0.3750	2.131E+13
Cs-134	9.0795E-02	1,726.23	3,452.45	0.00E+00	1.57E+02	3.13E+02	0.5750	3.460E+14
Cs-135	3.4477E-06	1,726.23	3,452.45	0.00E+00	5.95E-03	1.19E-02	0.8500	1.688E+13
Cs-137	2.5588E+00	1,726.23	3,452.45	0.00E+00	4.42E+03	8.83E+03	1.2500	5.493E+12
Eu-154	5.4847E-02	1,726.23	3,452.45	0.00E+00	9.47E+01	1.89E+02	1.7500	2.006E+11
Eu-155	1.9469E-02	1,726.23	3,452.45	0.00E+00	3.36E+01	6.72E+01	2.2500	1.326E+10
Fe-55	1.7797E-03	1,726.23	3,452.45	0.00E+00	3.07E+00	6.14E+00	2.7500	1.850E+08
H-3	8.0065E-03	1,726.23	3,452.45	0.00E+00	1.38E+01	2.76E+01	3.5000	2.203E+07
I-129	7.5300E-07	1,726.23	3,452.45	0.00E+00	1.30E-03	2.60E-03	5.0000	1.869E+03
Kr-85	2.0705E-01	1,726.23	3,452.45	0.00E+00	3.57E+02	7.15E+02	7.0000	2.079E+02
Np-237	9.5507E-06	1,726.23	3,452.45	0.00E+00	1.65E-02	3.30E-02	11.0000	2.340E+01
Pa-231	1.2740E-09	1,726.23	3,452.45	0.00E+00	2.20E-06	4.40E-06		
Pb-210	1.1838E-11	1,726.23	3,452.45	0.00E+00	2.04E-08	4.09E-08		
Pm-147	6.7974E-01	1,726.23	3,452.45	0.00E+00	1.17E+03	2.35E+03		
Pu-238	1.9755E-02	1,726.23	3,452.45	0.00E+00	3.41E+01	6.82E+01		
Pu-239	4.2838E-04	1,726.23	3,452.45	0.00E+00	7.39E-01	1.48E+00		
Pu-240	2.4390E-04	1,726.23	3,452.45	0.00E+00	4.21E-01	8.42E-01		
Pu-241	5.4058E-02	1,726.23	3,452.45	0.00E+00	9.33E+01	1.87E+02		
Pu-242	3.6329E-07	1,726.23	3,452.45	0.00E+00	6.27E-04	1.25E-03		
Ra-226	8.3742E-11	1,726.23	3,452.45	0.00E+00	1.45E-07	2.89E-07		
Ra-228	5.7734E-15	1,726.23	3,452.45	0.00E+00	9.97E-12	1.99E-11		
Ru-106	6.1356E-03	1,726.23	3,452.45	0.00E+00	1.06E+01	2.12E+01		
Se-79	1.2936E-05	1,726.23	3,452.45	0.00E+00	2.23E-02	4.47E-02		
Sn-126	1.1574E-05	1,726.23	3,452.45	0.00E+00	2.00E-02	4.00E-02		
Sr-90	2.4417E+00	1,726.23	3,452.45	0.00E+00	4.21E+03	8.43E+03		
Tc-99	4.2239E-04	1,726.23	3,452.45	0.00E+00	7.29E-01	1.46E+00		
Th-229	2.8568E-12	1,726.23	3,452.45	0.00E+00	4.93E-09	9.86E-09		
Th-230	2.5310E-06	1,726.23	3,452.45	0.00E+00	4.37E-05	8.74E-05		
Th-232	1.1631E-14	1,726.23	3,452.45	0.00E+00	2.01E-11	4.02E-11		
Tl-208	4.6705E-08	1,726.23	3,452.45	0.00E+00	8.06E-05	1.61E-04		
U-232	1.3151E-07	1,726.23	3,452.45	0.00E+00	2.27E-04	4.54E-04		
U-233	2.1650E-09	1,726.23	3,452.45	0.00E+00	3.74E-06	7.47E-06		
U-234	1.8399E-04	1,726.23	3,452.45	0.00E+00	3.18E-01	6.35E-01		
U-235	-2.7235E-06	1,726.23	0.00	2.70E-02	2.23E-02	2.70E-02		
U-236	1.5493E-05	1,726.23	3,452.45	0.00E+00	2.67E-02	5.35E-02		
U-238	-4.2851E-09	1,726.23	0.00	1.72E-02	1.72E-02	1.72E-02		
Y-90	2.4423E+00	1,726.23	3,452.45	0.00E+00	4.22E+03	8.43E+03		
Other Radionuclides					4.29E+03	8.58E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.46E+01	1.09E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.66156128	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,726.23
Bounding:		3,452.45

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.09	
Bounding:	0.17	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IEA-R1 (UALX LEU) BRAZIL
SNF ID #: 1076
Fuel Units & Descr: 39 - ASSEMBLY
Heavy Metal Mass: BOL=29.507kg; EOL=28.661kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1998
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' = 1.63

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8404E-10	801.46	1,602.93	0.00E+00	2.28E-07	4.55E-07	Avg. MeV	
Am-241	1.4935E-03	801.46	1,602.93	0.00E+00	1.20E+00	2.39E+00	0.0150	2.180E+14
Am-242m	4.4390E-07	801.46	1,602.93	0.00E+00	3.56E-04	7.12E-04	0.0250	4.588E+13
Am-243	1.4913E-06	801.46	1,602.93	0.00E+00	1.20E-03	2.39E-03	0.0375	4.000E+13
C-14	5.7217E-09	801.46	1,602.93	0.00E+00	4.59E-06	9.17E-06	0.0575	4.226E+13
Cl-36	1.3124E-32	801.46	1,602.93	0.00E+00	1.05E-29	2.10E-29	0.0850	2.571E+13
Cm-243	2.0967E-07	801.46	1,602.93	0.00E+00	1.68E-04	3.36E-04	0.1250	1.798E+13
Cm-244	4.3001E-05	801.46	1,602.93	0.00E+00	3.45E-02	6.89E-02	0.2250	2.208E+13
Co-60	1.9798E-05	801.46	1,602.93	0.00E+00	1.59E-02	3.17E-02	0.3750	9.895E+12
Cs-134	9.0795E-02	801.46	1,602.93	0.00E+00	7.28E+01	1.46E+02	0.5750	1.606E+14
Cs-135	3.4477E-06	801.46	1,602.93	0.00E+00	2.76E-03	5.53E-03	0.8500	7.836E+12
Cs-137	2.5588E+00	801.46	1,602.93	0.00E+00	2.05E+03	4.10E+03	1.2500	2.550E+12
Eu-154	5.4847E-02	801.46	1,602.93	0.00E+00	4.40E+01	8.79E+01	1.7500	9.312E+10
Eu-155	1.9469E-02	801.46	1,602.93	0.00E+00	1.56E+01	3.12E+01	2.2500	6.156E+09
Fe-55	1.7797E-03	801.46	1,602.93	0.00E+00	1.43E+00	2.85E+00	2.7500	8.590E+07
H-3	8.0065E-03	801.46	1,602.93	0.00E+00	6.42E+00	1.28E+01	3.5000	1.023E+07
I-129	7.5300E-07	801.46	1,602.93	0.00E+00	6.03E-04	1.21E-03	5.0000	8.679E+02
Kr-85	2.0705E-01	801.46	1,602.93	0.00E+00	1.66E+02	3.32E+02	7.0000	9.851E+01
Np-237	9.5507E-06	801.46	1,602.93	0.00E+00	7.65E-03	1.53E-02	11.0000	1.086E+01
Pa-231	1.2740E-09	801.46	1,602.93	0.00E+00	1.02E-06	2.04E-06		
Pb-210	1.1838E-11	801.46	1,602.93	0.00E+00	9.49E-09	1.90E-08		
Pm-147	6.7974E-01	801.46	1,602.93	0.00E+00	5.45E+02	1.09E+03		
Pu-238	1.9755E-02	801.46	1,602.93	0.00E+00	1.58E+01	3.17E+01		
Pu-239	4.2838E-04	801.46	1,602.93	0.00E+00	3.43E-01	6.87E-01		
Pu-240	2.4390E-04	801.46	1,602.93	0.00E+00	1.95E-01	3.91E-01		
Pu-241	5.4058E-02	801.46	1,602.93	0.00E+00	4.33E+01	8.67E+01		
Pu-242	3.6329E-07	801.46	1,602.93	0.00E+00	2.91E-04	5.82E-04		
Ra-226	8.3742E-11	801.46	1,602.93	0.00E+00	6.71E-08	1.34E-07		
Ra-228	5.7734E-15	801.46	1,602.93	0.00E+00	4.63E-12	9.25E-12		
Ru-106	6.1356E-03	801.46	1,602.93	0.00E+00	4.92E+00	9.83E+00		
Se-79	1.2936E-05	801.46	1,602.93	0.00E+00	1.04E-02	2.07E-02		
Sn-126	1.1574E-05	801.46	1,602.93	0.00E+00	9.28E-03	1.86E-02		
Sr-90	2.4417E+00	801.46	1,602.93	0.00E+00	1.96E+03	3.91E+03		
Tc-99	4.2239E-04	801.46	1,602.93	0.00E+00	3.39E-01	6.77E-01		
Th-229	2.8568E-12	801.46	1,602.93	0.00E+00	2.29E-09	4.58E-09		
Th-230	2.5310E-08	801.46	1,602.93	0.00E+00	2.03E-05	4.06E-05		
Th-232	1.1631E-14	801.46	1,602.93	0.00E+00	9.32E-12	1.86E-11		
Tl-208	4.6705E-08	801.46	1,602.93	0.00E+00	3.74E-05	7.49E-05		
U-232	1.3151E-07	801.46	1,602.93	0.00E+00	1.05E-04	2.11E-04		
U-233	2.1650E-09	801.46	1,602.93	0.00E+00	1.74E-06	3.47E-06		
U-234	1.8399E-04	801.46	1,602.93	0.00E+00	1.47E-01	2.95E-01		
U-235	-2.7235E-06	801.46	0.00	1.25E-02	1.04E-02	1.25E-02		
U-236	1.5493E-05	801.46	1,602.93	0.00E+00	1.24E-02	2.48E-02		
U-238	-4.2851E-09	801.46	0.00	7.97E-03	7.96E-03	7.97E-03		
Y-90	2.4423E+00	801.46	1,602.93	0.00E+00	1.96E+03	3.91E+03		
Other Radionuclides					1.99E+03	3.98E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.84E+01	5.07E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.66156126	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		801.46
Bounding:		1,602.93

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.09	
Bounding:	0.17	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IOWA ST. UNIV. (HEU UALX)
SNF ID #: 792
Fuel Units & Descr: 22 - FLAT PLATES IN CAN
Heavy Metal Mass: BOL=3.478kg; EOL=3.474kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' 0.61

II. Estimates

	m	x_a	x_b	b	y_a	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8404E-10	4.17	8.33	0.00E+00	1.18E-09	2.37E-09	Avg. MeV	
Am-241	1.4935E-03	4.17	8.33	0.00E+00	6.22E-03	1.24E-02	0.0150	1.134E+12
Am-242m	4.4390E-07	4.17	8.33	0.00E+00	1.85E-06	3.70E-06	0.0250	2.385E+11
Am-243	1.4913E-06	4.17	8.33	0.00E+00	6.21E-06	1.24E-05	0.0375	2.080E+11
C-14	5.7217E-09	4.17	8.33	0.00E+00	2.38E-08	4.77E-08	0.0575	2.197E+11
Cl-36	1.3124E-32	4.17	8.33	0.00E+00	5.47E-32	1.09E-31	0.0850	1.337E+11
Cm-243	2.0967E-07	4.17	8.33	0.00E+00	8.74E-07	1.75E-06	0.1250	9.354E+10
Cm-244	4.3001E-05	4.17	8.33	0.00E+00	1.79E-04	3.58E-04	0.2250	1.149E+11
Co-60	1.9798E-05	4.17	8.33	0.00E+00	8.25E-05	1.65E-04	0.3750	5.144E+10
Cs-134	9.0795E-02	4.17	8.33	0.00E+00	3.78E-01	7.57E-01	0.5750	8.352E+11
Cs-135	3.4477E-06	4.17	8.33	0.00E+00	1.44E-05	2.87E-05	0.8500	4.074E+10
Cs-137	2.5588E+00	4.17	8.33	0.00E+00	1.07E+01	2.13E+01	1.2500	1.326E+10
Eu-154	5.4847E-02	4.17	8.33	0.00E+00	2.29E-01	4.57E-01	1.7500	4.841E+08
Eu-155	1.9469E-02	4.17	8.33	0.00E+00	8.11E-02	1.62E-01	2.2500	3.201E+07
Fe-55	1.7797E-03	4.17	8.33	0.00E+00	7.42E-03	1.48E-02	2.7500	4.466E+05
H-3	8.0065E-03	4.17	8.33	0.00E+00	3.34E-02	6.67E-02	3.5000	5.317E+04
I-129	7.5300E-07	4.17	8.33	0.00E+00	3.14E-06	6.28E-06	5.0000	4.691E+00
Kr-85	2.0705E-01	4.17	8.33	0.00E+00	8.63E-01	1.73E+00	7.0000	5.217E-01
Np-237	9.5507E-06	4.17	8.33	0.00E+00	3.98E-05	7.96E-05	11.0000	5.872E-02
Pa-231	1.2740E-09	4.17	8.33	0.00E+00	5.31E-09	1.06E-08		
Pb-210	1.1838E-11	4.17	8.33	0.00E+00	4.93E-11	9.87E-11		
Pm-147	6.7974E-01	4.17	8.33	0.00E+00	2.83E+00	5.66E+00		
Pu-238	1.9755E-02	4.17	8.33	0.00E+00	8.23E-02	1.65E-01		
Pu-239	4.2838E-04	4.17	8.33	0.00E+00	1.78E-03	3.57E-03		
Pu-240	2.4390E-04	4.17	8.33	0.00E+00	1.02E-03	2.03E-03		
Pu-241	5.4058E-02	4.17	8.33	0.00E+00	2.25E-01	4.51E-01		
Pu-242	3.6329E-07	4.17	8.33	0.00E+00	1.51E-06	3.03E-06		
Ra-226	8.3742E-11	4.17	8.33	0.00E+00	3.49E-10	6.98E-10		
Ra-228	5.7734E-15	4.17	8.33	0.00E+00	2.41E-14	4.81E-14		
Ru-106	6.1356E-03	4.17	8.33	0.00E+00	2.56E-02	5.11E-02		
Se-79	1.2936E-05	4.17	8.33	0.00E+00	5.39E-05	1.08E-04		
Sn-126	1.1574E-05	4.17	8.33	0.00E+00	4.82E-05	9.65E-05		
Sr-90	2.4417E+00	4.17	8.33	0.00E+00	1.02E+01	2.03E+01		
Tc-99	4.2239E-04	4.17	8.33	0.00E+00	1.76E-03	3.52E-03		
Th-229	2.8568E-12	4.17	8.33	0.00E+00	1.19E-11	2.38E-11		
Th-230	2.5310E-08	4.17	8.33	0.00E+00	1.05E-07	2.11E-07		
Th-232	1.1631E-14	4.17	8.33	0.00E+00	4.85E-14	9.69E-14		
Tl-208	4.6705E-08	4.17	8.33	0.00E+00	1.95E-07	3.89E-07		
U-232	1.3151E-07	4.17	8.33	0.00E+00	5.48E-07	1.10E-06		
U-233	2.1650E-09	4.17	8.33	0.00E+00	9.02E-09	1.80E-08		
U-234	1.8399E-04	4.17	8.33	0.00E+00	7.67E-04	1.53E-03		
U-235	-2.7235E-08	4.17	0.00	7.01E-03	7.00E-03	7.01E-03		
U-236	1.5493E-05	4.17	8.33	0.00E+00	6.46E-05	1.29E-04		
U-238	-4.2851E-09	4.17	0.00	7.82E-05	7.82E-05	7.82E-05		
Y-90	2.4423E+00	4.17	8.33	0.00E+00	1.02E+01	2.04E+01		
Other Radionuclides					1.04E+01	2.07E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.32E-01	2.64E-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 %:	93.30981127	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		4.17
Bounding:		8.33

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	
Bounding:	0.01	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IOWA STATE UNIVERSITY (U3Si2 LEU)
SNF ID #: 953
Fuel Units & Descr: 24 - 24 FLAT PLATES
Heavy Metal Mass: BOL=19.205kg; EOL=19.195kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1998
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' 0.67

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.8404E-10	9.09	18.18	0.00E+00	2.58E-09	5.16E-09
Am-241	1.4935E-03	9.09	18.18	0.00E+00	1.36E-02	2.72E-02
Am-242m	4.4390E-07	9.09	18.18	0.00E+00	4.04E-06	8.07E-06
Am-243	1.4913E-06	9.09	18.18	0.00E+00	1.36E-05	2.71E-05
C-14	5.7217E-09	9.09	18.18	0.00E+00	5.20E-08	1.04E-07
Cl-36	1.3124E-32	9.09	18.18	0.00E+00	1.19E-31	2.39E-31
Cm-243	2.0967E-07	9.09	18.18	0.00E+00	1.91E-06	3.81E-06
Cm-244	4.3001E-05	9.09	18.18	0.00E+00	3.91E-04	7.82E-04
Co-60	1.9798E-05	9.09	18.18	0.00E+00	1.80E-04	3.60E-04
Cs-134	9.0795E-02	9.09	18.18	0.00E+00	8.25E-01	1.65E+00
Cs-135	3.4477E-06	9.09	18.18	0.00E+00	3.13E-05	6.27E-05
Cs-137	2.5588E+00	9.09	18.18	0.00E+00	2.33E+01	4.65E+01
Eu-154	5.4847E-02	9.09	18.18	0.00E+00	4.99E-01	9.97E-01
Eu-155	1.9469E-02	9.09	18.18	0.00E+00	1.77E-01	3.54E-01
Fe-55	1.7797E-03	9.09	18.18	0.00E+00	1.62E-02	3.24E-02
H-3	8.0065E-03	9.09	18.18	0.00E+00	7.28E-02	1.46E-01
I-129	7.5300E-07	9.09	18.18	0.00E+00	6.85E-06	1.37E-05
Kr-85	2.0705E-01	9.09	18.18	0.00E+00	1.88E+00	3.76E+00
Np-237	9.5507E-06	9.09	18.18	0.00E+00	8.68E-05	1.74E-04
Pa-231	1.2740E-09	9.09	18.18	0.00E+00	1.16E-08	2.32E-08
Pb-210	1.1838E-11	9.09	18.18	0.00E+00	1.08E-10	2.15E-10
Pm-147	6.7974E-01	9.09	18.18	0.00E+00	6.18E+00	1.24E+01
Pu-238	1.9755E-02	9.09	18.18	0.00E+00	1.80E-01	3.59E-01
Pu-239	4.2838E-04	9.09	18.18	0.00E+00	3.89E-03	7.79E-03
Pu-240	2.4390E-04	9.09	18.18	0.00E+00	2.22E-03	4.43E-03
Pu-241	5.4058E-02	9.09	18.18	0.00E+00	4.91E-01	9.83E-01
Pu-242	3.6329E-07	9.09	18.18	0.00E+00	3.30E-06	6.61E-06
Ra-226	8.3742E-11	9.09	18.18	0.00E+00	7.61E-10	1.52E-09
Ra-228	5.7734E-15	9.09	18.18	0.00E+00	5.25E-14	1.05E-13
Ru-106	6.1356E-03	9.09	18.18	0.00E+00	5.58E-02	1.12E-01
Se-79	1.2936E-05	9.09	18.18	0.00E+00	1.18E-04	2.35E-04
Sn-126	1.1574E-05	9.09	18.18	0.00E+00	1.05E-04	2.10E-04
Sr-90	2.4417E+00	9.09	18.18	0.00E+00	2.22E+01	4.44E+01
Tc-99	4.2239E-04	9.09	18.18	0.00E+00	3.84E-03	7.68E-03
Th-229	2.8568E-12	9.09	18.18	0.00E+00	2.60E-11	5.19E-11
Th-230	2.5310E-06	9.09	18.18	0.00E+00	2.30E-07	4.60E-07
Th-232	1.1631E-14	9.09	18.18	0.00E+00	1.06E-13	2.11E-13
Tl-208	4.6705E-06	9.09	18.18	0.00E+00	4.25E-07	8.49E-07
U-232	1.3151E-07	9.09	18.18	0.00E+00	1.20E-06	2.39E-06
U-233	2.1650E-09	9.09	18.18	0.00E+00	1.97E-08	3.94E-08
U-234	1.8399E-04	9.09	18.18	0.00E+00	1.67E-03	3.35E-03
U-235	-2.7235E-06	9.09	0.00	8.20E-03	8.18E-03	8.20E-03
U-236	1.5493E-05	9.09	18.18	0.00E+00	1.41E-04	2.82E-04
U-238	-4.2851E-09	9.09	0.00	5.18E-03	5.18E-03	5.18E-03
Y-90	2.4423E+00	9.09	18.18	0.00E+00	2.22E+01	4.44E+01
Other Radionuclides					2.26E+01	4.52E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.473E+12
0.0250	5.204E+11
0.0375	4.537E+11
0.0575	4.793E+11
0.0850	2.916E+11
0.1250	2.040E+11
0.2250	2.506E+11
0.3750	1.122E+11
0.5750	1.822E+12
0.8500	8.889E+10
1.2500	2.893E+10
1.7500	1.056E+09
2.2500	6.983E+07
2.7500	9.745E+05
3.5000	1.160E+05
5.0000	2.161E+01
7.0000	2.449E+00
11.0000	2.789E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.88E-01	5.76E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.76527712	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.02	9.09
Bounding:		18.18

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	473.39
Bounding:	0.00	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JEN-1 (HEU UALX) SPAIN
SNF ID #: 795
Fuel Units & Descr: 23 - 16 CURVED PLATES
Heavy Metal Mass: BOL=4.002kg; EOL=3.783kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1995
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 0.96

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.5861E-10	206.92	413.85	0.00E+00	9.49E-08	1.90E-07
Am-241	1.7832E-03	206.92	413.85	0.00E+00	3.69E-01	7.38E-01
Am-242m	4.3410E-07	206.92	413.85	0.00E+00	8.98E-05	1.80E-04
Am-243	1.4907E-06	206.92	413.85	0.00E+00	3.08E-04	6.17E-04
C-14	5.7162E-09	206.92	413.85	0.00E+00	1.18E-06	2.37E-06
Cl-36	1.3124E-32	206.92	413.85	0.00E+00	2.72E-30	5.43E-30
Cm-243	1.8568E-07	206.92	413.85	0.00E+00	3.84E-05	7.68E-05
Cm-244	3.5512E-05	206.92	413.85	0.00E+00	7.35E-03	1.47E-02
Co-60	1.0261E-05	206.92	413.85	0.00E+00	2.12E-03	4.25E-03
Cs-134	1.6931E-02	206.92	413.85	0.00E+00	3.50E+00	7.01E+00
Cs-135	3.4477E-06	206.92	413.85	0.00E+00	7.13E-04	1.43E-03
Cs-137	2.2800E+00	206.92	413.85	0.00E+00	4.72E+02	9.44E+02
Eu-154	3.6656E-02	206.92	413.85	0.00E+00	7.58E+00	1.52E+01
Eu-155	9.6841E-03	206.92	413.85	0.00E+00	2.00E+00	4.01E+00
Fe-55	4.6977E-04	206.92	413.85	0.00E+00	9.72E-02	1.94E-01
H-3	6.0485E-03	206.92	413.85	0.00E+00	1.25E+00	2.50E+00
I-129	7.5300E-07	206.92	413.85	0.00E+00	1.56E-04	3.12E-04
Kr-85	1.4989E-01	206.92	413.85	0.00E+00	3.10E+01	6.20E+01
Np-237	9.5534E-06	206.92	413.85	0.00E+00	1.98E-03	3.95E-03
Pa-231	1.6550E-09	206.92	413.85	0.00E+00	3.42E-07	6.85E-07
Pb-210	2.6631E-11	206.92	413.85	0.00E+00	5.51E-09	1.10E-08
Pm-147	1.8156E-01	206.92	413.85	0.00E+00	3.76E+01	7.51E+01
Pu-238	1.8990E-02	206.92	413.85	0.00E+00	3.93E+00	7.86E+00
Pu-239	4.2838E-04	206.92	413.85	0.00E+00	8.86E-02	1.77E-01
Pu-240	2.4379E-04	206.92	413.85	0.00E+00	5.04E-02	1.01E-01
Pu-241	4.2511E-02	206.92	413.85	0.00E+00	8.80E+00	1.76E+01
Pu-242	3.6329E-07	206.92	413.85	0.00E+00	7.52E-05	1.50E-04
Ra-226	1.4725E-10	206.92	413.85	0.00E+00	3.05E-08	6.09E-08
Ra-228	8.9760E-15	206.92	413.85	0.00E+00	1.86E-12	3.71E-12
Ru-106	1.9752E-04	206.92	413.85	0.00E+00	4.09E-02	8.17E-02
Se-79	1.2933E-05	206.92	413.85	0.00E+00	2.68E-03	5.35E-03
Sn-126	1.1574E-05	206.92	413.85	0.00E+00	2.39E-03	4.79E-03
Sr-90	2.1680E+00	206.92	413.85	0.00E+00	4.49E+02	8.97E+02
Tc-99	4.2239E-04	206.92	413.85	0.00E+00	8.74E-02	1.75E-01
Th-229	3.9270E-12	206.92	413.85	0.00E+00	8.13E-10	1.63E-09
Th-230	3.3578E-06	206.92	413.85	0.00E+00	6.95E-06	1.39E-05
Th-232	1.5452E-14	206.92	413.85	0.00E+00	3.20E-12	6.39E-12
Tl-208	4.6705E-06	206.92	413.85	0.00E+00	9.66E-06	1.93E-05
U-232	1.3045E-07	206.92	413.85	0.00E+00	2.70E-05	5.40E-05
U-233	2.3739E-09	206.92	413.85	0.00E+00	4.91E-07	9.82E-07
U-234	1.8423E-04	206.92	413.85	0.00E+00	3.81E-02	7.62E-02
U-235	-2.7235E-06	206.92	0.00	6.71E-03	6.15E-03	6.71E-03
U-236	1.5493E-05	206.92	413.85	0.00E+00	3.21E-03	6.41E-03
U-238	-4.2851E-09	206.92	0.00	3.01E-04	3.01E-04	3.01E-04
Y-90	2.1686E+00	206.92	413.85	0.00E+00	4.49E+02	8.97E+02
Other Radionuclides					4.50E+02	9.00E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.937E+13
0.0250	1.030E+13
0.0375	8.990E+12
0.0575	9.586E+12
0.0850	5.807E+12
0.1250	3.981E+12
0.2250	5.003E+12
0.3750	2.192E+12
0.5750	3.557E+13
0.8500	8.450E+11
1.2500	4.268E+11
1.7500	1.789E+10
2.2500	2.237E+07
2.7500	1.345E+08
3.5000	8.547E+04
5.0000	1.984E+02
7.0000	2.198E+01
11.0000	2.468E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.60E+00	1.12E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	77.58892697	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		206.92
Bounding:		413.85

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.16	
Bounding:	0.33	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JEN-1 (UALX LEU) SPAIN
SNF ID #: 749
Fuel Units & Descr: 18 - 16 CURVED PLATES
Heavy Metal Mass: BOL=12.64kg; EOL=12.447kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1995
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 0.75

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.5861E-10	182.40	364.79	0.00E+00	8.36E-08	1.67E-07
Am-241	1.7832E-03	182.40	364.79	0.00E+00	3.25E-01	6.51E-01
Am-242m	4.3410E-07	182.40	364.79	0.00E+00	7.92E-05	1.58E-04
Am-243	1.4907E-06	182.40	364.79	0.00E+00	2.72E-04	5.44E-04
C-14	5.7162E-09	182.40	364.79	0.00E+00	1.04E-06	2.09E-06
Cl-36	1.3124E-32	182.40	364.79	0.00E+00	2.39E-30	4.79E-30
Cm-243	1.8568E-07	182.40	364.79	0.00E+00	3.39E-05	6.77E-05
Cm-244	3.5512E-05	182.40	364.79	0.00E+00	6.48E-03	1.30E-02
Co-60	1.0261E-05	182.40	364.79	0.00E+00	1.87E-03	3.74E-03
Cs-134	1.6931E-02	182.40	364.79	0.00E+00	3.09E+00	6.18E+00
Cs-135	3.4477E-06	182.40	364.79	0.00E+00	6.29E-04	1.26E-03
Cs-137	2.2800E+00	182.40	364.79	0.00E+00	4.16E+02	8.32E+02
Eu-154	3.6656E-02	182.40	364.79	0.00E+00	6.69E+00	1.34E+01
Eu-155	9.6841E-03	182.40	364.79	0.00E+00	1.77E+00	3.53E+00
Fe-55	4.6977E-04	182.40	364.79	0.00E+00	8.57E-02	1.71E-01
H-3	6.0485E-03	182.40	364.79	0.00E+00	1.10E+00	2.21E+00
I-129	7.5300E-07	182.40	364.79	0.00E+00	1.37E-04	2.75E-04
Kr-85	1.4989E-01	182.40	364.79	0.00E+00	2.73E+01	5.47E+01
Np-237	9.5534E-06	182.40	364.79	0.00E+00	1.74E-03	3.48E-03
Pa-231	1.6550E-09	182.40	364.79	0.00E+00	3.02E-07	6.04E-07
Pb-210	2.6631E-11	182.40	364.79	0.00E+00	4.86E-09	9.71E-09
Pm-147	1.8156E-01	182.40	364.79	0.00E+00	3.31E+01	6.62E+01
Pu-238	1.8990E-02	182.40	364.79	0.00E+00	3.46E+00	6.93E+00
Pu-239	4.2838E-04	182.40	364.79	0.00E+00	7.81E-02	1.56E-01
Pu-240	2.4379E-04	182.40	364.79	0.00E+00	4.45E-02	8.89E-02
Pu-241	4.2511E-02	182.40	364.79	0.00E+00	7.75E+00	1.55E+01
Pu-242	3.6329E-07	182.40	364.79	0.00E+00	6.63E-05	1.33E-04
Ra-226	1.4725E-10	182.40	364.79	0.00E+00	2.69E-08	5.37E-08
Ra-228	8.9760E-15	182.40	364.79	0.00E+00	1.64E-12	3.27E-12
Ru-106	1.9752E-04	182.40	364.79	0.00E+00	3.60E-02	7.21E-02
Se-79	1.2933E-05	182.40	364.79	0.00E+00	2.36E-03	4.72E-03
Sn-126	1.1574E-05	182.40	364.79	0.00E+00	2.11E-03	4.22E-03
Sr-90	2.1680E+00	182.40	364.79	0.00E+00	3.95E+02	7.91E+02
Tc-99	4.2239E-04	182.40	364.79	0.00E+00	7.70E-02	1.54E-01
Th-229	3.9270E-12	182.40	364.79	0.00E+00	7.16E-10	1.43E-09
Th-230	3.3578E-08	182.40	364.79	0.00E+00	6.12E-06	1.22E-05
Th-232	1.5452E-14	182.40	364.79	0.00E+00	2.82E-12	5.64E-12
Tl-208	4.6705E-08	182.40	364.79	0.00E+00	8.52E-06	1.70E-05
U-232	1.3045E-07	182.40	364.79	0.00E+00	2.38E-05	4.76E-05
U-233	2.3739E-09	182.40	364.79	0.00E+00	4.33E-07	8.66E-07
U-234	1.8423E-04	182.40	364.79	0.00E+00	3.36E-02	6.72E-02
U-235	-2.7235E-06	182.40	0.00	5.25E-03	4.75E-03	5.25E-03
U-236	1.5493E-05	182.40	364.79	0.00E+00	2.83E-03	5.65E-03
U-238	-4.2851E-09	182.40	0.00	3.43E-03	3.43E-03	3.43E-03
Y-90	2.1686E+00	182.40	364.79	0.00E+00	3.96E+02	7.91E+02
Other Radionuclides					3.97E+02	7.93E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.352E+13
0.0250	9.076E+12
0.0375	7.925E+12
0.0575	8.450E+12
0.0850	5.118E+12
0.1250	3.509E+12
0.2250	4.410E+12
0.3750	1.932E+12
0.5750	3.136E+13
0.8500	7.448E+11
1.2500	3.762E+11
1.7500	1.577E+10
2.2500	1.972E+07
2.7500	1.185E+06
3.5000	7.536E+04
5.0000	1.821E+02
7.0000	2.020E+01
11.0000	2.271E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.94E+00	9.87E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.22438767	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		182.40
Bounding:		364.79

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.05	
Bounding:	0.09	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JMTR
SNF ID #: 507
Fuel Units & Descr: 574 - ASSEMBLY
Heavy Metal Mass: BOL=1176.7kg; EOL=1106.098kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1963
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated Canister usage: 18"x10' 23.92

II. Estimates

	m	x_a	x_b	b	y_a	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	66,861.47	133,722.93	0.00E+00	7.67E-05	1.53E-04	Avg. MeV	
Am-241	2.3056E-03	66,861.47	133,722.93	0.00E+00	1.54E+02	3.08E+02	0.0150	1.251E+16
Am-242m	4.1476E-07	66,861.47	133,722.93	0.00E+00	2.77E-02	5.55E-02	0.0250	2.600E+15
Am-243	1.4894E-06	66,861.47	133,722.93	0.00E+00	9.96E-02	1.99E-01	0.0375	2.264E+15
C-14	5.7108E-09	66,861.47	133,722.93	0.00E+00	3.82E-04	7.64E-04	0.0575	2.431E+15
Cl-36	1.3124E-32	66,861.47	133,722.93	0.00E+00	8.77E-28	1.75E-27	0.0850	1.467E+15
Cm-243	1.4562E-07	66,861.47	133,722.93	0.00E+00	9.74E-03	1.95E-02	0.1250	9.825E+14
Cm-244	2.4221E-05	66,861.47	133,722.93	0.00E+00	1.62E+00	3.24E+00	0.2250	1.266E+15
Co-60	2.7560E-06	66,861.47	133,722.93	0.00E+00	1.84E-01	3.69E-01	0.3750	5.506E+14
Cs-134	5.8851E-04	66,861.47	133,722.93	0.00E+00	3.93E+01	7.87E+01	0.5750	9.026E+15
Cs-135	3.4477E-06	66,861.47	133,722.93	0.00E+00	2.31E-01	4.61E-01	0.8500	1.301E+14
Cs-137	1.8099E+00	66,861.47	133,722.93	0.00E+00	1.21E+05	2.42E+05	1.2500	7.233E+13
Eu-154	1.6386E-02	66,861.47	133,722.93	0.00E+00	1.10E+03	2.19E+03	1.7500	3.573E+12
Eu-155	2.3957E-03	66,861.47	133,722.93	0.00E+00	1.60E+02	3.20E+02	2.2500	2.547E+08
Fe-55	3.2707E-05	66,861.47	133,722.93	0.00E+00	2.19E+00	4.37E+00	2.7500	2.085E+08
H-3	3.4504E-03	66,861.47	133,722.93	0.00E+00	2.31E+02	4.61E+02	3.5000	1.590E+05
I-129	7.5300E-07	66,861.47	133,722.93	0.00E+00	5.03E-02	1.01E-01	5.0000	5.365E+04
Kr-85	7.8540E-02	66,861.47	133,722.93	0.00E+00	5.25E+03	1.05E+04	7.0000	5.906E+03
Np-237	9.5615E-06	66,861.47	133,722.93	0.00E+00	6.39E-01	1.28E+00	11.0000	6.610E+02
Pa-231	2.7968E-09	66,861.47	133,722.93	0.00E+00	1.87E-04	3.74E-04		
Pb-210	1.2612E-10	66,861.47	133,722.93	0.00E+00	8.43E-06	1.69E-05		
Pm-147	1.2952E-02	66,861.47	133,722.93	0.00E+00	8.66E+02	1.73E+03		
Pu-238	1.7549E-02	66,861.47	133,722.93	0.00E+00	1.17E+03	2.35E+03		
Pu-239	4.2810E-04	66,861.47	133,722.93	0.00E+00	2.86E+01	5.72E+01		
Pu-240	2.4357E-04	66,861.47	133,722.93	0.00E+00	1.63E+01	3.26E+01		
Pu-241	2.6277E-02	66,861.47	133,722.93	0.00E+00	1.76E+03	3.51E+03		
Pu-242	3.6329E-07	66,861.47	133,722.93	0.00E+00	2.43E-02	4.86E-02		
Ra-226	4.4444E-10	66,861.47	133,722.93	0.00E+00	2.97E-05	5.94E-05		
Ra-228	1.9714E-14	66,861.47	133,722.93	0.00E+00	1.32E-09	2.64E-09		
Ru-106	2.0477E-07	66,861.47	133,722.93	0.00E+00	1.37E-02	2.74E-02		
Se-79	1.2933E-05	66,861.47	133,722.93	0.00E+00	8.65E-01	1.73E+00		
Sn-126	1.1574E-05	66,861.47	133,722.93	0.00E+00	7.74E-01	1.55E+00		
Sr-90	1.7092E+00	66,861.47	133,722.93	0.00E+00	1.14E+05	2.29E+05		
Tc-99	4.2239E-04	66,861.47	133,722.93	0.00E+00	2.82E+01	5.65E+01		
Th-229	7.7260E-12	66,861.47	133,722.93	0.00E+00	5.17E-07	1.03E-06		
Th-230	5.8497E-08	66,861.47	133,722.93	0.00E+00	3.91E-03	7.82E-03		
Th-232	2.6906E-14	66,861.47	133,722.93	0.00E+00	1.80E-09	3.60E-09		
Tl-208	4.4336E-08	66,861.47	133,722.93	0.00E+00	2.96E-03	5.93E-03		
U-232	1.2037E-07	66,861.47	133,722.93	0.00E+00	8.05E-03	1.61E-02		
U-233	3.0011E-09	66,861.47	133,722.93	0.00E+00	2.01E-04	4.01E-04		
U-234	1.8497E-04	66,861.47	133,722.93	0.00E+00	1.24E+01	2.47E+01		
U-235	-2.7235E-06	66,861.47	0.00	5.09E-01	3.26E-01	5.09E-01		
U-236	1.5493E-05	66,861.47	133,722.93	0.00E+00	1.04E+00	2.07E+00		
U-238	-4.2851E-09	66,861.47	0.00	3.16E-01	3.16E-01	3.16E-01		
Y-90	1.7094E+00	66,861.47	133,722.93	0.00E+00	1.14E+05	2.29E+05		
Other Radionuclides					1.15E+05	2.30E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.41E+03	2.83E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.00000029	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		66,861.47
Bounding:		133,722.93

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.18	
Bounding:	0.36	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JMTR (UALX 45% MEU) JAPAN
SNF ID #: 886
Fuel Units & Descr: 570 - MTR TYPE
Heavy Metal Mass: BOL=349.353kg; EOL=323.646kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1989
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 15.83

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	24,345.03	48,690.06	0.00E+00	1.61E-05	3.23E-05
Am-241	2.0060E-03	24,345.03	48,690.06	0.00E+00	4.88E+01	9.77E+01
Am-242m	4.2429E-07	24,345.03	48,690.06	0.00E+00	1.03E-02	2.07E-02
Am-243	1.4899E-06	24,345.03	48,690.06	0.00E+00	3.63E-02	7.25E-02
C-14	5.7135E-09	24,345.03	48,690.06	0.00E+00	1.39E-04	2.78E-04
Cl-36	1.3124E-32	24,345.03	48,690.06	0.00E+00	3.19E-28	6.39E-28
Cm-243	1.6443E-07	24,345.03	48,690.06	0.00E+00	4.00E-03	8.01E-03
Cm-244	2.9330E-05	24,345.03	48,690.06	0.00E+00	7.14E-01	1.43E+00
Co-60	5.3186E-06	24,345.03	48,690.06	0.00E+00	1.29E-01	2.59E-01
Cs-134	3.1563E-03	24,345.03	48,690.06	0.00E+00	7.68E+01	1.54E+02
Cs-135	3.4477E-06	24,345.03	48,690.06	0.00E+00	8.39E-02	1.68E-01
Cs-137	2.0313E+00	24,345.03	48,690.06	0.00E+00	4.95E+04	9.89E+04
Eu-154	2.4513E-02	24,345.03	48,690.06	0.00E+00	5.97E+02	1.19E+03
Eu-155	4.8175E-03	24,345.03	48,690.06	0.00E+00	1.17E+02	2.35E+02
Fe-55	1.2397E-04	24,345.03	48,690.06	0.00E+00	3.02E+00	6.04E+00
H-3	4.5697E-03	24,345.03	48,690.06	0.00E+00	1.11E+02	2.22E+02
I-129	7.5300E-07	24,345.03	48,690.06	0.00E+00	1.83E-02	3.67E-02
Kr-85	1.0850E-01	24,345.03	48,690.06	0.00E+00	2.64E+03	5.28E+03
Np-237	9.5561E-06	24,345.03	48,690.06	0.00E+00	2.33E-01	4.65E-01
Pa-231	2.0359E-09	24,345.03	48,690.06	0.00E+00	4.96E-05	9.91E-05
Pb-210	4.9728E-11	24,345.03	48,690.06	0.00E+00	1.21E-06	2.42E-06
Pm-147	4.8502E-02	24,345.03	48,690.06	0.00E+00	1.18E+03	2.36E+03
Pu-238	1.8254E-02	24,345.03	48,690.06	0.00E+00	4.44E+02	8.89E+02
Pu-239	4.2810E-04	24,345.03	48,690.06	0.00E+00	1.04E+01	2.08E+01
Pu-240	2.4368E-04	24,345.03	48,690.06	0.00E+00	5.93E+00	1.19E+01
Pu-241	3.3415E-02	24,345.03	48,690.06	0.00E+00	8.13E+02	1.63E+03
Pu-242	3.6329E-07	24,345.03	48,690.06	0.00E+00	8.84E-03	1.77E-02
Ra-226	2.2854E-10	24,345.03	48,690.06	0.00E+00	5.56E-06	1.11E-05
Ra-228	1.2426E-14	24,345.03	48,690.06	0.00E+00	3.03E-10	6.05E-10
Ru-106	6.3589E-06	24,345.03	48,690.06	0.00E+00	1.55E-01	3.10E-01
Se-79	1.2933E-05	24,345.03	48,690.06	0.00E+00	3.15E-01	6.30E-01
Sn-126	1.1574E-05	24,345.03	48,690.06	0.00E+00	2.82E-01	5.64E-01
Sr-90	1.9248E+00	24,345.03	48,690.06	0.00E+00	4.69E+04	9.37E+04
Tc-99	4.2239E-04	24,345.03	48,690.06	0.00E+00	1.03E+01	2.06E+01
Th-229	5.0953E-12	24,345.03	48,690.06	0.00E+00	1.24E-07	2.48E-07
Th-230	4.1885E-08	24,345.03	48,690.06	0.00E+00	1.02E-03	2.04E-03
Th-232	1.9270E-14	24,345.03	48,690.06	0.00E+00	4.69E-10	9.38E-10
Tl-208	4.6024E-08	24,345.03	48,690.06	0.00E+00	1.12E-03	2.24E-03
U-232	1.2582E-07	24,345.03	48,690.06	0.00E+00	3.06E-03	6.13E-03
U-233	2.5825E-09	24,345.03	48,690.06	0.00E+00	6.29E-05	1.26E-04
U-234	1.8450E-04	24,345.03	48,690.06	0.00E+00	4.49E+00	8.98E+00
U-235	-2.7235E-06	24,345.03	0.00	3.40E-01	2.74E-01	3.40E-01
U-236	1.5493E-05	24,345.03	48,690.06	0.00E+00	3.77E-01	7.54E-01
U-238	-4.2851E-09	24,345.03	0.00	6.46E-02	6.45E-02	6.46E-02
Y-90	1.9254E+00	24,345.03	48,690.06	0.00E+00	4.69E+04	9.37E+04
Other Radionuclides					4.71E+04	9.42E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.140E+15
0.0250	1.069E+15
0.0375	9.322E+14
0.0575	9.984E+14
0.0850	6.034E+14
0.1250	4.083E+14
0.2250	5.206E+14
0.3750	2.266E+14
0.5750	3.697E+15
0.8500	6.250E+13
1.2500	3.569E+13
1.7500	1.638E+12
2.2500	1.437E+08
2.7500	8.123E+07
3.5000	3.735E+05
5.0000	2.124E+04
7.0000	2.346E+03
11.0000	2.630E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.80E+02	1.16E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	45.011	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		24,345.03
Bounding:		48,690.06

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.22	
Bounding:	0.44	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JMTR (UALX HEU) JAPAN
SNF ID #: 123
Fuel Units & Descr: 152 - MTR TYPE
Heavy Metal Mass: BOL=44.384kg; EOL=37.21kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1989
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 4.22

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	6,794.30	13,588.59	0.00E+00	4.51E-06	9.01E-06
Am-241	2.0060E-03	6,794.30	13,588.59	0.00E+00	1.36E+01	2.73E+01
Am-242m	4.2429E-07	6,794.30	13,588.59	0.00E+00	2.88E-03	5.77E-03
Am-243	1.4899E-06	6,794.30	13,588.59	0.00E+00	1.01E-02	2.02E-02
C-14	5.7135E-09	6,794.30	13,588.59	0.00E+00	3.88E-05	7.76E-05
Cl-36	1.3124E-32	6,794.30	13,588.59	0.00E+00	8.92E-29	1.78E-28
Cm-243	1.6443E-07	6,794.30	13,588.59	0.00E+00	1.12E-03	2.23E-03
Cm-244	2.9330E-05	6,794.30	13,588.59	0.00E+00	1.99E-01	3.99E-01
Co-60	5.3186E-06	6,794.30	13,588.59	0.00E+00	3.61E-02	7.23E-02
Cs-134	3.1563E-03	6,794.30	13,588.59	0.00E+00	2.14E+01	4.29E+01
Cs-135	3.4477E-06	6,794.30	13,588.59	0.00E+00	2.34E-02	4.68E-02
Cs-137	2.0313E+00	6,794.30	13,588.59	0.00E+00	1.38E+04	2.76E+04
Eu-154	2.4513E-02	6,794.30	13,588.59	0.00E+00	1.67E+02	3.33E+02
Eu-155	4.8175E-03	6,794.30	13,588.59	0.00E+00	3.27E+01	6.55E+01
Fe-55	1.2397E-04	6,794.30	13,588.59	0.00E+00	8.42E-01	1.68E+00
H-3	4.5697E-03	6,794.30	13,588.59	0.00E+00	3.10E+01	6.21E+01
I-129	7.5300E-07	6,794.30	13,588.59	0.00E+00	5.12E-03	1.02E-02
Kr-85	1.0850E-01	6,794.30	13,588.59	0.00E+00	7.37E+02	1.47E+03
Np-237	9.5561E-06	6,794.30	13,588.59	0.00E+00	6.49E-02	1.30E-01
Pa-231	2.0359E-09	6,794.30	13,588.59	0.00E+00	1.38E-05	2.77E-05
Pb-210	4.9728E-11	6,794.30	13,588.59	0.00E+00	3.38E-07	6.76E-07
Pm-147	4.8502E-02	6,794.30	13,588.59	0.00E+00	3.30E+02	6.59E+02
Pu-238	1.8254E-02	6,794.30	13,588.59	0.00E+00	1.24E+02	2.48E+02
Pu-239	4.2810E-04	6,794.30	13,588.59	0.00E+00	2.91E+00	5.82E+00
Pu-240	2.4368E-04	6,794.30	13,588.59	0.00E+00	1.66E+00	3.31E+00
Pu-241	3.3415E-02	6,794.30	13,588.59	0.00E+00	2.27E+02	4.54E+02
Pu-242	3.6329E-07	6,794.30	13,588.59	0.00E+00	2.47E-03	4.94E-03
Ra-226	2.2854E-10	6,794.30	13,588.59	0.00E+00	1.55E-06	3.11E-06
Ra-228	1.2426E-14	6,794.30	13,588.59	0.00E+00	8.44E-11	1.69E-10
Ru-106	6.3589E-06	6,794.30	13,588.59	0.00E+00	4.32E-02	8.64E-02
Se-79	1.2933E-05	6,794.30	13,588.59	0.00E+00	8.79E-02	1.76E-01
Sn-126	1.1574E-05	6,794.30	13,588.59	0.00E+00	7.86E-02	1.57E-01
Sr-90	1.9248E+00	6,794.30	13,588.59	0.00E+00	1.31E+04	2.62E+04
Tc-99	4.2239E-04	6,794.30	13,588.59	0.00E+00	2.87E+00	5.74E+00
Th-229	5.0953E-12	6,794.30	13,588.59	0.00E+00	3.46E-08	6.92E-08
Th-230	4.1885E-08	6,794.30	13,588.59	0.00E+00	2.85E-04	5.69E-04
Th-232	1.9270E-14	6,794.30	13,588.59	0.00E+00	1.31E-10	2.62E-10
Tl-208	4.6024E-08	6,794.30	13,588.59	0.00E+00	3.13E-04	6.25E-04
U-232	1.2582E-07	6,794.30	13,588.59	0.00E+00	8.55E-04	1.71E-03
U-233	2.5825E-09	6,794.30	13,588.59	0.00E+00	1.75E-05	3.51E-05
U-234	1.8450E-04	6,794.30	13,588.59	0.00E+00	1.25E+00	2.51E+00
U-235	-2.7235E-08	6,794.30	0.00	8.94E-02	7.09E-02	8.94E-02
U-236	1.5493E-05	6,794.30	13,588.59	0.00E+00	1.05E-01	2.11E-01
U-238	-4.2851E-09	6,794.30	0.00	1.02E-03	9.87E-04	1.02E-03
Y-90	1.9254E+00	6,794.30	13,588.59	0.00E+00	1.31E+04	2.62E+04
Other Radionuclides					1.31E+04	2.63E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.434E+15
0.0250	2.983E+14
0.0375	2.602E+14
0.0575	2.786E+14
0.0850	1.684E+14
0.1250	1.139E+14
0.2250	1.453E+14
0.3750	6.325E+13
0.5750	1.032E+15
0.8500	1.744E+13
1.2500	9.959E+12
1.7500	4.571E+11
2.2500	4.010E+07
2.7500	2.267E+07
3.5000	1.041E+05
5.0000	5.889E+03
7.0000	6.502E+02
11.0000	7.287E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.82E+02	3.24E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.18522593	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		6,794.30
Bounding:		13,588.59

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.49	
Bounding:	0.97	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JRR-2 (UALX-HEU 45%) JAPAN
SNF ID #: 885
Fuel Units & Descr: 144 - 12 CURVED PLATES
Heavy Metal Mass: BOL=70.229kg; EOL=62.496kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1989
Estimates as of: 2010
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]Template Burnup(MWd): 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 4.00

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	3.1355E-10	7,122.71	14,245.41	0.00E+00	2.23E-06	4.47E-06
Am-241	8.0194E-03	7,122.71	14,245.41	0.00E+00	5.71E+01	1.14E+02
Am-242m	1.3694E-06	7,122.71	14,245.41	0.00E+00	9.75E-03	1.95E-02
Am-243	3.7096E-05	7,122.71	14,245.41	0.00E+00	2.64E-01	5.28E-01
C-14	2.6464E-08	7,122.71	14,245.41	0.00E+00	1.88E-04	3.77E-04
Cl-36	4.4441E-31	7,122.71	14,245.41	0.00E+00	3.17E-27	6.33E-27
Cm-243	5.7029E-06	7,122.71	14,245.41	0.00E+00	4.06E-02	8.12E-02
Cm-244	4.6555E-03	7,122.71	14,245.41	0.00E+00	3.32E+01	6.63E+01
Co-60	4.8663E-05	7,122.71	14,245.41	0.00E+00	3.47E-01	6.93E-01
Cs-134	1.0638E-02	7,122.71	14,245.41	0.00E+00	7.58E+01	1.52E+02
Cs-135	4.2564E-06	7,122.71	14,245.41	0.00E+00	3.03E-02	6.06E-02
Cs-137	2.0358E+00	7,122.71	14,245.41	0.00E+00	1.45E+04	2.90E+04
Eu-154	5.1956E-02	7,122.71	14,245.41	0.00E+00	3.70E+02	7.40E+02
Eu-155	1.4295E-02	7,122.71	14,245.41	0.00E+00	1.02E+02	2.04E+02
Fe-55	1.3560E-03	7,122.71	14,245.41	0.00E+00	9.66E+00	1.93E+01
H-3	4.6258E-03	7,122.71	14,245.41	0.00E+00	3.29E+01	6.59E+01
I-129	6.6403E-07	7,122.71	14,245.41	0.00E+00	4.73E-03	9.46E-03
Kr-85	1.0608E-01	7,122.71	14,245.41	0.00E+00	7.70E+02	1.54E+03
Np-237	3.1537E-05	7,122.71	14,245.41	0.00E+00	2.25E-01	4.49E-01
Pa-231	9.7023E-10	7,122.71	14,245.41	0.00E+00	6.91E-06	1.38E-05
Pb-210	1.1731E-11	7,122.71	14,245.41	0.00E+00	8.36E-08	1.67E-07
Pm-147	2.4405E-02	7,122.71	14,245.41	0.00E+00	1.74E+02	3.48E+02
Pu-238	1.5358E-01	7,122.71	14,245.41	0.00E+00	1.09E+03	2.19E+03
Pu-239	6.9502E-04	7,122.71	14,245.41	0.00E+00	4.95E+00	9.90E+00
Pu-240	3.7631E-04	7,122.71	14,245.41	0.00E+00	2.68E+00	5.36E+00
Pu-241	1.3433E-01	7,122.71	14,245.41	0.00E+00	9.57E+02	1.91E+03
Pu-242	3.0911E-06	7,122.71	14,245.41	0.00E+00	2.20E-02	4.40E-02
Ra-226	5.5079E-11	7,122.71	14,245.41	0.00E+00	3.92E-07	7.85E-07
Ra-228	1.3335E-14	7,122.71	14,245.41	0.00E+00	9.50E-11	1.90E-10
Ru-106	7.3390E-06	7,122.71	14,245.41	0.00E+00	5.23E-02	1.05E-01
Se-79	1.2339E-05	7,122.71	14,245.41	0.00E+00	8.79E-02	1.76E-01
Sn-126	1.0194E-05	7,122.71	14,245.41	0.00E+00	7.26E-02	1.45E-01
Sr-90	1.9064E+00	7,122.71	14,245.41	0.00E+00	1.36E+04	2.72E+04
Tc-99	3.8056E-04	7,122.71	14,245.41	0.00E+00	2.71E+00	5.42E+00
Th-229	4.9198E-12	7,122.71	14,245.41	0.00E+00	3.50E-08	7.01E-08
Th-230	1.0547E-08	7,122.71	14,245.41	0.00E+00	7.51E-05	1.50E-04
Th-232	2.0705E-14	7,122.71	14,245.41	0.00E+00	1.47E-10	2.95E-10
Tl-208	4.8827E-08	7,122.71	14,245.41	0.00E+00	3.48E-04	6.96E-04
U-232	1.3414E-07	7,122.71	14,245.41	0.00E+00	9.55E-04	1.91E-03
U-233	3.7679E-09	7,122.71	14,245.41	0.00E+00	2.68E-05	5.37E-05
U-234	5.2047E-05	7,122.71	14,245.41	0.00E+00	3.71E-01	7.41E-01
U-235	-2.8661E-06	7,122.71	0.00	6.82E-02	4.78E-02	6.82E-02
U-236	1.6701E-05	7,122.71	14,245.41	0.00E+00	1.19E-01	2.38E-01
U-238	-9.4194E-09	7,122.71	0.00	1.30E-02	1.29E-02	1.30E-02
Y-90	1.9070E+00	7,122.71	14,245.41	0.00E+00	1.36E+04	2.72E+04
Other Radionuclides					1.39E+04	2.77E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.506E+15
0.0250	3.104E+14
0.0375	2.758E+14
0.0575	2.920E+14
0.0850	1.768E+14
0.1250	1.252E+14
0.2250	1.521E+14
0.3750	6.585E+13
0.5750	1.090E+15
0.8500	2.854E+13
1.2500	1.830E+13
1.7500	7.051E+11
2.2500	4.509E+07
2.7500	2.638E+07
3.5000	1.115E+06
5.0000	4.286E+05
7.0000	4.920E+04
11.0000	5.638E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.06E+02	4.12E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	44.93930164	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		7,122.71
Bounding:		14,245.41

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.23	
Bounding:	0.46	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JRR-2 (UALX-HEU) JAPAN
SNF ID #: 606
Fuel Units & Descr: 34 - 17 FLAT PLATES
Heavy Metal Mass: BOL=6.943kg; EOL=5.222kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1989
Estimates as of: 2010
Template: HFBR (Heavy Water, Alum., 40 to 100%, U)
[2]Template Burnup(MWd): 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 0.94

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.1355E-10	1,584.67	3,169.33	0.00E+00	4.97E-07	9.94E-07	Avg. MeV	
Am-241	8.0194E-03	1,584.67	3,169.33	0.00E+00	1.27E+01	2.54E+01	0.0150	3.351E+14
Am-242m	1.3694E-06	1,584.67	3,169.33	0.00E+00	2.17E-03	4.34E-03	0.0250	6.906E+13
Am-243	3.7096E-05	1,584.67	3,169.33	0.00E+00	5.88E-02	1.18E-01	0.0375	6.136E+13
C-14	2.6464E-08	1,584.67	3,169.33	0.00E+00	4.19E-05	8.39E-05	0.0575	6.497E+13
Cl-36	4.4441E-31	1,584.67	3,169.33	0.00E+00	7.04E-28	1.41E-27	0.0850	3.932E+13
Cm-243	5.7029E-06	1,584.67	3,169.33	0.00E+00	9.04E-03	1.81E-02	0.1250	2.785E+13
Cm-244	4.6555E-03	1,584.67	3,169.33	0.00E+00	7.38E+00	1.48E+01	0.2250	3.385E+13
Co-60	4.8663E-05	1,584.67	3,169.33	0.00E+00	7.71E-02	1.54E-01	0.3750	1.465E+13
Cs-134	1.0638E-02	1,584.67	3,169.33	0.00E+00	1.69E+01	3.37E+01	0.5750	2.425E+14
Cs-135	4.2564E-06	1,584.67	3,169.33	0.00E+00	6.74E-03	1.35E-02	0.8500	6.350E+12
Cs-137	2.0358E+00	1,584.67	3,169.33	0.00E+00	3.23E+03	6.45E+03	1.2500	4.071E+12
Eu-154	5.1956E-02	1,584.67	3,169.33	0.00E+00	8.23E+01	1.65E+02	1.7500	1.569E+11
Eu-155	1.4295E-02	1,584.67	3,169.33	0.00E+00	2.27E+01	4.53E+01	2.2500	1.003E+07
Fe-55	1.3560E-03	1,584.67	3,169.33	0.00E+00	2.15E+00	4.30E+00	2.7500	5.870E+06
H-3	4.6258E-03	1,584.67	3,169.33	0.00E+00	7.33E+00	1.47E+01	3.5000	2.480E+05
I-129	6.6403E-07	1,584.67	3,169.33	0.00E+00	1.05E-03	2.10E-03	5.0000	9.535E+04
Kr-85	1.0808E-01	1,584.67	3,169.33	0.00E+00	1.71E+02	3.43E+02	7.0000	1.095E+04
Np-237	3.1537E-05	1,584.67	3,169.33	0.00E+00	5.00E-02	1.00E-01	11.0000	1.254E+03
Pa-231	9.7023E-10	1,584.67	3,169.33	0.00E+00	1.54E-06	3.07E-06		
Pb-210	1.1731E-11	1,584.67	3,169.33	0.00E+00	1.86E-08	3.72E-08		
Pm-147	2.4405E-02	1,584.67	3,169.33	0.00E+00	3.87E+01	7.73E+01		
Pu-238	1.5358E-01	1,584.67	3,169.33	0.00E+00	2.43E+02	4.87E+02		
Pu-239	6.9502E-04	1,584.67	3,169.33	0.00E+00	1.10E+00	2.20E+00		
Pu-240	3.7631E-04	1,584.67	3,169.33	0.00E+00	5.96E-01	1.19E+00		
Pu-241	1.3433E-01	1,584.67	3,169.33	0.00E+00	2.13E+02	4.26E+02		
Pu-242	3.0911E-06	1,584.67	3,169.33	0.00E+00	4.90E-03	9.80E-03		
Ra-226	5.5079E-11	1,584.67	3,169.33	0.00E+00	8.73E-08	1.75E-07		
Ra-228	1.3335E-14	1,584.67	3,169.33	0.00E+00	2.11E-11	4.23E-11		
Ru-106	7.3390E-06	1,584.67	3,169.33	0.00E+00	1.16E-02	2.33E-02		
Se-79	1.2339E-05	1,584.67	3,169.33	0.00E+00	1.96E-02	3.91E-02		
Sn-126	1.0194E-05	1,584.67	3,169.33	0.00E+00	1.62E-02	3.23E-02		
Sr-90	1.9064E+00	1,584.67	3,169.33	0.00E+00	3.02E+03	6.04E+03		
Tc-99	3.8056E-04	1,584.67	3,169.33	0.00E+00	6.03E-01	1.21E+00		
Th-229	4.9198E-12	1,584.67	3,169.33	0.00E+00	7.80E-09	1.56E-08		
Th-230	1.0547E-08	1,584.67	3,169.33	0.00E+00	1.67E-05	3.34E-05		
Th-232	2.0705E-14	1,584.67	3,169.33	0.00E+00	3.28E-11	6.56E-11		
Tl-208	4.8827E-08	1,584.67	3,169.33	0.00E+00	7.74E-05	1.55E-04		
U-232	1.3414E-07	1,584.67	3,169.33	0.00E+00	2.13E-04	4.25E-04		
U-233	3.7679E-09	1,584.67	3,169.33	0.00E+00	5.97E-06	1.19E-05		
U-234	5.2047E-05	1,584.67	3,169.33	0.00E+00	8.25E-02	1.65E-01		
U-235	-2.8661E-06	1,584.67	0.00	1.40E-02	9.41E-03	1.40E-02		
U-236	1.6701E-05	1,584.67	3,169.33	0.00E+00	2.65E-02	5.29E-02		
U-238	-9.4194E-09	1,584.67	0.00	1.63E-04	1.48E-04	1.63E-04		
Y-90	1.9070E+00	1,584.67	3,169.33	0.00E+00	3.02E+03	6.04E+03		
Other Radionuclides					3.09E+03	6.17E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.58E+01	9.17E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.01903552	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,584.67
Bounding:		3,169.33

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.52	
Bounding:	1.05	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JRR-3M (ULAX LEU)
SNF ID #: 1056
Fuel Units & Descr: 111 - 20 FLAT PLATES
Heavy Metal Mass: BOL=165.701kg; EOL=157.043kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1969
Estimates as of: 2010
Template: HFBR (Heavy Water, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 15
Template BOL Heavy Metal Mass (MT): 0.00034251
Template Decay Time: 20 years

Estimated Canister usage: 18"x10": 4.63

II. Estimates

	a_n	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.5333E-10	8,229.12	16,458.25	0.00E+00	7.02E-06	1.40E-05
Am-241	2.2753E-02	8,229.12	16,458.25	0.00E+00	1.87E+02	3.74E+02
Am-242m	8.9133E-06	8,229.12	16,458.25	0.00E+00	7.33E-02	1.47E-01
Am-243	6.4007E-06	8,229.12	16,458.25	0.00E+00	5.27E-02	1.05E-01
C-14	2.9620E-08	8,229.12	16,458.25	0.00E+00	2.44E-04	4.87E-04
Cl-36	5.9513E-35	8,229.12	16,458.25	0.00E+00	4.90E-31	9.79E-31
Cm-243	2.2087E-06	8,229.12	16,458.25	0.00E+00	1.82E-02	3.64E-02
Cm-244	1.1007E-04	8,229.12	16,458.25	0.00E+00	9.06E-01	1.81E+00
Co-60	1.6340E-05	8,229.12	16,458.25	0.00E+00	1.34E-01	2.69E-01
Cs-134	2.1353E-03	8,229.12	16,458.25	0.00E+00	1.76E+01	3.51E+01
Cs-135	4.8607E-06	8,229.12	16,458.25	0.00E+00	4.00E-02	8.00E-02
Cs-137	2.0227E+00	8,229.12	16,458.25	0.00E+00	1.66E+04	3.33E+04
Eu-154	2.0887E-02	8,229.12	16,458.25	0.00E+00	1.72E+02	3.44E+02
Eu-155	4.0867E-03	8,229.12	16,458.25	0.00E+00	3.36E+01	6.73E+01
Fe-55	1.4167E-03	8,229.12	16,458.25	0.00E+00	1.17E+01	2.33E+01
H-3	4.6653E-03	8,229.12	16,458.25	0.00E+00	3.84E+01	7.68E+01
I-129	7.1600E-07	8,229.12	16,458.25	0.00E+00	5.89E-03	1.18E-02
Kr-85	1.0240E-01	8,229.12	16,458.25	0.00E+00	8.43E+02	1.69E+03
Np-237	3.7227E-06	8,229.12	16,458.25	0.00E+00	3.06E-02	6.13E-02
Pa-231	2.6727E-09	8,229.12	16,458.25	0.00E+00	2.20E-05	4.40E-05
Pb-210	4.3313E-14	8,229.12	16,458.25	0.00E+00	3.56E-10	7.13E-10
Pm-147	4.6307E-02	8,229.12	16,458.25	0.00E+00	3.81E+02	7.62E+02
Pu-238	5.5273E-03	8,229.12	16,458.25	0.00E+00	4.55E+01	9.10E+01
Pu-239	1.0313E-02	8,229.12	16,458.25	0.00E+00	8.49E+01	1.70E+02
Pu-240	5.4180E-03	8,229.12	16,458.25	0.00E+00	4.46E+01	8.92E+01
Pu-241	3.7573E-01	8,229.12	16,458.25	0.00E+00	3.09E+03	6.18E+03
Pu-242	3.0713E-06	8,229.12	16,458.25	0.00E+00	2.53E-02	5.05E-02
Ra-226	2.3807E-13	8,229.12	16,458.25	0.00E+00	1.96E-09	3.92E-09
Ra-228	1.0607E-14	8,229.12	16,458.25	0.00E+00	8.73E-11	1.75E-10
Ru-106	8.4800E-06	8,229.12	16,458.25	0.00E+00	6.98E-02	1.40E-01
Se-79	1.2533E-05	8,229.12	16,458.25	0.00E+00	1.03E-01	2.06E-01
Sn-126	1.1393E-05	8,229.12	16,458.25	0.00E+00	9.38E-02	1.88E-01
Sr-90	1.8400E+00	8,229.12	16,458.25	0.00E+00	1.51E+04	3.03E+04
Tc-99	4.3533E-04	8,229.12	16,458.25	0.00E+00	3.58E+00	7.16E+00
Th-229	5.8947E-13	8,229.12	16,458.25	0.00E+00	4.85E-09	9.70E-09
Th-230	5.9500E-11	8,229.12	16,458.25	0.00E+00	4.90E-07	9.79E-07
Th-232	1.6360E-14	8,229.12	16,458.25	0.00E+00	1.35E-10	2.69E-10
Tl-208	7.6000E-09	8,229.12	16,458.25	0.00E+00	6.25E-05	1.25E-04
U-232	2.0747E-08	8,229.12	16,458.25	0.00E+00	1.71E-04	3.41E-04
U-233	4.4013E-10	8,229.12	16,458.25	0.00E+00	3.62E-06	7.24E-06
U-234	4.6500E-07	8,229.12	16,458.25	0.00E+00	3.83E-03	7.65E-03
U-235	-2.5335E-06	8,229.12	0.00	7.10E-02	5.02E-02	7.10E-02
U-236	1.3000E-05	8,229.12	16,458.25	0.00E+00	1.07E-01	2.14E-01
U-238	-1.4207E-08	8,229.12	0.00	4.46E-02	4.45E-02	4.46E-02
Y-90	1.8400E+00	8,229.12	16,458.25	0.00E+00	1.51E+04	3.03E+04
Other Radionuclides					1.58E+04	3.16E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.668E+15
0.0250	3.464E+14
0.0375	3.043E+14
0.0575	3.278E+14
0.0850	1.951E+14
0.1250	1.314E+14
0.2250	1.682E+14
0.3750	7.320E+13
0.5750	1.242E+15
0.8500	1.898E+13
1.2500	1.069E+13
1.7500	5.047E+11
2.2500	4.733E+07
2.7500	5.600E+06
3.5000	2.270E+05
5.0000	3.452E+04
7.0000	3.906E+03
11.0000	4.445E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.97E+02	3.94E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.837	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		8,229.12
Bounding:		16,458.25

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.13	
Bounding:	2.27	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JRR-4 (U3Si2 LEU)
SNF ID #: 1071
Fuel Units & Descr: 47 - ASSEMBLY
Heavy Metal Mass: BOL=47kg; EOL=44.655kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1989
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 1.96

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	2,221.04	4,442.09	0.00E+00	1.47E-06	2.95E-06	Avg. MeV	
Am-241	2.0060E-03	2,221.04	4,442.09	0.00E+00	4.46E+00	8.91E+00	0.0150	4.689E+14
Am-242m	4.2429E-07	2,221.04	4,442.09	0.00E+00	9.42E-04	1.88E-03	0.0250	9.751E+13
Am-243	1.4899E-06	2,221.04	4,442.09	0.00E+00	3.31E-03	6.62E-03	0.0375	8.505E+13
C-14	5.7135E-09	2,221.04	4,442.09	0.00E+00	1.27E-05	2.54E-05	0.0575	9.109E+13
Cl-36	1.3124E-32	2,221.04	4,442.09	0.00E+00	2.91E-29	5.83E-29	0.0850	5.504E+13
Cm-243	1.6443E-07	2,221.04	4,442.09	0.00E+00	3.65E-04	7.30E-04	0.1250	3.725E+13
Cm-244	2.9330E-05	2,221.04	4,442.09	0.00E+00	6.51E-02	1.30E-01	0.2250	4.750E+13
Co-60	5.3186E-06	2,221.04	4,442.09	0.00E+00	1.18E-02	2.36E-02	0.3750	2.068E+13
Cs-134	3.1563E-03	2,221.04	4,442.09	0.00E+00	7.01E+00	1.40E+01	0.5750	3.373E+14
Cs-135	3.4477E-06	2,221.04	4,442.09	0.00E+00	7.66E-03	1.53E-02	0.8500	5.702E+12
Cs-137	2.0313E+00	2,221.04	4,442.09	0.00E+00	4.51E+03	9.02E+03	1.2500	3.256E+12
Eu-154	2.4513E-02	2,221.04	4,442.09	0.00E+00	5.44E+01	1.09E+02	1.7500	1.494E+11
Eu-155	4.8175E-03	2,221.04	4,442.09	0.00E+00	1.07E+01	2.14E+01	2.2500	1.311E+07
Fe-55	1.2397E-04	2,221.04	4,442.09	0.00E+00	2.75E-01	5.51E-01	2.7500	7.411E+06
H-3	4.5697E-03	2,221.04	4,442.09	0.00E+00	1.01E+01	2.03E+01	3.5000	3.411E+04
I-129	7.5300E-07	2,221.04	4,442.09	0.00E+00	1.67E-03	3.34E-03	5.0000	1.953E+03
Kr-85	1.0850E-01	2,221.04	4,442.09	0.00E+00	2.41E+02	4.82E+02	7.0000	2.158E+02
Np-237	9.5561E-06	2,221.04	4,442.09	0.00E+00	2.12E-02	4.24E-02	11.0000	2.419E+01
Pa-231	2.0359E-09	2,221.04	4,442.09	0.00E+00	4.52E-06	9.04E-06		
Pb-210	4.9728E-11	2,221.04	4,442.09	0.00E+00	1.10E-07	2.21E-07		
Pm-147	4.8502E-02	2,221.04	4,442.09	0.00E+00	1.08E+02	2.15E+02		
Pu-238	1.8254E-02	2,221.04	4,442.09	0.00E+00	4.05E+01	8.11E+01		
Pu-239	4.2810E-04	2,221.04	4,442.09	0.00E+00	9.51E-01	1.90E+00		
Pu-240	2.4368E-04	2,221.04	4,442.09	0.00E+00	5.41E-01	1.08E+00		
Pu-241	3.3415E-02	2,221.04	4,442.09	0.00E+00	7.42E+01	1.48E+02		
Pu-242	3.6329E-07	2,221.04	4,442.09	0.00E+00	8.07E-04	1.61E-03		
Ra-226	2.2854E-10	2,221.04	4,442.09	0.00E+00	5.08E-07	1.02E-06		
Ra-228	1.2426E-14	2,221.04	4,442.09	0.00E+00	2.76E-11	5.52E-11		
Ru-106	6.3589E-06	2,221.04	4,442.09	0.00E+00	1.41E-02	2.82E-02		
Se-79	1.2933E-05	2,221.04	4,442.09	0.00E+00	2.87E-02	5.74E-02		
Sn-126	1.1574E-05	2,221.04	4,442.09	0.00E+00	2.57E-02	5.14E-02		
Sr-90	1.9248E+00	2,221.04	4,442.09	0.00E+00	4.28E+03	8.55E+03		
Tc-99	4.2239E-04	2,221.04	4,442.09	0.00E+00	9.38E-01	1.88E+00		
Th-229	5.0953E-12	2,221.04	4,442.09	0.00E+00	1.13E-08	2.26E-08		
Th-230	4.1885E-08	2,221.04	4,442.09	0.00E+00	9.30E-05	1.86E-04		
Th-232	1.9270E-14	2,221.04	4,442.09	0.00E+00	4.28E-11	8.56E-11		
Tl-208	4.6024E-08	2,221.04	4,442.09	0.00E+00	1.02E-04	2.04E-04		
U-232	1.2582E-07	2,221.04	4,442.09	0.00E+00	2.79E-04	5.59E-04	Thermal Power	
U-233	2.5825E-09	2,221.04	4,442.09	0.00E+00	5.74E-06	1.15E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8450E-04	2,221.04	4,442.09	0.00E+00	4.10E-01	8.20E-01	5.29E+01	1.06E+02
U-235	-2.7235E-08	2,221.04	0.00	2.03E-02	1.43E-02	2.03E-02	Total	Total
U-236	1.5493E-05	2,221.04	4,442.09	0.00E+00	3.44E-02	6.88E-02		
U-238	-4.2851E-09	2,221.04	0.00	1.26E-02	1.26E-02	1.26E-02		
Y-90	1.9254E+00	2,221.04	4,442.09	0.00E+00	4.28E+03	8.55E+03		
Other Radionuclides					4.30E+03	8.59E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2,221.04
Bounding:		4,442.09

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.15	
Bounding:	0.30	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JRR-4 (UALX HEU)
SNF ID #: 505
Fuel Units & Descr: 43 - ASSEMBLY
Heavy Metal Mass: BOL=7.676kg; EOL=6.338kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1969
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 1.19

II. Estimates	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	1,266.45	2,532.90	0.00E+00	8.40E-07	1.68E-06
Am-241	2.0060E-03	1,266.45	2,532.90	0.00E+00	2.54E+00	5.08E+00
Am-242m	4.2429E-07	1,266.45	2,532.90	0.00E+00	5.37E-04	1.07E-03
Am-243	1.4899E-06	1,266.45	2,532.90	0.00E+00	1.89E-03	3.77E-03
C-14	5.7135E-09	1,266.45	2,532.90	0.00E+00	7.24E-06	1.45E-05
Cl-36	1.3124E-32	1,266.45	2,532.90	0.00E+00	1.66E-29	3.32E-29
Cm-243	1.6443E-07	1,266.45	2,532.90	0.00E+00	2.08E-04	4.16E-04
Cm-244	2.9330E-05	1,266.45	2,532.90	0.00E+00	3.71E-02	7.43E-02
Co-60	5.3186E-06	1,266.45	2,532.90	0.00E+00	6.74E-03	1.35E-02
Cs-134	3.1563E-03	1,266.45	2,532.90	0.00E+00	4.00E+00	7.99E+00
Cs-135	3.4477E-06	1,266.45	2,532.90	0.00E+00	4.37E-03	8.73E-03
Cs-137	2.0313E+00	1,266.45	2,532.90	0.00E+00	2.57E+03	5.15E+03
Eu-154	2.4513E-02	1,266.45	2,532.90	0.00E+00	3.10E+01	6.21E+01
Eu-155	4.8175E-03	1,266.45	2,532.90	0.00E+00	6.10E+00	1.22E+01
Fe-55	1.2397E-04	1,266.45	2,532.90	0.00E+00	1.57E-01	3.14E-01
H-3	4.5697E-03	1,266.45	2,532.90	0.00E+00	5.79E+00	1.16E+01
I-129	7.5300E-07	1,266.45	2,532.90	0.00E+00	9.54E-04	1.91E-03
Kr-85	1.0650E-01	1,266.45	2,532.90	0.00E+00	1.37E+02	2.75E+02
Np-237	9.5561E-06	1,266.45	2,532.90	0.00E+00	1.21E-02	2.42E-02
Pa-231	2.0359E-09	1,266.45	2,532.90	0.00E+00	2.58E-06	5.16E-06
Pb-210	4.9728E-11	1,266.45	2,532.90	0.00E+00	6.30E-08	1.26E-07
Pm-147	4.8502E-02	1,266.45	2,532.90	0.00E+00	6.14E+01	1.23E+02
Pu-238	1.8254E-02	1,266.45	2,532.90	0.00E+00	2.31E+01	4.62E+01
Pu-239	4.2810E-04	1,266.45	2,532.90	0.00E+00	5.42E-01	1.08E+00
Pu-240	2.4368E-04	1,266.45	2,532.90	0.00E+00	3.09E-01	6.17E-01
Pu-241	3.3415E-02	1,266.45	2,532.90	0.00E+00	4.23E+01	8.46E+01
Pu-242	3.6329E-07	1,266.45	2,532.90	0.00E+00	4.60E-04	9.20E-04
Ra-226	2.2854E-10	1,266.45	2,532.90	0.00E+00	2.89E-07	5.79E-07
Ra-228	1.2426E-14	1,266.45	2,532.90	0.00E+00	1.57E-11	3.15E-11
Ru-106	6.3589E-06	1,266.45	2,532.90	0.00E+00	8.05E-03	1.61E-02
Se-79	1.2933E-05	1,266.45	2,532.90	0.00E+00	1.64E-02	3.28E-02
Sn-126	1.1574E-05	1,266.45	2,532.90	0.00E+00	1.47E-02	2.93E-02
Sr-90	1.9248E+00	1,266.45	2,532.90	0.00E+00	2.44E+03	4.88E+03
Tc-99	4.2239E-04	1,266.45	2,532.90	0.00E+00	5.35E-01	1.07E+00
Th-229	5.0953E-12	1,266.45	2,532.90	0.00E+00	6.45E-09	1.29E-08
Th-230	4.1885E-08	1,266.45	2,532.90	0.00E+00	5.30E-05	1.06E-04
Th-232	1.9270E-14	1,266.45	2,532.90	0.00E+00	2.44E-11	4.88E-11
Tl-208	4.6024E-08	1,266.45	2,532.90	0.00E+00	5.83E-05	1.17E-04
U-232	1.2582E-07	1,266.45	2,532.90	0.00E+00	1.59E-04	3.19E-04
U-233	2.5825E-09	1,266.45	2,532.90	0.00E+00	3.27E-06	6.54E-06
U-234	1.8450E-04	1,266.45	2,532.90	0.00E+00	2.34E-01	4.67E-01
U-235	-2.7235E-06	1,266.45	0.00	1.54E-02	1.20E-02	1.54E-02
U-236	1.5493E-05	1,266.45	2,532.90	0.00E+00	1.96E-02	3.92E-02
U-238	-4.2851E-09	1,266.45	0.00	1.80E-04	1.74E-04	1.80E-04
Y-90	1.9254E+00	1,266.45	2,532.90	0.00E+00	2.44E+03	4.88E+03
Other Radionuclides					2.45E+03	4.90E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.674E+14
0.0250	5.560E+13
0.0375	4.849E+13
0.0575	5.194E+13
0.0850	3.139E+13
0.1250	2.124E+13
0.2250	2.708E+13
0.3750	1.179E+13
0.5750	1.923E+14
0.8500	3.251E+12
1.2500	1.856E+12
1.7500	8.521E+10
2.2500	7.474E+06
2.7500	4.226E+06
3.5000	1.941E+04
5.0000	1.098E+03
7.0000	1.212E+02
11.0000	1.358E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.62E+01	6.04E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.03204799	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,266.45
Bounding:		2,532.90

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.52	
Bounding:	1.05	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JRR-4 (UALX HEU)
SNF ID #: 1070
Fuel Units & Descr: 11 - ASSEMBLY
Heavy Metal Mass: BOL=1.964kg; EOL=1.621kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1989
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 0.31

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	323.98	647.95	0.00E+00	2.15E-07	4.30E-07	Avg. MeV	
Am-241	2.0060E-03	323.98	647.95	0.00E+00	6.50E-01	1.30E+00	0.0150	6.840E+13
Am-242m	4.2429E-07	323.98	647.95	0.00E+00	1.37E-04	2.75E-04	0.0250	1.422E+13
Am-243	1.4899E-06	323.98	647.95	0.00E+00	4.83E-04	9.65E-04	0.0375	1.241E+13
C-14	5.7135E-09	323.98	647.95	0.00E+00	1.85E-06	3.70E-06	0.0575	1.329E+13
Cl-36	1.3124E-32	323.98	647.95	0.00E+00	4.25E-30	8.50E-30	0.0850	8.029E+12
Cm-243	1.6443E-07	323.98	647.95	0.00E+00	5.33E-05	1.07E-04	0.1250	5.433E+12
Cm-244	2.9330E-05	323.98	647.95	0.00E+00	9.50E-03	1.90E-02	0.2250	6.928E+12
Co-60	5.3186E-06	323.98	647.95	0.00E+00	1.72E-03	3.45E-03	0.3750	3.016E+12
Cs-134	3.1563E-03	323.98	647.95	0.00E+00	1.02E+00	2.05E+00	0.5750	4.919E+13
Cs-135	3.4477E-06	323.98	647.95	0.00E+00	1.12E-03	2.23E-03	0.8500	8.317E+11
Cs-137	2.0313E+00	323.98	647.95	0.00E+00	6.58E+02	1.32E+03	1.2500	4.749E+11
Eu-154	2.4513E-02	323.98	647.95	0.00E+00	7.94E+00	1.59E+01	1.7500	2.180E+10
Eu-155	4.8175E-03	323.98	647.95	0.00E+00	1.56E+00	3.12E+00	2.2500	1.912E+08
Fe-55	1.2397E-04	323.98	647.95	0.00E+00	4.02E-02	8.03E-02	2.7500	1.081E+08
H-3	4.5697E-03	323.98	647.95	0.00E+00	1.48E+00	2.96E+00	3.5000	4.966E+03
I-129	7.5300E-07	323.98	647.95	0.00E+00	2.44E-04	4.88E-04	5.0000	2.808E+02
Kr-85	1.0850E-01	323.98	647.95	0.00E+00	3.52E+01	7.03E+01	7.0000	3.100E+01
Np-237	9.5561E-06	323.98	647.95	0.00E+00	3.10E-03	6.19E-03	11.0000	3.475E+00
Pa-231	2.0359E-09	323.98	647.95	0.00E+00	6.60E-07	1.32E-06		
Pb-210	4.9728E-11	323.98	647.95	0.00E+00	1.61E-08	3.22E-08		
Pm-147	4.8502E-02	323.98	647.95	0.00E+00	1.57E+01	3.14E+01		
Pu-238	1.8254E-02	323.98	647.95	0.00E+00	5.91E+00	1.18E+01		
Pu-239	4.2810E-04	323.98	647.95	0.00E+00	1.39E-01	2.77E-01		
Pu-240	2.4368E-04	323.98	647.95	0.00E+00	7.89E-02	1.58E-01		
Pu-241	3.3415E-02	323.98	647.95	0.00E+00	1.08E+01	2.17E+01		
Pu-242	3.6329E-07	323.98	647.95	0.00E+00	1.18E-04	2.35E-04		
Ra-226	2.2854E-10	323.98	647.95	0.00E+00	7.40E-08	1.48E-07		
Ra-228	1.2426E-14	323.98	647.95	0.00E+00	4.03E-12	8.05E-12		
Ru-106	6.3589E-06	323.98	647.95	0.00E+00	2.06E-03	4.12E-03		
Se-79	1.2933E-05	323.98	647.95	0.00E+00	4.19E-03	8.38E-03		
Sn-126	1.1574E-05	323.98	647.95	0.00E+00	3.75E-03	7.50E-03		
Sr-90	1.9248E+00	323.98	647.95	0.00E+00	6.24E+02	1.25E+03		
Tc-99	4.2239E-04	323.98	647.95	0.00E+00	1.37E-01	2.74E-01		
Th-229	5.0953E-12	323.98	647.95	0.00E+00	1.65E-09	3.30E-09		
Th-230	4.1885E-08	323.98	647.95	0.00E+00	1.36E-05	2.71E-05		
Th-232	1.9270E-14	323.98	647.95	0.00E+00	6.24E-12	1.25E-11		
Tl-208	4.6024E-08	323.98	647.95	0.00E+00	1.49E-05	2.98E-05		
U-232	1.2582E-07	323.98	647.95	0.00E+00	4.08E-05	8.15E-05		
U-233	2.5825E-09	323.98	647.95	0.00E+00	8.37E-07	1.67E-06		
U-234	1.8450E-04	323.98	647.95	0.00E+00	5.98E-02	1.20E-01		
U-235	-2.7235E-06	323.98	0.00	3.95E-03	3.07E-03	3.95E-03		
U-236	1.5493E-05	323.98	647.95	0.00E+00	5.02E-03	1.00E-02		
U-238	-4.2851E-09	323.98	0.00	4.60E-05	4.46E-05	4.60E-05		
Y-90	1.9254E+00	323.98	647.95	0.00E+00	6.24E+02	1.25E+03		
Other Radionuclides					6.27E+02	1.25E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.72E+00	1.54E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.03204799	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		323.98
Bounding:		647.95

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.52	
Bounding:	1.05	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: KURR (UALX-HEU) JAPAN
SNF ID #: 601
Fuel Units & Descr: 240 - 18 CURVED PLATES
Heavy Metal Mass: BOL=40.824kg; EOL=33.48kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2006
Estimates as of: 2010
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' 6.67

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	6,954.91	13,909.82	0.00E+00	1.01E-06	2.02E-06
Am-241	1.1190E-03	6,954.91	13,909.82	0.00E+00	7.78E+00	1.56E+01
Am-242m	4.5425E-07	6,954.91	13,909.82	0.00E+00	3.16E-03	6.32E-03
Am-243	1.4921E-06	6,954.91	13,909.82	0.00E+00	1.04E-02	2.08E-02
C-14	5.7244E-09	6,954.91	13,909.82	0.00E+00	3.98E-05	7.96E-05
Cl-36	1.3124E-32	6,954.91	13,909.82	0.00E+00	9.13E-29	1.83E-28
Cm-243	2.3676E-07	6,954.91	13,909.82	0.00E+00	1.65E-03	3.29E-03
Cm-244	5.2042E-05	6,954.91	13,909.82	0.00E+00	3.62E-01	7.24E-01
Co-60	3.8208E-05	6,954.91	13,909.82	0.00E+00	2.66E-01	5.31E-01
Cs-134	4.8693E-01	6,954.91	13,909.82	0.00E+00	3.39E+03	6.77E+03
Cs-135	3.4477E-06	6,954.91	13,909.82	0.00E+00	2.40E-02	4.80E-02
Cs-137	2.8731E+00	6,954.91	13,909.82	0.00E+00	2.00E+04	4.00E+04
Eu-154	8.2053E-02	6,954.91	13,909.82	0.00E+00	5.71E+02	1.14E+03
Eu-155	3.9134E-02	6,954.91	13,909.82	0.00E+00	2.72E+02	5.44E+02
Fe-55	6.7429E-03	6,954.91	13,909.82	0.00E+00	4.69E+01	9.38E+01
H-3	1.0599E-02	6,954.91	13,909.82	0.00E+00	7.37E+01	1.47E+02
I-129	7.5300E-07	6,954.91	13,909.82	0.00E+00	5.24E-03	1.05E-02
Kr-85	2.8595E-01	6,954.91	13,909.82	0.00E+00	1.99E+03	3.98E+03
Np-237	9.5479E-06	6,954.91	13,909.82	0.00E+00	6.64E-02	1.33E-01
Pa-231	8.9297E-10	6,954.91	13,909.82	0.00E+00	6.21E-06	1.24E-05
Pb-210	3.7609E-12	6,954.91	13,909.82	0.00E+00	2.62E-08	5.23E-08
Pm-147	2.5452E+00	6,954.91	13,909.82	0.00E+00	1.77E+04	3.54E+04
Pu-238	2.0550E-02	6,954.91	13,909.82	0.00E+00	1.43E+02	2.86E+02
Pu-239	4.2838E-04	6,954.91	13,909.82	0.00E+00	2.98E+00	5.96E+00
Pu-240	2.4401E-04	6,954.91	13,909.82	0.00E+00	1.70E+00	3.39E+00
Pu-241	6.8764E-02	6,954.91	13,909.82	0.00E+00	4.78E+02	9.56E+02
Pu-242	3.6329E-07	6,954.91	13,909.82	0.00E+00	2.53E-03	5.05E-03
Ra-226	3.8045E-11	6,954.91	13,909.82	0.00E+00	2.65E-07	5.29E-07
Ra-228	2.9902E-15	6,954.91	13,909.82	0.00E+00	2.08E-11	4.16E-11
Ru-106	1.9055E-01	6,954.91	13,909.82	0.00E+00	1.33E+03	2.65E+03
Se-79	1.2936E-05	6,954.91	13,909.82	0.00E+00	9.00E-02	1.80E-01
Sn-126	1.1574E-05	6,954.91	13,909.82	0.00E+00	8.05E-02	1.61E-01
Sr-90	2.7505E+00	6,954.91	13,909.82	0.00E+00	1.91E+04	3.83E+04
Tc-99	4.2239E-04	6,954.91	13,909.82	0.00E+00	2.94E+00	5.88E+00
Th-229	1.8848E-12	6,954.91	13,909.82	0.00E+00	1.31E-08	2.62E-08
Th-230	1.7042E-08	6,954.91	13,909.82	0.00E+00	1.19E-04	2.37E-04
Th-232	7.8132E-15	6,954.91	13,909.82	0.00E+00	5.43E-11	1.09E-10
Tl-208	4.4063E-08	6,954.91	13,909.82	0.00E+00	3.06E-04	6.13E-04
U-232	1.3151E-07	6,954.91	13,909.82	0.00E+00	9.15E-04	1.83E-03
U-233	1.9564E-09	6,954.91	13,909.82	0.00E+00	1.36E-05	2.72E-05
U-234	1.8371E-04	6,954.91	13,909.82	0.00E+00	1.28E+00	2.56E+00
U-235	-2.7235E-06	6,954.91	0.00	8.22E-02	6.33E-02	8.22E-02
U-236	1.5493E-05	6,954.91	13,909.82	0.00E+00	1.08E-01	2.16E-01
U-238	-4.2851E-09	6,954.91	0.00	9.36E-04	9.07E-04	9.36E-04
Y-90	2.7505E+00	6,954.91	13,909.82	0.00E+00	1.91E+04	3.83E+04
Other Radionuclides					3.58E+04	7.15E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.684E+15
0.0250	5.781E+14
0.0375	5.335E+14
0.0575	5.246E+14
0.0850	3.344E+14
0.1250	2.896E+14
0.2250	2.834E+14
0.3750	1.372E+14
0.5750	1.885E+15
0.8500	2.639E+14
1.2500	4.910E+13
1.7500	2.059E+12
2.2500	4.319E+12
2.7500	2.485E+10
3.5000	2.756E+09
5.0000	8.241E+03
7.0000	9.187E+02
11.0000	1.036E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.83E+02	7.05E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.175	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		6,954.91
Bounding:		13,909.82

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.54	
Bounding:	1.06	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: LWR SAMPLES
SNF ID #: 134
Fuel Units & Descr: 5 - ROD
Heavy Metal Mass: BOL= ; EOL=12.74kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
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' 0.18

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	12,107.49	12,107.49	0.00E+00	2.79E-02	2.79E-02	Avg. MeV	
Am-241	8.4448E+00	12,107.49	12,107.49	0.00E+00	1.02E+05	1.02E+05	0.0150	1.484E+16
Am-242m	1.6848E-02	12,107.49	12,107.49	0.00E+00	2.04E+02	2.04E+02	0.0250	2.952E+15
Am-243	1.6320E-02	12,107.49	12,107.49	0.00E+00	1.98E+02	1.98E+02	0.0375	2.579E+15
C-14	1.2090E-01	12,107.49	12,107.49	0.00E+00	1.46E+03	1.46E+03	0.0575	4.058E+15
Cl-36	2.2849E-03	12,107.49	12,107.49	0.00E+00	2.77E+01	2.77E+01	0.0850	1.584E+15
Cm-243	8.6624E-04	12,107.49	12,107.49	0.00E+00	1.05E+01	1.05E+01	0.1250	1.241E+15
Cm-244	1.6848E-01	12,107.49	12,107.49	0.00E+00	2.04E+03	2.04E+03	0.2250	1.372E+15
Co-60	2.8086E+01	12,107.49	12,107.49	0.00E+00	3.40E+05	3.40E+05	0.3750	5.869E+14
Cs-134	3.4148E-04	12,107.49	12,107.49	0.00E+00	4.13E+00	4.13E+00	0.5750	9.544E+15
Cs-135	4.3976E-04	12,107.49	12,107.49	0.00E+00	5.32E+00	5.32E+00	0.8500	3.647E+14
Cs-137	2.1049E+01	12,107.49	12,107.49	0.00E+00	2.55E+05	2.55E+05	1.2500	2.549E+16
Eu-154	1.2500E+00	12,107.49	12,107.49	0.00E+00	1.51E+04	1.51E+04	1.7500	1.128E+13
Eu-155	6.8986E-02	12,107.49	12,107.49	0.00E+00	8.35E+02	8.35E+02	2.2500	1.337E+11
Fe-55	2.9308E-01	12,107.49	12,107.49	0.00E+00	3.55E+03	3.55E+03	2.7500	3.768E+10
H-3	2.4311E-01	12,107.49	12,107.49	0.00E+00	2.94E+03	2.94E+03	3.5000	3.015E+07
I-129	1.0618E-05	12,107.49	12,107.49	0.00E+00	1.29E-01	1.29E-01	5.0000	1.280E+07
Kr-85	5.9882E-01	12,107.49	12,107.49	0.00E+00	7.25E+03	7.25E+03	7.0000	1.466E+06
Np-237	1.5668E-04	12,107.49	12,107.49	0.00E+00	1.90E+00	1.90E+00	11.0000	1.678E+05
Pa-231	2.8656E-06	12,107.49	12,107.49	0.00E+00	3.47E-02	3.47E-02		
Pb-210	2.3918E-08	12,107.49	12,107.49	0.00E+00	2.90E-04	2.90E-04		
Pm-147	1.6900E-02	12,107.49	12,107.49	0.00E+00	2.05E+02	2.05E+02		
Pu-238	-8.6120E-01	12,107.49	0.00	3.27E+03	0.00E+00	3.27E+03		
Pu-239	-4.8440E-02	12,107.49	0.00	3.96E+02	0.00E+00	3.96E+02		
Pu-240	-3.0095E-01	12,107.49	0.00	5.06E+02	0.00E+00	5.06E+02		
Pu-241	-1.0411E+02	12,107.49	0.00	1.30E+05	0.00E+00	1.30E+05		
Pu-242	-1.1381E-04	12,107.49	0.00	2.19E+00	8.12E-01	2.19E+00		
Ra-226	6.4400E-08	12,107.49	12,107.49	0.00E+00	7.80E-04	7.80E-04		
Ra-228	5.9952E-07	12,107.49	12,107.49	0.00E+00	7.26E-03	7.26E-03		
Ru-106	8.5526E-07	12,107.49	12,107.49	0.00E+00	1.04E-02	1.04E-02		
Se-79	1.9181E-04	12,107.49	12,107.49	0.00E+00	2.32E+00	2.32E+00		
Sn-126	1.6671E-04	12,107.49	12,107.49	0.00E+00	2.02E+00	2.02E+00		
Sr-90	1.9799E+01	12,107.49	12,107.49	0.00E+00	2.40E+05	2.40E+05		
Tc-99	6.7678E-03	12,107.49	12,107.49	0.00E+00	8.19E+01	8.19E+01		
Th-229	1.7488E-08	12,107.49	12,107.49	0.00E+00	2.12E-02	2.12E-02		
Th-230	5.8704E-08	12,107.49	12,107.49	0.00E+00	7.11E-02	7.11E-02		
Th-232	6.0208E-07	12,107.49	12,107.49	0.00E+00	7.29E-03	7.29E-03		
Tl-208	8.7573E-05	12,107.49	12,107.49	0.00E+00	1.06E+00	1.06E+00		
U-232	2.3706E-04	12,107.49	12,107.49	0.00E+00	2.87E+00	2.87E+00		
U-233	3.6128E-04	12,107.49	12,107.49	0.00E+00	4.37E+00	4.37E+00		
U-234	1.2788E-02	12,107.49	12,107.49	0.00E+00	1.55E+02	1.55E+02		
U-235	5.7486E-04	12,107.49	12,107.49	1.10E-02	6.97E+00	6.97E+00		
U-236	2.3485E-04	12,107.49	12,107.49	0.00E+00	2.84E+00	2.84E+00		
U-238	1.1581E-04	12,107.49	12,107.49	1.36E-03	1.40E+00	1.40E+00		
Y-90	1.9804E+01	12,107.49	12,107.49	0.00E+00	2.40E+05	2.40E+05		
Other Radionuclides					7.47E+05	7.47E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.19E+04	1.21E+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 OR SST	SST/Inconel
BOL HM Constituents:	Pu and U	U, Th, & Pu
BOL Enrichment %:		0 to 100

Basis for Parameter Differences:

This fuel didn't closely match any existing templates, therefore the worst case template was used.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		12,107.49
Bounding:		12,107.49

Basis for burnup used in estimate:

Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	14.21	
Bounding:	14.21	

Estimated EOL HM/Given EOL HM: 591.64

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: MIT
SNF ID #: 135
Fuel Units & Descr: 525 - 15 FLAT PLATES
Heavy Metal Mass: BOL=286.02kg; EOL=232.68kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 17.50

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	95,816.70	191,633.40	0.00E+00	1.39E-05	2.79E-05
Am-241	1.1190E-03	95,816.70	191,633.40	0.00E+00	1.07E+02	2.14E+02
Am-242m	4.5425E-07	95,816.70	191,633.40	0.00E+00	4.35E-02	8.70E-02
Am-243	1.4921E-06	95,816.70	191,633.40	0.00E+00	1.43E-01	2.86E-01
C-14	5.7244E-09	95,816.70	191,633.40	0.00E+00	5.48E-04	1.10E-03
Cl-36	1.3124E-32	95,816.70	191,633.40	0.00E+00	1.26E-27	2.51E-27
Cm-243	2.3676E-07	95,816.70	191,633.40	0.00E+00	2.27E-02	4.54E-02
Cm-244	5.2042E-05	95,816.70	191,633.40	0.00E+00	4.99E+00	9.97E+00
Co-60	3.8208E-05	95,816.70	191,633.40	0.00E+00	3.66E+00	7.32E+00
Cs-134	4.8693E-01	95,816.70	191,633.40	0.00E+00	4.67E+04	9.33E+04
Cs-135	3.4477E-06	95,816.70	191,633.40	0.00E+00	3.30E-01	6.61E-01
Cs-137	2.8731E+00	95,816.70	191,633.40	0.00E+00	2.75E+05	5.51E+05
Eu-154	8.2053E-02	95,816.70	191,633.40	0.00E+00	7.86E+03	1.57E+04
Eu-155	3.9134E-02	95,816.70	191,633.40	0.00E+00	3.75E+03	7.50E+03
Fe-55	6.7429E-03	95,816.70	191,633.40	0.00E+00	6.46E+02	1.29E+03
H-3	1.0599E-02	95,816.70	191,633.40	0.00E+00	1.02E+03	2.03E+03
I-129	7.5300E-07	95,816.70	191,633.40	0.00E+00	7.21E-02	1.44E-01
Kr-85	2.8595E-01	95,816.70	191,633.40	0.00E+00	2.74E+04	5.48E+04
Np-237	9.5479E-06	95,816.70	191,633.40	0.00E+00	9.15E-01	1.83E+00
Pa-231	8.9297E-10	95,816.70	191,633.40	0.00E+00	8.56E-05	1.71E-04
Pb-210	3.7609E-12	95,816.70	191,633.40	0.00E+00	3.60E-07	7.21E-07
Pm-147	2.5452E+00	95,816.70	191,633.40	0.00E+00	2.44E+05	4.88E+05
Pu-238	2.0550E-02	95,816.70	191,633.40	0.00E+00	1.97E+03	3.94E+03
Pu-239	4.2838E-04	95,816.70	191,633.40	0.00E+00	4.10E+01	8.21E+01
Pu-240	2.4401E-04	95,816.70	191,633.40	0.00E+00	2.34E+01	4.68E+01
Pu-241	6.8764E-02	95,816.70	191,633.40	0.00E+00	6.59E+03	1.32E+04
Pu-242	3.6329E-07	95,816.70	191,633.40	0.00E+00	3.48E-02	6.96E-02
Ra-226	3.8045E-11	95,816.70	191,633.40	0.00E+00	3.65E-06	7.29E-06
Ra-228	2.9902E-15	95,816.70	191,633.40	0.00E+00	2.87E-10	5.73E-10
Ru-106	1.9055E-01	95,816.70	191,633.40	0.00E+00	1.83E+04	3.65E+04
Se-79	1.2936E-05	95,816.70	191,633.40	0.00E+00	1.24E+00	2.48E+00
Sn-126	1.1574E-05	95,816.70	191,633.40	0.00E+00	1.11E+00	2.22E+00
Sr-90	2.7505E+00	95,816.70	191,633.40	0.00E+00	2.64E+05	5.27E+05
Tc-99	4.2239E-04	95,816.70	191,633.40	0.00E+00	4.05E+01	8.09E+01
Th-229	1.8848E-12	95,816.70	191,633.40	0.00E+00	1.81E-07	3.61E-07
Th-230	1.7042E-08	95,816.70	191,633.40	0.00E+00	1.63E-03	3.27E-03
Th-232	7.8132E-15	95,816.70	191,633.40	0.00E+00	7.49E-10	1.50E-09
Tl-208	4.4063E-08	95,816.70	191,633.40	0.00E+00	4.22E-03	8.44E-03
U-232	1.3151E-07	95,816.70	191,633.40	0.00E+00	1.26E-02	2.52E-02
U-233	1.9564E-09	95,816.70	191,633.40	0.00E+00	1.87E-04	3.75E-04
U-234	1.8371E-04	95,816.70	191,633.40	0.00E+00	1.76E+01	3.52E+01
U-235	-2.7235E-06	95,816.70	0.00	5.76E-01	3.15E-01	5.76E-01
U-236	1.5493E-05	95,816.70	191,633.40	0.00E+00	1.48E+00	2.97E+00
U-238	-4.2851E-09	95,816.70	0.00	6.61E-03	6.20E-03	6.61E-03
Y-90	2.7505E+00	95,816.70	191,633.40	0.00E+00	2.64E+05	5.27E+05
Other Radionuclides					4.93E+05	9.86E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.697E+16
0.0250	7.965E+15
0.0375	7.350E+15
0.0575	7.227E+15
0.0850	4.607E+15
0.1250	3.990E+15
0.2250	3.905E+15
0.3750	1.890E+15
0.5750	2.596E+16
0.8500	3.636E+15
1.2500	6.765E+14
1.7500	2.837E+13
2.2500	5.950E+13
2.7500	3.423E+11
3.5000	3.797E+10
5.0000	1.135E+05
7.0000	1.265E+04
11.0000	1.426E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.86E+03	9.72E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.1245618	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	95,816.70	50,514.01
Bounding:		191,633.40

Basis for burnup used in estimate:
Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.06	0.53
Bounding:	2.13	

Estimated EOL HM/Given EOL HM: 0.82

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: MIT
SNF ID #: 136
Fuel Units & Descr: 120 - 15 FLAT PLATES
Heavy Metal Mass: BOL=65.46kg; EOL=43.032kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1994
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 4.00

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	21,239.75	42,479.50	0.00E+00	9.74E-06	1.95E-05	Avg. MeV	
Am-241	1.7832E-03	21,239.75	42,479.50	0.00E+00	3.79E+01	7.58E+01	0.0150	5.067E+15
Am-242m	4.3410E-07	21,239.75	42,479.50	0.00E+00	9.22E-03	1.84E-02	0.0250	1.057E+15
Am-243	1.4907E-06	21,239.75	42,479.50	0.00E+00	3.17E-02	6.33E-02	0.0375	9.228E+14
C-14	5.7162E-09	21,239.75	42,479.50	0.00E+00	1.21E-04	2.43E-04	0.0575	9.840E+14
Cl-36	1.3124E-32	21,239.75	42,479.50	0.00E+00	2.79E-28	5.57E-28	0.0850	5.960E+14
Cm-243	1.8568E-07	21,239.75	42,479.50	0.00E+00	3.94E-03	7.89E-03	0.1250	4.086E+14
Cm-244	3.5512E-05	21,239.75	42,479.50	0.00E+00	7.54E-01	1.51E+00	0.2250	5.135E+14
Co-60	1.0261E-05	21,239.75	42,479.50	0.00E+00	2.18E-01	4.36E-01	0.3750	2.250E+14
Cs-134	1.6931E-02	21,239.75	42,479.50	0.00E+00	3.60E+02	7.19E+02	0.5750	3.651E+15
Cs-135	3.4477E-06	21,239.75	42,479.50	0.00E+00	7.32E-02	1.46E-01	0.8500	8.673E+13
Cs-137	2.2800E+00	21,239.75	42,479.50	0.00E+00	4.84E+04	9.69E+04	1.2500	4.381E+13
Eu-154	3.6656E-02	21,239.75	42,479.50	0.00E+00	7.79E+02	1.56E+03	1.7500	1.836E+12
Eu-155	9.6841E-03	21,239.75	42,479.50	0.00E+00	2.06E+02	4.11E+02	2.2500	2.297E+09
Fe-55	4.6977E-04	21,239.75	42,479.50	0.00E+00	9.98E+00	2.00E+01	2.7500	1.380E+08
H-3	6.0485E-03	21,239.75	42,479.50	0.00E+00	1.28E+02	2.57E+02	3.5000	8.773E+08
I-129	7.5300E-07	21,239.75	42,479.50	0.00E+00	1.60E-02	3.20E-02	5.0000	2.029E+04
Kr-85	1.4989E-01	21,239.75	42,479.50	0.00E+00	3.18E+03	6.37E+03	7.0000	2.247E+03
Np-237	9.5534E-06	21,239.75	42,479.50	0.00E+00	2.03E-01	4.06E-01	11.0000	2.523E+02
Pa-231	1.6550E-09	21,239.75	42,479.50	0.00E+00	3.52E-05	7.03E-05		
Pb-210	2.6631E-11	21,239.75	42,479.50	0.00E+00	5.66E-07	1.13E-06		
Pm-147	1.8156E-01	21,239.75	42,479.50	0.00E+00	3.86E+03	7.71E+03		
Pu-238	1.8990E-02	21,239.75	42,479.50	0.00E+00	4.03E+02	8.07E+02		
Pu-239	4.2838E-04	21,239.75	42,479.50	0.00E+00	9.10E+00	1.82E+01		
Pu-240	2.4379E-04	21,239.75	42,479.50	0.00E+00	5.18E+00	1.04E+01		
Pu-241	4.2511E-02	21,239.75	42,479.50	0.00E+00	9.03E+02	1.81E+03		
Pu-242	3.6329E-07	21,239.75	42,479.50	0.00E+00	7.72E-03	1.54E-02		
Ra-226	1.4725E-10	21,239.75	42,479.50	0.00E+00	3.13E-06	6.26E-06		
Ra-228	8.9760E-15	21,239.75	42,479.50	0.00E+00	1.91E-10	3.81E-10		
Ru-106	1.9752E-04	21,239.75	42,479.50	0.00E+00	4.20E+00	8.39E+00		
Se-79	1.2933E-05	21,239.75	42,479.50	0.00E+00	2.75E-01	5.49E-01		
Sn-126	1.1574E-05	21,239.75	42,479.50	0.00E+00	2.46E-01	4.92E-01		
Sr-90	2.1680E+00	21,239.75	42,479.50	0.00E+00	4.60E+04	9.21E+04		
Tc-99	4.2239E-04	21,239.75	42,479.50	0.00E+00	8.97E+00	1.79E+01		
Th-229	3.9270E-12	21,239.75	42,479.50	0.00E+00	8.34E-08	1.67E-07		
Th-230	3.3578E-08	21,239.75	42,479.50	0.00E+00	7.13E-04	1.43E-03		
Th-232	1.5452E-14	21,239.75	42,479.50	0.00E+00	3.28E-10	6.56E-10		
Tl-208	4.6705E-08	21,239.75	42,479.50	0.00E+00	9.92E-04	1.98E-03		
U-232	1.3045E-07	21,239.75	42,479.50	0.00E+00	2.77E-03	5.54E-03		
U-233	2.3739E-09	21,239.75	42,479.50	0.00E+00	5.04E-05	1.01E-04		
U-234	1.8423E-04	21,239.75	42,479.50	0.00E+00	3.91E+00	7.83E+00		
U-235	-2.7235E-06	21,239.75	0.00	1.32E-01	7.39E-02	1.32E-01		
U-236	1.5493E-05	21,239.75	42,479.50	0.00E+00	3.29E-01	6.58E-01		
U-238	-4.2851E-09	21,239.75	0.00	1.51E-03	1.42E-03	1.51E-03		
Y-90	2.1686E+00	21,239.75	42,479.50	0.00E+00	4.61E+04	9.21E+04		
Other Radionuclides					4.62E+04	9.24E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.75E+02	1.15E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.145832	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		21,239.75	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		42,479.50	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.03	
Bounding:	2.06	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ML-1 (GCRE)
SNF ID #: 137
Fuel Units & Descr: 67 - 19 ROD ASSEMBLY
Heavy Metal Mass: BOL=58.625kg; EOL=58.29kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1965
Estimates as of: 2010
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"x10' = 3.72

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.3344E-08	316.46	632.91	0.00E+00	7.39E-06	1.48E-05
Am-241	1.1135E-04	316.46	632.91	0.00E+00	3.52E-02	7.05E-02
Am-242m	8.5075E-09	316.46	632.91	0.00E+00	2.69E-06	5.38E-06
Am-243	9.8519E-10	316.46	632.91	0.00E+00	3.12E-07	6.24E-07
C-14	2.3012E-04	316.46	632.91	0.00E+00	7.28E-02	1.46E-01
Cl-36	1.2261E-06	316.46	632.91	0.00E+00	3.88E-04	7.76E-04
Cm-243	2.4875E-10	316.46	632.91	0.00E+00	7.87E-08	1.57E-07
Cm-244	2.3178E-09	316.46	632.91	0.00E+00	7.33E-07	1.47E-06
Co-60	7.0849E-02	316.46	632.91	0.00E+00	2.24E+01	4.48E+01
Cs-134	3.0266E-06	316.46	632.91	0.00E+00	9.58E-04	1.92E-03
Cs-135	3.0316E-05	316.46	632.91	0.00E+00	9.59E-03	1.92E-02
Cs-137	1.4511E+00	316.46	632.91	0.00E+00	4.59E+02	9.18E+02
Eu-154	6.6955E-04	316.46	632.91	0.00E+00	2.12E-01	4.24E-01
Eu-155	6.9850E-04	316.46	632.91	0.00E+00	2.21E-01	4.42E-01
Fe-55	1.2318E-03	316.46	632.91	0.00E+00	3.90E-01	7.80E-01
H-3	2.5141E-03	316.46	632.91	0.00E+00	7.96E-01	1.59E+00
I-129	7.3195E-07	316.46	632.91	0.00E+00	2.32E-04	4.63E-04
Kr-85	4.1281E-02	316.46	632.91	0.00E+00	1.31E+01	2.61E+01
Np-237	1.1489E-06	316.46	632.91	0.00E+00	3.64E-04	7.27E-04
Pa-231	4.5241E-08	316.46	632.91	0.00E+00	1.43E-05	2.86E-05
Pb-210	6.4476E-13	316.46	632.91	0.00E+00	2.04E-10	4.08E-10
Pm-147	1.1651E-03	316.46	632.91	0.00E+00	3.69E-01	7.37E-01
Pu-238	2.9517E-04	316.46	632.91	0.00E+00	9.34E-02	1.87E-01
Pu-239	6.6772E-04	316.46	632.91	0.00E+00	2.11E-01	4.23E-01
Pu-240	8.6839E-05	316.46	632.91	0.00E+00	2.75E-02	5.50E-02
Pu-241	7.1514E-04	316.46	632.91	0.00E+00	2.26E-01	4.53E-01
Pu-242	1.9717E-09	316.46	632.91	0.00E+00	6.24E-07	1.25E-06
Ra-226	1.7654E-12	316.46	632.91	0.00E+00	5.59E-10	1.12E-09
Ra-228	8.2928E-12	316.46	632.91	0.00E+00	2.62E-09	5.25E-09
Ru-106	1.8419E-10	316.46	632.91	0.00E+00	5.83E-08	1.17E-07
Se-79	1.3223E-05	316.46	632.91	0.00E+00	4.18E-03	8.37E-03
Sn-126	1.1493E-05	316.46	632.91	0.00E+00	3.64E-03	7.27E-03
Sr-90	1.3649E+00	316.46	632.91	0.00E+00	4.32E+02	8.64E+02
Tc-99	4.6656E-04	316.46	632.91	0.00E+00	1.48E-01	2.95E-01
Th-229	1.4547E-11	316.46	632.91	0.00E+00	4.60E-09	9.21E-09
Th-230	1.6617E-10	316.46	632.91	0.00E+00	5.26E-08	1.05E-07
Th-232	8.3361E-12	316.46	632.91	0.00E+00	2.64E-09	5.28E-09
Tl-208	2.1664E-08	316.46	632.91	0.00E+00	6.86E-06	1.37E-05
U-232	5.8669E-08	316.46	632.91	0.00E+00	1.86E-05	3.71E-05
U-233	3.1847E-09	316.46	632.91	0.00E+00	1.01E-06	2.02E-06
U-234	3.8769E-07	316.46	632.91	0.00E+00	1.23E-04	2.45E-04
U-235	-2.7761E-06	316.46	0.00	1.18E-01	1.17E-01	1.18E-01
U-236	1.6190E-05	316.46	632.91	0.00E+00	5.12E-03	1.02E-02
U-238	-2.8547E-09	316.46	0.00	1.35E-03	1.35E-03	1.35E-03
Y-90	1.3652E+00	316.46	632.91	0.00E+00	4.32E+02	8.64E+02
Other Radionuclides					5.22E+02	1.04E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.724E+13
0.0250	9.817E+12
0.0375	8.491E+12
0.0575	9.152E+12
0.0850	5.530E+12
0.1250	3.591E+12
0.2250	4.762E+12
0.3750	2.076E+12
0.5750	3.420E+13
0.8500	3.462E+11
1.2500	3.441E+12
1.7500	8.929E+09
2.2500	1.854E+07
2.7500	5.359E+05
3.5000	4.872E+01
5.0000	2.014E+01
7.0000	2.234E+00
11.0000	2.514E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.53E+00	1.11E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	HASTELLOY	SST
BOL HM Constituents:	U	U
BOL Enrichment %:	93.143	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except cladding (SST is conservative).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		316.46
Bounding:		632.91

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.12	
Bounding:	0.23	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: MNR (UALX-HEU) CANADA
SNF ID #: 614
Fuel Units & Descr: 83 - 18 CURVED PLATES
Heavy Metal Mass: BOL=14.782kg; EOL=10.433kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2006
Estimates as of: 2010
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' 2.31

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	4,118.78	8,237.55	0.00E+00	5.99E-07	1.20E-06	Avg. MeV	
Am-241	1.1190E-03	4,118.78	8,237.55	0.00E+00	4.61E+00	9.22E+00	0.0150	1.589E+15
Am-242m	4.5425E-07	4,118.78	8,237.55	0.00E+00	1.87E-03	3.74E-03	0.0250	3.424E+14
Am-243	1.4921E-06	4,118.78	8,237.55	0.00E+00	6.15E-03	1.23E-02	0.0375	3.159E+14
C-14	5.7244E-09	4,118.78	8,237.55	0.00E+00	2.36E-05	4.72E-05	0.0575	3.107E+14
Cl-36	1.3124E-32	4,118.78	8,237.55	0.00E+00	5.41E-29	1.08E-28	0.0850	1.981E+14
Cm-243	2.3676E-07	4,118.78	8,237.55	0.00E+00	9.75E-04	1.95E-03	0.1250	1.715E+14
Cm-244	5.2042E-05	4,118.78	8,237.55	0.00E+00	2.14E-01	4.29E-01	0.2250	1.679E+14
Co-60	3.8208E-05	4,118.78	8,237.55	0.00E+00	1.57E-01	3.15E-01	0.3750	8.125E+13
Cs-134	4.8693E-01	4,118.78	8,237.55	0.00E+00	2.01E+03	4.01E+03	0.5750	1.116E+15
Cs-135	3.4477E-06	4,118.78	8,237.55	0.00E+00	1.42E-02	2.84E-02	0.8500	1.563E+14
Cs-137	2.8731E+00	4,118.78	8,237.55	0.00E+00	1.18E+04	2.37E+04	1.2500	2.908E+13
Eu-154	8.2053E-02	4,118.78	8,237.55	0.00E+00	3.38E+02	6.76E+02	1.7500	1.219E+12
Eu-155	3.9134E-02	4,118.78	8,237.55	0.00E+00	1.61E+02	3.22E+02	2.2500	2.558E+12
Fe-55	6.7429E-03	4,118.78	8,237.55	0.00E+00	2.78E+01	5.55E+01	2.7500	1.472E+10
H-3	1.0599E-02	4,118.78	8,237.55	0.00E+00	4.37E+01	8.73E+01	3.5000	1.632E+09
I-129	7.5300E-07	4,118.78	8,237.55	0.00E+00	3.10E-03	6.20E-03	5.0000	4.880E+03
Kr-85	2.8595E-01	4,118.78	8,237.55	0.00E+00	1.18E+03	2.36E+03	7.0000	5.440E+02
Np-237	9.5479E-06	4,118.78	8,237.55	0.00E+00	3.93E-02	7.87E-02	11.0000	6.132E+01
Pa-231	8.9297E-10	4,118.78	8,237.55	0.00E+00	3.68E-06	7.36E-06		
Pb-210	3.7609E-12	4,118.78	8,237.55	0.00E+00	1.55E-08	3.10E-08		
Pm-147	2.5452E+00	4,118.78	8,237.55	0.00E+00	1.05E+04	2.10E+04		
Pu-238	2.0550E-02	4,118.78	8,237.55	0.00E+00	8.46E+01	1.69E+02		
Pu-239	4.2838E-04	4,118.78	8,237.55	0.00E+00	1.76E+00	3.53E+00		
Pu-240	2.4401E-04	4,118.78	8,237.55	0.00E+00	1.01E+00	2.01E+00		
Pu-241	6.8764E-02	4,118.78	8,237.55	0.00E+00	2.83E+02	5.66E+02		
Pu-242	3.6329E-07	4,118.78	8,237.55	0.00E+00	1.50E-03	2.99E-03		
Ra-226	3.8045E-11	4,118.78	8,237.55	0.00E+00	1.57E-07	3.13E-07		
Ra-228	2.9902E-15	4,118.78	8,237.55	0.00E+00	1.23E-11	2.46E-11		
Ru-106	1.9055E-01	4,118.78	8,237.55	0.00E+00	7.85E+02	1.57E+03		
Se-79	1.2936E-05	4,118.78	8,237.55	0.00E+00	5.33E-02	1.07E-01		
Sn-126	1.1574E-05	4,118.78	8,237.55	0.00E+00	4.77E-02	9.53E-02		
Sr-90	2.7505E+00	4,118.78	8,237.55	0.00E+00	1.13E+04	2.27E+04		
Tc-99	4.2239E-04	4,118.78	8,237.55	0.00E+00	1.74E+00	3.48E+00		
Th-229	1.8848E-12	4,118.78	8,237.55	0.00E+00	7.76E-09	1.55E-08		
Th-230	1.7042E-08	4,118.78	8,237.55	0.00E+00	7.02E-05	1.40E-04		
Th-232	7.8132E-15	4,118.78	8,237.55	0.00E+00	3.22E-11	6.44E-11		
Tl-208	4.4063E-08	4,118.78	8,237.55	0.00E+00	1.81E-04	3.63E-04		
U-232	1.3151E-07	4,118.78	8,237.55	0.00E+00	5.42E-04	1.08E-03		
U-233	1.9564E-09	4,118.78	8,237.55	0.00E+00	8.06E-06	1.61E-05		
U-234	1.8371E-04	4,118.78	8,237.55	0.00E+00	7.57E-01	1.51E+00		
U-235	-2.7235E-06	4,118.78	0.00	2.97E-02	1.85E-02	2.97E-02		
U-236	1.5493E-05	4,118.78	8,237.55	0.00E+00	6.38E-02	1.28E-01		
U-238	-4.2851E-09	4,118.78	0.00	3.42E-04	3.24E-04	3.42E-04		
Y-90	2.7505E+00	4,118.78	8,237.55	0.00E+00	1.13E+04	2.27E+04		
Other Radionuclides					2.12E+04	4.24E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.09E+02	4.18E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.11672336	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		4,118.78
Bounding:		8,237.55

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.89	
Bounding:	1.77	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: MNR (UALX-HEU) CANADA
SNF ID #: 1064
Fuel Units & Descr: 11 - 18 CURVED PLATES
Heavy Metal Mass: BOL=1.959kg; EOL=1.383kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2006
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.31

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	1.4545E-10	545.86	1,091.72	0.00E+00	7.94E-08	1.59E-07
Am-241	1.1190E-03	545.86	1,091.72	0.00E+00	6.11E-01	1.22E+00
Am-242m	4.5425E-07	545.86	1,091.72	0.00E+00	2.48E-04	4.96E-04
Am-243	1.4921E-06	545.86	1,091.72	0.00E+00	8.14E-04	1.63E-03
C-14	5.7244E-09	545.86	1,091.72	0.00E+00	3.12E-06	6.25E-06
Cl-36	1.3124E-32	545.86	1,091.72	0.00E+00	7.16E-30	1.43E-29
Cm-243	2.3676E-07	545.86	1,091.72	0.00E+00	1.29E-04	2.58E-04
Cm-244	5.2042E-05	545.86	1,091.72	0.00E+00	2.84E-02	5.68E-02
Co-60	3.8208E-05	545.86	1,091.72	0.00E+00	2.09E-02	4.17E-02
Cs-134	4.8693E-01	545.86	1,091.72	0.00E+00	2.66E+02	5.32E+02
Cs-135	3.4477E-06	545.86	1,091.72	0.00E+00	1.88E-03	3.76E-03
Cs-137	2.8731E+00	545.86	1,091.72	0.00E+00	1.57E+03	3.14E+03
Eu-154	8.2053E-02	545.86	1,091.72	0.00E+00	4.48E+01	8.96E+01
Eu-155	3.9134E-02	545.86	1,091.72	0.00E+00	2.14E+01	4.27E+01
Fe-55	6.7429E-03	545.86	1,091.72	0.00E+00	3.68E+00	7.36E+00
H-3	1.0599E-02	545.86	1,091.72	0.00E+00	5.79E+00	1.16E+01
I-129	7.5300E-07	545.86	1,091.72	0.00E+00	4.11E-04	8.22E-04
Kr-85	2.8595E-01	545.86	1,091.72	0.00E+00	1.56E+02	3.12E+02
Np-237	9.5479E-06	545.86	1,091.72	0.00E+00	5.21E-03	1.04E-02
Pa-231	8.9297E-10	545.86	1,091.72	0.00E+00	4.87E-07	9.75E-07
Pb-210	3.7609E-12	545.86	1,091.72	0.00E+00	2.05E-09	4.11E-09
Pm-147	2.5452E+00	545.86	1,091.72	0.00E+00	1.39E+03	2.78E+03
Pu-238	2.0550E-02	545.86	1,091.72	0.00E+00	1.12E+01	2.24E+01
Pu-239	4.2838E-04	545.86	1,091.72	0.00E+00	2.34E-01	4.68E-01
Pu-240	2.4401E-04	545.86	1,091.72	0.00E+00	1.33E-01	2.66E-01
Pu-241	6.8764E-02	545.86	1,091.72	0.00E+00	3.75E+01	7.51E+01
Pu-242	3.6329E-07	545.86	1,091.72	0.00E+00	1.98E-04	3.97E-04
Ra-226	3.8045E-11	545.86	1,091.72	0.00E+00	2.08E-08	4.15E-08
Ra-228	2.9902E-15	545.86	1,091.72	0.00E+00	1.63E-12	3.26E-12
Ru-106	1.9055E-01	545.86	1,091.72	0.00E+00	1.04E+02	2.08E+02
Se-79	1.2936E-05	545.86	1,091.72	0.00E+00	7.06E-03	1.41E-02
Sn-126	1.1574E-05	545.86	1,091.72	0.00E+00	6.32E-03	1.26E-02
Sr-90	2.7505E+00	545.86	1,091.72	0.00E+00	1.50E+03	3.00E+03
Tc-99	4.2239E-04	545.86	1,091.72	0.00E+00	2.31E-01	4.61E-01
Th-229	1.8848E-12	545.86	1,091.72	0.00E+00	1.03E-09	2.06E-09
Th-230	1.7042E-08	545.86	1,091.72	0.00E+00	9.30E-06	1.86E-05
Th-232	7.8132E-15	545.86	1,091.72	0.00E+00	4.26E-12	8.53E-12
Tl-208	4.4063E-08	545.86	1,091.72	0.00E+00	2.41E-05	4.81E-05
U-232	1.3151E-07	545.86	1,091.72	0.00E+00	7.18E-05	1.44E-04
U-233	1.9564E-09	545.86	1,091.72	0.00E+00	1.07E-06	2.14E-06
U-234	1.8371E-04	545.86	1,091.72	0.00E+00	1.00E-01	2.01E-01
U-235	-2.7235E-06	545.86	0.00	3.94E-03	2.46E-03	3.94E-03
U-236	1.5493E-05	545.86	1,091.72	0.00E+00	8.46E-03	1.69E-02
U-238	-4.2851E-09	545.86	0.00	4.53E-05	4.30E-05	4.53E-05
Y-90	2.7505E+00	545.86	1,091.72	0.00E+00	1.50E+03	3.00E+03
Other Radionuclides					2.81E+03	5.61E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.106E+14
0.0250	4.538E+13
0.0375	4.187E+13
0.0575	4.117E+13
0.0850	2.825E+13
0.1250	2.273E+13
0.2250	2.225E+13
0.3750	1.077E+13
0.5750	1.479E+14
0.8500	2.071E+13
1.2500	3.854E+12
1.7500	1.616E+11
2.2500	3.390E+11
2.7500	1.950E+09
3.5000	2.163E+08
5.0000	6.467E+02
7.0000	7.209E+01
11.0000	8.126E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.77E+01	5.54E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.11672336	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		545.86
Bounding:		1,091.72

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.89	
Bounding:	1.77	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: MURR (UALX) COLUMBIA
SNF ID #: 144
Fuel Units & Descr: 972 - 24 CURVED PLATES
Heavy Metal Mass: BOL=807.732kg; EOL=704.311kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 40.50

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	97,941.50	195,883.01	0.00E+00	1.42E-05	2.85E-05	Avg. MeV	
Am-241	1.1190E-03	97,941.50	195,883.01	0.00E+00	1.10E+02	2.19E+02	0.0150	3.779E+16
Am-242m	4.5425E-07	97,941.50	195,883.01	0.00E+00	4.45E-02	8.90E-02	0.0250	8.142E+15
Am-243	1.4921E-06	97,941.50	195,883.01	0.00E+00	1.46E-01	2.92E-01	0.0375	7.513E+15
C-14	5.7244E-09	97,941.50	195,883.01	0.00E+00	5.61E-04	1.12E-03	0.0575	7.387E+15
Cl-36	1.3124E-32	97,941.50	195,883.01	0.00E+00	1.29E-27	2.57E-27	0.0850	4.710E+15
Cm-243	2.3676E-07	97,941.50	195,883.01	0.00E+00	2.32E-02	4.64E-02	0.1250	4.078E+15
Cm-244	5.2042E-05	97,941.50	195,883.01	0.00E+00	5.10E+00	1.02E+01	0.2250	3.992E+15
Co-60	3.8208E-05	97,941.50	195,883.01	0.00E+00	3.74E+00	7.48E+00	0.3750	1.932E+15
Cs-134	4.8693E-01	97,941.50	195,883.01	0.00E+00	4.77E+04	9.54E+04	0.5750	2.654E+16
Cs-135	3.4477E-06	97,941.50	195,883.01	0.00E+00	3.38E-01	6.75E-01	0.8500	3.717E+15
Cs-137	2.8731E+00	97,941.50	195,883.01	0.00E+00	2.81E+05	5.63E+05	1.2500	6.915E+14
Eu-154	8.2053E-02	97,941.50	195,883.01	0.00E+00	8.04E+03	1.61E+04	1.7500	2.900E+13
Eu-155	3.9134E-02	97,941.50	195,883.01	0.00E+00	3.83E+03	7.67E+03	2.2500	6.082E+13
Fe-55	6.7429E-03	97,941.50	195,883.01	0.00E+00	6.60E+02	1.32E+03	2.7500	3.499E+11
H-3	1.0599E-02	97,941.50	195,883.01	0.00E+00	1.04E+03	2.08E+03	3.5000	3.881E+10
I-129	7.5300E-07	97,941.50	195,883.01	0.00E+00	7.37E-02	1.47E-01	5.0000	1.161E+06
Kr-85	2.8595E-01	97,941.50	195,883.01	0.00E+00	2.80E+04	5.60E+04	7.0000	1.294E+04
Np-237	9.5479E-08	97,941.50	195,883.01	0.00E+00	9.35E-01	1.87E+00	11.0000	1.458E+03
Pa-231	8.9297E-10	97,941.50	195,883.01	0.00E+00	8.75E-05	1.75E-04		
Pb-210	3.7609E-12	97,941.50	195,883.01	0.00E+00	3.68E-07	7.37E-07		
Pm-147	2.5452E+00	97,941.50	195,883.01	0.00E+00	2.49E+05	4.99E+05		
Pu-238	2.0550E-02	97,941.50	195,883.01	0.00E+00	2.01E+03	4.03E+03		
Pu-239	4.2838E-04	97,941.50	195,883.01	0.00E+00	4.20E+01	8.39E+01		
Pu-240	2.4401E-04	97,941.50	195,883.01	0.00E+00	2.39E+01	4.78E+01		
Pu-241	6.8764E-02	97,941.50	195,883.01	0.00E+00	6.73E+03	1.35E+04		
Pu-242	3.6329E-07	97,941.50	195,883.01	0.00E+00	3.56E-02	7.12E-02		
Ra-226	3.8045E-11	97,941.50	195,883.01	0.00E+00	3.73E-06	7.45E-06		
Ra-228	2.9902E-15	97,941.50	195,883.01	0.00E+00	2.93E-10	5.86E-10		
Ru-106	1.9055E-01	97,941.50	195,883.01	0.00E+00	1.87E+04	3.73E+04		
Se-79	1.2936E-05	97,941.50	195,883.01	0.00E+00	1.27E+00	2.53E+00		
Sn-126	1.1574E-05	97,941.50	195,883.01	0.00E+00	1.13E+00	2.27E+00		
Sr-90	2.7505E+00	97,941.50	195,883.01	0.00E+00	2.69E+05	5.39E+05		
Tc-99	4.2239E-04	97,941.50	195,883.01	0.00E+00	4.14E+01	8.27E+01		
Th-229	1.8848E-12	97,941.50	195,883.01	0.00E+00	1.85E-07	3.69E-07		
Th-230	1.7042E-08	97,941.50	195,883.01	0.00E+00	1.67E-03	3.34E-03		
Th-232	7.8132E-15	97,941.50	195,883.01	0.00E+00	7.65E-10	1.53E-09		
Tl-208	4.4063E-08	97,941.50	195,883.01	0.00E+00	4.32E-03	8.63E-03		
U-232	1.3151E-07	97,941.50	195,883.01	0.00E+00	1.29E-02	2.58E-02		
U-233	1.9564E-09	97,941.50	195,883.01	0.00E+00	1.92E-04	3.83E-04		
U-234	1.8371E-04	97,941.50	195,883.01	0.00E+00	1.80E+01	3.60E+01		
U-235	-2.7235E-08	97,941.50	0.00	1.63E+00	1.36E+00	1.63E+00		
U-236	1.5493E-05	97,941.50	195,883.01	0.00E+00	1.52E+00	3.03E+00		
U-238	-4.2851E-09	97,941.50	0.00	1.83E-02	1.79E-02	1.83E-02		
Y-90	2.7505E+00	97,941.50	195,883.01	0.00E+00	2.69E+05	5.39E+05		
Other Radionuclides					5.04E+05	1.01E+06		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.97E+03	9.93E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.26113117	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		97,941.50
Bounding:		195,883.01

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.39	
Bounding:	0.77	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: MURR (ULAX HEU) COLUMBIA
SNF ID #: 143
Fuel Units & Descr: 312 - 24 CURVED PLATES
Heavy Metal Mass: BOL=259.022kg; EOL=213.065kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1990
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage:
18"x10': 13.00

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	43,522.74	87,045.48	0.00E+00	2.89E-05	5.77E-05
Am-241	2.0060E-03	43,522.74	87,045.48	0.00E+00	8.73E+01	1.75E+02
Am-242m	4.2429E-07	43,522.74	87,045.48	0.00E+00	1.85E-02	3.69E-02
Am-243	1.4899E-06	43,522.74	87,045.48	0.00E+00	6.48E-02	1.30E-01
C-14	5.7135E-09	43,522.74	87,045.48	0.00E+00	2.49E-04	4.97E-04
Cl-36	1.3124E-32	43,522.74	87,045.48	0.00E+00	5.71E-28	1.14E-27
Cm-243	1.6443E-07	43,522.74	87,045.48	0.00E+00	7.16E-03	1.43E-02
Cm-244	2.9330E-05	43,522.74	87,045.48	0.00E+00	1.28E+00	2.55E+00
Co-60	5.3186E-06	43,522.74	87,045.48	0.00E+00	2.31E-01	4.63E-01
Cs-134	3.1563E-03	43,522.74	87,045.48	0.00E+00	1.37E+02	2.75E+02
Cs-135	3.4477E-06	43,522.74	87,045.48	0.00E+00	1.50E-01	3.00E-01
Cs-137	2.0313E+00	43,522.74	87,045.48	0.00E+00	8.84E+04	1.77E+05
Eu-154	2.4513E-02	43,522.74	87,045.48	0.00E+00	1.07E+03	2.13E+03
Eu-155	4.8175E-03	43,522.74	87,045.48	0.00E+00	2.10E+02	4.19E+02
Fe-55	1.2397E-04	43,522.74	87,045.48	0.00E+00	5.40E+00	1.08E+01
H-3	4.5697E-03	43,522.74	87,045.48	0.00E+00	1.99E+02	3.98E+02
I-129	7.5300E-07	43,522.74	87,045.48	0.00E+00	3.28E-02	6.55E-02
Kr-85	1.0850E-01	43,522.74	87,045.48	0.00E+00	4.72E+03	9.44E+03
Np-237	9.5561E-06	43,522.74	87,045.48	0.00E+00	4.16E-01	8.32E-01
Pa-231	2.0359E-09	43,522.74	87,045.48	0.00E+00	8.86E-05	1.77E-04
Pb-210	4.9728E-11	43,522.74	87,045.48	0.00E+00	2.16E-06	4.33E-06
Pm-147	4.8502E-02	43,522.74	87,045.48	0.00E+00	2.11E+03	4.22E+03
Pu-238	1.8254E-02	43,522.74	87,045.48	0.00E+00	7.94E+02	1.59E+03
Pu-239	4.2810E-04	43,522.74	87,045.48	0.00E+00	1.86E+01	3.73E+01
Pu-240	2.4368E-04	43,522.74	87,045.48	0.00E+00	1.06E+01	2.12E+01
Pu-241	3.3415E-02	43,522.74	87,045.48	0.00E+00	1.45E+03	2.91E+03
Pu-242	3.6329E-07	43,522.74	87,045.48	0.00E+00	1.58E-02	3.16E-02
Ra-226	2.2854E-10	43,522.74	87,045.48	0.00E+00	9.95E-06	1.99E-05
Ra-228	1.2426E-14	43,522.74	87,045.48	0.00E+00	5.41E-10	1.08E-09
Ru-106	6.3589E-06	43,522.74	87,045.48	0.00E+00	2.77E-01	5.54E-01
Se-79	1.2933E-05	43,522.74	87,045.48	0.00E+00	5.63E-01	1.13E+00
Sn-126	1.1574E-05	43,522.74	87,045.48	0.00E+00	5.04E-01	1.01E+00
Sr-90	1.9248E+00	43,522.74	87,045.48	0.00E+00	8.38E+04	1.68E+05
Tc-99	4.2239E-04	43,522.74	87,045.48	0.00E+00	1.84E+01	3.68E+01
Th-229	5.0953E-12	43,522.74	87,045.48	0.00E+00	2.22E-07	4.44E-07
Th-230	4.1885E-08	43,522.74	87,045.48	0.00E+00	1.82E-03	3.65E-03
Th-232	1.9270E-14	43,522.74	87,045.48	0.00E+00	8.39E-10	1.68E-09
Tl-208	4.6024E-08	43,522.74	87,045.48	0.00E+00	2.00E-03	4.01E-03
U-232	1.2582E-07	43,522.74	87,045.48	0.00E+00	5.48E-03	1.10E-02
U-233	2.5825E-09	43,522.74	87,045.48	0.00E+00	1.12E-04	2.25E-04
U-234	1.8450E-04	43,522.74	87,045.48	0.00E+00	8.03E+00	1.61E+01
U-235	-2.7235E-06	43,522.74	0.00	5.21E-01	4.03E-01	5.21E-01
U-236	1.5493E-05	43,522.74	87,045.48	0.00E+00	6.74E-01	1.35E+00
U-238	-4.2851E-09	43,522.74	0.00	5.97E-03	5.79E-03	5.97E-03
Y-90	1.9254E+00	43,522.74	87,045.48	0.00E+00	8.38E+04	1.68E+05
Other Radionuclides					8.42E+04	1.68E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.188E+15
0.0250	1.911E+15
0.0375	1.667E+15
0.0575	1.785E+15
0.0850	1.079E+15
0.1250	7.299E+14
0.2250	9.307E+14
0.3750	4.051E+14
0.5750	6.609E+15
0.8500	1.117E+14
1.2500	6.380E+13
1.7500	2.928E+12
2.2500	2.569E+08
2.7500	1.452E+08
3.5000	6.671E+05
5.0000	3.772E+04
7.0000	4.165E+03
11.0000	4.668E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.04E+03	2.08E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.137	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		43,522.74
Bounding:		87,045.48

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.53	
Bounding:	1.07	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: N.S. SAVANNAH (UO2)
SNF ID #: 854
Fuel Units & Descr: 12 - UNKNOWN
Heavy Metal Mass: BOL= ; EOL=21.09kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1963
Estimates as of: 2010
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'
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	8.7758E-10	31.68	31.68	0.00E+00	2.78E-08	2.78E-08
Am-241	1.4352E-01	31.68	31.68	0.00E+00	4.55E+00	4.55E+00
Am-242m	2.8698E-04	31.68	31.68	0.00E+00	9.09E-03	9.09E-03
Am-243	6.2565E-04	31.68	31.68	0.00E+00	1.98E-02	1.98E-02
C-14	4.7901E-05	31.68	31.68	0.00E+00	1.52E-03	1.52E-03
Cl-36	8.0297E-07	31.68	31.68	0.00E+00	2.54E-05	2.54E-05
Cm-243	2.5081E-04	31.68	31.68	0.00E+00	7.95E-03	7.95E-03
Cm-244	4.9015E-02	31.68	31.68	0.00E+00	1.55E+00	1.55E+00
Co-60	2.5581E-03	31.68	31.68	0.00E+00	8.11E-02	8.11E-02
Cs-134	4.0536E-05	31.68	31.68	0.00E+00	1.28E-03	1.28E-03
Cs-135	1.4433E-05	31.68	31.68	0.00E+00	4.57E-04	4.57E-04
Cs-137	1.3979E+00	31.68	31.68	0.00E+00	4.43E+01	4.43E+01
Eu-154	2.0203E-02	31.68	31.68	0.00E+00	6.40E-01	6.40E-01
Eu-155	1.7684E-03	31.68	31.68	0.00E+00	5.60E-02	5.60E-02
Fe-55	4.3136E-05	31.68	31.68	0.00E+00	1.37E-03	1.37E-03
H-3	2.0769E-02	31.68	31.68	0.00E+00	6.58E-01	6.58E-01
I-129	9.8288E-07	31.68	31.68	0.00E+00	3.11E-05	3.11E-05
Kr-85	2.8214E-02	31.68	31.68	0.00E+00	8.94E-01	8.94E-01
Np-237	1.1218E-05	31.68	31.68	0.00E+00	3.55E-04	3.55E-04
Pa-231	1.3036E-09	31.68	31.68	0.00E+00	4.13E-08	4.13E-08
Pb-210	8.5078E-11	31.68	31.68	0.00E+00	2.70E-09	2.70E-09
Pm-147	3.6531E-04	31.68	31.68	0.00E+00	1.16E-02	1.16E-02
Pu-238	7.4564E-02	31.68	31.68	0.00E+00	2.36E+00	2.36E+00
Pu-239	1.1623E-02	31.68	31.68	0.00E+00	3.68E-01	3.68E-01
Pu-240	1.5132E-02	31.68	31.68	0.00E+00	4.79E-01	4.79E-01
Pu-241	9.0036E-01	31.68	31.68	0.00E+00	2.85E+01	2.85E+01
Pu-242	6.4260E-05	31.68	31.68	0.00E+00	2.04E-03	2.04E-03
Ra-226	2.2804E-10	31.68	31.68	0.00E+00	7.23E-09	7.23E-09
Ra-228	5.2713E-12	31.68	31.68	0.00E+00	1.67E-10	1.67E-10
Ru-106	6.1160E-10	31.68	31.68	0.00E+00	1.94E-08	1.94E-08
Se-79	1.2377E-05	31.68	31.68	0.00E+00	3.92E-04	3.92E-04
Sn-126	2.5210E-05	31.68	31.68	0.00E+00	7.99E-04	7.99E-04
Sr-90	9.1667E-01	31.68	31.68	0.00E+00	2.90E+01	2.90E+01
Tc-99	3.9357E-04	31.68	31.68	0.00E+00	1.25E-02	1.25E-02
Th-229	1.2057E-10	31.68	31.68	0.00E+00	3.82E-09	3.82E-09
Th-230	2.1043E-08	31.68	31.68	0.00E+00	6.67E-07	6.67E-07
Th-232	5.2972E-12	31.68	31.68	0.00E+00	1.68E-10	1.68E-10
Tl-208	1.7474E-07	31.68	31.68	0.00E+00	5.54E-06	5.54E-06
U-232	4.7368E-07	31.68	31.68	0.00E+00	1.50E-05	1.50E-05
U-233	2.5097E-08	31.68	31.68	0.00E+00	7.95E-07	7.95E-07
U-234	5.0000E-05	31.68	31.68	0.00E+00	1.58E-03	1.58E-03
U-235	-1.4489E-06	31.68	0.00	1.46E-03	1.41E-03	1.46E-03
U-236	7.5824E-06	31.68	31.68	0.00E+00	2.40E-04	2.40E-04
U-238	-2.6129E-07	31.68	0.00	6.87E-03	6.86E-03	6.87E-03
Y-90	9.1699E-01	31.68	31.68	0.00E+00	2.91E+01	2.91E+01
Other Radionuclides					4.25E+01	4.25E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.705E+12
0.0250	3.438E+11
0.0375	3.279E+11
0.0575	3.789E+11
0.0850	1.908E+11
0.1250	1.324E+11
0.2250	1.636E+11
0.3750	7.034E+10
0.5750	1.636E+12
0.8500	2.263E+10
1.2500	2.223E+10
1.7500	6.658E+08
2.2500	1.073E+06
2.7500	2.197E+06
3.5000	2.265E+04
5.0000	9.684E+03
7.0000	1.116E+03
11.0000	1.282E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.29E-01	7.29E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:		0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		31.68
Bounding:		31.68

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup
Bounding burnup taken from SFD and converted to MWd using BOL=21.123kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.04	
Bounding:	0.04	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: NEREIDE (FRANCE)
SNF ID #: 751
Fuel Units & Descr: 46 - 12 CURVED PLATES
Heavy Metal Mass: BOL= ; EOL=35.42kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1982
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated Canister usage: 18"x10' = 1.92

II. Estimates

Radionuclide	a_n Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.1465E-09	21.27	42.53	0.00E+00	2.44E-08	4.88E-08
Am-241	2.3056E-03	21.27	42.53	0.00E+00	4.90E-02	9.81E-02
Am-242m	4.1476E-07	21.27	42.53	0.00E+00	8.82E-06	1.76E-05
Am-243	1.4894E-06	21.27	42.53	0.00E+00	3.17E-05	6.33E-05
C-14	5.7108E-09	21.27	42.53	0.00E+00	1.21E-07	2.43E-07
Cl-36	1.3124E-32	21.27	42.53	0.00E+00	2.79E-31	5.58E-31
Cm-243	1.4562E-07	21.27	42.53	0.00E+00	3.10E-06	6.19E-06
Cm-244	2.4221E-05	21.27	42.53	0.00E+00	5.15E-04	1.03E-03
Co-60	2.7560E-06	21.27	42.53	0.00E+00	5.86E-05	1.17E-04
Cs-134	5.8851E-04	21.27	42.53	0.00E+00	1.25E-02	2.50E-02
Cs-135	3.4477E-06	21.27	42.53	0.00E+00	7.33E-05	1.47E-04
Cs-137	1.8099E+00	21.27	42.53	0.00E+00	3.85E+01	7.70E+01
Eu-154	1.6386E-02	21.27	42.53	0.00E+00	3.48E-01	6.97E-01
Eu-155	2.3957E-03	21.27	42.53	0.00E+00	5.09E-02	1.02E-01
Fe-55	3.2707E-05	21.27	42.53	0.00E+00	6.96E-04	1.39E-03
H-3	3.4504E-03	21.27	42.53	0.00E+00	7.34E-02	1.47E-01
I-129	7.5300E-07	21.27	42.53	0.00E+00	1.60E-05	3.20E-05
Kr-85	7.8540E-02	21.27	42.53	0.00E+00	1.67E+00	3.34E+00
Np-237	9.5615E-06	21.27	42.53	0.00E+00	2.03E-04	4.07E-04
Pa-231	2.7968E-09	21.27	42.53	0.00E+00	5.95E-08	1.19E-07
Pb-210	1.2612E-10	21.27	42.53	0.00E+00	2.68E-09	5.36E-09
Pm-147	1.2952E-02	21.27	42.53	0.00E+00	2.75E-01	5.51E-01
Pu-238	1.7549E-02	21.27	42.53	0.00E+00	3.73E-01	7.46E-01
Pu-239	4.2810E-04	21.27	42.53	0.00E+00	9.10E-03	1.82E-02
Pu-240	2.4357E-04	21.27	42.53	0.00E+00	5.18E-03	1.04E-02
Pu-241	2.6277E-02	21.27	42.53	0.00E+00	5.59E-01	1.12E+00
Pu-242	3.6329E-07	21.27	42.53	0.00E+00	7.73E-06	1.55E-05
Ra-226	4.4444E-10	21.27	42.53	0.00E+00	9.45E-09	1.89E-08
Ra-228	1.9714E-14	21.27	42.53	0.00E+00	4.19E-13	8.38E-13
Ru-106	2.0477E-07	21.27	42.53	0.00E+00	4.35E-06	8.71E-06
Se-79	1.2933E-05	21.27	42.53	0.00E+00	2.75E-04	5.50E-04
Sn-126	1.1574E-05	21.27	42.53	0.00E+00	2.46E-04	4.92E-04
Sr-90	1.7092E+00	21.27	42.53	0.00E+00	3.63E+01	7.27E+01
Tc-99	4.2239E-04	21.27	42.53	0.00E+00	8.98E-03	1.80E-02
Th-229	7.7260E-12	21.27	42.53	0.00E+00	1.64E-10	3.29E-10
Th-230	5.8497E-08	21.27	42.53	0.00E+00	1.24E-06	2.49E-06
Th-232	2.6906E-14	21.27	42.53	0.00E+00	5.72E-13	1.14E-12
Tl-208	4.4336E-08	21.27	42.53	0.00E+00	9.43E-07	1.89E-06
U-232	1.2037E-07	21.27	42.53	0.00E+00	2.56E-06	5.12E-06
U-233	3.0011E-09	21.27	42.53	0.00E+00	6.38E-08	1.28E-07
U-234	1.8497E-04	21.27	42.53	0.00E+00	3.93E-03	7.87E-03
U-235	-2.7235E-06	21.27	0.00	7.06E-02	7.05E-02	7.06E-02
U-236	1.5493E-05	21.27	42.53	0.00E+00	3.29E-04	6.59E-04
U-238	-4.2851E-09	21.27	0.00	7.14E-04	7.14E-04	7.14E-04
Y-90	1.7094E+00	21.27	42.53	0.00E+00	3.64E+01	7.27E+01
Other Radionuclides					3.66E+01	7.33E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.981E+12
0.0250	8.268E+11
0.0375	7.200E+11
0.0575	7.732E+11
0.0850	4.667E+11
0.1250	3.129E+11
0.2250	4.042E+11
0.3750	1.751E+11
0.5750	2.871E+12
0.8500	4.137E+10
1.2500	2.300E+10
1.7500	1.137E+09
2.2500	8.102E+04
2.7500	6.633E+04
3.5000	5.622E+01
5.0000	1.943E+01
7.0000	2.144E+00
11.0000	2.403E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.82E-01	9.01E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:		60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		21.27
Bounding:		42.53

Basis for burnup used in estimate:
Nominal burnup taken from SFD and converted to MWd using BOL=35.442kg
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	
Bounding:	0.00	

Estimated EOL HM/Given EOL HM: 0.98

[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: NIST
SNF ID #: 154
Fuel Units & Descr: 980 - 17 CURVED PLATES
Heavy Metal Mass: BOL=367.5kg; EOL=159.74kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1997
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' = 27.22

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3262E-10	191,368.36	338,505.35	0.00E+00	2.54E-05	4.49E-05	Avg. MeV	
Am-241	5.9611E-03	191,368.36	338,505.35	0.00E+00	1.14E+03	2.02E+03	0.0150	4.627E+16
Am-242m	1.4332E-06	191,368.36	338,505.35	0.00E+00	2.74E-01	4.85E-01	0.0250	9.643E+15
Am-243	3.7132E-05	191,368.36	338,505.35	0.00E+00	7.11E+00	1.26E+01	0.0375	8.725E+15
C-14	2.6501E-08	191,368.36	338,505.35	0.00E+00	5.07E-03	8.97E-03	0.0575	8.979E+15
Cl-36	4.4441E-31	191,368.36	338,505.35	0.00E+00	8.50E-26	1.50E-25	0.0850	5.562E+15
Cm-243	7.2722E-06	191,368.36	338,505.35	0.00E+00	1.39E+00	2.46E+00	0.1250	4.176E+15
Cm-244	6.8226E-03	191,368.36	338,505.35	0.00E+00	1.31E+03	2.31E+03	0.2250	4.695E+15
Co-60	1.8117E-04	191,368.36	338,505.35	0.00E+00	3.47E+01	6.13E+01	0.3750	2.074E+15
Cs-134	3.0595E-01	191,368.36	338,505.35	0.00E+00	5.85E+04	1.04E+05	0.5750	3.747E+16
Cs-135	4.2564E-06	191,368.36	338,505.35	0.00E+00	8.15E-01	1.44E+00	0.8500	4.395E+15
Cs-137	2.5650E+00	191,368.36	338,505.35	0.00E+00	4.91E+05	8.68E+05	1.2500	1.104E+15
Eu-154	1.1628E-01	191,368.36	338,505.35	0.00E+00	2.23E+04	3.94E+04	1.7500	3.181E+13
Eu-155	5.7776E-02	191,368.36	338,505.35	0.00E+00	1.11E+04	1.96E+04	2.2500	1.392E+12
Fe-55	1.9465E-02	191,368.36	338,505.35	0.00E+00	3.73E+03	6.59E+03	2.7500	2.081E+10
H-3	8.1045E-03	191,368.36	338,505.35	0.00E+00	1.55E+03	2.74E+03	3.5000	2.525E+09
I-129	6.6403E-07	191,368.36	338,505.35	0.00E+00	1.27E-01	2.25E-01	5.0000	1.465E+07
Kr-85	2.0620E-01	191,368.36	338,505.35	0.00E+00	3.95E+04	6.98E+04	7.0000	1.684E+06
Np-237	3.1513E-05	191,368.36	338,505.35	0.00E+00	6.03E+00	1.07E+01	11.0000	1.931E+05
Pa-231	6.0304E-10	191,368.36	338,505.35	0.00E+00	1.15E-04	2.04E-04		
Pb-210	2.7017E-12	191,368.36	338,505.35	0.00E+00	5.17E-07	9.15E-07		
Pm-147	3.4210E-01	191,368.36	338,505.35	0.00E+00	6.55E+04	1.16E+05		
Pu-238	1.6622E-01	191,368.36	338,505.35	0.00E+00	3.18E+04	5.63E+04		
Pu-239	6.9563E-04	191,368.36	338,505.35	0.00E+00	1.33E+02	2.35E+02		
Pu-240	3.7169E-04	191,368.36	338,505.35	0.00E+00	7.11E+01	1.26E+02		
Pu-241	2.1731E-01	191,368.36	338,505.35	0.00E+00	4.16E+04	7.36E+04		
Pu-242	3.0911E-06	191,368.36	338,505.35	0.00E+00	5.92E-01	1.05E+00		
Ra-226	1.9435E-11	191,368.36	338,505.35	0.00E+00	3.72E-06	6.58E-06		
Ra-228	6.1725E-15	191,368.36	338,505.35	0.00E+00	1.18E-09	2.09E-09		
Ru-106	7.0778E-03	191,368.36	338,505.35	0.00E+00	1.35E+03	2.40E+03		
Se-79	1.2339E-05	191,368.36	338,505.35	0.00E+00	2.36E+00	4.18E+00		
Sn-126	1.0194E-05	191,368.36	338,505.35	0.00E+00	1.95E+00	3.45E+00		
Sr-90	2.4186E+00	191,368.36	338,505.35	0.00E+00	4.63E+05	8.19E+05		
Tc-99	3.8056E-04	191,368.36	338,505.35	0.00E+00	7.28E+01	1.29E+02		
Th-229	2.0097E-12	191,368.36	338,505.35	0.00E+00	3.85E-07	6.80E-07		
Th-230	6.0577E-09	191,368.36	338,505.35	0.00E+00	1.16E-03	2.05E-03		
Th-232	1.2473E-14	191,368.36	338,505.35	0.00E+00	2.39E-09	4.22E-09		
Tl-208	4.8791E-08	191,368.36	338,505.35	0.00E+00	9.34E-03	1.65E-02		
U-232	1.3821E-07	191,368.36	338,505.35	0.00E+00	2.64E-02	4.68E-02		
U-233	2.3906E-09	191,368.36	338,505.35	0.00E+00	4.57E-04	8.09E-04		
U-234	4.7697E-05	191,368.36	338,505.35	0.00E+00	9.13E+00	1.61E+01		
U-235	-2.8661E-06	191,368.36	0.00	7.41E-01	1.93E-01	7.41E-01		
U-236	1.6701E-05	191,368.36	338,505.35	0.00E+00	3.20E+00	5.65E+00		
U-238	-9.4194E-09	191,368.36	0.00	8.23E-03	6.43E-03	8.23E-03		
Y-90	2.4192E+00	191,368.36	338,505.35	0.00E+00	4.63E+05	8.19E+05		
Other Radionuclides					4.79E+05	8.47E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.55E+03	1.34E+04
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.33333333	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		191,368.36	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	190,365.00	338,505.35	Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.19	
Bounding:	2.11	1.78

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: NIST (U308 HEU)
SNF ID #: 752
Fuel Units & Descr: 420 - 17 CURVED PLATES
Heavy Metal Mass: BOL=72.156kg; EOL=33.894kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1997
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' 11.67

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.3262E-10	35,243.24	66,463.11	0.00E+00	4.67E-06	8.81E-06
Am-241	5.9611E-03	35,243.24	66,463.11	0.00E+00	2.10E+02	3.96E+02
Am-242m	1.4332E-06	35,243.24	66,463.11	0.00E+00	5.05E-02	9.53E-02
Am-243	3.7132E-05	35,243.24	66,463.11	0.00E+00	1.31E+00	2.47E+00
C-14	2.6501E-08	35,243.24	66,463.11	0.00E+00	9.34E-04	1.76E-03
Cl-36	4.4441E-31	35,243.24	66,463.11	0.00E+00	1.57E-26	2.95E-26
Cm-243	7.2722E-06	35,243.24	66,463.11	0.00E+00	2.56E-01	4.83E-01
Cm-244	6.8226E-03	35,243.24	66,463.11	0.00E+00	2.40E+02	4.53E+02
Co-60	1.8117E-04	35,243.24	66,463.11	0.00E+00	6.38E+00	1.20E+01
Cs-134	3.0595E-01	35,243.24	66,463.11	0.00E+00	1.08E+04	2.03E+04
Cs-135	4.2564E-06	35,243.24	66,463.11	0.00E+00	1.50E-01	2.83E-01
Cs-137	2.5650E+00	35,243.24	66,463.11	0.00E+00	9.04E+04	1.70E+05
Eu-154	1.1628E-01	35,243.24	66,463.11	0.00E+00	4.10E+03	7.73E+03
Eu-155	5.7776E-02	35,243.24	66,463.11	0.00E+00	2.04E+03	3.84E+03
Fe-55	1.9465E-02	35,243.24	66,463.11	0.00E+00	6.86E+02	1.29E+03
H-3	8.1045E-03	35,243.24	66,463.11	0.00E+00	2.86E+02	5.39E+02
I-129	6.6403E-07	35,243.24	66,463.11	0.00E+00	2.34E-02	4.41E-02
Kr-85	2.0620E-01	35,243.24	66,463.11	0.00E+00	7.27E+03	1.37E+04
Np-237	3.1513E-05	35,243.24	66,463.11	0.00E+00	1.11E+00	2.09E+00
Pa-231	6.0304E-10	35,243.24	66,463.11	0.00E+00	2.13E-05	4.01E-05
Pb-210	2.7017E-12	35,243.24	66,463.11	0.00E+00	9.52E-08	1.80E-07
Pm-147	3.4210E-01	35,243.24	66,463.11	0.00E+00	1.21E+04	2.27E+04
Pu-238	1.6622E-01	35,243.24	66,463.11	0.00E+00	5.86E+03	1.10E+04
Pu-239	6.9563E-04	35,243.24	66,463.11	0.00E+00	2.45E+01	4.62E+01
Pu-240	3.7169E-04	35,243.24	66,463.11	0.00E+00	1.31E+01	2.47E+01
Pu-241	2.1731E-01	35,243.24	66,463.11	0.00E+00	7.66E+03	1.44E+04
Pu-242	3.0911E-06	35,243.24	66,463.11	0.00E+00	1.09E-01	2.05E-01
Ra-226	1.9435E-11	35,243.24	66,463.11	0.00E+00	6.85E-07	1.29E-06
Ra-228	6.1725E-15	35,243.24	66,463.11	0.00E+00	2.18E-10	4.10E-10
Ru-106	7.0778E-03	35,243.24	66,463.11	0.00E+00	2.49E+02	4.70E+02
Se-79	1.2339E-05	35,243.24	66,463.11	0.00E+00	4.35E-01	8.20E-01
Sn-126	1.0194E-05	35,243.24	66,463.11	0.00E+00	3.59E-01	6.78E-01
Sr-90	2.4186E+00	35,243.24	66,463.11	0.00E+00	8.52E+04	1.61E+05
Tc-99	3.8056E-04	35,243.24	66,463.11	0.00E+00	1.34E+01	2.53E+01
Th-229	2.0097E-12	35,243.24	66,463.11	0.00E+00	7.08E-08	1.34E-07
Th-230	6.0577E-09	35,243.24	66,463.11	0.00E+00	2.13E-04	4.03E-04
Th-232	1.2473E-14	35,243.24	66,463.11	0.00E+00	4.40E-10	8.29E-10
Tl-208	4.8791E-08	35,243.24	66,463.11	0.00E+00	1.72E-03	3.24E-03
U-232	1.3821E-07	35,243.24	66,463.11	0.00E+00	4.87E-03	9.19E-03
U-233	2.3906E-09	35,243.24	66,463.11	0.00E+00	8.43E-05	1.59E-04
U-234	4.7697E-05	35,243.24	66,463.11	0.00E+00	1.68E+00	3.17E+00
U-235	-2.8661E-06	35,243.24	0.00	1.45E-01	4.43E-02	1.45E-01
U-236	1.6701E-05	35,243.24	66,463.11	0.00E+00	5.89E-01	1.11E+00
U-238	-9.4194E-09	35,243.24	0.00	1.66E-03	1.32E-03	1.66E-03
Y-90	2.4192E+00	35,243.24	66,463.11	0.00E+00	8.53E+04	1.61E+05
Other Radionuclides					8.81E+04	1.66E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.084E+15
0.0250	1.893E+15
0.0375	1.713E+15
0.0575	1.763E+15
0.0850	1.092E+15
0.1250	8.199E+14
0.2250	9.219E+14
0.3750	4.073E+14
0.5750	7.358E+15
0.8500	8.629E+14
1.2500	2.169E+14
1.7500	6.245E+12
2.2500	2.734E+11
2.7500	4.085E+09
3.5000	4.958E+08
5.0000	2.877E+06
7.0000	3.306E+05
11.0000	3.791E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.39E+03	2.62E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	HEAVY WATER	HEAVY WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.17430199	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	43.29	35,243.24
Bounding:		66,463.11

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.12	814.05
Bounding:	2.11	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: OHIO STATE (HEU)
SNF ID #: 157
Fuel Units & Descr: 24 - 18 FLAT PLATES
Heavy Metal Mass: BOL=3.41kg; EOL=3.41kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1995
Estimates as of: 2010
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: 15 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	4.5861E-10	64.59	129.19	0.00E+00	2.96E-08	5.92E-08
Am-241	1.7832E-03	64.59	129.19	0.00E+00	1.15E-01	2.30E-01
Am-242m	4.3410E-07	64.59	129.19	0.00E+00	2.80E-05	5.61E-05
Am-243	1.4907E-06	64.59	129.19	0.00E+00	9.63E-05	1.93E-04
C-14	5.7162E-09	64.59	129.19	0.00E+00	3.69E-07	7.38E-07
Cl-36	1.3124E-32	64.59	129.19	0.00E+00	8.48E-31	1.70E-30
Cm-243	1.8568E-07	64.59	129.19	0.00E+00	1.20E-05	2.40E-05
Cm-244	3.5512E-05	64.59	129.19	0.00E+00	2.29E-03	4.59E-03
Co-60	1.0261E-05	64.59	129.19	0.00E+00	6.63E-04	1.33E-03
Cs-134	1.6931E-02	64.59	129.19	0.00E+00	1.09E+00	2.19E+00
Cs-135	3.4477E-06	64.59	129.19	0.00E+00	2.23E-04	4.45E-04
Cs-137	2.2800E+00	64.59	129.19	0.00E+00	1.47E+02	2.95E+02
Eu-154	3.6656E-02	64.59	129.19	0.00E+00	2.37E+00	4.74E+00
Eu-155	9.6841E-03	64.59	129.19	0.00E+00	6.26E-01	1.25E+00
Fe-55	4.6977E-04	64.59	129.19	0.00E+00	3.03E-02	6.07E-02
H-3	6.0485E-03	64.59	129.19	0.00E+00	3.91E-01	7.81E-01
I-129	7.5300E-07	64.59	129.19	0.00E+00	4.86E-05	9.73E-05
Kr-85	1.4989E-01	64.59	129.19	0.00E+00	9.68E+00	1.94E+01
Np-237	9.5534E-06	64.59	129.19	0.00E+00	6.17E-04	1.23E-03
Pa-231	1.6550E-09	64.59	129.19	0.00E+00	1.07E-07	2.14E-07
Pb-210	2.6631E-11	64.59	129.19	0.00E+00	1.72E-09	3.44E-09
Pm-147	1.8156E-01	64.59	129.19	0.00E+00	1.17E+01	2.35E+01
Pu-238	1.8990E-02	64.59	129.19	0.00E+00	1.23E+00	2.45E+00
Pu-239	4.2838E-04	64.59	129.19	0.00E+00	2.77E-02	5.53E-02
Pu-240	2.4379E-04	64.59	129.19	0.00E+00	1.57E-02	3.15E-02
Pu-241	4.2511E-02	64.59	129.19	0.00E+00	2.75E+00	5.49E+00
Pu-242	3.6329E-07	64.59	129.19	0.00E+00	2.35E-05	4.69E-05
Ra-226	1.4725E-10	64.59	129.19	0.00E+00	9.51E-09	1.90E-08
Ra-228	8.9760E-15	64.59	129.19	0.00E+00	5.80E-13	1.16E-12
Ru-106	1.9752E-04	64.59	129.19	0.00E+00	1.28E-02	2.55E-02
Se-79	1.2933E-05	64.59	129.19	0.00E+00	8.35E-04	1.67E-03
Sn-126	1.1574E-05	64.59	129.19	0.00E+00	7.48E-04	1.50E-03
Sr-90	2.1680E+00	64.59	129.19	0.00E+00	1.40E+02	2.80E+02
Tc-99	4.2239E-04	64.59	129.19	0.00E+00	2.73E-02	5.46E-02
Th-229	3.9270E-12	64.59	129.19	0.00E+00	2.54E-10	5.07E-10
Th-230	3.3578E-08	64.59	129.19	0.00E+00	2.17E-06	4.34E-06
Th-232	1.5452E-14	64.59	129.19	0.00E+00	9.98E-13	2.00E-12
Tl-208	4.6705E-08	64.59	129.19	0.00E+00	3.02E-06	6.03E-06
U-232	1.3045E-07	64.59	129.19	0.00E+00	8.43E-06	1.69E-05
U-233	2.3739E-09	64.59	129.19	0.00E+00	1.53E-07	3.07E-07
U-234	1.8423E-04	64.59	129.19	0.00E+00	1.19E-02	2.38E-02
U-235	-2.7235E-06	64.59	0.00	6.87E-03	6.70E-03	6.87E-03
U-236	1.5493E-05	64.59	129.19	0.00E+00	1.00E-03	2.00E-03
U-238	-4.2851E-09	64.59	0.00	7.73E-05	7.70E-05	7.73E-05
Y-90	2.1686E+00	64.59	129.19	0.00E+00	1.40E+02	2.80E+02
Other Radionuclides					1.40E+02	2.81E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.541E+13
0.0250	3.214E+12
0.0375	2.806E+12
0.0575	2.993E+12
0.0850	1.813E+12
0.1250	1.243E+12
0.2250	1.562E+12
0.3750	6.841E+11
0.5750	1.110E+13
0.8500	2.638E+11
1.2500	1.332E+11
1.7500	5.583E+09
2.2500	6.965E+08
2.7500	4.198E+05
3.5000	2.668E+04
5.0000	6.196E+01
7.0000	6.862E+00
11.0000	7.706E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.75E+00	3.50E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.25425219	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		64.59
Bounding:		129.19

Basis for burnup used in estimate:
Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM: 0.98

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: OHIO STATE (LEU)
SNF ID #: 158
Fuel Units & Descr: 30 - 18 FLAT PLATES
Heavy Metal Mass: BOL=26.151kg; EOL=26.151kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10" 1.25

II. Estimates

	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	1.4545E-10	495.31	990.62	0.00E+00	7.20E-08	1.44E-07
Am-241	1.1190E-03	495.31	990.62	0.00E+00	5.54E-01	1.11E+00
Am-242m	4.5425E-07	495.31	990.62	0.00E+00	2.25E-04	4.50E-04
Am-243	1.4921E-06	495.31	990.62	0.00E+00	7.39E-04	1.48E-03
C-14	5.7244E-09	495.31	990.62	0.00E+00	2.84E-06	5.67E-06
Cl-36	1.3124E-32	495.31	990.62	0.00E+00	6.50E-30	1.30E-29
Cm-243	2.3676E-07	495.31	990.62	0.00E+00	1.17E-04	2.35E-04
Cm-244	5.2042E-05	495.31	990.62	0.00E+00	2.58E-02	5.16E-02
Co-60	3.8208E-05	495.31	990.62	0.00E+00	1.89E-02	3.78E-02
Cs-134	4.8693E-01	495.31	990.62	0.00E+00	2.41E+02	4.82E+02
Cs-135	3.4477E-06	495.31	990.62	0.00E+00	1.71E-03	3.42E-03
Cs-137	2.8731E+00	495.31	990.62	0.00E+00	1.42E+03	2.85E+03
Eu-154	8.2053E-02	495.31	990.62	0.00E+00	4.06E+01	8.13E+01
Eu-155	3.9134E-02	495.31	990.62	0.00E+00	1.94E+01	3.88E+01
Fe-55	6.7429E-03	495.31	990.62	0.00E+00	3.34E+00	6.68E+00
H-3	1.0599E-02	495.31	990.62	0.00E+00	5.25E+00	1.05E+01
I-129	7.5300E-07	495.31	990.62	0.00E+00	3.73E-04	7.46E-04
Kr-85	2.8595E-01	495.31	990.62	0.00E+00	1.42E+02	2.83E+02
Np-237	9.5479E-06	495.31	990.62	0.00E+00	4.73E-03	9.46E-03
Pa-231	8.9297E-10	495.31	990.62	0.00E+00	4.42E-07	8.85E-07
Pb-210	3.7609E-12	495.31	990.62	0.00E+00	1.86E-09	3.73E-09
Pm-147	2.5452E+00	495.31	990.62	0.00E+00	1.26E+03	2.52E+03
Pu-238	2.0550E-02	495.31	990.62	0.00E+00	1.02E+01	2.04E+01
Pu-239	4.2838E-04	495.31	990.62	0.00E+00	2.12E-01	4.24E-01
Pu-240	2.4401E-04	495.31	990.62	0.00E+00	1.21E-01	2.42E-01
Pu-241	6.8764E-02	495.31	990.62	0.00E+00	3.41E+01	6.81E+01
Pu-242	3.6329E-07	495.31	990.62	0.00E+00	1.80E-04	3.60E-04
Ra-226	3.8045E-11	495.31	990.62	0.00E+00	1.88E-08	3.77E-08
Ra-228	2.9902E-15	495.31	990.62	0.00E+00	1.48E-12	2.96E-12
Ru-106	1.9055E-01	495.31	990.62	0.00E+00	9.44E+01	1.89E+02
Se-79	1.2936E-05	495.31	990.62	0.00E+00	6.41E-03	1.28E-02
Sn-126	1.1574E-05	495.31	990.62	0.00E+00	5.73E-03	1.15E-02
Sr-90	2.7505E+00	495.31	990.62	0.00E+00	1.36E+03	2.72E+03
Tc-99	4.2239E-04	495.31	990.62	0.00E+00	2.09E-01	4.18E-01
Th-229	1.8848E-12	495.31	990.62	0.00E+00	9.34E-10	1.87E-09
Th-230	1.7042E-06	495.31	990.62	0.00E+00	8.44E-06	1.69E-05
Th-232	7.8132E-15	495.31	990.62	0.00E+00	3.87E-12	7.74E-12
Tl-208	4.4063E-08	495.31	990.62	0.00E+00	2.18E-05	4.36E-05
U-232	1.3151E-07	495.31	990.62	0.00E+00	6.51E-05	1.30E-04
U-233	1.9564E-09	495.31	990.62	0.00E+00	9.69E-07	1.94E-06
U-234	1.8371E-04	495.31	990.62	0.00E+00	9.10E-02	1.82E-01
U-235	-2.7235E-06	495.31	0.00	1.12E-02	9.82E-03	1.12E-02
U-236	1.5493E-05	495.31	990.62	0.00E+00	7.67E-03	1.53E-02
U-238	-4.2851E-09	495.31	0.00	7.05E-03	7.05E-03	7.05E-03
Y-90	2.7505E+00	495.31	990.62	0.00E+00	1.36E+03	2.72E+03
Other Radionuclides					2.55E+03	5.09E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.911E+14
0.0250	4.117E+13
0.0375	3.799E+13
0.0575	3.736E+13
0.0850	2.382E+13
0.1250	2.063E+13
0.2250	2.019E+13
0.3750	9.771E+12
0.5750	1.342E+14
0.8500	1.880E+13
1.2500	3.497E+12
1.7500	1.466E+11
2.2500	3.076E+11
2.7500	1.770E+09
3.5000	1.963E+08
5.0000	6.030E+02
7.0000	6.728E+01
11.0000	7.568E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.51E+01	5.02E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.76578383	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		495.31
Bounding:		990.62

Basis for burnup used in estimate:

Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM: 0.98

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: OMEGA WEST (204)
SNF ID #: 406
Fuel Units & Descr: 16 - 18 OR 19 FLAT PLATES
Heavy Metal Mass: BOL=3.264kg; EOL=2.525kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1992
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 0.67

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	848.64	1,021.63	0.00E+00	3.89E-07	4.69E-07	Avg. MeV	
Am-241	1.7832E-03	848.64	1,021.63	0.00E+00	1.51E+00	1.82E+00	0.0150	1.219E+14
Am-242m	4.3410E-07	848.64	1,021.63	0.00E+00	3.68E-04	4.43E-04	0.0250	2.542E+13
Am-243	1.4907E-06	848.64	1,021.63	0.00E+00	1.27E-03	1.52E-03	0.0375	2.219E+13
C-14	5.7162E-09	848.64	1,021.63	0.00E+00	4.85E-06	5.84E-06	0.0575	2.367E+13
Cl-36	1.3124E-32	848.64	1,021.63	0.00E+00	1.11E-29	1.34E-29	0.0850	1.433E+13
Cm-243	1.8568E-07	848.64	1,021.63	0.00E+00	1.58E-04	1.90E-04	0.1250	9.828E+12
Cm-244	3.5512E-05	848.64	1,021.63	0.00E+00	3.01E-02	3.63E-02	0.2250	1.235E+13
Co-60	1.0261E-05	848.64	1,021.63	0.00E+00	8.71E-03	1.05E-02	0.3750	5.410E+12
Cs-134	1.6931E-02	848.64	1,021.63	0.00E+00	1.44E+01	1.73E+01	0.5750	8.782E+13
Cs-135	3.4477E-06	848.64	1,021.63	0.00E+00	2.93E-03	3.52E-03	0.8500	2.086E+12
Cs-137	2.2800E+00	848.64	1,021.63	0.00E+00	1.93E+03	2.33E+03	1.2500	1.054E+12
Eu-154	3.6656E-02	848.64	1,021.63	0.00E+00	3.11E+01	3.74E+01	1.7500	4.415E+10
Eu-155	9.6841E-03	848.64	1,021.63	0.00E+00	8.22E+00	9.89E+00	2.2500	5.523E+07
Fe-55	4.6977E-04	848.64	1,021.63	0.00E+00	3.99E-01	4.80E-01	2.7500	3.320E+06
H-3	6.0485E-03	848.64	1,021.63	0.00E+00	5.13E+00	6.18E+00	3.5000	2.110E+05
I-129	7.5300E-07	848.64	1,021.63	0.00E+00	6.39E-04	7.69E-04	5.0000	4.881E+02
Kr-85	1.4989E-01	848.64	1,021.63	0.00E+00	1.27E+02	1.53E+02	7.0000	5.406E+01
Np-237	9.5534E-06	848.64	1,021.63	0.00E+00	8.11E-03	9.76E-03	11.0000	6.070E+00
Pa-231	1.6550E-09	848.64	1,021.63	0.00E+00	1.40E-06	1.69E-06		
Pb-210	2.6631E-11	848.64	1,021.63	0.00E+00	2.26E-08	2.72E-08		
Pm-147	1.8156E-01	848.64	1,021.63	0.00E+00	1.54E+02	1.85E+02		
Pu-238	1.8990E-02	848.64	1,021.63	0.00E+00	1.61E+01	1.94E+01		
Pu-239	4.2838E-04	848.64	1,021.63	0.00E+00	3.64E-01	4.38E-01		
Pu-240	2.4379E-04	848.64	1,021.63	0.00E+00	2.07E-01	2.49E-01		
Pu-241	4.2511E-02	848.64	1,021.63	0.00E+00	3.61E+01	4.34E+01		
Pu-242	3.6329E-07	848.64	1,021.63	0.00E+00	3.08E-04	3.71E-04		
Ra-226	1.4725E-10	848.64	1,021.63	0.00E+00	1.25E-07	1.50E-07		
Ra-228	8.9760E-15	848.64	1,021.63	0.00E+00	7.62E-12	9.17E-12		
Ru-106	1.9752E-04	848.64	1,021.63	0.00E+00	1.68E-01	2.02E-01		
Se-79	1.2933E-05	848.64	1,021.63	0.00E+00	1.10E-02	1.32E-02		
Sn-126	1.1574E-05	848.64	1,021.63	0.00E+00	9.82E-03	1.18E-02		
Sr-90	2.1680E+00	848.64	1,021.63	0.00E+00	1.84E+03	2.21E+03		
Tc-99	4.2239E-04	848.64	1,021.63	0.00E+00	3.58E-01	4.32E-01		
Th-229	3.9270E-12	848.64	1,021.63	0.00E+00	3.33E-09	4.01E-09		
Th-230	3.3578E-08	848.64	1,021.63	0.00E+00	2.85E-05	3.43E-05		
Th-232	1.5452E-14	848.64	1,021.63	0.00E+00	1.31E-11	1.58E-11		
Tl-208	4.6705E-08	848.64	1,021.63	0.00E+00	3.96E-05	4.77E-05		
U-232	1.3045E-07	848.64	1,021.63	0.00E+00	1.11E-04	1.33E-04		
U-233	2.3739E-09	848.64	1,021.63	0.00E+00	2.01E-06	2.43E-06		
U-234	1.8423E-04	848.64	1,021.63	0.00E+00	1.56E-01	1.88E-01		
U-235	-2.7235E-06	848.64	0.00	6.57E-03	4.26E-03	6.57E-03		
U-236	1.5493E-05	848.64	1,021.63	0.00E+00	1.31E-02	1.58E-02		
U-238	-4.2851E-09	848.64	0.00	7.53E-05	7.16E-05	7.53E-05		
Y-90	2.1686E+00	848.64	1,021.63	0.00E+00	1.84E+03	2.22E+03		
Other Radionuclides					1.85E+03	2.22E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.30E+01	2.76E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.1372549	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	848.64	700.04	Nominal burnup taken directly from SFD (converted to MWd).
Bounding:	1,021.63	1,400.07	Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.83	0.82
Bounding:	0.99	1.37

Estimated EOL HM/Given EOL HM: 0.96

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: OMEGA WEST (236)
SNF ID #: 407
Fuel Units & Descr: 44 - 18 OR 19 FLAT PLATES
Heavy Metal Mass: BOL=10.384kg; EOL=7.264kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1992
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 1.83

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.5861E-10	3,665.55	4,475.50	0.00E+00	1.68E-06	2.05E-06
Am-241	1.7832E-03	3,665.55	4,475.50	0.00E+00	6.54E+00	7.98E+00
Am-242m	4.3410E-07	3,665.55	4,475.50	0.00E+00	1.59E-03	1.94E-03
Am-243	1.4907E-06	3,665.55	4,475.50	0.00E+00	5.46E-03	6.67E-03
C-14	5.7162E-09	3,665.55	4,475.50	0.00E+00	2.10E-05	2.56E-05
Cl-36	1.3124E-32	3,665.55	4,475.50	0.00E+00	4.81E-29	5.87E-29
Cm-243	1.8568E-07	3,665.55	4,475.50	0.00E+00	6.81E-04	8.31E-04
Cm-244	3.5512E-05	3,665.55	4,475.50	0.00E+00	1.30E-01	1.59E-01
Co-60	1.0261E-05	3,665.55	4,475.50	0.00E+00	3.76E-02	4.59E-02
Cs-134	1.6931E-02	3,665.55	4,475.50	0.00E+00	6.21E+01	7.58E+01
Cs-135	3.4477E-06	3,665.55	4,475.50	0.00E+00	1.26E-02	1.54E-02
Cs-137	2.2800E+00	3,665.55	4,475.50	0.00E+00	8.36E+03	1.02E+04
Eu-154	3.6656E-02	3,665.55	4,475.50	0.00E+00	1.34E+02	1.64E+02
Eu-155	9.6841E-03	3,665.55	4,475.50	0.00E+00	3.55E+01	4.33E+01
Fe-55	4.6977E-04	3,665.55	4,475.50	0.00E+00	1.72E+00	2.10E+00
H-3	6.0485E-03	3,665.55	4,475.50	0.00E+00	2.22E+01	2.71E+01
I-129	7.5300E-07	3,665.55	4,475.50	0.00E+00	2.76E-03	3.37E-03
Kr-85	1.4989E-01	3,665.55	4,475.50	0.00E+00	5.49E+02	6.71E+02
Np-237	9.5534E-06	3,665.55	4,475.50	0.00E+00	3.50E-02	4.28E-02
Pa-231	1.6550E-09	3,665.55	4,475.50	0.00E+00	6.07E-06	7.41E-06
Pb-210	2.6631E-11	3,665.55	4,475.50	0.00E+00	9.76E-08	1.19E-07
Pm-147	1.8156E-01	3,665.55	4,475.50	0.00E+00	6.66E+02	8.13E+02
Pu-238	1.8990E-02	3,665.55	4,475.50	0.00E+00	6.96E+01	8.50E+01
Pu-239	4.2838E-04	3,665.55	4,475.50	0.00E+00	1.57E+00	1.92E+00
Pu-240	2.4379E-04	3,665.55	4,475.50	0.00E+00	8.94E-01	1.09E+00
Pu-241	4.2511E-02	3,665.55	4,475.50	0.00E+00	1.56E+02	1.90E+02
Pu-242	3.6329E-07	3,665.55	4,475.50	0.00E+00	1.33E-03	1.63E-03
Ra-226	1.4725E-10	3,665.55	4,475.50	0.00E+00	5.40E-07	6.59E-07
Ra-228	8.9760E-15	3,665.55	4,475.50	0.00E+00	3.29E-11	4.02E-11
Ru-106	1.9752E-04	3,665.55	4,475.50	0.00E+00	7.24E-01	8.84E-01
Se-79	1.2933E-05	3,665.55	4,475.50	0.00E+00	4.74E-02	5.79E-02
Sn-126	1.1574E-05	3,665.55	4,475.50	0.00E+00	4.24E-02	5.18E-02
Sr-90	2.1680E+00	3,665.55	4,475.50	0.00E+00	7.95E+03	9.70E+03
Tc-99	4.2239E-04	3,665.55	4,475.50	0.00E+00	1.55E+00	1.89E+00
Th-229	3.9270E-12	3,665.55	4,475.50	0.00E+00	1.44E-08	1.76E-08
Th-230	3.3578E-08	3,665.55	4,475.50	0.00E+00	1.23E-04	1.50E-04
Th-232	1.5452E-14	3,665.55	4,475.50	0.00E+00	5.66E-11	6.92E-11
Tl-208	4.6705E-08	3,665.55	4,475.50	0.00E+00	1.71E-04	2.09E-04
U-232	1.3045E-07	3,665.55	4,475.50	0.00E+00	4.78E-04	5.84E-04
U-233	2.3739E-09	3,665.55	4,475.50	0.00E+00	8.70E-06	1.06E-05
U-234	1.8423E-04	3,665.55	4,475.50	0.00E+00	6.75E-01	8.25E-01
U-235	-2.7235E-06	3,665.55	0.00	2.09E-02	1.09E-02	2.09E-02
U-236	1.5493E-05	3,665.55	4,475.50	0.00E+00	5.68E-02	6.93E-02
U-238	-4.2851E-09	3,665.55	0.00	2.37E-04	2.21E-04	2.37E-04
Y-90	2.1686E+00	3,665.55	4,475.50	0.00E+00	7.95E+03	9.71E+03
Other Radionuclides					7.97E+03	9.73E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.339E+14
0.0250	1.113E+14
0.0375	9.722E+13
0.0575	1.037E+14
0.0850	6.279E+13
0.1250	4.305E+13
0.2250	5.410E+13
0.3750	2.370E+13
0.5750	3.847E+14
0.8500	9.138E+12
1.2500	4.616E+12
1.7500	1.934E+11
2.2500	2.420E+08
2.7500	1.454E+07
3.5000	9.243E+05
5.0000	2.138E+03
7.0000	2.368E+02
11.0000	2.659E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.92E+01	1.21E+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 %:	93.22033898	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	3,665.55	2,954.32
Bounding:	4,475.50	5,908.64

Basis for burnup used in estimate:
Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.12	0.81
Bounding:	1.37	1.32

Estimated EOL HM/Given EOL HM: 0.93

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: OMEGA WEST (250)
SNF ID #: 408
Fuel Units & Descr: 27 - 18 OR 19 FLAT PLATES
Heavy Metal Mass: BOL=6.75kg; EOL=5.2kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1992
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 1.13

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.5861E-10	1,559.25	2,949.75	0.00E+00	7.15E-07	1.35E-06
Am-241	1.7832E-03	1,559.25	2,949.75	0.00E+00	2.78E+00	5.26E+00
Am-242m	4.3410E-07	1,559.25	2,949.75	0.00E+00	6.77E-04	1.28E-03
Am-243	1.4907E-06	1,559.25	2,949.75	0.00E+00	2.32E-03	4.40E-03
C-14	5.7162E-09	1,559.25	2,949.75	0.00E+00	8.91E-06	1.69E-05
Cl-36	1.3124E-32	1,559.25	2,949.75	0.00E+00	2.05E-29	3.87E-29
Cm-243	1.8568E-07	1,559.25	2,949.75	0.00E+00	2.90E-04	5.48E-04
Cm-244	3.5512E-05	1,559.25	2,949.75	0.00E+00	5.54E-02	1.05E-01
Co-60	1.0261E-05	1,559.25	2,949.75	0.00E+00	1.60E-02	3.03E-02
Cs-134	1.6931E-02	1,559.25	2,949.75	0.00E+00	2.64E+01	4.99E+01
Cs-135	3.4477E-06	1,559.25	2,949.75	0.00E+00	5.38E-03	1.02E-02
Cs-137	2.2800E+00	1,559.25	2,949.75	0.00E+00	3.56E+03	6.73E+03
Eu-154	3.6656E-02	1,559.25	2,949.75	0.00E+00	5.72E+01	1.08E+02
Eu-155	9.6841E-03	1,559.25	2,949.75	0.00E+00	1.51E+01	2.86E+01
Fe-55	4.6977E-04	1,559.25	2,949.75	0.00E+00	7.32E-01	1.39E+00
H-3	6.0485E-03	1,559.25	2,949.75	0.00E+00	9.43E+00	1.78E+01
I-129	7.5300E-07	1,559.25	2,949.75	0.00E+00	1.17E-03	2.22E-03
Kr-85	1.4989E-01	1,559.25	2,949.75	0.00E+00	2.34E+02	4.42E+02
Np-237	9.5634E-06	1,559.25	2,949.75	0.00E+00	1.49E-02	2.82E-02
Pa-231	1.6550E-09	1,559.25	2,949.75	0.00E+00	2.58E-06	4.88E-06
Pb-210	2.6631E-11	1,559.25	2,949.75	0.00E+00	4.15E-08	7.86E-08
Pm-147	1.8156E-01	1,559.25	2,949.75	0.00E+00	2.83E+02	5.36E+02
Pu-238	1.8990E-02	1,559.25	2,949.75	0.00E+00	2.96E+01	5.60E+01
Pu-239	4.2838E-04	1,559.25	2,949.75	0.00E+00	6.68E-01	1.26E+00
Pu-240	2.4379E-04	1,559.25	2,949.75	0.00E+00	3.80E-01	7.19E-01
Pu-241	4.2511E-02	1,559.25	2,949.75	0.00E+00	6.63E+01	1.25E+02
Pu-242	3.6329E-07	1,559.25	2,949.75	0.00E+00	5.66E-04	1.07E-03
Ra-226	1.4725E-10	1,559.25	2,949.75	0.00E+00	2.30E-07	4.34E-07
Ra-228	8.9760E-15	1,559.25	2,949.75	0.00E+00	1.40E-11	2.65E-11
Ru-106	1.9752E-04	1,559.25	2,949.75	0.00E+00	3.08E-01	5.83E-01
Se-79	1.2933E-05	1,559.25	2,949.75	0.00E+00	2.02E-02	3.81E-02
Sn-126	1.1574E-05	1,559.25	2,949.75	0.00E+00	1.80E-02	3.41E-02
Sr-90	2.1680E+00	1,559.25	2,949.75	0.00E+00	3.38E+03	6.40E+03
Tc-99	4.2239E-04	1,559.25	2,949.75	0.00E+00	6.59E-01	1.25E+00
Th-229	3.9270E-12	1,559.25	2,949.75	0.00E+00	6.12E-09	1.16E-08
Th-230	3.3578E-08	1,559.25	2,949.75	0.00E+00	5.24E-05	9.90E-05
Th-232	1.5452E-14	1,559.25	2,949.75	0.00E+00	2.41E-11	4.56E-11
Tl-208	4.6705E-08	1,559.25	2,949.75	0.00E+00	7.28E-05	1.38E-04
U-232	1.3045E-07	1,559.25	2,949.75	0.00E+00	2.03E-04	3.85E-04
U-233	2.3739E-09	1,559.25	2,949.75	0.00E+00	3.70E-06	7.00E-06
U-234	1.8423E-04	1,559.25	2,949.75	0.00E+00	2.87E-01	5.43E-01
U-235	-2.7235E-06	1,559.25	0.00	1.36E-02	9.33E-03	1.36E-02
U-236	1.5493E-05	1,559.25	2,949.75	0.00E+00	2.42E-02	4.57E-02
U-238	-4.2851E-09	1,559.25	0.00	1.58E-04	1.51E-04	1.58E-04
Y-90	2.1686E+00	1,559.25	2,949.75	0.00E+00	3.38E+03	6.40E+03
Other Radionuclides					3.39E+03	6.42E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.519E+14
0.0250	7.339E+13
0.0375	6.408E+13
0.0575	6.833E+13
0.0850	4.139E+13
0.1250	2.838E+13
0.2250	3.566E+13
0.3750	1.562E+13
0.5750	2.535E+14
0.8500	6.023E+12
1.2500	3.042E+12
1.7500	1.275E+11
2.2500	1.595E+08
2.7500	9.584E+06
3.5000	6.092E+05
5.0000	1.409E+03
7.0000	1.561E+02
11.0000	1.752E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.22E+01	7.98E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.048	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	1,559.25	1,467.69
Bounding:	2,949.75	2,935.38

Basis for burnup used in estimate:
Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.73	0.94
Bounding:	1.39	1.00

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ORR (U308 HEU)
SNF ID #: 903
Fuel Units & Descr: 97 - 19 CURVED PLATES
Heavy Metal Mass: BOL=29.643kg; EOL=20.777kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1966
Estimates as of: 2010
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' = 2.69

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	8,396.08	16,792.17	0.00E+00	1.68E-05	3.37E-05
Am-241	2.5251E-03	8,396.08	16,792.17	0.00E+00	2.12E+01	4.24E+01
Am-242m	3.9624E-07	8,396.08	16,792.17	0.00E+00	3.33E-03	6.65E-03
Am-243	1.4880E-06	8,396.08	16,792.17	0.00E+00	1.25E-02	2.50E-02
C-14	5.7053E-09	8,396.08	16,792.17	0.00E+00	4.79E-05	9.58E-05
Cl-36	1.3124E-32	8,396.08	16,792.17	0.00E+00	1.10E-28	2.20E-28
Cm-243	1.1419E-07	8,396.08	16,792.17	0.00E+00	9.59E-04	1.92E-03
Cm-244	1.6522E-05	8,396.08	16,792.17	0.00E+00	1.39E-01	2.77E-01
Co-60	7.4047E-07	8,396.08	16,792.17	0.00E+00	6.22E-03	1.24E-02
Cs-134	2.0455E-05	8,396.08	16,792.17	0.00E+00	1.72E-01	3.43E-01
Cs-135	3.4477E-06	8,396.08	16,792.17	0.00E+00	2.89E-02	5.79E-02
Cs-137	1.4365E+00	8,396.08	16,792.17	0.00E+00	1.21E+04	2.41E+04
Eu-154	7.3230E-03	8,396.08	16,792.17	0.00E+00	6.15E+01	1.23E+02
Eu-155	5.9259E-04	8,396.08	16,792.17	0.00E+00	4.98E+00	9.95E+00
Fe-55	2.2791E-06	8,396.08	16,792.17	0.00E+00	1.91E-02	3.83E-02
H-3	1.9698E-03	8,396.08	16,792.17	0.00E+00	1.65E+01	3.31E+01
I-129	7.5300E-07	8,396.08	16,792.17	0.00E+00	6.32E-03	1.26E-02
Kr-85	4.1176E-02	8,396.08	16,792.17	0.00E+00	3.46E+02	6.91E+02
Np-237	9.5752E-06	8,396.08	16,792.17	0.00E+00	8.04E-02	1.61E-01
Pa-231	3.9379E-09	8,396.08	16,792.17	0.00E+00	3.31E-05	6.61E-05
Pb-210	3.3115E-10	8,396.08	16,792.17	0.00E+00	2.78E-06	5.56E-06
Pm-147	9.2402E-04	8,396.08	16,792.17	0.00E+00	7.76E+00	1.55E+01
Pu-238	1.6217E-02	8,396.08	16,792.17	0.00E+00	1.36E+02	2.72E+02
Pu-239	4.2810E-04	8,396.08	16,792.17	0.00E+00	3.59E+00	7.19E+00
Pu-240	2.4333E-04	8,396.08	16,792.17	0.00E+00	2.04E+00	4.09E+00
Pu-241	1.6242E-02	8,396.08	16,792.17	0.00E+00	1.36E+02	2.73E+02
Pu-242	3.6329E-07	8,396.08	16,792.17	0.00E+00	3.05E-03	6.10E-03
Ra-226	9.0114E-10	8,396.08	16,792.17	0.00E+00	7.57E-06	1.51E-05
Ra-228	3.1019E-14	8,396.08	16,792.17	0.00E+00	2.60E-10	5.21E-10
Ru-106	2.1225E-10	8,396.08	16,792.17	0.00E+00	1.78E-06	3.56E-06
Se-79	1.2930E-05	8,396.08	16,792.17	0.00E+00	1.09E-01	2.17E-01
Sn-126	1.1571E-05	8,396.08	16,792.17	0.00E+00	9.72E-02	1.94E-01
Sr-90	1.3472E+00	8,396.08	16,792.17	0.00E+00	1.13E+04	2.26E+04
Tc-99	4.2239E-04	8,396.08	16,792.17	0.00E+00	3.55E+00	7.09E+00
Th-229	1.2407E-11	8,396.08	16,792.17	0.00E+00	1.04E-07	2.08E-07
Th-230	8.3497E-08	8,396.08	16,792.17	0.00E+00	7.01E-04	1.40E-03
Th-232	3.8371E-14	8,396.08	16,792.17	0.00E+00	3.22E-10	6.44E-10
Tl-208	4.0414E-08	8,396.08	16,792.17	0.00E+00	3.39E-04	6.79E-04
U-232	1.0948E-07	8,396.08	16,792.17	0.00E+00	9.19E-04	1.84E-03
U-233	3.6275E-09	8,396.08	16,792.17	0.00E+00	3.05E-05	6.09E-05
U-234	1.8562E-04	8,396.08	16,792.17	0.00E+00	1.56E+00	3.12E+00
U-235	-2.7235E-06	8,396.08	0.00	5.97E-02	3.68E-02	5.97E-02
U-236	1.5493E-05	8,396.08	16,792.17	0.00E+00	1.30E-01	2.60E-01
U-238	-4.2851E-09	8,396.08	0.00	6.82E-04	6.46E-04	6.82E-04
Y-90	1.3475E+00	8,396.08	16,792.17	0.00E+00	1.13E+04	2.26E+04
Other Radionuclides					1.15E+04	2.30E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.237E+15
0.0250	2.568E+14
0.0375	2.232E+14
0.0575	2.403E+14
0.0850	1.448E+14
0.1250	9.562E+13
0.2250	1.250E+14
0.3750	5.437E+13
0.5750	8.986E+14
0.8500	1.098E+13
1.2500	5.309E+12
1.7500	2.988E+11
2.2500	2.498E+07
2.7500	2.384E+07
3.5000	1.381E+04
5.0000	5.645E+03
7.0000	6.177E+02
11.0000	6.887E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.41E+02	2.81E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.15626243	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		8,396.08
Bounding:		16,792.17

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.90	
Bounding:	1.80	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ORR (U3O8 HEU)
SNF ID #: 753
Fuel Units & Descr: 4 - 19 CURVED PLATES
Heavy Metal Mass: BOL=0.716kg; EOL=0.308kg
RCD Storage Site: SRS

[1]Fuel decay start date: 1966
Estimates as of: 2010
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" = 0.11

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	386.76	678.07	0.00E+00	7.76E-07	1.36E-06	Avg. MeV	
Am-241	2.5251E-03	386.76	678.07	0.00E+00	9.77E-01	1.71E+00	0.0150	4.994E+13
Am-242m	3.9624E-07	386.76	678.07	0.00E+00	1.53E-04	2.69E-04	0.0250	1.037E+13
Am-243	1.4880E-06	386.76	678.07	0.00E+00	5.76E-04	1.01E-03	0.0375	9.014E+12
C-14	5.7053E-09	386.76	678.07	0.00E+00	2.21E-06	3.87E-06	0.0575	9.702E+12
Cl-36	1.3124E-32	386.76	678.07	0.00E+00	5.08E-30	8.90E-30	0.0850	5.846E+12
Cm-243	1.1419E-07	386.76	678.07	0.00E+00	4.42E-05	7.74E-05	0.1250	3.861E+12
Cm-244	1.6522E-05	386.76	678.07	0.00E+00	6.39E-03	1.12E-02	0.2250	5.047E+12
Co-60	7.4047E-07	386.76	678.07	0.00E+00	2.86E-04	5.02E-04	0.3750	2.196E+12
Cs-134	2.0455E-05	386.76	678.07	0.00E+00	7.91E-03	1.39E-02	0.5750	3.629E+13
Cs-135	3.4477E-06	386.76	678.07	0.00E+00	1.33E-03	2.34E-03	0.8500	4.432E+11
Cs-137	1.4365E+00	386.76	678.07	0.00E+00	5.56E+02	9.74E+02	1.2500	2.144E+11
Eu-154	7.3230E-03	386.76	678.07	0.00E+00	2.83E+00	4.97E+00	1.7500	1.207E+10
Eu-155	5.9259E-04	386.76	678.07	0.00E+00	2.29E-01	4.02E-01	2.2500	1.009E+08
Fe-55	2.2791E-06	386.76	678.07	0.00E+00	8.81E-04	1.55E-03	2.7500	9.629E+05
H-3	1.9698E-03	386.76	678.07	0.00E+00	7.62E-01	1.34E+00	3.5000	5.577E+02
I-129	7.5300E-07	386.76	678.07	0.00E+00	2.91E-04	5.11E-04	5.0000	2.279E+02
Kr-85	4.1176E-02	386.76	678.07	0.00E+00	1.59E+01	2.79E+01	7.0000	2.494E+01
Np-237	9.5752E-06	386.76	678.07	0.00E+00	3.70E-03	6.49E-03	11.0000	2.781E+00
Pa-231	3.9379E-09	386.76	678.07	0.00E+00	1.52E-06	2.67E-06		
Pb-210	3.3115E-10	386.76	678.07	0.00E+00	1.28E-07	2.25E-07		
Pm-147	9.2402E-04	386.76	678.07	0.00E+00	3.57E-01	6.27E-01		
Pu-238	1.6217E-02	386.76	678.07	0.00E+00	6.27E+00	1.10E+01		
Pu-239	4.2810E-04	386.76	678.07	0.00E+00	1.66E-01	2.90E-01		
Pu-240	2.4333E-04	386.76	678.07	0.00E+00	9.41E-02	1.65E-01		
Pu-241	1.6242E-02	386.76	678.07	0.00E+00	6.28E+00	1.10E+01		
Pu-242	3.6329E-07	386.76	678.07	0.00E+00	1.41E-04	2.46E-04		
Ra-226	9.0114E-10	386.76	678.07	0.00E+00	3.49E-07	6.11E-07		
Ra-228	3.1019E-14	386.76	678.07	0.00E+00	1.20E-11	2.10E-11		
Ru-106	2.1225E-10	386.76	678.07	0.00E+00	8.21E-08	1.44E-07		
Se-79	1.2930E-05	386.76	678.07	0.00E+00	5.00E-03	8.77E-03		
Sn-126	1.1571E-05	386.76	678.07	0.00E+00	4.48E-03	7.85E-03		
Sr-90	1.3472E+00	386.76	678.07	0.00E+00	5.21E+02	9.14E+02		
Tc-99	4.2239E-04	386.76	678.07	0.00E+00	1.63E-01	2.86E-01		
Th-229	1.2407E-11	386.76	678.07	0.00E+00	4.80E-09	8.41E-09		
Th-230	8.3497E-08	386.76	678.07	0.00E+00	3.23E-05	5.66E-05		
Th-232	3.8371E-14	386.76	678.07	0.00E+00	1.48E-11	2.60E-11		
Tl-208	4.0414E-08	386.76	678.07	0.00E+00	1.56E-05	2.74E-05		
U-232	1.0948E-07	386.76	678.07	0.00E+00	4.23E-05	7.42E-05	Thermal Power	
U-233	3.6275E-09	386.76	678.07	0.00E+00	1.40E-06	2.46E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8562E-04	386.76	678.07	0.00E+00	7.18E-02	1.26E-01		
U-235	-2.7235E-06	386.76	0.00	1.44E-03	3.90E-04	1.44E-03		
U-236	1.5493E-05	386.76	678.07	0.00E+00	5.99E-03	1.05E-02	6.47E+00	1.13E+01
U-238	-4.2851E-09	386.76	0.00	1.61E-05	1.45E-05	1.61E-05	Total	Total
Y-90	1.3475E+00	386.76	678.07	0.00E+00	5.21E+02	9.14E+02		
Other Radionuclides					5.29E+02	9.28E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.29608939	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		386.76	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		678.07	Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.72	
Bounding:	3.01	

Estimated EOL HM/Given EOL HM: 1.08

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ORR (U3Si2 LEU)
SNF ID #: 165
Fuel Units & Descr: 52 - 19 CURVED PLATES
Heavy Metal Mass: BOL=87.953kg; EOL=83.294kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1987
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' = 1.44

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	4,412.35	8,824.71	0.00E+00	2.93E-06	5.85E-06
Am-241	2.0060E-03	4,412.35	8,824.71	0.00E+00	8.85E+00	1.77E+01
Am-242m	4.2429E-07	4,412.35	8,824.71	0.00E+00	1.87E-03	3.74E-03
Am-243	1.4899E-06	4,412.35	8,824.71	0.00E+00	6.57E-03	1.31E-02
C-14	5.7135E-09	4,412.35	8,824.71	0.00E+00	2.52E-05	5.04E-05
Cl-36	1.3124E-32	4,412.35	8,824.71	0.00E+00	5.79E-29	1.16E-28
Cm-243	1.6443E-07	4,412.35	8,824.71	0.00E+00	7.26E-04	1.45E-03
Cm-244	2.9330E-05	4,412.35	8,824.71	0.00E+00	1.29E-01	2.59E-01
Co-60	5.3186E-06	4,412.35	8,824.71	0.00E+00	2.35E-02	4.69E-02
Cs-134	3.1563E-03	4,412.35	8,824.71	0.00E+00	1.39E+01	2.79E+01
Cs-135	3.4477E-06	4,412.35	8,824.71	0.00E+00	1.52E-02	3.04E-02
Cs-137	2.0313E+00	4,412.35	8,824.71	0.00E+00	8.96E+03	1.79E+04
Eu-154	2.4513E-02	4,412.35	8,824.71	0.00E+00	1.08E+02	2.16E+02
Eu-155	4.8175E-03	4,412.35	8,824.71	0.00E+00	2.13E+01	4.25E+01
Fe-55	1.2397E-04	4,412.35	8,824.71	0.00E+00	5.47E-01	1.09E+00
H-3	4.5697E-03	4,412.35	8,824.71	0.00E+00	2.02E+01	4.03E+01
I-129	7.5300E-07	4,412.35	8,824.71	0.00E+00	3.32E-03	6.64E-03
Kr-85	1.0850E-01	4,412.35	8,824.71	0.00E+00	4.79E+02	9.57E+02
Np-237	9.5561E-06	4,412.35	8,824.71	0.00E+00	4.22E-02	8.43E-02
Pa-231	2.0359E-09	4,412.35	8,824.71	0.00E+00	8.98E-06	1.80E-05
Pb-210	4.9728E-11	4,412.35	8,824.71	0.00E+00	2.19E-07	4.39E-07
Pm-147	4.8502E-02	4,412.35	8,824.71	0.00E+00	2.14E+02	4.28E+02
Pu-238	1.8254E-02	4,412.35	8,824.71	0.00E+00	8.05E+01	1.61E+02
Pu-239	4.2810E-04	4,412.35	8,824.71	0.00E+00	1.89E+00	3.78E+00
Pu-240	2.4368E-04	4,412.35	8,824.71	0.00E+00	1.08E+00	2.15E+00
Pu-241	3.3415E-02	4,412.35	8,824.71	0.00E+00	1.47E+02	2.95E+02
Pu-242	3.6329E-07	4,412.35	8,824.71	0.00E+00	1.60E-03	3.21E-03
Ra-226	2.2854E-10	4,412.35	8,824.71	0.00E+00	1.01E-06	2.02E-06
Ra-228	1.2426E-14	4,412.35	8,824.71	0.00E+00	5.48E-11	1.10E-10
Ru-106	6.3589E-06	4,412.35	8,824.71	0.00E+00	2.81E-02	5.61E-02
Se-79	1.2933E-05	4,412.35	8,824.71	0.00E+00	5.71E-02	1.14E-01
Sn-126	1.1574E-05	4,412.35	8,824.71	0.00E+00	5.11E-02	1.02E-01
Sr-90	1.9248E+00	4,412.35	8,824.71	0.00E+00	8.49E+03	1.70E+04
Tc-99	4.2239E-04	4,412.35	8,824.71	0.00E+00	1.86E+00	3.73E+00
Th-229	5.0953E-12	4,412.35	8,824.71	0.00E+00	2.25E-08	4.50E-08
Th-230	4.1885E-08	4,412.35	8,824.71	0.00E+00	1.85E-04	3.70E-04
Th-232	1.9270E-14	4,412.35	8,824.71	0.00E+00	8.50E-11	1.70E-10
Tl-208	4.6024E-08	4,412.35	8,824.71	0.00E+00	2.03E-04	4.06E-04
U-232	1.2582E-07	4,412.35	8,824.71	0.00E+00	5.55E-04	1.11E-03
U-233	2.5825E-09	4,412.35	8,824.71	0.00E+00	1.14E-05	2.28E-05
U-234	1.8450E-04	4,412.35	8,824.71	0.00E+00	8.14E-01	1.63E+00
U-235	-2.7235E-06	4,412.35	0.00	3.81E-02	2.61E-02	3.81E-02
U-236	1.5493E-05	4,412.35	8,824.71	0.00E+00	6.84E-02	1.37E-01
U-238	-4.2851E-09	4,412.35	0.00	2.36E-02	2.36E-02	2.36E-02
Y-90	1.9254E+00	4,412.35	8,824.71	0.00E+00	8.50E+03	1.70E+04
Other Radionuclides					8.53E+03	1.71E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.315E+14
0.0250	1.937E+14
0.0375	1.690E+14
0.0575	1.810E+14
0.0850	1.094E+14
0.1250	7.400E+13
0.2250	9.436E+13
0.3750	4.107E+13
0.5750	6.700E+14
0.8500	1.133E+13
1.2500	6.468E+12
1.7500	2.969E+11
2.2500	2.604E+07
2.7500	1.472E+07
3.5000	6.775E+04
5.0000	3.877E+03
7.0000	4.283E+02
11.0000	4.802E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.65E+02	2.10E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	20.03831236	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		4,412.35
Bounding:		8,824.71

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.16	
Bounding:	0.32	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ORR (U3Si2 LEU)
SNF ID #: 850
Fuel Units & Descr: 11 - ASSEMBLY
Heavy Metal Mass: BOL=11.076kg; EOL=9.908kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1966
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' = 0.31

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	1,106.31	2,212.62	0.00E+00	2.22E-06	4.44E-06
Am-241	2.5251E-03	1,106.31	2,212.62	0.00E+00	2.79E+00	5.59E+00
Am-242m	3.9624E-07	1,106.31	2,212.62	0.00E+00	4.38E-04	8.77E-04
Am-243	1.4880E-06	1,106.31	2,212.62	0.00E+00	1.65E-03	3.29E-03
C-14	5.7053E-09	1,106.31	2,212.62	0.00E+00	6.31E-06	1.26E-05
Cl-36	1.3124E-32	1,106.31	2,212.62	0.00E+00	1.45E-29	2.90E-29
Cm-243	1.1419E-07	1,106.31	2,212.62	0.00E+00	1.26E-04	2.53E-04
Cm-244	1.6522E-05	1,106.31	2,212.62	0.00E+00	1.83E-02	3.66E-02
Co-60	7.4047E-07	1,106.31	2,212.62	0.00E+00	8.19E-04	1.64E-03
Cs-134	2.0455E-05	1,106.31	2,212.62	0.00E+00	2.26E-02	4.53E-02
Cs-135	3.4477E-06	1,106.31	2,212.62	0.00E+00	3.81E-03	7.63E-03
Cs-137	1.4365E+00	1,106.31	2,212.62	0.00E+00	1.59E+03	3.18E+03
Eu-154	7.3230E-03	1,106.31	2,212.62	0.00E+00	8.10E+00	1.62E+01
Eu-155	5.9259E-04	1,106.31	2,212.62	0.00E+00	6.56E-01	1.31E+00
Fe-55	2.2791E-06	1,106.31	2,212.62	0.00E+00	2.52E-03	5.04E-03
H-3	1.9698E-03	1,106.31	2,212.62	0.00E+00	2.18E+00	4.36E+00
I-129	7.5300E-07	1,106.31	2,212.62	0.00E+00	8.33E-04	1.67E-03
Kr-85	4.1176E-02	1,106.31	2,212.62	0.00E+00	4.56E+01	9.11E+01
Np-237	9.5752E-06	1,106.31	2,212.62	0.00E+00	1.06E-02	2.12E-02
Pa-231	3.9379E-09	1,106.31	2,212.62	0.00E+00	4.36E-06	8.71E-06
Pb-210	3.3115E-10	1,106.31	2,212.62	0.00E+00	3.66E-07	7.33E-07
Pm-147	9.2402E-04	1,106.31	2,212.62	0.00E+00	1.02E+00	2.04E+00
Pu-238	1.6217E-02	1,106.31	2,212.62	0.00E+00	1.79E+01	3.59E+01
Pu-239	4.2810E-04	1,106.31	2,212.62	0.00E+00	4.74E-01	9.47E-01
Pu-240	2.4333E-04	1,106.31	2,212.62	0.00E+00	2.69E-01	5.38E-01
Pu-241	1.6242E-02	1,106.31	2,212.62	0.00E+00	1.80E+01	3.59E+01
Pu-242	3.6329E-07	1,106.31	2,212.62	0.00E+00	4.02E-04	8.04E-04
Ra-226	9.0114E-10	1,106.31	2,212.62	0.00E+00	9.97E-07	1.99E-06
Ra-228	3.1019E-14	1,106.31	2,212.62	0.00E+00	3.43E-11	6.86E-11
Ru-106	2.1225E-10	1,106.31	2,212.62	0.00E+00	2.35E-07	4.70E-07
Se-79	1.2930E-05	1,106.31	2,212.62	0.00E+00	1.43E-02	2.86E-02
Sn-126	1.1571E-05	1,106.31	2,212.62	0.00E+00	1.28E-02	2.56E-02
Sr-90	1.3472E+00	1,106.31	2,212.62	0.00E+00	1.49E+03	2.98E+03
Tc-99	4.2239E-04	1,106.31	2,212.62	0.00E+00	4.67E-01	9.35E-01
Th-229	1.2407E-11	1,106.31	2,212.62	0.00E+00	1.37E-08	2.75E-08
Th-230	8.3497E-08	1,106.31	2,212.62	0.00E+00	9.24E-05	1.85E-04
Th-232	3.8371E-14	1,106.31	2,212.62	0.00E+00	4.25E-11	8.49E-11
Tl-208	4.0414E-08	1,106.31	2,212.62	0.00E+00	4.47E-05	8.94E-05
U-232	1.0948E-07	1,106.31	2,212.62	0.00E+00	1.21E-04	2.42E-04
U-233	3.6275E-09	1,106.31	2,212.62	0.00E+00	4.01E-06	8.03E-06
U-234	1.8562E-04	1,106.31	2,212.62	0.00E+00	2.05E-01	4.11E-01
U-235	-2.7235E-06	1,106.31	0.00	4.74E-03	1.73E-03	4.74E-03
U-236	1.5493E-05	1,106.31	2,212.62	0.00E+00	1.71E-02	3.43E-02
U-238	-4.2851E-09	1,106.31	0.00	2.99E-03	2.98E-03	2.99E-03
Y-90	1.3475E+00	1,106.31	2,212.62	0.00E+00	1.49E+03	2.98E+03
Other Radionuclides					1.51E+03	3.03E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.630E+14
0.0250	3.384E+13
0.0375	2.941E+13
0.0575	3.168E+13
0.0850	1.908E+13
0.1250	1.260E+13
0.2250	1.647E+13
0.3750	7.164E+12
0.5750	1.184E+14
0.8500	1.446E+12
1.2500	6.995E+11
1.7500	3.937E+10
2.2500	3.292E+06
2.7500	3.142E+06
3.5000	1.836E+03
5.0000	7.504E+02
7.0000	8.216E+01
11.0000	9.163E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.85E+01	3.70E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.81328831	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,106.31
Bounding:		2,212.62

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.32	
Bounding:	0.63	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ORR (U3Si2 LEU)
SNF ID #: 944
Fuel Units & Descr: 33 - 19 CURVED PLATES
Heavy Metal Mass: BOL=56.539kg; EOL=53.655kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1987
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10" 1.38

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	2,731.39	5,462.79	0.00E+00	1.81E-06	3.62E-06
Am-241	2.0060E-03	2,731.39	5,462.79	0.00E+00	5.48E+00	1.10E+01
Am-242m	4.2429E-07	2,731.39	5,462.79	0.00E+00	1.16E-03	2.32E-03
Am-243	1.4899E-06	2,731.39	5,462.79	0.00E+00	4.07E-03	8.14E-03
C-14	5.7135E-09	2,731.39	5,462.79	0.00E+00	1.56E-05	3.12E-05
Cl-36	1.3124E-32	2,731.39	5,462.79	0.00E+00	3.58E-29	7.17E-29
Cm-243	1.6443E-07	2,731.39	5,462.79	0.00E+00	4.49E-04	8.98E-04
Cm-244	2.9330E-05	2,731.39	5,462.79	0.00E+00	8.01E-02	1.60E-01
Co-60	5.3186E-06	2,731.39	5,462.79	0.00E+00	1.45E-02	2.91E-02
Cs-134	3.1563E-03	2,731.39	5,462.79	0.00E+00	8.62E+00	1.72E+01
Cs-135	3.4477E-06	2,731.39	5,462.79	0.00E+00	9.42E-03	1.88E-02
Cs-137	2.0313E+00	2,731.39	5,462.79	0.00E+00	5.55E+03	1.11E+04
Eu-154	2.4513E-02	2,731.39	5,462.79	0.00E+00	6.70E+01	1.34E+02
Eu-155	4.8175E-03	2,731.39	5,462.79	0.00E+00	1.32E+01	2.63E+01
Fe-55	1.2397E-04	2,731.39	5,462.79	0.00E+00	3.39E-01	6.77E-01
H-3	4.5697E-03	2,731.39	5,462.79	0.00E+00	1.25E+01	2.50E+01
I-129	7.5300E-07	2,731.39	5,462.79	0.00E+00	2.06E-03	4.11E-03
Kr-85	1.0850E-01	2,731.39	5,462.79	0.00E+00	2.96E+02	5.93E+02
Np-237	9.5561E-06	2,731.39	5,462.79	0.00E+00	2.61E-02	5.22E-02
Pa-231	2.0359E-09	2,731.39	5,462.79	0.00E+00	5.56E-06	1.11E-05
Pb-210	4.9728E-11	2,731.39	5,462.79	0.00E+00	1.36E-07	2.72E-07
Pm-147	4.8502E-02	2,731.39	5,462.79	0.00E+00	1.32E+02	2.65E+02
Pu-238	1.8254E-02	2,731.39	5,462.79	0.00E+00	4.99E+01	9.97E+01
Pu-239	4.2810E-04	2,731.39	5,462.79	0.00E+00	1.17E+00	2.34E+00
Pu-240	2.4368E-04	2,731.39	5,462.79	0.00E+00	6.66E-01	1.33E+00
Pu-241	3.3415E-02	2,731.39	5,462.79	0.00E+00	9.13E+01	1.83E+02
Pu-242	3.6329E-07	2,731.39	5,462.79	0.00E+00	9.92E-04	1.98E-03
Ra-226	2.2854E-10	2,731.39	5,462.79	0.00E+00	6.24E-07	1.25E-06
Ra-228	1.2426E-14	2,731.39	5,462.79	0.00E+00	3.39E-11	6.79E-11
Ru-106	6.3589E-06	2,731.39	5,462.79	0.00E+00	1.74E-02	3.47E-02
Se-79	1.2933E-05	2,731.39	5,462.79	0.00E+00	3.53E-02	7.07E-02
Sn-126	1.1574E-05	2,731.39	5,462.79	0.00E+00	3.16E-02	6.32E-02
Sr-90	1.9248E+00	2,731.39	5,462.79	0.00E+00	5.26E+03	1.05E+04
Tc-99	4.2239E-04	2,731.39	5,462.79	0.00E+00	1.15E+00	2.31E+00
Th-229	5.0953E-12	2,731.39	5,462.79	0.00E+00	1.39E-08	2.78E-08
Th-230	4.1885E-08	2,731.39	5,462.79	0.00E+00	1.14E-04	2.29E-04
Th-232	1.9270E-14	2,731.39	5,462.79	0.00E+00	5.26E-11	1.05E-10
Tl-208	4.6024E-08	2,731.39	5,462.79	0.00E+00	1.26E-04	2.51E-04
U-232	1.2582E-07	2,731.39	5,462.79	0.00E+00	3.44E-04	6.87E-04
U-233	2.5825E-09	2,731.39	5,462.79	0.00E+00	7.05E-06	1.41E-05
U-234	1.8450E-04	2,731.39	5,462.79	0.00E+00	5.04E-01	1.01E+00
U-235	-2.7235E-06	2,731.39	0.00	2.42E-02	1.68E-02	2.42E-02
U-236	1.5493E-05	2,731.39	5,462.79	0.00E+00	4.23E-02	8.46E-02
U-238	-4.2851E-09	2,731.39	0.00	1.52E-02	1.52E-02	1.52E-02
Y-90	1.9254E+00	2,731.39	5,462.79	0.00E+00	5.26E+03	1.05E+04
Other Radionuclides					5.28E+03	1.06E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.766E+14
0.0250	1.199E+14
0.0375	1.046E+14
0.0575	1.120E+14
0.0850	6.769E+13
0.1250	4.581E+13
0.2250	5.841E+13
0.3750	2.543E+13
0.5750	4.147E+14
0.8500	7.012E+12
1.2500	4.004E+12
1.7500	1.838E+11
2.2500	1.612E+07
2.7500	9.113E+06
3.5000	4.195E+04
5.0000	2.401E+03
7.0000	2.653E+02
11.0000	2.974E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.51E+01	1.30E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.818	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2,731.39
Bounding:		5,462.79

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.15	
Bounding:	0.31	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ORR SPECIAL
SNF ID #: 163
Fuel Units & Descr: 11 - 19 CURVED PLATES
Heavy Metal Mass: BOL=22.045kg; EOL=18.48kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1966
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' = 0.31

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.0068E-09	3,376.22	6,752.44	0.00E+00	6.78E-06	1.36E-05
Am-241	2.5251E-03	3,376.22	6,752.44	0.00E+00	8.53E+00	1.71E+01
Am-242m	3.9624E-07	3,376.22	6,752.44	0.00E+00	1.34E-03	2.68E-03
Am-243	1.4880E-06	3,376.22	6,752.44	0.00E+00	5.02E-03	1.00E-02
C-14	5.7053E-09	3,376.22	6,752.44	0.00E+00	1.93E-05	3.85E-05
Cl-36	1.3124E-32	3,376.22	6,752.44	0.00E+00	4.43E-29	8.86E-29
Cm-243	1.1419E-07	3,376.22	6,752.44	0.00E+00	3.86E-04	7.71E-04
Cm-244	1.6522E-05	3,376.22	6,752.44	0.00E+00	5.58E-02	1.12E-01
Co-60	7.4047E-07	3,376.22	6,752.44	0.00E+00	2.50E-03	5.00E-03
Cs-134	2.0455E-05	3,376.22	6,752.44	0.00E+00	6.91E-02	1.38E-01
Cs-135	3.4477E-06	3,376.22	6,752.44	0.00E+00	1.16E-02	2.33E-02
Cs-137	1.4365E+00	3,376.22	6,752.44	0.00E+00	4.85E+03	9.70E+03
Eu-154	7.3230E-03	3,376.22	6,752.44	0.00E+00	2.47E+01	4.94E+01
Eu-155	5.9259E-04	3,376.22	6,752.44	0.00E+00	2.00E+00	4.00E+00
Fe-55	2.2791E-06	3,376.22	6,752.44	0.00E+00	7.69E-03	1.54E-02
H-3	1.9698E-03	3,376.22	6,752.44	0.00E+00	6.65E+00	1.33E+01
I-129	7.5300E-07	3,376.22	6,752.44	0.00E+00	2.54E-03	5.08E-03
Kr-85	4.1176E-02	3,376.22	6,752.44	0.00E+00	1.39E+02	2.78E+02
Np-237	9.5752E-06	3,376.22	6,752.44	0.00E+00	3.23E-02	6.47E-02
Pa-231	3.9379E-09	3,376.22	6,752.44	0.00E+00	1.33E-05	2.66E-05
Pb-210	3.3115E-10	3,376.22	6,752.44	0.00E+00	1.12E-06	2.24E-06
Pm-147	9.2402E-04	3,376.22	6,752.44	0.00E+00	3.12E+00	6.24E+00
Pu-238	1.6217E-02	3,376.22	6,752.44	0.00E+00	5.48E+01	1.10E+02
Pu-239	4.2810E-04	3,376.22	6,752.44	0.00E+00	1.45E+00	2.89E+00
Pu-240	2.4333E-04	3,376.22	6,752.44	0.00E+00	8.22E-01	1.64E+00
Pu-241	1.6242E-02	3,376.22	6,752.44	0.00E+00	5.48E+01	1.10E+02
Pu-242	3.6329E-07	3,376.22	6,752.44	0.00E+00	1.23E-03	2.45E-03
Ra-226	9.0114E-10	3,376.22	6,752.44	0.00E+00	3.04E-06	6.08E-06
Ra-228	3.1019E-14	3,376.22	6,752.44	0.00E+00	1.05E-10	2.09E-10
Ru-106	2.1225E-10	3,376.22	6,752.44	0.00E+00	7.17E-07	1.43E-06
Se-79	1.2930E-05	3,376.22	6,752.44	0.00E+00	4.37E-02	8.73E-02
Sn-126	1.1571E-05	3,376.22	6,752.44	0.00E+00	3.91E-02	7.81E-02
Sr-90	1.3472E+00	3,376.22	6,752.44	0.00E+00	4.55E+03	9.10E+03
Tc-99	4.2239E-04	3,376.22	6,752.44	0.00E+00	1.43E+00	2.85E+00
Th-229	1.2407E-11	3,376.22	6,752.44	0.00E+00	4.19E-08	8.38E-08
Th-230	8.3497E-08	3,376.22	6,752.44	0.00E+00	2.82E-04	5.64E-04
Th-232	3.8371E-14	3,376.22	6,752.44	0.00E+00	1.30E-10	2.59E-10
Tl-208	4.0414E-08	3,376.22	6,752.44	0.00E+00	1.36E-04	2.73E-04
U-232	1.0948E-07	3,376.22	6,752.44	0.00E+00	3.70E-04	7.39E-04
U-233	3.6275E-09	3,376.22	6,752.44	0.00E+00	1.22E-05	2.45E-05
U-234	1.8562E-04	3,376.22	6,752.44	0.00E+00	6.27E-01	1.25E+00
U-235	-2.7235E-06	3,376.22	0.00	1.13E-02	2.07E-03	1.13E-02
U-236	1.5493E-05	3,376.22	6,752.44	0.00E+00	5.23E-02	1.05E-01
U-238	-4.2851E-09	3,376.22	0.00	5.66E-03	5.64E-03	5.66E-03
Y-90	1.3475E+00	3,376.22	6,752.44	0.00E+00	4.55E+03	9.10E+03
Other Radionuclides					4.62E+03	9.24E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.973E+14
0.0250	1.033E+14
0.0375	8.976E+13
0.0575	9.662E+13
0.0850	5.821E+13
0.1250	3.845E+13
0.2250	5.026E+13
0.3750	2.186E+13
0.5750	3.613E+14
0.8500	4.414E+12
1.2500	2.135E+12
1.7500	1.202E+11
2.2500	1.005E+07
2.7500	9.589E+06
3.5000	5.583E+03
5.0000	2.282E+03
7.0000	2.498E+02
11.0000	2.786E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.55E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	23.64708607	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3,376.22
Bounding:		6,752.44

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.49	
Bounding:	0.97	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ORR-BW-1 (MOX)
SNF ID #: 160
Fuel Units & Descr: 1 - 19 CURVED PLATES
Heavy Metal Mass: BOL= ; EOL=0.07kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
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' 0.03

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.3072E-06	66.52	66.52	0.00E+00	1.53E-04	1.53E-04
Am-241	8.4448E+00	66.52	66.52	0.00E+00	5.62E+02	5.62E+02
Am-242m	1.6848E-02	66.52	66.52	0.00E+00	1.12E+00	1.12E+00
Am-243	1.6320E-02	66.52	66.52	0.00E+00	1.09E+00	1.09E+00
C-14	1.2090E-01	66.52	66.52	0.00E+00	8.04E+00	8.04E+00
Cl-36	2.2849E-03	66.52	66.52	0.00E+00	1.52E-01	1.52E-01
Cm-243	8.6624E-04	66.52	66.52	0.00E+00	5.76E-02	5.76E-02
Cm-244	1.6848E-01	66.52	66.52	0.00E+00	1.12E+01	1.12E+01
Co-60	2.8086E+01	66.52	66.52	0.00E+00	1.87E+03	1.87E+03
Cs-134	3.4148E-04	66.52	66.52	0.00E+00	2.27E-02	2.27E-02
Cs-135	4.3976E-04	66.52	66.52	0.00E+00	2.93E-02	2.93E-02
Cs-137	2.1049E+01	66.52	66.52	0.00E+00	1.40E+03	1.40E+03
Eu-154	1.2500E+00	66.52	66.52	0.00E+00	8.32E+01	8.32E+01
Eu-155	6.8986E-02	66.52	66.52	0.00E+00	4.59E+00	4.59E+00
Fe-55	2.9308E-01	66.52	66.52	0.00E+00	1.95E+01	1.95E+01
H-3	2.4311E-01	66.52	66.52	0.00E+00	1.62E+01	1.62E+01
I-129	1.0618E-05	66.52	66.52	0.00E+00	7.06E-04	7.06E-04
Kr-85	5.9882E-01	66.52	66.52	0.00E+00	3.98E+01	3.98E+01
Np-237	1.5668E-04	66.52	66.52	0.00E+00	1.04E-02	1.04E-02
Pa-231	2.8656E-06	66.52	66.52	0.00E+00	1.91E-04	1.91E-04
Pb-210	2.3918E-06	66.52	66.52	0.00E+00	1.59E-06	1.59E-06
Pm-147	1.6900E-02	66.52	66.52	0.00E+00	1.12E+00	1.12E+00
Pu-238	-8.6120E-01	66.52	0.00	1.80E+01	0.00E+00	1.80E+01
Pu-239	-4.8440E-02	66.52	0.00	2.18E+00	0.00E+00	2.18E+00
Pu-240	-3.0095E-01	66.52	0.00	2.78E+00	0.00E+00	2.78E+00
Pu-241	-1.0411E+02	66.52	0.00	7.16E+02	0.00E+00	7.16E+02
Pu-242	-1.1381E-04	66.52	0.00	1.20E-02	4.46E-03	1.20E-02
Ra-226	6.4400E-06	66.52	66.52	0.00E+00	4.28E-06	4.28E-06
Ra-228	5.9952E-07	66.52	66.52	0.00E+00	3.99E-05	3.99E-05
Ru-106	8.5526E-07	66.52	66.52	0.00E+00	5.69E-05	5.69E-05
Se-79	1.9181E-04	66.52	66.52	0.00E+00	1.28E-02	1.28E-02
Sn-126	1.6671E-04	66.52	66.52	0.00E+00	1.11E-02	1.11E-02
Sr-90	1.9799E+01	66.52	66.52	0.00E+00	1.32E+03	1.32E+03
Tc-99	6.7678E-03	66.52	66.52	0.00E+00	4.50E-01	4.50E-01
Th-229	1.7488E-06	66.52	66.52	0.00E+00	1.16E-04	1.16E-04
Th-230	5.8704E-06	66.52	66.52	0.00E+00	3.91E-04	3.91E-04
Th-232	6.0208E-07	66.52	66.52	0.00E+00	4.01E-05	4.01E-05
Tl-208	8.7573E-05	66.52	66.52	0.00E+00	5.83E-03	5.83E-03
U-232	2.3706E-04	66.52	66.52	0.00E+00	1.58E-02	1.58E-02
U-233	3.6128E-04	66.52	66.52	0.00E+00	2.40E-02	2.40E-02
U-234	1.2788E-02	66.52	66.52	0.00E+00	8.51E-01	8.51E-01
U-235	5.7486E-04	66.52	66.52	6.02E-05	3.83E-02	3.83E-02
U-236	2.3485E-04	66.52	66.52	0.00E+00	1.56E-02	1.56E-02
U-238	1.1581E-04	66.52	66.52	7.49E-06	7.71E-03	7.71E-03
Y-90	1.9804E+01	66.52	66.52	0.00E+00	1.32E+03	1.32E+03
Other Radionuclides					4.10E+03	4.10E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.152E+13
0.0250	1.622E+13
0.0375	1.417E+13
0.0575	2.230E+13
0.0850	8.703E+12
0.1250	6.821E+12
0.2250	7.539E+12
0.3750	3.225E+12
0.5750	5.244E+13
0.8500	2.004E+12
1.2500	1.401E+14
1.7500	6.196E+10
2.2500	7.346E+08
2.7500	2.070E+08
3.5000	1.657E+05
5.0000	7.036E+04
7.0000	8.057E+03
11.0000	9.219E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.55E+01	6.63E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	(Worst Case)
Fuel Cladding:	SST	SST/Inconel
BOL HM Constituents:	Pu and U	U, Th, & Pu
BOL Enrichment %:		0 to 100

Basis for Parameter Differences:

This fuel didn't closely match any existing templates, therefore the worst case template was used.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		66.52
Bounding:		66.52

Basis for burnup used in estimate:

Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	14.21	
Bounding:	14.21	

Estimated EOL HM/Given EOL HM: 591.64

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PRR-1 (UALX-HEU) PHILIPPINES
SNF ID #: 636
Fuel Units & Descr: 21 - 18 FLAT PLATES
Heavy Metal Mass: BOL=3.286kg; EOL=3.286kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1998
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00016
Template Decay Time: 10 years

Estimated Canister usage: 18"x10' 0.88

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.2892E-09	62.74	125.48	0.00E+00	8.09E-08	1.62E-07	Avg. MeV	
Am-241	2.9429E-03	62.74	125.48	0.00E+00	1.85E-01	3.69E-01	0.0150	1.687E+13
Am-242m	1.9489E-06	62.74	125.48	0.00E+00	1.22E-04	2.45E-04	0.0250	3.528E+12
Am-243	2.3308E-07	62.74	125.48	0.00E+00	1.46E-05	2.92E-05	0.0375	4.166E+12
C-14	4.3278E-05	62.74	125.48	0.00E+00	2.72E-03	5.43E-03	0.0575	3.445E+12
Cl-36	4.3023E-08	62.74	125.48	0.00E+00	2.70E-06	5.40E-06	0.0850	2.239E+12
Cm-243	2.4286E-07	62.74	125.48	0.00E+00	1.52E-05	3.05E-05	0.1250	3.099E+12
Cm-244	2.6015E-06	62.74	125.48	0.00E+00	1.63E-04	3.26E-04	0.2250	1.966E+12
Co-60	1.6075E-02	62.74	125.48	0.00E+00	1.01E+00	2.02E+00	0.3750	8.090E+11
Cs-134	1.9323E-02	62.74	125.48	0.00E+00	1.21E+00	2.42E+00	0.5750	1.205E+13
Cs-135	3.1549E-05	62.74	125.48	0.00E+00	1.98E-03	3.96E-03	0.8500	2.196E+12
Cs-137	2.4556E+00	62.74	125.48	0.00E+00	1.54E+02	3.08E+02	1.2500	2.414E+12
Eu-154	9.0180E-01	62.74	125.48	0.00E+00	5.66E+01	1.13E+02	1.7500	6.922E+10
Eu-155	2.1820E-01	62.74	125.48	0.00E+00	1.37E+01	2.74E+01	2.2500	1.647E+08
Fe-55	2.2902E-03	62.74	125.48	0.00E+00	1.44E-01	2.87E-01	2.7500	3.229E+06
H-3	8.1609E-03	62.74	125.48	0.00E+00	5.12E-01	1.02E+00	3.5000	3.939E+05
I-129	7.3805E-07	62.74	125.48	0.00E+00	4.63E-05	9.26E-05	5.0000	7.136E+01
Kr-85	1.8256E-01	62.74	125.48	0.00E+00	1.15E+01	2.29E+01	7.0000	8.066E+00
Np-237	1.4505E-06	62.74	125.48	0.00E+00	9.10E-05	1.82E-04	11.0000	9.180E-01
Pa-231	4.5564E-09	62.74	125.48	0.00E+00	2.86E-07	5.72E-07		
Pb-210	1.8842E-14	62.74	125.48	0.00E+00	1.18E-12	2.36E-12		
Pm-147	5.5459E-01	62.74	125.48	0.00E+00	3.48E+01	6.96E+01		
Pu-238	1.2992E-03	62.74	125.48	0.00E+00	8.15E-02	1.63E-01		
Pu-239	5.6932E-03	62.74	125.48	0.00E+00	3.57E-01	7.14E-01		
Pu-240	2.2632E-03	62.74	125.48	0.00E+00	1.42E-01	2.84E-01		
Pu-241	9.8857E-02	62.74	125.48	0.00E+00	6.20E+00	1.24E+01		
Pu-242	3.0602E-07	62.74	125.48	0.00E+00	1.92E-05	3.84E-05		
Ra-226	1.0823E-13	62.74	125.48	0.00E+00	6.79E-12	1.36E-11		
Ra-228	2.0406E-10	62.74	125.48	0.00E+00	1.28E-08	2.56E-08		
Ru-106	3.0180E-03	62.74	125.48	0.00E+00	1.89E-01	3.79E-01		
Se-79	1.2937E-05	62.74	125.48	0.00E+00	8.12E-04	1.62E-03		
Sn-126	1.2238E-05	62.74	125.48	0.00E+00	7.68E-04	1.54E-03		
Sr-90	2.3098E+00	62.74	125.48	0.00E+00	1.45E+02	2.90E+02		
Tc-99	4.4120E-04	62.74	125.48	0.00E+00	2.77E-02	5.54E-02		
Th-229	2.0932E-10	62.74	125.48	0.00E+00	1.31E-08	2.63E-08		
Th-230	2.7744E-11	62.74	125.48	0.00E+00	1.74E-09	3.48E-09		
Th-232	2.3744E-10	62.74	125.48	0.00E+00	1.49E-08	2.98E-08		
Tl-208	1.9459E-06	62.74	125.48	0.00E+00	1.22E-06	2.44E-06		
U-232	5.3850E-06	62.74	125.48	0.00E+00	3.38E-06	6.76E-06	Thermal Power	
U-233	1.3135E-07	62.74	125.48	0.00E+00	8.24E-06	1.65E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.9143E-07	62.74	125.48	0.00E+00	1.20E-05	2.40E-05	2.33E+00	4.65E+00
U-235	-2.6159E-08	62.74	0.00	6.62E-03	6.45E-03	6.62E-03	Total	Total
U-236	1.2719E-05	62.74	125.48	0.00E+00	7.98E-04	1.60E-03		
U-238	-3.8857E-08	62.74	0.00	7.57E-05	7.33E-05	7.57E-05		
Y-90	2.3098E+00	62.74	125.48	0.00E+00	1.45E+02	2.90E+02		
Other Radionuclides					1.66E+02	3.31E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.14680552	10 to 20.1

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		62.74
Bounding:		125.48

Basis for burnup used in estimate:
Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.52	
Bounding:	1.03	

Estimated EOL HM/Given EOL HM: 0.98

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PRR-1 (UALX-LEU) PHILLIPPINES
SNF ID #: 558
Fuel Units & Descr: 30 - 17 FLAT PLATES
Heavy Metal Mass: BOL=20.328kg; EOL=19.713kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1998
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 10 years

Estimated Canister usage: 18"x10' 1.25

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.2892E-09	587.03	1,174.06	0.00E+00	7.57E-07	1.51E-06
Am-241	2.9429E-03	587.03	1,174.06	0.00E+00	1.73E+00	3.46E+00
Am-242m	1.9489E-06	587.03	1,174.06	0.00E+00	1.14E-03	2.29E-03
Am-243	2.3308E-07	587.03	1,174.06	0.00E+00	1.37E-04	2.74E-04
C-14	4.3278E-05	587.03	1,174.06	0.00E+00	2.54E-02	5.08E-02
Cl-36	4.3023E-08	587.03	1,174.06	0.00E+00	2.53E-05	5.05E-05
Cm-243	2.4286E-07	587.03	1,174.06	0.00E+00	1.43E-04	2.85E-04
Cm-244	2.6015E-06	587.03	1,174.06	0.00E+00	1.53E-03	3.05E-03
Co-60	1.6075E-02	587.03	1,174.06	0.00E+00	9.44E+00	1.89E+01
Cs-134	1.9323E-02	587.03	1,174.06	0.00E+00	1.13E+01	2.27E+01
Cs-135	3.1549E-05	587.03	1,174.06	0.00E+00	1.85E-02	3.70E-02
Cs-137	2.4556E+00	587.03	1,174.06	0.00E+00	1.44E+03	2.88E+03
Eu-154	9.0180E-01	587.03	1,174.06	0.00E+00	5.29E+02	1.06E+03
Eu-155	2.1820E-01	587.03	1,174.06	0.00E+00	1.28E+02	2.56E+02
Fe-55	2.2902E-03	587.03	1,174.06	0.00E+00	1.34E+00	2.69E+00
H-3	8.1609E-03	587.03	1,174.06	0.00E+00	4.79E+00	9.58E+00
I-129	7.3805E-07	587.03	1,174.06	0.00E+00	4.33E-04	8.67E-04
Kr-85	1.8256E-01	587.03	1,174.06	0.00E+00	1.07E+02	2.14E+02
Np-237	1.4505E-06	587.03	1,174.06	0.00E+00	8.52E-04	1.70E-03
Pa-231	4.5564E-09	587.03	1,174.06	0.00E+00	2.67E-06	5.35E-06
Pb-210	1.8842E-14	587.03	1,174.06	0.00E+00	1.11E-11	2.21E-11
Pm-147	5.5459E-01	587.03	1,174.06	0.00E+00	3.26E+02	6.51E+02
Pu-238	1.2992E-03	587.03	1,174.06	0.00E+00	7.63E-01	1.53E+00
Pu-239	5.6932E-03	587.03	1,174.06	0.00E+00	3.34E+00	6.68E+00
Pu-240	2.2632E-03	587.03	1,174.06	0.00E+00	1.33E+00	2.66E+00
Pu-241	9.8857E-02	587.03	1,174.06	0.00E+00	5.80E+01	1.16E+02
Pu-242	3.0602E-07	587.03	1,174.06	0.00E+00	1.80E-04	3.59E-04
Ra-226	1.0823E-13	587.03	1,174.06	0.00E+00	6.35E-11	1.27E-10
Ra-228	2.0406E-10	587.03	1,174.06	0.00E+00	1.20E-07	2.40E-07
Ru-106	3.0180E-03	587.03	1,174.06	0.00E+00	1.77E+00	3.54E+00
Se-79	1.2937E-05	587.03	1,174.06	0.00E+00	7.59E-03	1.52E-02
Sn-126	1.2238E-05	587.03	1,174.06	0.00E+00	7.18E-03	1.44E-02
Sr-90	2.3098E+00	587.03	1,174.06	0.00E+00	1.36E+03	2.71E+03
Tc-99	4.4120E-04	587.03	1,174.06	0.00E+00	2.59E-01	5.18E-01
Th-229	2.0932E-10	587.03	1,174.06	0.00E+00	1.23E-07	2.46E-07
Th-230	2.7744E-11	587.03	1,174.06	0.00E+00	1.63E-08	3.26E-08
Th-232	2.3744E-10	587.03	1,174.06	0.00E+00	1.39E-07	2.79E-07
Tl-208	1.9459E-08	587.03	1,174.06	0.00E+00	1.14E-05	2.28E-05
U-232	5.3850E-08	587.03	1,174.06	0.00E+00	3.16E-05	6.32E-05
U-233	1.3135E-07	587.03	1,174.06	0.00E+00	7.71E-05	1.54E-04
U-234	1.9143E-07	587.03	1,174.06	0.00E+00	1.12E-04	2.25E-04
U-235	-2.6159E-06	587.03	0.00	8.73E-03	7.20E-03	8.73E-03
U-236	1.2719E-05	587.03	1,174.06	0.00E+00	7.47E-03	1.49E-02
U-238	-3.8857E-08	587.03	0.00	5.47E-03	5.45E-03	5.47E-03
Y-90	2.3098E+00	587.03	1,174.06	0.00E+00	1.36E+03	2.71E+03
Other Radionuclides					1.55E+03	3.10E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.578E+14
0.0250	3.301E+13
0.0375	3.898E+13
0.0575	3.224E+13
0.0850	2.095E+13
0.1250	2.900E+13
0.2250	1.839E+13
0.3750	7.570E+12
0.5750	1.128E+14
0.8500	2.055E+13
1.2500	2.259E+13
1.7500	6.477E+11
2.2500	1.541E+09
2.7500	3.021E+07
3.5000	3.686E+06
5.0000	6.778E+02
7.0000	7.665E+01
11.0000	8.725E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.18E+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:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.87821382	10 to 20.1

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		587.03	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,174.06	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.78		1.00
Bounding:	1.56		

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PURDUE UNIVERSITY (U-ALX HEU)
SNF ID #: 177
Fuel Units & Descr: 124 - ELEMENT
Heavy Metal Mass: BOL=2.22kg; EOL=2.22kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 3.44

II. Estimates

	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	1.4545E-10	42.04	84.08	0.00E+00	6.11E-09	1.22E-08
Am-241	1.1190E-03	42.04	84.08	0.00E+00	4.70E-02	9.41E-02
Am-242m	4.5425E-07	42.04	84.08	0.00E+00	1.91E-05	3.82E-05
Am-243	1.4921E-06	42.04	84.08	0.00E+00	6.27E-05	1.25E-04
C-14	5.7244E-09	42.04	84.08	0.00E+00	2.41E-07	4.81E-07
Cl-36	1.3124E-32	42.04	84.08	0.00E+00	5.52E-31	1.10E-30
Cm-243	2.3676E-07	42.04	84.08	0.00E+00	9.95E-06	1.99E-05
Cm-244	5.2042E-05	42.04	84.08	0.00E+00	2.19E-03	4.38E-03
Co-60	3.8208E-05	42.04	84.08	0.00E+00	1.61E-03	3.21E-03
Cs-134	4.8693E-01	42.04	84.08	0.00E+00	2.05E+01	4.09E+01
Cs-135	3.4477E-06	42.04	84.08	0.00E+00	1.45E-04	2.90E-04
Cs-137	2.8731E+00	42.04	84.08	0.00E+00	1.21E+02	2.42E+02
Eu-154	8.2053E-02	42.04	84.08	0.00E+00	3.45E+00	6.90E+00
Eu-155	3.9134E-02	42.04	84.08	0.00E+00	1.65E+00	3.29E+00
Fe-55	6.7429E-03	42.04	84.08	0.00E+00	2.83E-01	5.67E-01
H-3	1.0599E-02	42.04	84.08	0.00E+00	4.46E-01	8.91E-01
I-129	7.5300E-07	42.04	84.08	0.00E+00	3.17E-05	6.33E-05
Kr-85	2.8595E-01	42.04	84.08	0.00E+00	1.20E+01	2.40E+01
Np-237	9.5479E-06	42.04	84.08	0.00E+00	4.01E-04	8.03E-04
Pa-231	8.9297E-10	42.04	84.08	0.00E+00	3.75E-08	7.51E-08
Pb-210	3.7609E-12	42.04	84.08	0.00E+00	1.58E-10	3.16E-10
Pm-147	2.5452E+00	42.04	84.08	0.00E+00	1.07E+02	2.14E+02
Pu-238	2.0550E-02	42.04	84.08	0.00E+00	8.64E-01	1.73E+00
Pu-239	4.2838E-04	42.04	84.08	0.00E+00	1.80E-02	3.60E-02
Pu-240	2.4401E-04	42.04	84.08	0.00E+00	1.03E-02	2.05E-02
Pu-241	6.8764E-02	42.04	84.08	0.00E+00	2.89E+00	5.78E+00
Pu-242	3.6329E-07	42.04	84.08	0.00E+00	1.53E-05	3.05E-05
Ra-226	3.8045E-11	42.04	84.08	0.00E+00	1.60E-09	3.20E-09
Ra-228	2.9902E-15	42.04	84.08	0.00E+00	1.26E-13	2.51E-13
Ru-106	1.9055E-01	42.04	84.08	0.00E+00	8.01E+00	1.60E+01
Se-79	1.2936E-05	42.04	84.08	0.00E+00	5.44E-04	1.09E-03
Sn-126	1.1574E-05	42.04	84.08	0.00E+00	4.87E-04	9.73E-04
Sr-90	2.7505E+00	42.04	84.08	0.00E+00	1.16E+02	2.31E+02
Tc-99	4.2239E-04	42.04	84.08	0.00E+00	1.78E-02	3.55E-02
Th-229	1.8848E-12	42.04	84.08	0.00E+00	7.92E-11	1.58E-10
Th-230	1.7042E-08	42.04	84.08	0.00E+00	7.16E-07	1.43E-06
Th-232	7.8132E-15	42.04	84.08	0.00E+00	3.28E-13	6.57E-13
Tl-208	4.4063E-08	42.04	84.08	0.00E+00	1.85E-06	3.70E-06
U-232	1.3151E-07	42.04	84.08	0.00E+00	5.53E-06	1.11E-05
U-233	1.9564E-09	42.04	84.08	0.00E+00	8.22E-08	1.64E-07
U-234	1.8371E-04	42.04	84.08	0.00E+00	7.72E-03	1.54E-02
U-235	-2.7235E-06	42.04	0.00	4.41E-03	4.30E-03	4.41E-03
U-238	1.5493E-05	42.04	84.08	0.00E+00	6.51E-04	1.30E-03
U-238	-4.2851E-09	42.04	0.00	5.97E-05	5.95E-05	5.97E-05
Y-90	2.7505E+00	42.04	84.08	0.00E+00	1.16E+02	2.31E+02
Other Radionuclides					2.16E+02	4.32E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.622E+13
0.0250	3.495E+12
0.0375	3.225E+12
0.0575	3.171E+12
0.0850	2.022E+12
0.1250	1.751E+12
0.2250	1.713E+12
0.3750	8.293E+11
0.5750	1.139E+13
0.8500	1.595E+12
1.2500	2.968E+11
1.7500	1.245E+10
2.2500	2.611E+10
2.7500	1.502E+08
3.5000	1.666E+07
5.0000	4.999E+01
7.0000	5.573E+00
11.0000	6.282E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.13E+06	4.26E+06
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.00045093	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		42.04
Bounding:		84.08

Basis for burnup used in estimate:
Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM: 0.98

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PURDUE UNIVERSITY-MTR-SI
SNF ID #: 178
Fuel Units & Descr: 16 - 10 FLAT PLATES
Heavy Metal Mass: BOL=18.182kg; EOL=18.182kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 0.44

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	344.38	688.76	0.00E+00	5.01E-08	1.00E-07
Am-241	1.1190E-03	344.38	688.76	0.00E+00	3.85E-01	7.71E-01
Am-242m	4.5425E-07	344.38	688.76	0.00E+00	1.56E-04	3.13E-04
Am-243	1.4921E-06	344.38	688.76	0.00E+00	5.14E-04	1.03E-03
C-14	5.7244E-09	344.38	688.76	0.00E+00	1.97E-06	3.94E-06
Cl-36	1.3124E-32	344.38	688.76	0.00E+00	4.52E-30	9.04E-30
Cm-243	2.3676E-07	344.38	688.76	0.00E+00	8.15E-05	1.63E-04
Cm-244	5.2042E-05	344.38	688.76	0.00E+00	1.79E-02	3.58E-02
Co-60	3.8208E-05	344.38	688.76	0.00E+00	1.32E-02	2.63E-02
Cs-134	4.8693E-01	344.38	688.76	0.00E+00	1.68E+02	3.35E+02
Cs-135	3.4477E-06	344.38	688.76	0.00E+00	1.19E-03	2.37E-03
Cs-137	2.8731E+00	344.38	688.76	0.00E+00	9.89E+02	1.98E+03
Eu-154	8.2053E-02	344.38	688.76	0.00E+00	2.83E+01	5.65E+01
Eu-155	3.9134E-02	344.38	688.76	0.00E+00	1.35E+01	2.70E+01
Fe-55	6.7429E-03	344.38	688.76	0.00E+00	2.32E+00	4.64E+00
H-3	1.0599E-02	344.38	688.76	0.00E+00	3.65E+00	7.30E+00
I-129	7.5300E-07	344.38	688.76	0.00E+00	2.59E-04	5.19E-04
Kr-85	2.8595E-01	344.38	688.76	0.00E+00	9.85E+01	1.97E+02
Np-237	9.5479E-06	344.38	688.76	0.00E+00	3.29E-03	6.58E-03
Pa-231	8.9297E-10	344.38	688.76	0.00E+00	3.08E-07	6.15E-07
Pb-210	3.7609E-12	344.38	688.76	0.00E+00	1.30E-09	2.59E-09
Pm-147	2.5452E+00	344.38	688.76	0.00E+00	8.77E+02	1.75E+03
Pu-238	2.0550E-02	344.38	688.76	0.00E+00	7.08E+00	1.42E+01
Pu-239	4.2838E-04	344.38	688.76	0.00E+00	1.48E-01	2.95E-01
Pu-240	2.4401E-04	344.38	688.76	0.00E+00	8.40E-02	1.68E-01
Pu-241	6.8764E-02	344.38	688.76	0.00E+00	2.37E+01	4.74E+01
Pu-242	3.6329E-07	344.38	688.76	0.00E+00	1.25E-04	2.50E-04
Ra-226	3.8045E-11	344.38	688.76	0.00E+00	1.31E-08	2.62E-08
Ra-228	2.9902E-15	344.38	688.76	0.00E+00	1.03E-12	2.06E-12
Ru-106	1.9055E-01	344.38	688.76	0.00E+00	6.56E+01	1.31E+02
Se-79	1.2936E-05	344.38	688.76	0.00E+00	4.45E-03	8.91E-03
Sn-126	1.1574E-05	344.38	688.76	0.00E+00	3.99E-03	7.97E-03
Sr-90	2.7505E+00	344.38	688.76	0.00E+00	9.47E+02	1.89E+03
Tc-99	4.2239E-04	344.38	688.76	0.00E+00	1.45E-01	2.91E-01
Th-229	1.8848E-12	344.38	688.76	0.00E+00	6.49E-10	1.30E-09
Th-230	1.7042E-08	344.38	688.76	0.00E+00	5.87E-06	1.17E-05
Th-232	7.8132E-15	344.38	688.76	0.00E+00	2.69E-12	5.38E-12
Tl-208	4.4063E-08	344.38	688.76	0.00E+00	1.52E-05	3.03E-05
U-232	1.3151E-07	344.38	688.76	0.00E+00	4.53E-05	9.06E-05
U-233	1.9564E-09	344.38	688.76	0.00E+00	6.74E-07	1.35E-06
U-234	1.8371E-04	344.38	688.76	0.00E+00	6.33E-02	1.27E-01
U-235	-2.7235E-06	344.38	0.00	7.47E-03	6.53E-03	7.47E-03
U-236	1.5493E-05	344.38	688.76	0.00E+00	5.34E-03	1.07E-02
U-238	-4.2851E-09	344.38	0.00	4.95E-03	4.95E-03	4.95E-03
Y-90	2.7505E+00	344.38	688.76	0.00E+00	9.47E+02	1.89E+03
Other Radionuclides					1.77E+03	3.54E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.329E+14
0.0250	2.863E+13
0.0375	2.642E+13
0.0575	2.598E+13
0.0850	1.656E+13
0.1250	1.434E+13
0.2250	1.404E+13
0.3750	6.794E+12
0.5750	9.332E+13
0.8500	1.307E+13
1.2500	2.431E+12
1.7500	1.020E+11
2.2500	2.139E+11
2.7500	1.230E+09
3.5000	1.365E+08
5.0000	4.193E+02
7.0000	4.679E+01
11.0000	5.277E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.76E+01	3.49E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.0001402	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		344.38
Bounding:		688.76

Basis for burnup used in estimate:
Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM: 0.98

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: R-2 SVTR (U3Si2 LEU) SWEDEN
SNF ID #: 942
Fuel Units & Descr: 183 - MTR TYPE
Heavy Metal Mass: BOL=351.47kg; EOL=308.977kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2010
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: 10 years

Estimated Canister usage:
18"x10'
5.08

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.8404E-10	40,241.32	80,482.63	0.00E+00	1.14E-05	2.29E-05
Am-241	1.4935E-03	40,241.32	80,482.63	0.00E+00	6.01E+01	1.20E+02
Am-242m	4.4390E-07	40,241.32	80,482.63	0.00E+00	1.79E-02	3.57E-02
Am-243	1.4913E-06	40,241.32	80,482.63	0.00E+00	6.00E-02	1.20E-01
C-14	5.7217E-09	40,241.32	80,482.63	0.00E+00	2.30E-04	4.60E-04
Cl-36	1.3124E-32	40,241.32	80,482.63	0.00E+00	5.28E-28	1.06E-27
Cm-243	2.0967E-07	40,241.32	80,482.63	0.00E+00	8.44E-03	1.69E-02
Cm-244	4.3001E-05	40,241.32	80,482.63	0.00E+00	1.73E+00	3.46E+00
Co-60	1.9798E-05	40,241.32	80,482.63	0.00E+00	7.97E-01	1.59E+00
Cs-134	9.0795E-02	40,241.32	80,482.63	0.00E+00	3.65E+03	7.31E+03
Cs-135	3.4477E-06	40,241.32	80,482.63	0.00E+00	1.39E-01	2.77E-01
Cs-137	2.5588E+00	40,241.32	80,482.63	0.00E+00	1.03E+05	2.06E+05
Eu-154	5.4847E-02	40,241.32	80,482.63	0.00E+00	2.21E+03	4.41E+03
Eu-155	1.9469E-02	40,241.32	80,482.63	0.00E+00	7.83E+02	1.57E+03
Fe-55	1.7797E-03	40,241.32	80,482.63	0.00E+00	7.16E+01	1.43E+02
H-3	8.0065E-03	40,241.32	80,482.63	0.00E+00	3.22E+02	6.44E+02
I-129	7.5300E-07	40,241.32	80,482.63	0.00E+00	3.03E-02	6.06E-02
Kr-85	2.0705E-01	40,241.32	80,482.63	0.00E+00	8.33E+03	1.67E+04
Np-237	9.5507E-06	40,241.32	80,482.63	0.00E+00	3.84E-01	7.69E-01
Pa-231	1.2740E-09	40,241.32	80,482.63	0.00E+00	5.13E-05	1.03E-04
Pb-210	1.1838E-11	40,241.32	80,482.63	0.00E+00	4.76E-07	9.53E-07
Pm-147	6.7974E-01	40,241.32	80,482.63	0.00E+00	2.74E+04	5.47E+04
Pu-238	1.9755E-02	40,241.32	80,482.63	0.00E+00	7.95E+02	1.59E+03
Pu-239	4.2838E-04	40,241.32	80,482.63	0.00E+00	1.72E+01	3.45E+01
Pu-240	2.4390E-04	40,241.32	80,482.63	0.00E+00	9.81E+00	1.96E+01
Pu-241	5.4058E-02	40,241.32	80,482.63	0.00E+00	2.18E+03	4.35E+03
Pu-242	3.6329E-07	40,241.32	80,482.63	0.00E+00	1.46E-02	2.92E-02
Ra-226	8.3742E-11	40,241.32	80,482.63	0.00E+00	3.37E-06	6.74E-06
Ra-228	5.7734E-15	40,241.32	80,482.63	0.00E+00	2.32E-10	4.65E-10
Ru-106	6.1356E-03	40,241.32	80,482.63	0.00E+00	2.47E+02	4.94E+02
Se-79	1.2936E-05	40,241.32	80,482.63	0.00E+00	5.21E-01	1.04E+00
Sn-126	1.1574E-05	40,241.32	80,482.63	0.00E+00	4.66E-01	9.32E-01
Sr-90	2.4417E+00	40,241.32	80,482.63	0.00E+00	9.83E+04	1.97E+05
Tc-99	4.2239E-04	40,241.32	80,482.63	0.00E+00	1.70E+01	3.40E+01
Th-229	2.8568E-12	40,241.32	80,482.63	0.00E+00	1.15E-07	2.30E-07
Th-230	2.5310E-06	40,241.32	80,482.63	0.00E+00	1.02E-03	2.04E-03
Th-232	1.1631E-14	40,241.32	80,482.63	0.00E+00	4.68E-10	9.36E-10
Tl-208	4.6705E-08	40,241.32	80,482.63	0.00E+00	1.88E-03	3.76E-03
U-232	1.3151E-07	40,241.32	80,482.63	0.00E+00	5.29E-03	1.06E-02
U-233	2.1650E-09	40,241.32	80,482.63	0.00E+00	8.71E-05	1.74E-04
U-234	1.8399E-04	40,241.32	80,482.63	0.00E+00	7.40E+00	1.48E+01
U-235	-2.7235E-06	40,241.32	0.00	1.51E-01	4.11E-02	1.51E-01
U-236	1.5493E-05	40,241.32	80,482.63	0.00E+00	6.23E-01	1.25E+00
U-238	-4.2851E-09	40,241.32	0.00	9.47E-02	9.45E-02	9.47E-02
Y-90	2.4423E+00	40,241.32	80,482.63	0.00E+00	9.83E+04	1.97E+05
Other Radionuclides					1.00E+05	2.00E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.095E+16
0.0250	2.304E+15
0.0375	2.008E+15
0.0575	2.122E+15
0.0850	1.291E+15
0.1250	9.030E+14
0.2250	1.108E+15
0.3750	4.968E+14
0.5750	8.066E+15
0.8500	3.934E+14
1.2500	1.280E+14
1.7500	4.675E+12
2.2500	3.091E+11
2.7500	4.313E+09
3.5000	5.135E+08
5.0000	4.287E+04
7.0000	4.764E+03
11.0000	5.360E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.27E+03	2.55E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.84262055	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		40,241.32
Bounding:		80,482.63

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.36	
Bounding:	0.73	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: R-2 SVTR (UALX HEU) SWEDEN
SNF ID #: 801
Fuel Units & Descr: 450 - MTR TYPE
Heavy Metal Mass: BOL=111.015kg; EOL=59.85kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' 12.50

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.8404E-10	48,454.25	96,908.50	0.00E+00	1.38E-05	2.75E-05
Am-241	1.4935E-03	48,454.25	96,908.50	0.00E+00	7.24E+01	1.45E+02
Am-242m	4.4390E-07	48,454.25	96,908.50	0.00E+00	2.15E-02	4.30E-02
Am-243	1.4913E-06	48,454.25	96,908.50	0.00E+00	7.23E-02	1.45E-01
C-14	5.7217E-09	48,454.25	96,908.50	0.00E+00	2.77E-04	5.54E-04
Cl-36	1.3124E-32	48,454.25	96,908.50	0.00E+00	6.36E-28	1.27E-27
Cm-243	2.0967E-07	48,454.25	96,908.50	0.00E+00	1.02E-02	2.03E-02
Cm-244	4.3001E-05	48,454.25	96,908.50	0.00E+00	2.08E+00	4.17E+00
Co-60	1.9798E-05	48,454.25	96,908.50	0.00E+00	9.59E-01	1.92E+00
Cs-134	9.0795E-02	48,454.25	96,908.50	0.00E+00	4.40E+03	8.80E+03
Cs-135	3.4477E-06	48,454.25	96,908.50	0.00E+00	1.67E-01	3.34E-01
Cs-137	2.5588E+00	48,454.25	96,908.50	0.00E+00	1.24E+05	2.48E+05
Eu-154	5.4847E-02	48,454.25	96,908.50	0.00E+00	2.66E+03	5.32E+03
Eu-155	1.9469E-02	48,454.25	96,908.50	0.00E+00	9.43E+02	1.89E+03
Fe-55	1.7797E-03	48,454.25	96,908.50	0.00E+00	8.62E+01	1.72E+02
H-3	8.0065E-03	48,454.25	96,908.50	0.00E+00	3.88E+02	7.76E+02
I-129	7.5300E-07	48,454.25	96,908.50	0.00E+00	3.65E-02	7.30E-02
Kr-85	2.0705E-01	48,454.25	96,908.50	0.00E+00	1.00E+04	2.01E+04
Np-237	9.5507E-06	48,454.25	96,908.50	0.00E+00	4.63E-01	9.26E-01
Pa-231	1.2740E-09	48,454.25	96,908.50	0.00E+00	6.17E-05	1.23E-04
Pb-210	1.1838E-11	48,454.25	96,908.50	0.00E+00	5.74E-07	1.15E-06
Pm-147	6.7974E-01	48,454.25	96,908.50	0.00E+00	3.29E+04	6.59E+04
Pu-238	1.9755E-02	48,454.25	96,908.50	0.00E+00	9.57E+02	1.91E+03
Pu-239	4.2838E-04	48,454.25	96,908.50	0.00E+00	2.08E+01	4.15E+01
Pu-240	2.4390E-04	48,454.25	96,908.50	0.00E+00	1.18E+01	2.36E+01
Pu-241	5.4058E-02	48,454.25	96,908.50	0.00E+00	2.62E+03	5.24E+03
Pu-242	3.6329E-07	48,454.25	96,908.50	0.00E+00	1.76E-02	3.52E-02
Ra-226	8.3742E-11	48,454.25	96,908.50	0.00E+00	4.06E-06	8.12E-06
Ra-228	5.7734E-15	48,454.25	96,908.50	0.00E+00	2.80E-10	5.59E-10
Ru-106	6.1356E-03	48,454.25	96,908.50	0.00E+00	2.97E+02	5.95E+02
Se-79	1.2936E-05	48,454.25	96,908.50	0.00E+00	6.27E-01	1.25E+00
Sn-126	1.1574E-05	48,454.25	96,908.50	0.00E+00	5.61E-01	1.12E+00
Sr-90	2.4417E+00	48,454.25	96,908.50	0.00E+00	1.18E+05	2.37E+05
Tc-99	4.2239E-04	48,454.25	96,908.50	0.00E+00	2.05E+01	4.09E+01
Th-229	2.8568E-12	48,454.25	96,908.50	0.00E+00	1.38E-07	2.77E-07
Th-230	2.5310E-08	48,454.25	96,908.50	0.00E+00	1.23E-03	2.45E-03
Th-232	1.1631E-14	48,454.25	96,908.50	0.00E+00	5.64E-10	1.13E-09
Tl-208	4.6705E-08	48,454.25	96,908.50	0.00E+00	2.26E-03	4.53E-03
U-232	1.3151E-07	48,454.25	96,908.50	0.00E+00	6.37E-03	1.27E-02
U-233	2.1650E-09	48,454.25	96,908.50	0.00E+00	1.05E-04	2.10E-04
U-234	1.8399E-04	48,454.25	96,908.50	0.00E+00	8.91E+00	1.78E+01
U-235	-2.7235E-06	48,454.25	0.00	2.22E-01	9.00E-02	2.22E-01
U-236	1.5493E-05	48,454.25	96,908.50	0.00E+00	7.51E-01	1.50E+00
U-238	-4.2851E-09	48,454.25	0.00	2.79E-03	2.58E-03	2.79E-03
Y-90	2.4423E+00	48,454.25	96,908.50	0.00E+00	1.18E+05	2.37E+05
Other Radionuclides					1.20E+05	2.41E+05

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.318E+16
0.0250	2.774E+15
0.0375	2.418E+15
0.0575	2.555E+15
0.0850	1.554E+15
0.1250	1.087E+15
0.2250	1.335E+15
0.3750	5.982E+14
0.5750	9.712E+15
0.8500	4.737E+14
1.2500	1.542E+14
1.7500	5.630E+12
2.2500	3.722E+11
2.7500	5.193E+09
3.5000	6.183E+08
5.0000	5.137E+04
7.0000	5.707E+03
11.0000	6.421E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.83E+03	3.07E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.5168132	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		48,454.25
Bounding:		96,908.50

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.39	
Bounding:	2.77	

Estimated EOL HM/Given EOL HM: 1.05

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RA-3 (UALX-HEU) (ARGENTINA)
SNF ID #: 634
Fuel Units & Descr: 32 - 19 CURVED PLATES
Heavy Metal Mass: BOL=5.722kg; EOL=4.595kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1987
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10" 1.33

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	1,066.72	2,133.45	0.00E+00	7.07E-07	1.41E-06
Am-241	2.0060E-03	1,066.72	2,133.45	0.00E+00	2.14E+00	4.28E+00
Am-242m	4.2429E-07	1,066.72	2,133.45	0.00E+00	4.53E-04	9.05E-04
Am-243	1.4899E-06	1,066.72	2,133.45	0.00E+00	1.59E-03	3.18E-03
C-14	5.7135E-09	1,066.72	2,133.45	0.00E+00	6.09E-06	1.22E-05
Cl-36	1.3124E-32	1,066.72	2,133.45	0.00E+00	1.40E-29	2.80E-29
Cm-243	1.6443E-07	1,066.72	2,133.45	0.00E+00	1.75E-04	3.51E-04
Cm-244	2.9330E-05	1,066.72	2,133.45	0.00E+00	3.13E-02	6.26E-02
Co-60	5.3186E-06	1,066.72	2,133.45	0.00E+00	5.67E-03	1.13E-02
Cs-134	3.1563E-03	1,066.72	2,133.45	0.00E+00	3.37E+00	6.73E+00
Cs-135	3.4477E-06	1,066.72	2,133.45	0.00E+00	3.68E-03	7.36E-03
Cs-137	2.0313E+00	1,066.72	2,133.45	0.00E+00	2.17E+03	4.33E+03
Eu-154	2.4513E-02	1,066.72	2,133.45	0.00E+00	2.61E+01	5.23E+01
Eu-155	4.8175E-03	1,066.72	2,133.45	0.00E+00	5.14E+00	1.03E+01
Fe-55	1.2397E-04	1,066.72	2,133.45	0.00E+00	1.32E-01	2.64E-01
H-3	4.5697E-03	1,066.72	2,133.45	0.00E+00	4.87E+00	9.75E+00
I-129	7.5300E-07	1,066.72	2,133.45	0.00E+00	8.03E-04	1.61E-03
Kr-85	1.0850E-01	1,066.72	2,133.45	0.00E+00	1.16E+02	2.31E+02
Np-237	9.5561E-06	1,066.72	2,133.45	0.00E+00	1.02E-02	2.04E-02
Pa-231	2.0359E-09	1,066.72	2,133.45	0.00E+00	2.17E-06	4.34E-06
Pb-210	4.9728E-11	1,066.72	2,133.45	0.00E+00	5.30E-08	1.06E-07
Pm-147	4.8502E-02	1,066.72	2,133.45	0.00E+00	5.17E+01	1.03E+02
Pu-238	1.8254E-02	1,066.72	2,133.45	0.00E+00	1.95E+01	3.89E+01
Pu-239	4.2810E-04	1,066.72	2,133.45	0.00E+00	4.57E-01	9.13E-01
Pu-240	2.4368E-04	1,066.72	2,133.45	0.00E+00	2.60E-01	5.20E-01
Pu-241	3.3415E-02	1,066.72	2,133.45	0.00E+00	3.56E+01	7.13E+01
Pu-242	3.6329E-07	1,066.72	2,133.45	0.00E+00	3.88E-04	7.75E-04
Ra-226	2.2854E-10	1,066.72	2,133.45	0.00E+00	2.44E-07	4.88E-07
Ra-228	1.2426E-14	1,066.72	2,133.45	0.00E+00	1.33E-11	2.65E-11
Ru-106	6.3589E-06	1,066.72	2,133.45	0.00E+00	6.78E-03	1.36E-02
Se-79	1.2933E-05	1,066.72	2,133.45	0.00E+00	1.38E-02	2.76E-02
Sn-126	1.1574E-05	1,066.72	2,133.45	0.00E+00	1.23E-02	2.47E-02
Sr-90	1.9248E+00	1,066.72	2,133.45	0.00E+00	2.05E+03	4.11E+03
Tc-99	4.2239E-04	1,066.72	2,133.45	0.00E+00	4.51E-01	9.01E-01
Th-229	5.0953E-12	1,066.72	2,133.45	0.00E+00	5.44E-09	1.09E-08
Th-230	4.1885E-08	1,066.72	2,133.45	0.00E+00	4.47E-05	8.94E-05
Th-232	1.9270E-14	1,066.72	2,133.45	0.00E+00	2.06E-11	4.11E-11
Tl-208	4.6024E-08	1,066.72	2,133.45	0.00E+00	4.91E-05	9.82E-05
U-232	1.2582E-07	1,066.72	2,133.45	0.00E+00	1.34E-04	2.68E-04
U-233	2.5825E-09	1,066.72	2,133.45	0.00E+00	2.75E-06	5.51E-06
U-234	1.8450E-04	1,066.72	2,133.45	0.00E+00	1.97E-01	3.94E-01
U-235	-2.7235E-06	1,066.72	0.00	1.11E-02	8.22E-03	1.11E-02
U-236	1.5493E-05	1,066.72	2,133.45	0.00E+00	1.65E-02	3.31E-02
U-238	-4.2851E-09	1,066.72	0.00	1.93E-04	1.88E-04	1.93E-04
Y-90	1.9254E+00	1,066.72	2,133.45	0.00E+00	2.05E+03	4.11E+03
Other Radionuclides					2.06E+03	4.13E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.252E+14
0.0250	4.683E+13
0.0375	4.085E+13
0.0575	4.375E+13
0.0850	2.644E+13
0.1250	1.789E+13
0.2250	2.281E+13
0.3750	9.930E+12
0.5750	1.620E+14
0.8500	2.738E+12
1.2500	1.564E+12
1.7500	7.177E+10
2.2500	6.296E+08
2.7500	3.559E+08
3.5000	1.635E+04
5.0000	9.247E+02
7.0000	1.021E+02
11.0000	1.144E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.54E+01	5.09E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	89.96321383	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,066.72
Bounding:		2,133.45

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.59	
Bounding:	1.18	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RA-3 (UALX-HEU) (ARGENTINA)
SNF ID #: 636
Fuel Units & Descr: 207 - 19 CURVED PLATES
Heavy Metal Mass: BOL=37.84kg; EOL=30.139kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1987
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage: 18"x10' 8.63

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.6313E-10	7,292.43	14,584.86	0.00E+00	4.84E-06	9.67E-06
Am-241	2.0060E-03	7,292.43	14,584.86	0.00E+00	1.46E+01	2.93E+01
Am-242m	4.2429E-07	7,292.43	14,584.86	0.00E+00	3.09E-03	6.19E-03
Am-243	1.4899E-06	7,292.43	14,584.86	0.00E+00	1.09E-02	2.17E-02
C-14	5.7135E-09	7,292.43	14,584.86	0.00E+00	4.17E-05	8.33E-05
Cl-36	1.3124E-32	7,292.43	14,584.86	0.00E+00	9.57E-29	1.91E-28
Cm-243	1.6443E-07	7,292.43	14,584.86	0.00E+00	1.20E-03	2.40E-03
Cm-244	2.9330E-05	7,292.43	14,584.86	0.00E+00	2.14E-01	4.28E-01
Co-60	5.3186E-06	7,292.43	14,584.86	0.00E+00	3.88E-02	7.76E-02
Cs-134	3.1563E-03	7,292.43	14,584.86	0.00E+00	2.30E+01	4.60E+01
Cs-135	3.4477E-06	7,292.43	14,584.86	0.00E+00	2.51E-02	5.03E-02
Cs-137	2.0313E+00	7,292.43	14,584.86	0.00E+00	1.48E+04	2.96E+04
Eu-154	2.4513E-02	7,292.43	14,584.86	0.00E+00	1.79E+02	3.58E+02
Eu-155	4.8175E-03	7,292.43	14,584.86	0.00E+00	3.51E+01	7.03E+01
Fe-55	1.2397E-04	7,292.43	14,584.86	0.00E+00	9.04E-01	1.81E+00
H-3	4.5697E-03	7,292.43	14,584.86	0.00E+00	3.33E+01	6.66E+01
I-129	7.5300E-07	7,292.43	14,584.86	0.00E+00	5.49E-03	1.10E-02
Kr-85	1.0850E-01	7,292.43	14,584.86	0.00E+00	7.91E+02	1.58E+03
Np-237	9.5561E-06	7,292.43	14,584.86	0.00E+00	6.97E-02	1.39E-01
Pa-231	2.0359E-09	7,292.43	14,584.86	0.00E+00	1.48E-05	2.97E-05
Pb-210	4.9728E-11	7,292.43	14,584.86	0.00E+00	3.63E-07	7.25E-07
Pm-147	4.8502E-02	7,292.43	14,584.86	0.00E+00	3.54E+02	7.07E+02
Pu-238	1.8254E-02	7,292.43	14,584.86	0.00E+00	1.33E+02	2.66E+02
Pu-239	4.2810E-04	7,292.43	14,584.86	0.00E+00	3.12E+00	6.24E+00
Pu-240	2.4368E-04	7,292.43	14,584.86	0.00E+00	1.78E+00	3.55E+00
Pu-241	3.3415E-02	7,292.43	14,584.86	0.00E+00	2.44E+02	4.87E+02
Pu-242	3.6329E-07	7,292.43	14,584.86	0.00E+00	2.65E-03	5.30E-03
Ra-226	2.2854E-10	7,292.43	14,584.86	0.00E+00	1.67E-06	3.33E-06
Ra-228	1.2426E-14	7,292.43	14,584.86	0.00E+00	9.06E-11	1.81E-10
Ru-106	6.3589E-06	7,292.43	14,584.86	0.00E+00	4.64E-02	9.27E-02
Se-79	1.2933E-05	7,292.43	14,584.86	0.00E+00	9.43E-02	1.89E-01
Sn-126	1.1574E-05	7,292.43	14,584.86	0.00E+00	8.44E-02	1.69E-01
Sr-90	1.9248E+00	7,292.43	14,584.86	0.00E+00	1.40E+04	2.81E+04
Tc-99	4.2239E-04	7,292.43	14,584.86	0.00E+00	3.08E+00	6.16E+00
Th-229	5.0953E-12	7,292.43	14,584.86	0.00E+00	3.72E-08	7.43E-08
Th-230	4.1885E-08	7,292.43	14,584.86	0.00E+00	3.05E-04	6.11E-04
Th-232	1.9270E-14	7,292.43	14,584.86	0.00E+00	1.41E-10	2.81E-10
Tl-208	4.6024E-08	7,292.43	14,584.86	0.00E+00	3.36E-04	6.71E-04
U-232	1.2582E-07	7,292.43	14,584.86	0.00E+00	9.18E-04	1.84E-03
U-233	2.5825E-09	7,292.43	14,584.86	0.00E+00	1.88E-05	3.77E-05
U-234	1.8450E-04	7,292.43	14,584.86	0.00E+00	1.35E+00	2.69E+00
U-235	-2.7235E-06	7,292.43	0.00	7.36E-02	5.37E-02	7.36E-02
U-236	1.5493E-05	7,292.43	14,584.86	0.00E+00	1.13E-01	2.26E-01
U-238	-4.2851E-09	7,292.43	0.00	1.27E-03	1.24E-03	1.27E-03
Y-90	1.9254E+00	7,292.43	14,584.86	0.00E+00	1.40E+04	2.81E+04
Other Radionuclides					1.41E+04	2.82E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.540E+15
0.0250	3.201E+14
0.0375	2.792E+14
0.0575	2.991E+14
0.0850	1.807E+14
0.1250	1.223E+14
0.2250	1.559E+14
0.3750	6.788E+13
0.5750	1.107E+15
0.8500	1.872E+13
1.2500	1.069E+13
1.7500	4.906E+11
2.2500	4.304E+07
2.7500	2.433E+07
3.5000	1.118E+05
5.0000	6.321E+03
7.0000	6.979E+02
11.0000	7.821E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.74E+02	3.48E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	89.97773401	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		7,292.43
Bounding:		14,584.86

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.61	
Bounding:	1.22	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RECH-1 (CHILE)
SNF ID #: 708
Fuel Units & Descr: 58 - MTR TYPE
Heavy Metal Mass: BOL=11.873kg; EOL=7.998kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1999
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10" 2.42

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.8404E-10	3,669.13	7,338.26	0.00E+00	1.04E-06	2.08E-06
Am-241	1.4935E-03	3,669.13	7,338.26	0.00E+00	5.48E+00	1.10E+01
Am-242m	4.4390E-07	3,669.13	7,338.26	0.00E+00	1.63E-03	3.26E-03
Am-243	1.4913E-06	3,669.13	7,338.26	0.00E+00	5.47E-03	1.09E-02
C-14	5.7217E-09	3,669.13	7,338.26	0.00E+00	2.10E-05	4.20E-05
Cl-36	1.3124E-32	3,669.13	7,338.26	0.00E+00	4.82E-29	9.63E-29
Cm-243	2.0967E-07	3,669.13	7,338.26	0.00E+00	7.69E-04	1.54E-03
Cm-244	4.3001E-05	3,669.13	7,338.26	0.00E+00	1.58E-01	3.16E-01
Co-60	1.9798E-05	3,669.13	7,338.26	0.00E+00	7.26E-02	1.45E-01
Cs-134	9.0795E-02	3,669.13	7,338.26	0.00E+00	3.33E+02	6.66E+02
Cs-135	3.4477E-06	3,669.13	7,338.26	0.00E+00	1.27E-02	2.53E-02
Cs-137	2.5588E+00	3,669.13	7,338.26	0.00E+00	9.39E+03	1.88E+04
Eu-154	5.4847E-02	3,669.13	7,338.26	0.00E+00	2.01E+02	4.02E+02
Eu-155	1.9469E-02	3,669.13	7,338.26	0.00E+00	7.14E+01	1.43E+02
Fe-55	1.7797E-03	3,669.13	7,338.26	0.00E+00	6.53E+00	1.31E+01
H-3	8.0065E-03	3,669.13	7,338.26	0.00E+00	2.94E+01	5.88E+01
I-129	7.5300E-07	3,669.13	7,338.26	0.00E+00	2.76E-03	5.53E-03
Kr-85	2.0705E-01	3,669.13	7,338.26	0.00E+00	7.60E+02	1.52E+03
Np-237	9.5507E-06	3,669.13	7,338.26	0.00E+00	3.50E-02	7.01E-02
Pa-231	1.2740E-09	3,669.13	7,338.26	0.00E+00	4.67E-06	9.35E-06
Pb-210	1.1838E-11	3,669.13	7,338.26	0.00E+00	4.34E-08	8.69E-08
Pm-147	6.7974E-01	3,669.13	7,338.26	0.00E+00	2.49E+03	4.99E+03
Pu-238	1.9755E-02	3,669.13	7,338.26	0.00E+00	7.25E+01	1.45E+02
Pu-239	4.2838E-04	3,669.13	7,338.26	0.00E+00	1.57E+00	3.14E+00
Pu-240	2.4390E-04	3,669.13	7,338.26	0.00E+00	8.95E-01	1.79E+00
Pu-241	5.4058E-02	3,669.13	7,338.26	0.00E+00	1.98E+02	3.97E+02
Pu-242	3.6329E-07	3,669.13	7,338.26	0.00E+00	1.33E-03	2.67E-03
Ra-226	8.3742E-11	3,669.13	7,338.26	0.00E+00	3.07E-07	6.15E-07
Ra-228	5.7734E-15	3,669.13	7,338.26	0.00E+00	2.12E-11	4.24E-11
Ru-106	6.1356E-03	3,669.13	7,338.26	0.00E+00	2.25E+01	4.50E+01
Se-79	1.2936E-05	3,669.13	7,338.26	0.00E+00	4.75E-02	9.49E-02
Sn-126	1.1574E-05	3,669.13	7,338.26	0.00E+00	4.25E-02	8.49E-02
Sr-90	2.4417E+00	3,669.13	7,338.26	0.00E+00	8.96E+03	1.79E+04
Tc-99	4.2239E-04	3,669.13	7,338.26	0.00E+00	1.55E+00	3.10E+00
Th-229	2.8568E-12	3,669.13	7,338.26	0.00E+00	1.05E-08	2.10E-08
Th-230	2.5310E-08	3,669.13	7,338.26	0.00E+00	9.29E-05	1.86E-04
Th-232	1.1631E-14	3,669.13	7,338.26	0.00E+00	4.27E-11	8.54E-11
Tl-208	4.6705E-08	3,669.13	7,338.26	0.00E+00	1.71E-04	3.43E-04
U-232	1.3151E-07	3,669.13	7,338.26	0.00E+00	4.83E-04	9.65E-04
U-233	2.1650E-09	3,669.13	7,338.26	0.00E+00	7.94E-06	1.59E-05
U-234	1.8399E-04	3,669.13	7,338.26	0.00E+00	6.75E-01	1.35E+00
U-235	-2.7235E-06	3,669.13	0.00	2.05E-02	1.05E-02	2.05E-02
U-236	1.5493E-05	3,669.13	7,338.26	0.00E+00	5.68E-02	1.14E-01
U-238	-4.2851E-09	3,669.13	0.00	7.98E-04	7.83E-04	7.98E-04
Y-90	2.4423E+00	3,669.13	7,338.26	0.00E+00	8.96E+03	1.79E+04
Other Radionuclides					9.12E+03	1.82E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.980E+14
0.0250	2.100E+14
0.0375	1.831E+14
0.0575	1.934E+14
0.0850	1.177E+14
0.1250	8.233E+13
0.2250	1.011E+14
0.3750	4.530E+13
0.5750	7.354E+14
0.8500	3.587E+13
1.2500	1.168E+13
1.7500	4.263E+11
2.2500	2.818E+10
2.7500	3.933E+08
3.5000	4.682E+07
5.0000	3.891E+03
7.0000	4.323E+02
11.0000	4.864E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.16E+02	2.32E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	79.9939132	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		3,669.13
Bounding:		7,338.26

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.98	
Bounding:	1.98	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RHF (FRANCE)
SNF ID #: 179
Fuel Units & Descr: 4 - 2 CONCENTRIC TUBES
Heavy Metal Mass: BOL=36.9kg; EOL=25.51kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1989
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated Canister usage:

18"x10'
0.67

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	10,786.55	21,573.10	0.00E+00	7.15E-06	1.43E-05	Avg. MeV	
Am-241	2.0060E-03	10,786.55	21,573.10	0.00E+00	2.16E+01	4.33E+01	0.0150	2.277E+15
Am-242m	4.2429E-07	10,786.55	21,573.10	0.00E+00	4.58E-03	9.15E-03	0.0250	4.735E+14
Am-243	1.4899E-06	10,786.55	21,573.10	0.00E+00	1.61E-02	3.21E-02	0.0375	4.130E+14
C-14	5.7135E-09	10,786.55	21,573.10	0.00E+00	6.16E-05	1.23E-04	0.0575	4.424E+14
Cl-36	1.3124E-32	10,786.55	21,573.10	0.00E+00	1.42E-28	2.83E-28	0.0850	2.673E+14
Cm-243	1.6443E-07	10,786.55	21,573.10	0.00E+00	1.77E-03	3.55E-03	0.1250	1.809E+14
Cm-244	2.9330E-05	10,786.55	21,573.10	0.00E+00	3.16E-01	6.33E-01	0.2250	2.307E+14
Co-60	5.3186E-06	10,786.55	21,573.10	0.00E+00	5.74E-02	1.15E-01	0.3750	1.004E+14
Cs-134	3.1563E-03	10,786.55	21,573.10	0.00E+00	3.40E+01	6.81E+01	0.5750	1.638E+15
Cs-135	3.4477E-06	10,786.55	21,573.10	0.00E+00	3.72E-02	7.44E-02	0.8500	2.769E+13
Cs-137	2.0313E+00	10,786.55	21,573.10	0.00E+00	2.19E+04	4.38E+04	1.2500	1.581E+13
Eu-154	2.4513E-02	10,786.55	21,573.10	0.00E+00	2.64E+02	5.29E+02	1.7500	7.257E+11
Eu-155	4.8175E-03	10,786.55	21,573.10	0.00E+00	5.20E+01	1.04E+02	2.2500	6.366E+07
Fe-55	1.2397E-04	10,786.55	21,573.10	0.00E+00	1.34E+00	2.67E+00	2.7500	3.599E+07
H-3	4.5697E-03	10,786.55	21,573.10	0.00E+00	4.93E+01	9.86E+01	3.5000	1.653E+05
I-129	7.5300E-07	10,786.55	21,573.10	0.00E+00	8.12E-03	1.62E-02	5.0000	9.347E+03
Kr-85	1.0850E-01	10,786.55	21,573.10	0.00E+00	1.17E+03	2.34E+03	7.0000	1.032E+03
Np-237	9.5561E-06	10,786.55	21,573.10	0.00E+00	1.03E-01	2.06E-01	11.0000	1.157E+02
Pa-231	2.0359E-09	10,786.55	21,573.10	0.00E+00	2.20E-05	4.39E-05		
Pb-210	4.9728E-11	10,786.55	21,573.10	0.00E+00	5.36E-07	1.07E-06		
Pm-147	4.8502E-02	10,786.55	21,573.10	0.00E+00	5.23E+02	1.05E+03		
Pu-238	1.8254E-02	10,786.55	21,573.10	0.00E+00	1.97E+02	3.94E+02		
Pu-239	4.2810E-04	10,786.55	21,573.10	0.00E+00	4.62E+00	9.24E+00		
Pu-240	2.4368E-04	10,786.55	21,573.10	0.00E+00	2.63E+00	5.26E+00		
Pu-241	3.3415E-02	10,786.55	21,573.10	0.00E+00	3.60E+02	7.21E+02		
Pu-242	3.6329E-07	10,786.55	21,573.10	0.00E+00	3.92E-03	7.84E-03		
Ra-226	2.2854E-10	10,786.55	21,573.10	0.00E+00	2.47E-06	4.93E-06		
Ra-228	1.2426E-14	10,786.55	21,573.10	0.00E+00	1.34E-10	2.68E-10		
Ru-106	6.3589E-06	10,786.55	21,573.10	0.00E+00	6.86E-02	1.37E-01		
Se-79	1.2933E-05	10,786.55	21,573.10	0.00E+00	1.40E-01	2.79E-01		
Sn-126	1.1574E-05	10,786.55	21,573.10	0.00E+00	1.25E-01	2.50E-01		
Sr-90	1.9248E+00	10,786.55	21,573.10	0.00E+00	2.08E+04	4.15E+04		
Tc-99	4.2239E-04	10,786.55	21,573.10	0.00E+00	4.56E+00	9.11E+00		
Th-229	5.0953E-12	10,786.55	21,573.10	0.00E+00	5.50E-08	1.10E-07		
Th-230	4.1885E-08	10,786.55	21,573.10	0.00E+00	4.52E-04	9.04E-04		
Th-232	1.9270E-14	10,786.55	21,573.10	0.00E+00	2.08E-10	4.16E-10		
Tl-208	4.6024E-08	10,786.55	21,573.10	0.00E+00	4.96E-04	9.93E-04		
U-232	1.2582E-07	10,786.55	21,573.10	0.00E+00	1.36E-03	2.71E-03		
U-233	2.5825E-09	10,786.55	21,573.10	0.00E+00	2.79E-05	5.57E-05		
U-234	1.8450E-04	10,786.55	21,573.10	0.00E+00	1.99E+00	3.98E+00		
U-235	-2.7235E-06	10,786.55	0.00	7.41E-02	4.48E-02	7.41E-02		
U-236	1.5493E-05	10,786.55	21,573.10	0.00E+00	1.67E-01	3.34E-01		
U-238	-4.2851E-09	10,786.55	0.00	8.72E-04	8.26E-04	8.72E-04		
Y-90	1.9254E+00	10,786.55	21,573.10	0.00E+00	2.08E+04	4.15E+04		
Other Radionuclides					2.09E+04	4.17E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.67E+02	5.14E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.97	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		10,786.55
Bounding:		21,573.10

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.93	
Bounding:	1.86	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RINSC
SNF ID #: 181
Fuel Units & Descr: 44 - 18 FLAT PLATES
Heavy Metal Mass: BOL=61.12kg; EOL=60.465kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2010
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"x18' 1.83

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	620.87	1,241.73	0.00E+00	9.03E-08	1.81E-07	Avg. MeV	
Am-241	1.1190E-03	620.87	1,241.73	0.00E+00	6.95E-01	1.39E+00	0.0150	2.396E+14
Am-242m	4.5425E-07	620.87	1,241.73	0.00E+00	2.82E-04	5.64E-04	0.0250	5.161E+13
Am-243	1.4921E-06	620.87	1,241.73	0.00E+00	9.26E-04	1.85E-03	0.0375	4.763E+13
C-14	5.7244E-09	620.87	1,241.73	0.00E+00	3.55E-06	7.11E-06	0.0575	4.683E+13
Cl-36	1.3124E-32	620.87	1,241.73	0.00E+00	8.15E-30	1.63E-29	0.0850	2.985E+13
Cm-243	2.3676E-07	620.87	1,241.73	0.00E+00	1.47E-04	2.94E-04	0.1250	2.585E+13
Cm-244	5.2042E-05	620.87	1,241.73	0.00E+00	3.23E-02	6.46E-02	0.2250	2.530E+13
Co-60	3.8208E-05	620.87	1,241.73	0.00E+00	2.37E-02	4.74E-02	0.3750	1.225E+13
Cs-134	4.8693E-01	620.87	1,241.73	0.00E+00	3.02E+02	6.05E+02	0.5750	1.682E+14
Cs-135	3.4477E-06	620.87	1,241.73	0.00E+00	2.14E-03	4.28E-03	0.8500	2.356E+13
Cs-137	2.8731E+00	620.87	1,241.73	0.00E+00	1.78E+03	3.57E+03	1.2500	4.383E+12
Eu-154	8.2053E-02	620.87	1,241.73	0.00E+00	5.09E+01	1.02E+02	1.7500	1.838E+11
Eu-155	3.9134E-02	620.87	1,241.73	0.00E+00	2.43E+01	4.86E+01	2.2500	3.855E+11
Fe-55	6.7429E-03	620.87	1,241.73	0.00E+00	4.19E+00	8.37E+00	2.7500	2.218E+09
H-3	1.0599E-02	620.87	1,241.73	0.00E+00	6.58E+00	1.32E+01	3.5000	2.460E+08
I-129	7.5300E-07	620.87	1,241.73	0.00E+00	4.68E-04	9.35E-04	5.0000	7.735E+02
Kr-85	2.8595E-01	620.87	1,241.73	0.00E+00	1.78E+02	3.55E+02	7.0000	8.636E+01
Np-237	9.5479E-06	620.87	1,241.73	0.00E+00	5.93E-03	1.19E-02	11.0000	9.745E+00
Pa-231	8.9297E-10	620.87	1,241.73	0.00E+00	5.54E-07	1.11E-06		
Pb-210	3.7609E-12	620.87	1,241.73	0.00E+00	2.34E-09	4.67E-09		
Pm-147	2.5452E+00	620.87	1,241.73	0.00E+00	1.58E+03	3.16E+03		
Pu-238	2.0550E-02	620.87	1,241.73	0.00E+00	1.28E+01	2.55E+01		
Pu-239	4.2838E-04	620.87	1,241.73	0.00E+00	2.66E-01	5.32E-01		
Pu-240	2.4401E-04	620.87	1,241.73	0.00E+00	1.51E-01	3.03E-01		
Pu-241	6.8764E-02	620.87	1,241.73	0.00E+00	4.27E+01	8.54E+01		
Pu-242	3.6329E-07	620.87	1,241.73	0.00E+00	2.26E-04	4.51E-04		
Ra-226	3.8045E-11	620.87	1,241.73	0.00E+00	2.36E-08	4.72E-08		
Ra-228	2.9902E-15	620.87	1,241.73	0.00E+00	1.86E-12	3.71E-12		
Ru-106	1.9055E-01	620.87	1,241.73	0.00E+00	1.18E+02	2.37E+02		
Se-79	1.2936E-05	620.87	1,241.73	0.00E+00	8.03E-03	1.61E-02		
Sn-126	1.1574E-05	620.87	1,241.73	0.00E+00	7.19E-03	1.44E-02		
Sr-90	2.7505E+00	620.87	1,241.73	0.00E+00	1.71E+03	3.42E+03		
Tc-99	4.2239E-04	620.87	1,241.73	0.00E+00	2.62E-01	5.24E-01		
Th-229	1.8848E-12	620.87	1,241.73	0.00E+00	1.17E-09	2.34E-09		
Th-230	1.7042E-08	620.87	1,241.73	0.00E+00	1.06E-05	2.12E-05		
Th-232	7.8132E-15	620.87	1,241.73	0.00E+00	4.85E-12	9.70E-12		
Tl-208	4.4063E-08	620.87	1,241.73	0.00E+00	2.74E-05	5.47E-05		
U-232	1.3151E-07	620.87	1,241.73	0.00E+00	8.16E-05	1.63E-04		
U-233	1.9564E-09	620.87	1,241.73	0.00E+00	1.21E-06	2.43E-06		
U-234	1.8371E-04	620.87	1,241.73	0.00E+00	1.14E-01	2.28E-01		
U-235	-2.7235E-06	620.87	0.00	2.61E-02	2.44E-02	2.61E-02		
U-236	1.5493E-05	620.87	1,241.73	0.00E+00	9.62E-03	1.92E-02		
U-238	-4.2851E-09	620.87	0.00	1.65E-02	1.65E-02	1.65E-02		
Y-90	2.7505E+00	620.87	1,241.73	0.00E+00	1.71E+03	3.42E+03		
Other Radionuclides					3.19E+03	6.39E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.15E+01	6.30E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.7728395	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		620.87
Bounding:		1,241.73

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.03	
Bounding:	0.06	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RINSC
SNF ID #: 180
Fuel Units & Descr: 70 - 18 FLAT PLATES
Heavy Metal Mass: BOL=9.366kg; EOL=8.498kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1992
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 1.94

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.5861E-10	822.01	1,644.03	0.00E+00	3.77E-07	7.54E-07
Am-241	1.7832E-03	822.01	1,644.03	0.00E+00	1.47E+00	2.93E+00
Am-242m	4.3410E-07	822.01	1,644.03	0.00E+00	3.57E-04	7.14E-04
Am-243	1.4907E-06	822.01	1,644.03	0.00E+00	1.23E-03	2.45E-03
C-14	5.7162E-09	822.01	1,644.03	0.00E+00	4.70E-06	9.40E-06
Cl-36	1.3124E-32	822.01	1,644.03	0.00E+00	1.08E-29	2.16E-29
Cm-243	1.8568E-07	822.01	1,644.03	0.00E+00	1.53E-04	3.05E-04
Cm-244	3.5512E-05	822.01	1,644.03	0.00E+00	2.92E-02	5.84E-02
Co-60	1.0261E-05	822.01	1,644.03	0.00E+00	8.44E-03	1.69E-02
Cs-134	1.6931E-02	822.01	1,644.03	0.00E+00	1.39E+01	2.78E+01
Cs-135	3.4477E-06	822.01	1,644.03	0.00E+00	2.83E-03	5.67E-03
Cs-137	2.2800E+00	822.01	1,644.03	0.00E+00	1.87E+03	3.75E+03
Eu-154	3.6656E-02	822.01	1,644.03	0.00E+00	3.01E+01	6.03E+01
Eu-155	9.6841E-03	822.01	1,644.03	0.00E+00	7.96E+00	1.59E+01
Fe-55	4.6977E-04	822.01	1,644.03	0.00E+00	3.86E-01	7.72E-01
H-3	6.0485E-03	822.01	1,644.03	0.00E+00	4.97E+00	9.94E+00
I-129	7.5300E-07	822.01	1,644.03	0.00E+00	6.19E-04	1.24E-03
Kr-85	1.4989E-01	822.01	1,644.03	0.00E+00	1.23E+02	2.46E+02
Np-237	9.5534E-06	822.01	1,644.03	0.00E+00	7.85E-03	1.57E-02
Pa-231	1.6550E-09	822.01	1,644.03	0.00E+00	1.36E-06	2.72E-06
Pb-210	2.6631E-11	822.01	1,644.03	0.00E+00	2.19E-08	4.38E-08
Pm-147	1.8156E-01	822.01	1,644.03	0.00E+00	1.49E+02	2.98E+02
Pu-238	1.8990E-02	822.01	1,644.03	0.00E+00	1.56E+01	3.12E+01
Pu-239	4.2838E-04	822.01	1,644.03	0.00E+00	3.52E-01	7.04E-01
Pu-240	2.4379E-04	822.01	1,644.03	0.00E+00	2.00E-01	4.01E-01
Pu-241	4.2511E-02	822.01	1,644.03	0.00E+00	3.49E+01	6.99E+01
Pu-242	3.6329E-07	822.01	1,644.03	0.00E+00	2.99E-04	5.97E-04
Ra-226	1.4725E-10	822.01	1,644.03	0.00E+00	1.21E-07	2.42E-07
Ra-228	8.9760E-15	822.01	1,644.03	0.00E+00	7.38E-12	1.48E-11
Ru-106	1.9752E-04	822.01	1,644.03	0.00E+00	1.62E-01	3.25E-01
Se-79	1.2933E-05	822.01	1,644.03	0.00E+00	1.06E-02	2.13E-02
Sn-126	1.1574E-05	822.01	1,644.03	0.00E+00	9.51E-03	1.90E-02
Sr-90	2.1680E+00	822.01	1,644.03	0.00E+00	1.78E+03	3.56E+03
Tc-99	4.2239E-04	822.01	1,644.03	0.00E+00	3.47E-01	6.94E-01
Th-229	3.9270E-12	822.01	1,644.03	0.00E+00	3.23E-09	6.46E-09
Th-230	3.3578E-08	822.01	1,644.03	0.00E+00	2.76E-05	5.52E-05
Th-232	1.5452E-14	822.01	1,644.03	0.00E+00	1.27E-11	2.54E-11
Tl-208	4.6705E-08	822.01	1,644.03	0.00E+00	3.84E-05	7.68E-05
U-232	1.3045E-07	822.01	1,644.03	0.00E+00	1.07E-04	2.14E-04
U-233	2.3739E-09	822.01	1,644.03	0.00E+00	1.95E-06	3.90E-06
U-234	1.8423E-04	822.01	1,644.03	0.00E+00	1.51E-01	3.03E-01
U-235	-2.7235E-06	822.01	0.00	1.89E-02	1.66E-02	1.89E-02
U-236	1.5493E-05	822.01	1,644.03	0.00E+00	1.27E-02	2.55E-02
U-238	-4.2851E-09	822.01	0.00	2.16E-04	2.13E-04	2.16E-04
Y-90	2.1686E+00	822.01	1,644.03	0.00E+00	1.78E+03	3.57E+03
Other Radionuclides					1.79E+03	3.58E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.961E+14
0.0250	4.090E+13
0.0375	3.571E+13
0.0575	3.808E+13
0.0850	2.307E+13
0.1250	1.581E+13
0.2250	1.987E+13
0.3750	8.706E+12
0.5750	1.413E+14
0.8500	3.357E+12
1.2500	1.696E+12
1.7500	7.105E+10
2.2500	8.888E+07
2.7500	5.342E+06
3.5000	3.395E+05
5.0000	7.858E+02
7.0000	8.703E+01
11.0000	9.772E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.22E+01	4.45E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.13598185	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		822.01
Bounding:	37.46	1,644.03

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.28	
Bounding:	0.56	43.88

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RPI (UALX-LEU) PORTUGAL
SNF ID #: 943
Fuel Units & Descr: 39 - ASSEMBLY
Heavy Metal Mass: BOL=30.381kg; EOL=29.23kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1998
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' 1.63

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.8404E-10	1,089.55	2,179.09	0.00E+00	3.09E-07	6.19E-07
Am-241	1.4935E-03	1,089.55	2,179.09	0.00E+00	1.63E+00	3.25E+00
Am-242m	4.4390E-07	1,089.55	2,179.09	0.00E+00	4.84E-04	9.67E-04
Am-243	1.4913E-06	1,089.55	2,179.09	0.00E+00	1.62E-03	3.25E-03
C-14	5.7217E-09	1,089.55	2,179.09	0.00E+00	6.23E-06	1.25E-05
Cl-36	1.3124E-32	1,089.55	2,179.09	0.00E+00	1.43E-29	2.86E-29
Cm-243	2.0967E-07	1,089.55	2,179.09	0.00E+00	2.28E-04	4.57E-04
Cm-244	4.3001E-05	1,089.55	2,179.09	0.00E+00	4.69E-02	9.37E-02
Co-60	1.9798E-05	1,089.55	2,179.09	0.00E+00	2.16E-02	4.31E-02
Cs-134	9.0795E-02	1,089.55	2,179.09	0.00E+00	9.89E+01	1.98E+02
Cs-135	3.4477E-06	1,089.55	2,179.09	0.00E+00	3.76E-03	7.51E-03
Cs-137	2.5588E+00	1,089.55	2,179.09	0.00E+00	2.79E+03	5.58E+03
Eu-154	5.4847E-02	1,089.55	2,179.09	0.00E+00	5.98E+01	1.20E+02
Eu-155	1.9469E-02	1,089.55	2,179.09	0.00E+00	2.12E+01	4.24E+01
Fe-55	1.7797E-03	1,089.55	2,179.09	0.00E+00	1.94E+00	3.88E+00
H-3	8.0065E-03	1,089.55	2,179.09	0.00E+00	8.72E+00	1.74E+01
I-129	7.5300E-07	1,089.55	2,179.09	0.00E+00	8.20E-04	1.64E-03
Kr-85	2.0705E-01	1,089.55	2,179.09	0.00E+00	2.26E+02	4.51E+02
Np-237	9.5507E-06	1,089.55	2,179.09	0.00E+00	1.04E-02	2.08E-02
Pa-231	1.2740E-09	1,089.55	2,179.09	0.00E+00	1.39E-06	2.78E-06
Pb-210	1.1838E-11	1,089.55	2,179.09	0.00E+00	1.29E-08	2.58E-08
Pm-147	6.7974E-01	1,089.55	2,179.09	0.00E+00	7.41E+02	1.48E+03
Pu-238	1.9755E-02	1,089.55	2,179.09	0.00E+00	2.15E+01	4.30E+01
Pu-239	4.2838E-04	1,089.55	2,179.09	0.00E+00	4.67E-01	9.33E-01
Pu-240	2.4390E-04	1,089.55	2,179.09	0.00E+00	2.66E-01	5.31E-01
Pu-241	5.4058E-02	1,089.55	2,179.09	0.00E+00	5.89E+01	1.18E+02
Pu-242	3.6329E-07	1,089.55	2,179.09	0.00E+00	3.96E-04	7.92E-04
Ra-226	8.3742E-11	1,089.55	2,179.09	0.00E+00	9.12E-08	1.82E-07
Ra-228	5.7734E-15	1,089.55	2,179.09	0.00E+00	6.29E-12	1.26E-11
Ru-106	6.1356E-03	1,089.55	2,179.09	0.00E+00	6.69E+00	1.34E+01
Se-79	1.2936E-05	1,089.55	2,179.09	0.00E+00	1.41E-02	2.82E-02
Sn-126	1.1574E-05	1,089.55	2,179.09	0.00E+00	1.26E-02	2.52E-02
Sr-90	2.4417E+00	1,089.55	2,179.09	0.00E+00	2.66E+03	5.32E+03
Tc-99	4.2239E-04	1,089.55	2,179.09	0.00E+00	4.60E-01	9.20E-01
Th-229	2.8568E-12	1,089.55	2,179.09	0.00E+00	3.11E-09	6.23E-09
Th-230	2.5310E-08	1,089.55	2,179.09	0.00E+00	2.76E-05	5.52E-05
Th-232	1.1631E-14	1,089.55	2,179.09	0.00E+00	1.27E-11	2.53E-11
Tl-208	4.6705E-08	1,089.55	2,179.09	0.00E+00	5.09E-05	1.02E-04
U-232	1.3151E-07	1,089.55	2,179.09	0.00E+00	1.43E-04	2.87E-04
U-233	2.1650E-09	1,089.55	2,179.09	0.00E+00	2.36E-06	4.72E-06
U-234	1.8399E-04	1,089.55	2,179.09	0.00E+00	2.00E-01	4.01E-01
U-235	-2.7235E-08	1,089.55	0.00	1.30E-02	1.01E-02	1.30E-02
U-236	1.5493E-05	1,089.55	2,179.09	0.00E+00	1.69E-02	3.38E-02
U-238	-4.2851E-09	1,089.55	0.00	8.19E-03	8.18E-03	8.19E-03
Y-90	2.4423E+00	1,089.55	2,179.09	0.00E+00	2.66E+03	5.32E+03
Other Radionuclides					2.71E+03	5.42E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.964E+14
0.0250	6.237E+13
0.0375	5.438E+13
0.0575	5.744E+13
0.0850	3.495E+13
0.1250	2.445E+13
0.2250	3.001E+13
0.3750	1.345E+13
0.5750	2.184E+14
0.8500	1.065E+13
1.2500	3.467E+12
1.7500	1.266E+11
2.2500	8.369E+09
2.7500	1.168E+08
3.5000	1.390E+07
5.0000	1.174E+03
7.0000	1.305E+02
11.0000	1.469E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.45E+01	6.90E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.83094182	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,089.55
Bounding:		2,179.09

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.11	
Bounding:	0.23	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RSG-GAS (U308-LEU) INDONESIA
SNF ID #: 288
Fuel Units & Descr: 47 - ASSEMBLY
Heavy Metal Mass: BOL=56.188kg; EOL=51.479kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1999
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' 1.96

II. Estimates

Radionuclide	m CI/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (CI)	y_n Nominal Fuel Inventories(CI)	y_b Bounding Fuel Inventories(CI)
Ac-227	2.8404E-10	4,459.89	8,919.79	0.00E+00	1.27E-06	2.53E-06
Am-241	1.4935E-03	4,459.89	8,919.79	0.00E+00	6.66E+00	1.33E+01
Am-242m	4.4390E-07	4,459.89	8,919.79	0.00E+00	1.98E-03	3.96E-03
Am-243	1.4913E-06	4,459.89	8,919.79	0.00E+00	6.65E-03	1.33E-02
C-14	5.7217E-09	4,459.89	8,919.79	0.00E+00	2.55E-05	5.10E-05
Cl-36	1.3124E-32	4,459.89	8,919.79	0.00E+00	5.85E-29	1.17E-28
Cm-243	2.0967E-07	4,459.89	8,919.79	0.00E+00	9.35E-04	1.87E-03
Cm-244	4.3001E-05	4,459.89	8,919.79	0.00E+00	1.92E-01	3.84E-01
Co-60	1.9798E-05	4,459.89	8,919.79	0.00E+00	8.83E-02	1.77E-01
Cs-134	9.0795E-02	4,459.89	8,919.79	0.00E+00	4.05E+02	8.10E+02
Cs-135	3.4477E-06	4,459.89	8,919.79	0.00E+00	1.54E-02	3.08E-02
Cs-137	2.5588E+00	4,459.89	8,919.79	0.00E+00	1.14E+04	2.28E+04
Eu-154	5.4847E-02	4,459.89	8,919.79	0.00E+00	2.45E+02	4.89E+02
Eu-155	1.9469E-02	4,459.89	8,919.79	0.00E+00	8.68E+01	1.74E+02
Fe-55	1.7797E-03	4,459.89	8,919.79	0.00E+00	7.94E+00	1.59E+01
H-3	8.0065E-03	4,459.89	8,919.79	0.00E+00	3.57E+01	7.14E+01
I-129	7.5300E-07	4,459.89	8,919.79	0.00E+00	3.36E-03	6.72E-03
Kr-85	2.0705E-01	4,459.89	8,919.79	0.00E+00	9.23E+02	1.85E+03
Np-237	9.5507E-06	4,459.89	8,919.79	0.00E+00	4.26E-02	8.52E-02
Pa-231	1.2740E-09	4,459.89	8,919.79	0.00E+00	5.68E-06	1.14E-05
Pb-210	1.1838E-11	4,459.89	8,919.79	0.00E+00	5.28E-08	1.06E-07
Pm-147	6.7974E-01	4,459.89	8,919.79	0.00E+00	3.03E+03	6.06E+03
Pu-238	1.9755E-02	4,459.89	8,919.79	0.00E+00	8.81E+01	1.76E+02
Pu-239	4.2838E-04	4,459.89	8,919.79	0.00E+00	1.91E+00	3.82E+00
Pu-240	2.4390E-04	4,459.89	8,919.79	0.00E+00	1.09E+00	2.18E+00
Pu-241	5.4058E-02	4,459.89	8,919.79	0.00E+00	2.41E+02	4.82E+02
Pu-242	3.6329E-07	4,459.89	8,919.79	0.00E+00	1.62E-03	3.24E-03
Ra-226	8.3742E-11	4,459.89	8,919.79	0.00E+00	3.73E-07	7.47E-07
Ra-228	5.7734E-15	4,459.89	8,919.79	0.00E+00	2.57E-11	5.15E-11
Ru-106	6.1356E-03	4,459.89	8,919.79	0.00E+00	2.74E+01	5.47E+01
Se-79	1.2936E-05	4,459.89	8,919.79	0.00E+00	5.77E-02	1.15E-01
Sn-126	1.1574E-05	4,459.89	8,919.79	0.00E+00	5.16E-02	1.03E-01
Sr-90	2.4417E+00	4,459.89	8,919.79	0.00E+00	1.09E+04	2.18E+04
Tc-99	4.2239E-04	4,459.89	8,919.79	0.00E+00	1.88E+00	3.77E+00
Th-229	2.8568E-12	4,459.89	8,919.79	0.00E+00	1.27E-08	2.55E-08
Th-230	2.5310E-08	4,459.89	8,919.79	0.00E+00	1.13E-04	2.26E-04
Th-232	1.1631E-14	4,459.89	8,919.79	0.00E+00	5.19E-11	1.04E-10
Tl-208	4.6705E-08	4,459.89	8,919.79	0.00E+00	2.08E-04	4.17E-04
U-232	1.3151E-07	4,459.89	8,919.79	0.00E+00	5.87E-04	1.17E-03
U-233	2.1650E-09	4,459.89	8,919.79	0.00E+00	9.66E-06	1.93E-05
U-234	1.8399E-04	4,459.89	8,919.79	0.00E+00	8.21E-01	1.64E+00
U-235	-2.7235E-06	4,459.89	0.00	2.39E-02	1.18E-02	2.39E-02
U-236	1.5493E-05	4,459.89	8,919.79	0.00E+00	6.91E-02	1.38E-01
U-238	-4.2851E-09	4,459.89	0.00	1.52E-02	1.51E-02	1.52E-02
Y-90	2.4423E+00	4,459.89	8,919.79	0.00E+00	1.09E+04	2.18E+04
Other Radionuclides					1.11E+04	2.22E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.213E+15
0.0250	2.553E+14
0.0375	2.226E+14
0.0575	2.351E+14
0.0850	1.431E+14
0.1250	1.001E+14
0.2250	1.229E+14
0.3750	5.506E+13
0.5750	8.939E+14
0.8500	4.360E+13
1.2500	1.419E+13
1.7500	5.182E+11
2.2500	3.426E+10
2.7500	4.780E+08
3.5000	5.691E+07
5.0000	4.762E+03
7.0000	5.293E+02
11.0000	5.955E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.41E+02	2.82E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.68299334	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		4,459.89
Bounding:		8,919.79

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.25	
Bounding:	0.50	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RU-1 (UALX LEU) URAGUAY
SNF ID #: 557
Fuel Units & Descr: 4 - ASSEMBLY
Heavy Metal Mass: BOL=2.112kg; EOL=2.11kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1998
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' 0.11

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8404E-10	1.89	3.79	0.00E+00	5.38E-10	1.08E-09	Avg. MeV	
Am-241	1.4935E-03	1.89	3.79	0.00E+00	2.83E-03	5.66E-03	0.0150	5.152E+11
Am-242m	4.4390E-07	1.89	3.79	0.00E+00	8.41E-07	1.68E-06	0.0250	1.084E+11
Am-243	1.4913E-06	1.89	3.79	0.00E+00	2.82E-06	5.65E-06	0.0375	9.453E+10
C-14	5.7217E-09	1.89	3.79	0.00E+00	1.08E-08	2.17E-08	0.0575	9.986E+10
Cl-36	1.3124E-32	1.89	3.79	0.00E+00	2.49E-32	4.97E-32	0.0850	6.076E+10
Cm-243	2.0967E-07	1.89	3.79	0.00E+00	3.97E-07	7.94E-07	0.1250	4.250E+10
Cm-244	4.3001E-05	1.89	3.79	0.00E+00	8.14E-05	1.63E-04	0.2250	5.219E+10
Co-60	1.9798E-05	1.89	3.79	0.00E+00	3.75E-05	7.50E-05	0.3750	2.338E+10
Cs-134	9.0795E-02	1.89	3.79	0.00E+00	1.72E-01	3.44E-01	0.5750	3.796E+11
Cs-135	3.4477E-06	1.89	3.79	0.00E+00	6.53E-06	1.31E-05	0.8500	1.852E+10
Cs-137	2.5588E+00	1.89	3.79	0.00E+00	4.85E+00	9.69E+00	1.2500	6.027E+09
Eu-154	5.4847E-02	1.89	3.79	0.00E+00	1.04E-01	2.08E-01	1.7500	2.201E+08
Eu-155	1.9469E-02	1.89	3.79	0.00E+00	3.69E-02	7.37E-02	2.2500	1.455E+07
Fe-55	1.7797E-03	1.89	3.79	0.00E+00	3.37E-03	6.74E-03	2.7500	2.030E+05
H-3	8.0065E-03	1.89	3.79	0.00E+00	1.52E-02	3.03E-02	3.5000	2.417E+04
I-129	7.5300E-07	1.89	3.79	0.00E+00	1.43E-06	2.85E-06	5.0000	3.324E+00
Kr-85	2.0705E-01	1.89	3.79	0.00E+00	3.92E-01	7.84E-01	7.0000	3.745E-01
Np-237	9.5507E-06	1.89	3.79	0.00E+00	1.81E-05	3.62E-05	11.0000	4.251E-02
Pa-231	1.2740E-09	1.89	3.79	0.00E+00	2.41E-09	4.83E-09		
Pb-210	1.1838E-11	1.89	3.79	0.00E+00	2.24E-11	4.48E-11		
Pm-147	6.7974E-01	1.89	3.79	0.00E+00	1.29E+00	2.57E+00		
Pu-238	1.9755E-02	1.89	3.79	0.00E+00	3.74E-02	7.48E-02		
Pu-239	4.2838E-04	1.89	3.79	0.00E+00	8.11E-04	1.62E-03		
Pu-240	2.4390E-04	1.89	3.79	0.00E+00	4.62E-04	9.24E-04		
Pu-241	5.4058E-02	1.89	3.79	0.00E+00	1.02E-01	2.05E-01		
Pu-242	3.6329E-07	1.89	3.79	0.00E+00	6.88E-07	1.38E-06		
Ra-226	8.3742E-11	1.89	3.79	0.00E+00	1.59E-10	3.17E-10		
Ra-228	5.7734E-15	1.89	3.79	0.00E+00	1.09E-14	2.19E-14		
Ru-106	6.1356E-03	1.89	3.79	0.00E+00	1.16E-02	2.32E-02		
Se-79	1.2936E-05	1.89	3.79	0.00E+00	2.45E-05	4.90E-05		
Sn-126	1.1574E-05	1.89	3.79	0.00E+00	2.19E-05	4.38E-05		
Sr-90	2.4417E+00	1.89	3.79	0.00E+00	4.62E+00	9.25E+00		
Tc-99	4.2239E-04	1.89	3.79	0.00E+00	8.00E-04	1.60E-03		
Th-229	2.8568E-12	1.89	3.79	0.00E+00	5.41E-12	1.08E-11		
Th-230	2.5310E-08	1.89	3.79	0.00E+00	4.79E-08	9.59E-08		
Th-232	1.1631E-14	1.89	3.79	0.00E+00	2.20E-14	4.41E-14		
Tl-208	4.6705E-08	1.89	3.79	0.00E+00	8.85E-08	1.77E-07		
U-232	1.3151E-07	1.89	3.79	0.00E+00	2.49E-07	4.98E-07		
U-233	2.1650E-09	1.89	3.79	0.00E+00	4.10E-09	8.20E-09		
U-234	1.8399E-04	1.89	3.79	0.00E+00	3.48E-04	6.97E-04		
U-235	-2.7235E-06	1.89	0.00	9.04E-04	8.99E-04	9.04E-04		
U-236	1.5493E-05	1.89	3.79	0.00E+00	2.93E-05	5.87E-05		
U-238	-4.2851E-09	1.89	0.00	5.69E-04	5.69E-04	5.69E-04		
Y-90	2.4423E+00	1.89	3.79	0.00E+00	4.63E+00	9.25E+00		
Other Radionuclides					4.71E+00	9.42E+00		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.00E-02	1.20E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.81060606	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.00	1.89
Bounding:		3.79

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	448.40
Bounding:	0.01	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RU-1 (UALX LEU) URAGUAY
SNF ID #: 1073
Fuel Units & Descr: 15 - ASSEMBLY
Heavy Metal Mass: BOL=7.92kg; EOL=7.912kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1998
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' = 0.42

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8404E-10	7.10	14.21	0.00E+00	2.02E-09	4.03E-09	Avg. MeV	
Am-241	1.4935E-03	7.10	14.21	0.00E+00	1.06E-02	2.12E-02	0.0150	1.932E+12
Am-242m	4.4390E-07	7.10	14.21	0.00E+00	3.15E-06	6.31E-06	0.0250	4.066E+11
Am-243	1.4913E-06	7.10	14.21	0.00E+00	1.06E-05	2.12E-05	0.0375	3.545E+11
C-14	5.7217E-09	7.10	14.21	0.00E+00	4.06E-08	8.13E-08	0.0575	3.745E+11
Cl-36	1.3124E-32	7.10	14.21	0.00E+00	9.32E-32	1.86E-31	0.0850	2.278E+11
Cm-243	2.0967E-07	7.10	14.21	0.00E+00	1.49E-06	2.98E-06	0.1250	1.594E+11
Cm-244	4.3001E-05	7.10	14.21	0.00E+00	3.05E-04	6.11E-04	0.2250	1.957E+11
Co-60	1.9798E-05	7.10	14.21	0.00E+00	1.41E-04	2.81E-04	0.3750	8.769E+10
Cs-134	9.0795E-02	7.10	14.21	0.00E+00	6.45E-01	1.29E+00	0.5750	1.424E+12
Cs-135	3.4477E-06	7.10	14.21	0.00E+00	2.45E-05	4.90E-05	0.8500	6.944E+10
Cs-137	2.5588E+00	7.10	14.21	0.00E+00	1.82E+01	3.63E+01	1.2500	2.260E+10
Eu-154	5.4847E-02	7.10	14.21	0.00E+00	3.90E-01	7.79E-01	1.7500	8.252E+08
Eu-155	1.9469E-02	7.10	14.21	0.00E+00	1.38E-01	2.77E-01	2.2500	5.456E+07
Fe-55	1.7797E-03	7.10	14.21	0.00E+00	1.26E-02	2.53E-02	2.7500	7.613E+05
H-3	8.0065E-03	7.10	14.21	0.00E+00	5.69E-02	1.14E-01	3.5000	9.065E+04
I-129	7.5300E-07	7.10	14.21	0.00E+00	5.35E-06	1.07E-05	5.0000	1.246E+01
Kr-85	2.0705E-01	7.10	14.21	0.00E+00	1.47E+00	2.94E+00	7.0000	1.405E+00
Np-237	9.5507E-06	7.10	14.21	0.00E+00	6.78E-05	1.36E-04	11.0000	1.594E-01
Pa-231	1.2740E-09	7.10	14.21	0.00E+00	9.05E-09	1.81E-08		
Pb-210	1.1838E-11	7.10	14.21	0.00E+00	8.41E-11	1.68E-10		
Pm-147	6.7974E-01	7.10	14.21	0.00E+00	4.83E+00	9.66E+00		
Pu-238	1.9755E-02	7.10	14.21	0.00E+00	1.40E-01	2.81E-01		
Pu-239	4.2838E-04	7.10	14.21	0.00E+00	3.04E-03	6.09E-03		
Pu-240	2.4390E-04	7.10	14.21	0.00E+00	1.73E-03	3.46E-03		
Pu-241	5.4058E-02	7.10	14.21	0.00E+00	3.84E-01	7.68E-01		
Pu-242	3.6329E-07	7.10	14.21	0.00E+00	2.58E-06	5.16E-06		
Ra-226	8.3742E-11	7.10	14.21	0.00E+00	5.95E-10	1.19E-09		
Ra-228	5.7734E-15	7.10	14.21	0.00E+00	4.10E-14	8.20E-14		
Ru-106	6.1356E-03	7.10	14.21	0.00E+00	4.36E-02	8.72E-02		
Se-79	1.2936E-05	7.10	14.21	0.00E+00	9.19E-05	1.84E-04		
Sn-126	1.1574E-05	7.10	14.21	0.00E+00	8.22E-05	1.64E-04		
Sr-90	2.4417E+00	7.10	14.21	0.00E+00	1.73E+01	3.47E+01		
Tc-99	4.2239E-04	7.10	14.21	0.00E+00	3.00E-03	6.00E-03		
Th-229	2.8568E-12	7.10	14.21	0.00E+00	2.03E-11	4.06E-11		
Th-230	2.5310E-08	7.10	14.21	0.00E+00	1.80E-07	3.60E-07		
Th-232	1.1631E-14	7.10	14.21	0.00E+00	8.26E-14	1.65E-13		
Tl-208	4.6705E-08	7.10	14.21	0.00E+00	3.32E-07	6.63E-07		
U-232	1.3151E-07	7.10	14.21	0.00E+00	9.34E-07	1.87E-06		
U-233	2.1650E-09	7.10	14.21	0.00E+00	1.54E-08	3.08E-08		
U-234	1.8399E-04	7.10	14.21	0.00E+00	1.31E-03	2.61E-03		
U-235	-2.7235E-06	7.10	0.00	3.39E-03	3.37E-03	3.39E-03		
U-236	1.5493E-05	7.10	14.21	0.00E+00	1.10E-04	2.20E-04		
U-238	-4.2851E-09	7.10	0.00	2.13E-03	2.13E-03	2.13E-03		
Y-90	2.4423E+00	7.10	14.21	0.00E+00	1.73E+01	3.47E+01		
Other Radionuclides					1.77E+01	3.53E+01		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.25E-01	4.50E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.81060606	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.02	7.10
Bounding:		14.21

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	448.40
Bounding:	0.01	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RV-1 (UALX LEU) VENEZUELA
SNF ID #: 816
Fuel Units & Descr: 56 - MTR TYPE
Heavy Metal Mass: BOL=39.696kg; EOL=38.713kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1997
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' = 2.33

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8404E-10	933.38	1,866.76	0.00E+00	2.65E-07	5.30E-07	Avg. MeV	
Am-241	1.4935E-03	933.38	1,866.76	0.00E+00	1.39E+00	2.79E+00	0.0150	2.539E+14
Am-242m	4.4390E-07	933.38	1,866.76	0.00E+00	4.14E-04	8.29E-04	0.0250	5.343E+13
Am-243	1.4913E-06	933.38	1,866.76	0.00E+00	1.39E-03	2.78E-03	0.0375	4.658E+13
C-14	5.7217E-09	933.38	1,866.76	0.00E+00	5.34E-06	1.07E-05	0.0575	4.921E+13
Cl-36	1.3124E-32	933.38	1,866.76	0.00E+00	1.22E-29	2.45E-29	0.0850	2.994E+13
Cm-243	2.0967E-07	933.38	1,866.76	0.00E+00	1.96E-04	3.91E-04	0.1250	2.094E+13
Cm-244	4.3001E-05	933.38	1,866.76	0.00E+00	4.01E-02	8.03E-02	0.2250	2.571E+13
Co-60	1.9798E-05	933.38	1,866.76	0.00E+00	1.85E-02	3.70E-02	0.3750	1.152E+13
Cs-134	9.0795E-02	933.38	1,866.76	0.00E+00	8.47E+01	1.69E+02	0.5750	1.871E+14
Cs-135	3.4477E-06	933.38	1,866.76	0.00E+00	3.22E-03	6.44E-03	0.8500	9.126E+12
Cs-137	2.5588E+00	933.38	1,866.76	0.00E+00	2.39E+03	4.78E+03	1.2500	2.970E+12
Eu-154	5.4847E-02	933.38	1,866.76	0.00E+00	5.12E+01	1.02E+02	1.7500	1.084E+11
Eu-155	1.9469E-02	933.38	1,866.76	0.00E+00	1.82E+01	3.63E+01	2.2500	7.170E+09
Fe-55	1.7797E-03	933.38	1,866.76	0.00E+00	1.66E+00	3.32E+00	2.7500	1.000E+08
H-3	8.0065E-03	933.38	1,866.76	0.00E+00	7.47E+00	1.49E+01	3.5000	1.191E+07
I-129	7.5300E-07	933.38	1,866.76	0.00E+00	7.03E-04	1.41E-03	5.0000	1.014E+03
Kr-85	2.0705E-01	933.38	1,866.76	0.00E+00	1.93E+02	3.87E+02	7.0000	1.128E+02
Np-237	9.5507E-06	933.38	1,866.76	0.00E+00	8.91E-03	1.78E-02	11.0000	1.270E+01
Pa-231	1.2740E-09	933.38	1,866.76	0.00E+00	1.19E-06	2.38E-06		
Pb-210	1.1838E-11	933.38	1,866.76	0.00E+00	1.10E-08	2.21E-08		
Pm-147	6.7974E-01	933.38	1,866.76	0.00E+00	6.34E+02	1.27E+03		
Pu-238	1.9755E-02	933.38	1,866.76	0.00E+00	1.84E+01	3.69E+01		
Pu-239	4.2838E-04	933.38	1,866.76	0.00E+00	4.00E-01	8.00E-01		
Pu-240	2.4390E-04	933.38	1,866.76	0.00E+00	2.28E-01	4.55E-01		
Pu-241	5.4058E-02	933.38	1,866.76	0.00E+00	5.05E+01	1.01E+02		
Pu-242	3.6329E-07	933.38	1,866.76	0.00E+00	3.39E-04	6.78E-04		
Ra-226	8.3742E-11	933.38	1,866.76	0.00E+00	7.82E-08	1.56E-07		
Ra-228	5.7734E-15	933.38	1,866.76	0.00E+00	5.39E-12	1.08E-11		
Ru-106	6.1356E-03	933.38	1,866.76	0.00E+00	5.73E+00	1.15E+01		
Se-79	1.2936E-05	933.38	1,866.76	0.00E+00	1.21E-02	2.41E-02		
Sn-126	1.1574E-05	933.38	1,866.76	0.00E+00	1.08E-02	2.16E-02		
Sr-90	2.4417E+00	933.38	1,866.76	0.00E+00	2.28E+03	4.56E+03		
Tc-99	4.2239E-04	933.38	1,866.76	0.00E+00	3.94E-01	7.88E-01		
Th-229	2.8568E-12	933.38	1,866.76	0.00E+00	2.67E-09	5.33E-09		
Th-230	2.5310E-08	933.38	1,866.76	0.00E+00	2.36E-05	4.72E-05		
Th-232	1.1631E-14	933.38	1,866.76	0.00E+00	1.09E-11	2.17E-11		
Tl-208	4.6705E-08	933.38	1,866.76	0.00E+00	4.36E-05	8.72E-05		
U-232	1.3151E-07	933.38	1,866.76	0.00E+00	1.23E-04	2.45E-04	Thermal Power	
U-233	2.1650E-09	933.38	1,866.76	0.00E+00	2.02E-06	4.04E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8399E-04	933.38	1,866.76	0.00E+00	1.72E-01	3.43E-01		
U-235	-2.7235E-06	933.38	0.00	1.64E-02	1.39E-02	1.64E-02		
U-236	1.5493E-05	933.38	1,866.76	0.00E+00	1.45E-02	2.89E-02	2.95E+01	5.91E+01
U-238	-4.2851E-09	933.38	0.00	1.08E-02	1.08E-02	1.08E-02	Total	Total
Y-90	2.4423E+00	933.38	1,866.76	0.00E+00	2.28E+03	4.56E+03		
Other Radionuclides					2.32E+03	4.64E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.1126847	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		933.38
Bounding:		1,866.76

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.07	
Bounding:	0.15	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAPHIR U3SI2-LEU (SWITZERLAND)
SNF ID #: 443
Fuel Units & Descr: 39 - MTR TYPE
Heavy Metal Mass: BOL=79.732kg; EOL=71.191kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1993
Estimates as of: 2010
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: 15 years

Estimated Canister usage:
18"x10'
1.63

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.5861E-10	8,088.49	16,176.99	0.00E+00	3.71E-06	7.42E-06
Am-241	1.7832E-03	8,088.49	16,176.99	0.00E+00	1.44E+01	2.88E+01
Am-242m	4.3410E-07	8,088.49	16,176.99	0.00E+00	3.51E-03	7.02E-03
Am-243	1.4907E-06	8,088.49	16,176.99	0.00E+00	1.21E-02	2.41E-02
C-14	5.7162E-09	8,088.49	16,176.99	0.00E+00	4.62E-05	9.25E-05
Cl-36	1.3124E-32	8,088.49	16,176.99	0.00E+00	1.06E-28	2.12E-28
Cm-243	1.8568E-07	8,088.49	16,176.99	0.00E+00	1.50E-03	3.00E-03
Cm-244	3.5512E-05	8,088.49	16,176.99	0.00E+00	2.87E-01	5.74E-01
Co-60	1.0261E-05	8,088.49	16,176.99	0.00E+00	8.30E-02	1.66E-01
Cs-134	1.6931E-02	8,088.49	16,176.99	0.00E+00	1.37E+02	2.74E+02
Cs-135	3.4477E-06	8,088.49	16,176.99	0.00E+00	2.79E-02	5.58E-02
Cs-137	2.2800E+00	8,088.49	16,176.99	0.00E+00	1.84E+04	3.69E+04
Eu-154	3.6656E-02	8,088.49	16,176.99	0.00E+00	2.96E+02	5.93E+02
Eu-155	9.6841E-03	8,088.49	16,176.99	0.00E+00	7.83E+01	1.57E+02
Fe-55	4.6977E-04	8,088.49	16,176.99	0.00E+00	3.80E+00	7.60E+00
H-3	6.0485E-03	8,088.49	16,176.99	0.00E+00	4.89E+01	9.78E+01
I-129	7.5300E-07	8,088.49	16,176.99	0.00E+00	6.09E-03	1.22E-02
Kr-85	1.4989E-01	8,088.49	16,176.99	0.00E+00	1.21E+03	2.42E+03
Np-237	9.5534E-06	8,088.49	16,176.99	0.00E+00	7.73E-02	1.55E-01
Pa-231	1.6550E-09	8,088.49	16,176.99	0.00E+00	1.34E-05	2.68E-05
Pb-210	2.6631E-11	8,088.49	16,176.99	0.00E+00	2.15E-07	4.31E-07
Pm-147	1.8156E-01	8,088.49	16,176.99	0.00E+00	1.47E+03	2.94E+03
Pu-238	1.8990E-02	8,088.49	16,176.99	0.00E+00	1.54E+02	3.07E+02
Pu-239	4.2838E-04	8,088.49	16,176.99	0.00E+00	3.46E+00	6.93E+00
Pu-240	2.4379E-04	8,088.49	16,176.99	0.00E+00	1.97E+00	3.94E+00
Pu-241	4.2511E-02	8,088.49	16,176.99	0.00E+00	3.44E+02	6.88E+02
Pu-242	3.6329E-07	8,088.49	16,176.99	0.00E+00	2.94E-03	5.88E-03
Ra-226	1.4725E-10	8,088.49	16,176.99	0.00E+00	1.19E-06	2.38E-06
Ra-228	8.9760E-15	8,088.49	16,176.99	0.00E+00	7.26E-11	1.45E-10
Ru-106	1.9752E-04	8,088.49	16,176.99	0.00E+00	1.60E+00	3.20E+00
Se-79	1.2933E-05	8,088.49	16,176.99	0.00E+00	1.05E-01	2.09E-01
Sn-126	1.1574E-05	8,088.49	16,176.99	0.00E+00	9.36E-02	1.87E-01
Sr-90	2.1680E+00	8,088.49	16,176.99	0.00E+00	1.75E+04	3.51E+04
Tc-99	4.2239E-04	8,088.49	16,176.99	0.00E+00	3.42E+00	6.83E+00
Th-229	3.9270E-12	8,088.49	16,176.99	0.00E+00	3.18E-08	6.35E-08
Th-230	3.3578E-08	8,088.49	16,176.99	0.00E+00	2.72E-04	5.43E-04
Th-232	1.5452E-14	8,088.49	16,176.99	0.00E+00	1.25E-10	2.50E-10
Tl-208	4.6705E-08	8,088.49	16,176.99	0.00E+00	3.78E-04	7.56E-04
U-232	1.3045E-07	8,088.49	16,176.99	0.00E+00	1.06E-03	2.11E-03
U-233	2.3739E-09	8,088.49	16,176.99	0.00E+00	1.92E-05	3.84E-05
U-234	1.8423E-04	8,088.49	16,176.99	0.00E+00	1.49E+00	2.98E+00
U-235	-2.7235E-06	8,088.49	0.00	3.42E-02	1.22E-02	3.42E-02
U-236	1.5493E-05	8,088.49	16,176.99	0.00E+00	1.25E-01	2.51E-01
U-238	-4.2851E-09	8,088.49	0.00	2.15E-02	2.14E-02	2.15E-02
Y-90	2.1686E+00	8,088.49	16,176.99	0.00E+00	1.75E+04	3.51E+04
Other Radionuclides					1.76E+04	3.52E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.930E+15
0.0250	4.025E+14
0.0375	3.514E+14
0.0575	3.747E+14
0.0850	2.270E+14
0.1250	1.556E+14
0.2250	1.955E+14
0.3750	8.567E+13
0.5750	1.391E+15
0.8500	3.303E+13
1.2500	1.668E+13
1.7500	6.991E+11
2.2500	8.746E+08
2.7500	5.256E+07
3.5000	3.341E+06
5.0000	7.775E+03
7.0000	8.612E+02
11.0000	9.672E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.19E+02	4.38E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.83740991	60 to 100

Basis for Parameter Differences:

This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		8,088.49
Bounding:		16,176.99

Basis for burnup used in estimate:

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.32	
Bounding:	0.64	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]*Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).*

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAPHIR UALX-HEU (SWITZERLAND)
SNF ID #: 444
Fuel Units & Descr: 76 - MTR TYPE
Heavy Metal Mass: BOL=21.447kg; EOL=12kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1993
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 3.17

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.5861E-10	8,946.30	17,892.61	0.00E+00	4.10E-06	8.21E-06
Am-241	1.7832E-03	8,946.30	17,892.61	0.00E+00	1.60E+01	3.19E+01
Am-242m	4.3410E-07	8,946.30	17,892.61	0.00E+00	3.88E-03	7.77E-03
Am-243	1.4907E-06	8,946.30	17,892.61	0.00E+00	1.33E-02	2.67E-02
C-14	5.7162E-09	8,946.30	17,892.61	0.00E+00	5.11E-05	1.02E-04
Cl-36	1.3124E-32	8,946.30	17,892.61	0.00E+00	1.17E-28	2.35E-28
Cm-243	1.8568E-07	8,946.30	17,892.61	0.00E+00	1.66E-03	3.32E-03
Cm-244	3.5512E-05	8,946.30	17,892.61	0.00E+00	3.18E-01	6.35E-01
Co-60	1.0261E-05	8,946.30	17,892.61	0.00E+00	9.18E-02	1.84E-01
Cs-134	1.6931E-02	8,946.30	17,892.61	0.00E+00	1.51E+02	3.03E+02
Cs-135	3.4477E-06	8,946.30	17,892.61	0.00E+00	3.08E-02	6.17E-02
Cs-137	2.2800E+00	8,946.30	17,892.61	0.00E+00	2.04E+04	4.08E+04
Eu-154	3.6656E-02	8,946.30	17,892.61	0.00E+00	3.28E+02	6.56E+02
Eu-155	9.6841E-03	8,946.30	17,892.61	0.00E+00	8.66E+01	1.73E+02
Fe-55	4.6977E-04	8,946.30	17,892.61	0.00E+00	4.20E+00	8.41E+00
H-3	6.0485E-03	8,946.30	17,892.61	0.00E+00	5.41E+01	1.08E+02
I-129	7.5300E-07	8,946.30	17,892.61	0.00E+00	6.74E-03	1.35E-02
Kr-85	1.4989E-01	8,946.30	17,892.61	0.00E+00	1.34E+03	2.68E+03
Np-237	9.5534E-06	8,946.30	17,892.61	0.00E+00	8.55E-02	1.71E-01
Pa-231	1.6550E-09	8,946.30	17,892.61	0.00E+00	1.48E-05	2.96E-05
Pb-210	2.6631E-11	8,946.30	17,892.61	0.00E+00	2.38E-07	4.77E-07
Pm-147	1.8156E-01	8,946.30	17,892.61	0.00E+00	1.62E+03	3.25E+03
Pu-238	1.8990E-02	8,946.30	17,892.61	0.00E+00	1.70E+02	3.40E+02
Pu-239	4.2838E-04	8,946.30	17,892.61	0.00E+00	3.83E+00	7.66E+00
Pu-240	2.4379E-04	8,946.30	17,892.61	0.00E+00	2.18E+00	4.36E+00
Pu-241	4.2511E-02	8,946.30	17,892.61	0.00E+00	3.80E+02	7.61E+02
Pu-242	3.6329E-07	8,946.30	17,892.61	0.00E+00	3.25E-03	6.50E-03
Ra-226	1.4725E-10	8,946.30	17,892.61	0.00E+00	1.32E-06	2.63E-06
Ra-228	8.9760E-15	8,946.30	17,892.61	0.00E+00	8.03E-11	1.61E-10
Ru-106	1.9752E-04	8,946.30	17,892.61	0.00E+00	1.77E+00	3.53E+00
Se-79	1.2933E-05	8,946.30	17,892.61	0.00E+00	1.16E-01	2.31E-01
Sn-126	1.1574E-05	8,946.30	17,892.61	0.00E+00	1.04E-01	2.07E-01
Sr-90	2.1680E+00	8,946.30	17,892.61	0.00E+00	1.94E+04	3.88E+04
Tc-99	4.2239E-04	8,946.30	17,892.61	0.00E+00	3.78E+00	7.56E+00
Th-229	3.9270E-12	8,946.30	17,892.61	0.00E+00	3.51E-08	7.03E-08
Th-230	3.3578E-08	8,946.30	17,892.61	0.00E+00	3.00E-04	6.01E-04
Th-232	1.5452E-14	8,946.30	17,892.61	0.00E+00	1.38E-10	2.76E-10
Tl-208	4.6705E-08	8,946.30	17,892.61	0.00E+00	4.18E-04	8.36E-04
U-232	1.3045E-07	8,946.30	17,892.61	0.00E+00	1.17E-03	2.33E-03
U-233	2.3739E-09	8,946.30	17,892.61	0.00E+00	2.12E-05	4.25E-05
U-234	1.8423E-04	8,946.30	17,892.61	0.00E+00	1.65E+00	3.30E+00
U-235	-2.7235E-06	8,946.30	0.00	4.20E-02	1.76E-02	4.20E-02
U-238	1.5493E-05	8,946.30	17,892.61	0.00E+00	1.39E-01	2.77E-01
U-238	-4.2851E-09	8,946.30	0.00	6.76E-04	6.38E-04	6.76E-04
Y-90	2.1686E+00	8,946.30	17,892.61	0.00E+00	1.94E+04	3.88E+04
Other Radionuclides					1.95E+04	3.89E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.134E+15
0.0250	4.451E+14
0.0375	3.887E+14
0.0575	4.145E+14
0.0850	2.510E+14
0.1250	1.721E+14
0.2250	2.163E+14
0.3750	9.475E+13
0.5750	1.538E+15
0.8500	3.653E+13
1.2500	1.845E+13
1.7500	7.733E+11
2.2500	9.674E+08
2.7500	5.814E+07
3.5000	3.695E+08
5.0000	8.546E+03
7.0000	9.465E+02
11.0000	1.063E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.42E+02	4.84E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	90.62318257	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		8,946.30	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		17,892.61	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.33	
Bounding:	2.65	

Estimated EOL HM/Given EOL HM: 1.05

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAPHIR ULAX MEU (SWITZERLAND)
SNF ID #: 945
Fuel Units & Descr: 52 - MTR TYPE
Heavy Metal Mass: BOL=35.984kg; EOL=28.808kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1993
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 2.17

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	4.5861E-10	6,795.81	13,591.62	0.00E+00	3.12E-06	6.23E-06
Am-241	1.7832E-03	6,795.81	13,591.62	0.00E+00	1.21E+01	2.42E+01
Am-242m	4.3410E-07	6,795.81	13,591.62	0.00E+00	2.95E-03	5.90E-03
Am-243	1.4907E-06	6,795.81	13,591.62	0.00E+00	1.01E-02	2.03E-02
C-14	5.7162E-09	6,795.81	13,591.62	0.00E+00	3.88E-05	7.77E-05
Cl-36	1.3124E-32	6,795.81	13,591.62	0.00E+00	8.92E-29	1.78E-28
Cm-243	1.8568E-07	6,795.81	13,591.62	0.00E+00	1.26E-03	2.52E-03
Cm-244	3.5512E-05	6,795.81	13,591.62	0.00E+00	2.41E-01	4.83E-01
Co-60	1.0261E-05	6,795.81	13,591.62	0.00E+00	6.97E-02	1.39E-01
Cs-134	1.6931E-02	6,795.81	13,591.62	0.00E+00	1.15E+02	2.30E+02
Cs-135	3.4477E-06	6,795.81	13,591.62	0.00E+00	2.34E-02	4.69E-02
Cs-137	2.2800E+00	6,795.81	13,591.62	0.00E+00	1.55E+04	3.10E+04
Eu-154	3.6656E-02	6,795.81	13,591.62	0.00E+00	2.49E+02	4.98E+02
Eu-155	9.6841E-03	6,795.81	13,591.62	0.00E+00	6.58E+01	1.32E+02
Fe-55	4.6977E-04	6,795.81	13,591.62	0.00E+00	3.19E+00	6.38E+00
H-3	6.0485E-03	6,795.81	13,591.62	0.00E+00	4.11E+01	8.22E+01
I-129	7.5300E-07	6,795.81	13,591.62	0.00E+00	5.12E-03	1.02E-02
Kr-85	1.4989E-01	6,795.81	13,591.62	0.00E+00	1.02E+03	2.04E+03
Np-237	9.5534E-06	6,795.81	13,591.62	0.00E+00	6.49E-02	1.30E-01
Pa-231	1.6550E-09	6,795.81	13,591.62	0.00E+00	1.12E-05	2.25E-05
Pb-210	2.6631E-11	6,795.81	13,591.62	0.00E+00	1.81E-07	3.62E-07
Pm-147	1.8156E-01	6,795.81	13,591.62	0.00E+00	1.23E+03	2.47E+03
Pu-238	1.8990E-02	6,795.81	13,591.62	0.00E+00	1.29E+02	2.58E+02
Pu-239	4.2838E-04	6,795.81	13,591.62	0.00E+00	2.91E+00	5.82E+00
Pu-240	2.4379E-04	6,795.81	13,591.62	0.00E+00	1.66E+00	3.31E+00
Pu-241	4.2511E-02	6,795.81	13,591.62	0.00E+00	2.89E+02	5.78E+02
Pu-242	3.6329E-07	6,795.81	13,591.62	0.00E+00	2.47E-03	4.94E-03
Ra-226	1.4725E-10	6,795.81	13,591.62	0.00E+00	1.00E-06	2.00E-06
Ra-228	8.9760E-15	6,795.81	13,591.62	0.00E+00	6.10E-11	1.22E-10
Ru-106	1.9752E-04	6,795.81	13,591.62	0.00E+00	1.34E+00	2.68E+00
Se-79	1.2933E-05	6,795.81	13,591.62	0.00E+00	8.79E-02	1.76E-01
Sn-126	1.1574E-05	6,795.81	13,591.62	0.00E+00	7.87E-02	1.57E-01
Sr-90	2.1680E+00	6,795.81	13,591.62	0.00E+00	1.47E+04	2.95E+04
Tc-99	4.2239E-04	6,795.81	13,591.62	0.00E+00	2.87E+00	5.74E+00
Th-229	3.9270E-12	6,795.81	13,591.62	0.00E+00	2.67E-06	5.34E-06
Th-230	3.3578E-08	6,795.81	13,591.62	0.00E+00	2.28E-04	4.56E-04
Th-232	1.5452E-14	6,795.81	13,591.62	0.00E+00	1.05E-10	2.10E-10
Tl-208	4.6705E-08	6,795.81	13,591.62	0.00E+00	3.17E-04	6.35E-04
U-232	1.3045E-07	6,795.81	13,591.62	0.00E+00	8.86E-04	1.77E-03
U-233	2.3739E-09	6,795.81	13,591.62	0.00E+00	1.61E-05	3.23E-05
U-234	1.8423E-04	6,795.81	13,591.62	0.00E+00	1.25E+00	2.50E+00
U-235	-2.7235E-06	6,795.81	0.00	3.50E-02	1.65E-02	3.50E-02
U-236	1.5493E-05	6,795.81	13,591.62	0.00E+00	1.05E-01	2.11E-01
U-238	-4.2851E-09	6,795.81	0.00	6.64E-03	6.61E-03	6.64E-03
Y-90	2.1686E+00	6,795.81	13,591.62	0.00E+00	1.47E+04	2.95E+04
Other Radionuclides					1.48E+04	2.96E+04

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.621E+15
0.0250	3.381E+14
0.0375	2.953E+14
0.0575	3.148E+14
0.0850	1.907E+14
0.1250	1.307E+14
0.2250	1.643E+14
0.3750	7.196E+13
0.5750	1.168E+15
0.8500	2.775E+13
1.2500	1.402E+13
1.7500	5.874E+11
2.2500	7.348E+08
2.7500	4.416E+07
3.5000	2.807E+06
5.0000	6.506E+03
7.0000	7.206E+02
11.0000	8.092E+01

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.84E+02	3.68E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	45.07146122	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		6,795.81
Bounding:		13,591.62

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.60	
Bounding:	1.20	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAXTON (MOX SST)
SNF ID #: 883
Fuel Units & Descr: 25 - ELEMENT
Heavy Metal Mass: BOL= ; EOL=95.588kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1972
Estimates as of: 2010
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' = 0.78

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	95.69	95.69	0.00E+00	2.21E-04	2.21E-04	Avg. MeV	
Am-241	8.4448E+00	95.69	95.69	0.00E+00	8.08E+02	8.08E+02	0.0150	2.160E+14
Am-242m	1.6848E-02	95.69	95.69	0.00E+00	1.61E+00	1.61E+00	0.0250	2.333E+13
Am-243	1.6320E-02	95.69	95.69	0.00E+00	1.56E+00	1.56E+00	0.0375	2.059E+13
C-14	1.2090E-01	95.69	95.69	0.00E+00	1.16E+01	1.16E+01	0.0575	3.211E+13
Cl-36	2.2849E-03	95.69	95.69	0.00E+00	2.19E-01	2.19E-01	0.0850	1.256E+13
Cm-243	8.6624E-04	95.69	95.69	0.00E+00	8.29E-02	8.29E-02	0.1250	9.820E+12
Cm-244	1.6848E-01	95.69	95.69	0.00E+00	1.61E+01	1.61E+01	0.2250	1.085E+13
Co-60	2.8086E+01	95.69	95.69	0.00E+00	2.69E+03	2.69E+03	0.3750	4.642E+12
Cs-134	3.4148E-04	95.69	95.69	0.00E+00	3.27E-02	3.27E-02	0.5750	7.543E+13
Cs-135	4.3976E-04	95.69	95.69	0.00E+00	4.21E-02	4.21E-02	0.8500	2.883E+12
Cs-137	2.1049E+01	95.69	95.69	0.00E+00	2.01E+03	2.01E+03	1.2500	2.015E+14
Eu-154	1.2500E+00	95.69	95.69	0.00E+00	1.20E+02	1.20E+02	1.7500	8.913E+10
Eu-155	6.8986E-02	95.69	95.69	0.00E+00	6.60E+00	6.60E+00	2.2500	1.080E+09
Fe-55	2.9308E-01	95.69	95.69	0.00E+00	2.80E+01	2.80E+01	2.7500	2.998E+08
H-3	2.4311E-01	95.69	95.69	0.00E+00	2.33E+01	2.33E+01	3.5000	2.044E+08
I-129	1.0618E-05	95.69	95.69	0.00E+00	1.02E-03	1.02E-03	5.0000	8.631E+05
Kr-85	5.9882E-01	95.69	95.69	0.00E+00	5.73E+01	5.73E+01	7.0000	9.777E+04
Np-237	1.5668E-04	95.69	95.69	0.00E+00	1.50E-02	1.50E-02	11.0000	1.114E+04
Pa-231	2.8656E-06	95.69	95.69	0.00E+00	2.74E-04	2.74E-04		
Pb-210	2.3918E-08	95.69	95.69	0.00E+00	2.29E-06	2.29E-06		
Pm-147	1.6900E-02	95.69	95.69	0.00E+00	1.62E+00	1.62E+00		
Pu-238	-8.6120E-01	95.69	0.00	1.23E+04	1.22E+04	1.23E+04		
Pu-239	-4.8440E-02	95.69	0.00	1.49E+03	1.48E+03	1.49E+03		
Pu-240	-3.0095E-01	95.69	0.00	1.90E+03	1.87E+03	1.90E+03		
Pu-241	-1.0411E+02	95.69	0.00	4.89E+05	4.79E+05	4.89E+05		
Pu-242	-1.1381E-04	95.69	0.00	8.22E+00	8.21E+00	8.22E+00		
Ra-226	6.4400E-08	95.69	95.69	0.00E+00	6.16E-06	6.16E-06		
Ra-228	5.9952E-07	95.69	95.69	0.00E+00	5.74E-05	5.74E-05		
Ru-106	8.5526E-07	95.69	95.69	0.00E+00	8.18E-05	8.18E-05		
Se-79	1.9181E-04	95.69	95.69	0.00E+00	1.84E-02	1.84E-02		
Sn-126	1.6671E-04	95.69	95.69	0.00E+00	1.60E-02	1.60E-02		
Sr-90	1.9799E+01	95.69	95.69	0.00E+00	1.89E+03	1.89E+03		
Tc-99	6.7678E-03	95.69	95.69	0.00E+00	6.48E-01	6.48E-01		
Th-229	1.7488E-08	95.69	95.69	0.00E+00	1.67E-04	1.67E-04		
Th-230	5.8704E-06	95.69	95.69	0.00E+00	5.62E-04	5.62E-04		
Th-232	6.0208E-07	95.69	95.69	0.00E+00	5.76E-05	5.76E-05		
Tl-208	8.7573E-05	95.69	95.69	0.00E+00	8.38E-03	8.38E-03		
U-232	2.3706E-04	95.69	95.69	0.00E+00	2.27E-02	2.27E-02		
U-233	3.6128E-04	95.69	95.69	0.00E+00	3.46E-02	3.46E-02		
U-234	1.2788E-02	95.69	95.69	0.00E+00	1.22E+00	1.22E+00		
U-235	5.7486E-04	95.69	95.69	4.12E-02	9.62E-02	9.62E-02		
U-236	2.3485E-04	95.69	95.69	0.00E+00	2.25E-02	2.25E-02		
U-238	1.1581E-04	95.69	95.69	5.12E-03	1.62E-02	1.62E-02		
Y-90	1.9804E+01	95.69	95.69	0.00E+00	1.89E+03	1.89E+03		
Other Radionuclides					5.90E+03	5.90E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.18E+02	6.22E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	(Worst Case)
Fuel Cladding:	SST	SST/Inconel
BOL HM Constituents:	Pu and U	U, Th, & Pu
BOL Enrichment %:		0 to 100

Basis for Parameter Differences:

This fuel didn't closely match any existing templates, therefore the worst case template was used.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		95.69
Bounding:		95.69

Basis for burnup used in estimate:

Nominal burnup set equal to bounding burnup
Bounding burnup taken from SFD and converted to MWd using BOL=95.588kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.03	
Bounding:	0.03	

Estimated EOL HM/Given EOL HM: 1.40

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAXTON (MOX ZR)
SNF ID #: 787
Fuel Units & Descr: 43 - ELEMENT
Heavy Metal Mass: BOL= ; EOL=239.88kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1972
Estimates as of: 2010
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' = 1.34

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	240.13	240.13	0.00E+00	5.54E-04	5.54E-04	Avg. MeV	
Am-241	8.4448E+00	240.13	240.13	0.00E+00	2.03E+03	2.03E+03	0.0150	5.419E+14
Am-242m	1.6848E-02	240.13	240.13	0.00E+00	4.05E+00	4.05E+00	0.0250	5.856E+13
Am-243	1.6320E-02	240.13	240.13	0.00E+00	3.92E+00	3.92E+00	0.0375	5.167E+13
C-14	1.2090E-01	240.13	240.13	0.00E+00	2.90E+01	2.90E+01	0.0575	8.058E+13
Cl-36	2.2849E-03	240.13	240.13	0.00E+00	5.49E-01	5.49E-01	0.0850	3.152E+13
Cm-243	8.6624E-04	240.13	240.13	0.00E+00	2.08E-01	2.08E-01	0.1250	2.464E+13
Cm-244	1.6848E-01	240.13	240.13	0.00E+00	4.05E+01	4.05E+01	0.2250	2.723E+13
Co-60	2.8086E+01	240.13	240.13	0.00E+00	6.74E+03	6.74E+03	0.3750	1.165E+13
Cs-134	3.4148E-04	240.13	240.13	0.00E+00	8.20E-02	8.20E-02	0.5750	1.893E+14
Cs-135	4.3976E-04	240.13	240.13	0.00E+00	1.06E-01	1.06E-01	0.8500	7.234E+12
Cs-137	2.1049E+01	240.13	240.13	0.00E+00	5.05E+03	5.05E+03	1.2500	5.056E+14
Eu-154	1.2500E+00	240.13	240.13	0.00E+00	3.00E+02	3.00E+02	1.7500	2.237E+11
Eu-155	6.8986E-02	240.13	240.13	0.00E+00	1.66E+01	1.66E+01	2.2500	2.660E+09
Fe-55	2.9308E-01	240.13	240.13	0.00E+00	7.04E+01	7.04E+01	2.7500	7.524E+08
H-3	2.4311E-01	240.13	240.13	0.00E+00	5.84E+01	5.84E+01	3.5000	5.129E+06
I-129	1.0618E-05	240.13	240.13	0.00E+00	2.55E-03	2.55E-03	5.0000	2.166E+06
Kr-85	5.9882E-01	240.13	240.13	0.00E+00	1.44E+02	1.44E+02	7.0000	2.453E+05
Np-237	1.5668E-04	240.13	240.13	0.00E+00	3.76E-02	3.76E-02	11.0000	2.796E+04
Pa-231	2.8656E-06	240.13	240.13	0.00E+00	6.88E-04	6.88E-04		
Pb-210	2.3918E-08	240.13	240.13	0.00E+00	5.74E-06	5.74E-06		
Pm-147	1.6900E-02	240.13	240.13	0.00E+00	4.06E+00	4.06E+00		
Pu-238	-8.6120E-01	240.13	0.00	3.09E+04	3.07E+04	3.09E+04		
Pu-239	-4.8440E-02	240.13	0.00	3.73E+03	3.72E+03	3.73E+03		
Pu-240	-3.0095E-01	240.13	0.00	4.77E+03	4.70E+03	4.77E+03		
Pu-241	-1.0411E+02	240.13	0.00	1.23E+06	1.20E+06	1.23E+06		
Pu-242	-1.1381E-04	240.13	0.00	2.06E+01	2.06E+01	2.06E+01		
Ra-226	6.4400E-08	240.13	240.13	0.00E+00	1.55E-05	1.55E-05		
Ra-228	5.9952E-07	240.13	240.13	0.00E+00	1.44E-04	1.44E-04		
Ru-106	8.5526E-07	240.13	240.13	0.00E+00	2.05E-04	2.05E-04		
Se-79	1.9181E-04	240.13	240.13	0.00E+00	4.61E-02	4.61E-02		
Sn-126	1.6671E-04	240.13	240.13	0.00E+00	4.00E-02	4.00E-02		
Sr-90	1.9799E+01	240.13	240.13	0.00E+00	4.75E+03	4.75E+03		
Tc-99	6.7678E-03	240.13	240.13	0.00E+00	1.63E+00	1.63E+00		
Th-229	1.7488E-06	240.13	240.13	0.00E+00	4.20E-04	4.20E-04		
Th-230	5.8704E-06	240.13	240.13	0.00E+00	1.41E-03	1.41E-03		
Th-232	6.0208E-07	240.13	240.13	0.00E+00	1.45E-04	1.45E-04		
Tl-208	8.7573E-05	240.13	240.13	0.00E+00	2.10E-02	2.10E-02		
U-232	2.3706E-04	240.13	240.13	0.00E+00	5.69E-02	5.69E-02	Thermal Power	
U-233	3.6128E-04	240.13	240.13	0.00E+00	8.68E-02	8.68E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.2788E-02	240.13	240.13	0.00E+00	3.07E+00	3.07E+00		
U-235	5.7486E-04	240.13	240.13	1.03E-01	2.41E-01	2.41E-01	1.85E+03	1.86E+03
U-236	2.3485E-04	240.13	240.13	0.00E+00	5.64E-02	5.64E-02	Total	Total
U-238	1.1581E-04	240.13	240.13	1.29E-02	4.07E-02	4.07E-02		
Y-90	1.9804E+01	240.13	240.13	0.00E+00	4.76E+03	4.76E+03		
Other Radionuclides					1.48E+04	1.48E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	(Worst Case)
Fuel Cladding:	ZIRC	SST/Inconel
BOL HM Constituents:	Pu and U	U, Th, & Pu
BOL Enrichment %:		0 to 100

Basis for Parameter Differences:

This fuel didn't closely match any existing templates, therefore the worst case template was used.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		240.13
Bounding:		240.13

Basis for burnup used in estimate:

Nominal burnup set equal to bounding burnup
Bounding burnup taken from SFD and converted to MWd using BOL=240.132kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.03	
Bounding:	0.03	

Estimated EOL HM/Given EOL HM: 1.40

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAXTON (UO2 SST)
SNF ID #: 882
Fuel Units & Descr: 20 - ELEMENT
Heavy Metal Mass: BOL= ; EOL=10.402kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1972
Estimates as of: 2010
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
[2]Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012682
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 0.69

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3344E-08	16.67	16.67	0.00E+00	3.89E-07	3.89E-07	Avg. MeV	
Am-241	1.1135E-04	16.67	16.67	0.00E+00	1.86E-03	1.86E-03	0.0150	1.245E+12
Am-242m	8.5075E-09	16.67	16.67	0.00E+00	1.42E-07	1.42E-07	0.0250	2.586E+11
Am-243	9.8519E-10	16.67	16.67	0.00E+00	1.64E-08	1.64E-08	0.0375	2.237E+11
C-14	2.3012E-04	16.67	16.67	0.00E+00	3.84E-03	3.84E-03	0.0575	2.411E+11
Cl-36	1.2261E-06	16.67	16.67	0.00E+00	2.04E-05	2.04E-05	0.0850	1.457E+11
Cm-243	2.4875E-10	16.67	16.67	0.00E+00	4.15E-09	4.15E-09	0.1250	9.469E+10
Cm-244	2.3178E-09	16.67	16.67	0.00E+00	3.86E-08	3.86E-08	0.2250	1.258E+11
Co-60	7.0849E-02	16.67	16.67	0.00E+00	1.18E+00	1.18E+00	0.3750	5.469E+10
Cs-134	3.0266E-06	16.67	16.67	0.00E+00	5.05E-05	5.05E-05	0.5750	9.009E+11
Cs-135	3.0316E-05	16.67	16.67	0.00E+00	5.05E-04	5.05E-04	0.8500	9.119E+09
Cs-137	1.4511E+00	16.67	16.67	0.00E+00	2.42E+01	2.42E+01	1.2500	9.064E+10
Eu-154	6.6955E-04	16.67	16.67	0.00E+00	1.12E-02	1.12E-02	1.7500	2.352E+08
Eu-155	6.9850E-04	16.67	16.67	0.00E+00	1.16E-02	1.16E-02	2.2500	4.883E+05
Fe-55	1.2318E-03	16.67	16.67	0.00E+00	2.05E-02	2.05E-02	2.7500	1.412E+04
H-3	2.5141E-03	16.67	16.67	0.00E+00	4.19E-02	4.19E-02	3.5000	2.911E+00
I-129	7.3195E-07	16.67	16.67	0.00E+00	1.22E-05	1.22E-05	5.0000	1.214E+00
Kr-85	4.1281E-02	16.67	16.67	0.00E+00	6.88E-01	6.88E-01	7.0000	1.358E-01
Np-237	1.1489E-06	16.67	16.67	0.00E+00	1.92E-05	1.92E-05	11.0000	1.536E-02
Pa-231	4.5241E-08	16.67	16.67	0.00E+00	7.54E-07	7.54E-07		
Pb-210	6.4476E-13	16.67	16.67	0.00E+00	1.07E-11	1.07E-11		
Pm-147	1.1651E-03	16.67	16.67	0.00E+00	1.94E-02	1.94E-02		
Pu-238	2.9517E-04	16.67	16.67	0.00E+00	4.92E-03	4.92E-03		
Pu-239	6.6772E-04	16.67	16.67	0.00E+00	1.11E-02	1.11E-02		
Pu-240	8.6839E-05	16.67	16.67	0.00E+00	1.45E-03	1.45E-03		
Pu-241	7.1514E-04	16.67	16.67	0.00E+00	1.19E-02	1.19E-02		
Pu-242	1.9717E-09	16.67	16.67	0.00E+00	3.29E-08	3.29E-08		
Ra-226	1.7654E-12	16.67	16.67	0.00E+00	2.94E-11	2.94E-11		
Ra-228	8.2928E-12	16.67	16.67	0.00E+00	1.38E-10	1.38E-10		
Ru-106	1.8419E-10	16.67	16.67	0.00E+00	3.07E-09	3.07E-09		
Se-79	1.3223E-05	16.67	16.67	0.00E+00	2.20E-04	2.20E-04		
Sn-126	1.1493E-05	16.67	16.67	0.00E+00	1.92E-04	1.92E-04		
Sr-90	1.3649E+00	16.67	16.67	0.00E+00	2.28E+01	2.28E+01		
Tc-99	4.6656E-04	16.67	16.67	0.00E+00	7.78E-03	7.78E-03		
Th-229	1.4547E-11	16.67	16.67	0.00E+00	2.43E-10	2.43E-10		
Th-230	1.6617E-10	16.67	16.67	0.00E+00	2.77E-09	2.77E-09		
Th-232	8.3361E-12	16.67	16.67	0.00E+00	1.39E-10	1.39E-10		
Tl-208	2.1664E-08	16.67	16.67	0.00E+00	3.61E-07	3.61E-07		
U-232	5.8669E-08	16.67	16.67	0.00E+00	9.78E-07	9.78E-07	Thermal Power	
U-233	3.1847E-09	16.67	16.67	0.00E+00	5.31E-08	5.31E-08	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	3.8769E-07	16.67	16.67	0.00E+00	6.46E-06	6.46E-06	2.92E-01	2.92E-01
U-235	-2.7761E-06	16.67	0.00	2.10E-02	2.10E-02	2.10E-02	Total	Total
U-236	1.6190E-05	16.67	16.67	0.00E+00	2.70E-04	2.70E-04		
U-238	-2.8547E-09	16.67	0.00	2.28E-04	2.27E-04	2.28E-04		
Y-90	1.3652E+00	16.67	16.67	0.00E+00	2.28E+01	2.28E+01		
Other Radionuclides					2.75E+01	2.75E+01		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	SST	SST
BOL HM Constituents:	U	U
BOL Enrichment %:		60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		16.67
Bounding:		16.67

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup
Bounding burnup taken from SFD and converted to MWd using BOL=10.42kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.03	
Bounding:	0.03	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAXTON (UO2 ZR)
SNF ID #: 788
Fuel Units & Descr: 9 - ELEMENT
Heavy Metal Mass: BOL= ; EOL=41.482kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1972
Estimates as of: 2010
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' 0.31

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	8.7758E-10	66.48	66.48	0.00E+00	5.83E-08	5.83E-08
Am-241	1.4352E-01	66.48	66.48	0.00E+00	9.54E+00	9.54E+00
Am-242m	2.8698E-04	66.48	66.48	0.00E+00	1.91E-02	1.91E-02
Am-243	6.2565E-04	66.48	66.48	0.00E+00	4.16E-02	4.16E-02
C-14	4.7901E-05	66.48	66.48	0.00E+00	3.18E-03	3.18E-03
Cl-36	8.0297E-07	66.48	66.48	0.00E+00	5.34E-05	5.34E-05
Cm-243	2.5081E-04	66.48	66.48	0.00E+00	1.67E-02	1.67E-02
Cm-244	4.9015E-02	66.48	66.48	0.00E+00	3.26E+00	3.26E+00
Co-60	2.5581E-03	66.48	66.48	0.00E+00	1.70E-01	1.70E-01
Cs-134	4.0536E-05	66.48	66.48	0.00E+00	2.69E-03	2.69E-03
Cs-135	1.4433E-05	66.48	66.48	0.00E+00	9.60E-04	9.60E-04
Cs-137	1.3979E+00	66.48	66.48	0.00E+00	9.29E+01	9.29E+01
Eu-154	2.0203E-02	66.48	66.48	0.00E+00	1.34E+00	1.34E+00
Eu-155	1.7684E-03	66.48	66.48	0.00E+00	1.18E-01	1.18E-01
Fe-55	4.3136E-05	66.48	66.48	0.00E+00	2.87E-03	2.87E-03
H-3	2.0769E-02	66.48	66.48	0.00E+00	1.38E+00	1.38E+00
I-129	9.8288E-07	66.48	66.48	0.00E+00	6.53E-05	6.53E-05
Kr-85	2.8214E-02	66.48	66.48	0.00E+00	1.88E+00	1.88E+00
Np-237	1.1218E-05	66.48	66.48	0.00E+00	7.46E-04	7.46E-04
Pa-231	1.3036E-09	66.48	66.48	0.00E+00	8.67E-08	8.67E-08
Pb-210	8.5078E-11	66.48	66.48	0.00E+00	5.66E-09	5.66E-09
Pm-147	3.6531E-04	66.48	66.48	0.00E+00	2.43E-02	2.43E-02
Pu-238	7.4564E-02	66.48	66.48	0.00E+00	4.96E+00	4.96E+00
Pu-239	1.1623E-02	66.48	66.48	0.00E+00	7.73E-01	7.73E-01
Pu-240	1.5132E-02	66.48	66.48	0.00E+00	1.01E+00	1.01E+00
Pu-241	9.0036E-01	66.48	66.48	0.00E+00	5.99E+01	5.99E+01
Pu-242	6.4260E-05	66.48	66.48	0.00E+00	4.27E-03	4.27E-03
Ra-226	2.2804E-10	66.48	66.48	0.00E+00	1.52E-08	1.52E-08
Ra-228	5.2713E-12	66.48	66.48	0.00E+00	3.50E-10	3.50E-10
Ru-106	6.1160E-10	66.48	66.48	0.00E+00	4.07E-08	4.07E-08
Se-79	1.2377E-05	66.48	66.48	0.00E+00	8.23E-04	8.23E-04
Sn-126	2.5210E-05	66.48	66.48	0.00E+00	1.68E-03	1.68E-03
Sr-90	9.1667E-01	66.48	66.48	0.00E+00	6.09E+01	6.09E+01
Tc-99	3.9357E-04	66.48	66.48	0.00E+00	2.62E-02	2.62E-02
Th-229	1.2057E-10	66.48	66.48	0.00E+00	8.02E-09	8.02E-09
Th-230	2.1043E-08	66.48	66.48	0.00E+00	1.40E-06	1.40E-06
Th-232	5.2972E-12	66.48	66.48	0.00E+00	3.52E-10	3.52E-10
Tl-208	1.7474E-07	66.48	66.48	0.00E+00	1.16E-05	1.16E-05
U-232	4.7368E-07	66.48	66.48	0.00E+00	3.15E-05	3.15E-05
U-233	2.5097E-08	66.48	66.48	0.00E+00	1.67E-06	1.67E-06
U-234	5.0000E-05	66.48	66.48	0.00E+00	3.32E-03	3.32E-03
U-235	-1.4489E-06	66.48	0.00	2.87E-03	2.78E-03	2.87E-03
U-236	7.5824E-06	66.48	66.48	0.00E+00	5.04E-04	5.04E-04
U-238	-2.6129E-07	66.48	0.00	1.35E-02	1.35E-02	1.35E-02
Y-90	9.1699E-01	66.48	66.48	0.00E+00	6.10E+01	6.10E+01
Other Radionuclides					8.92E+01	8.92E+01

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.577E+12
0.0250	7.213E+11
0.0375	6.880E+11
0.0575	7.949E+11
0.0850	4.003E+11
0.1250	2.778E+11
0.2250	3.433E+11
0.3750	1.476E+11
0.5750	3.433E+12
0.8500	4.749E+10
1.2500	4.665E+10
1.7500	1.397E+09
2.2500	2.251E+05
2.7500	4.609E+05
3.5000	4.752E+04
5.0000	2.032E+04
7.0000	2.342E+03
11.0000	2.690E+02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.83E+00	1.83E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:		0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		66.48
Bounding:		66.48

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup
Bounding burnup taken from SFD and converted to MWd using BOL=41.552kg

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.05	
Bounding:	0.05	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SHIPPINGPORT PWR C1 BLKT (RODS)
SNF ID #: 189
Fuel Units & Descr: 2 - ROD
Heavy Metal Mass: BOL=16.891kg; EOL=16.108kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1959
Estimates as of: 2010
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' 0.07

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.0733E-09	744.60	1,489.19	0.00E+00	7.99E-07	1.60E-06
Am-241	1.4751E-01	744.60	1,489.19	0.00E+00	1.10E+02	2.20E+02
Am-242m	2.6809E-04	744.60	1,489.19	0.00E+00	2.00E-01	3.99E-01
Am-243	6.2484E-04	744.60	1,489.19	0.00E+00	4.65E-01	9.31E-01
C-14	4.7820E-05	744.60	1,489.19	0.00E+00	3.56E-02	7.12E-02
Cl-36	8.0297E-07	744.60	1,489.19	0.00E+00	5.98E-04	1.20E-03
Cm-243	1.7426E-04	744.60	1,489.19	0.00E+00	1.30E-01	2.60E-01
Cm-244	2.7616E-02	744.60	1,489.19	0.00E+00	2.06E+01	4.11E+01
Co-60	3.5610E-04	744.60	1,489.19	0.00E+00	2.65E-01	5.30E-01
Cs-134	2.6260E-07	744.60	1,489.19	0.00E+00	1.96E-04	3.91E-04
Cs-135	1.4433E-05	744.60	1,489.19	0.00E+00	1.07E-02	2.15E-02
Cs-137	9.8870E-01	744.60	1,489.19	0.00E+00	7.36E+02	1.47E+03
Eu-154	6.0320E-03	744.60	1,489.19	0.00E+00	4.49E+00	8.98E+00
Eu-155	2.1770E-04	744.60	1,489.19	0.00E+00	1.62E-01	3.24E-01
Fe-55	7.9296E-07	744.60	1,489.19	0.00E+00	5.90E-04	1.18E-03
H-3	8.9486E-03	744.60	1,489.19	0.00E+00	6.66E+00	1.33E+01
I-129	9.8288E-07	744.60	1,489.19	0.00E+00	7.32E-04	1.46E-03
Kr-85	1.0707E-02	744.60	1,489.19	0.00E+00	7.97E+00	1.59E+01
Np-237	1.1927E-05	744.60	1,489.19	0.00E+00	8.88E-03	1.78E-02
Pa-231	1.4703E-09	744.60	1,489.19	0.00E+00	1.09E-06	2.19E-06
Pb-210	1.6828E-10	744.60	1,489.19	0.00E+00	1.25E-07	2.51E-07
Pm-147	6.9606E-06	744.60	1,489.19	0.00E+00	5.18E-03	1.04E-02
Pu-238	6.6263E-02	744.60	1,489.19	0.00E+00	4.93E+01	9.87E+01
Pu-239	1.1618E-02	744.60	1,489.19	0.00E+00	8.65E+00	1.73E+01
Pu-240	1.5142E-02	744.60	1,489.19	0.00E+00	1.13E+01	2.25E+01
Pu-241	4.3766E-01	744.60	1,489.19	0.00E+00	3.26E+02	6.52E+02
Pu-242	6.4260E-05	744.60	1,489.19	0.00E+00	4.78E-02	9.57E-02
Ra-226	3.8501E-10	744.60	1,489.19	0.00E+00	2.87E-07	5.73E-07
Ra-228	5.2955E-12	744.60	1,489.19	0.00E+00	3.94E-09	7.89E-09
Ru-106	2.0413E-14	744.60	1,489.19	0.00E+00	1.52E-11	3.04E-11
Se-79	1.2376E-05	744.60	1,489.19	0.00E+00	9.21E-03	1.84E-02
Sn-126	2.5210E-05	744.60	1,489.19	0.00E+00	1.88E-02	3.75E-02
Sr-90	6.4163E-01	744.60	1,489.19	0.00E+00	4.78E+02	9.56E+02
Tc-99	3.9357E-04	744.60	1,489.19	0.00E+00	2.93E-01	5.86E-01
Th-229	1.5644E-10	744.60	1,489.19	0.00E+00	1.16E-07	2.33E-07
Th-230	2.7972E-08	744.60	1,489.19	0.00E+00	2.08E-05	4.17E-05
Th-232	5.3036E-12	744.60	1,489.19	0.00E+00	3.95E-09	7.90E-09
Tl-208	1.5136E-07	744.60	1,489.19	0.00E+00	1.13E-04	2.25E-04
U-232	4.1005E-07	744.60	1,489.19	0.00E+00	3.05E-04	6.11E-04
U-233	2.5856E-08	744.60	1,489.19	0.00E+00	1.93E-05	3.85E-05
U-234	5.2665E-05	744.60	1,489.19	0.00E+00	3.92E-02	7.84E-02
U-235	-1.4487E-06	744.60	0.00	2.60E-04	0.00E+00	2.60E-04
U-236	7.5888E-06	744.60	1,489.19	0.00E+00	5.65E-03	1.13E-02
U-238	-2.6129E-07	744.60	0.00	5.64E-03	5.44E-03	5.64E-03
Y-90	6.4180E-01	744.60	1,489.19	0.00E+00	4.78E+02	9.56E+02
Other Radionuclides					7.10E+02	1.42E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.666E+13
0.0250	1.136E+13
0.0375	1.070E+13
0.0575	1.339E+13
0.0850	6.256E+12
0.1250	4.162E+12
0.2250	5.341E+12
0.3750	2.307E+12
0.5750	5.432E+13
0.8500	5.304E+11
1.2500	3.375E+11
1.7500	1.484E+10
2.2500	2.439E+06
2.7500	8.597E+06
3.5000	6.133E+05
5.0000	2.621E+05
7.0000	3.020E+04
11.0000	3.467E+03

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.35E+01	2.69E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	0.710999907	0 to 5

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		744.60	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	304.04	1,489.19	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	1.26	
Bounding:	2.52	4.90

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SLOWPOKE (HEU) CANADA
SNF ID #: 296
Fuel Units & Descr: 1 - 297 ROD ARRAY
Heavy Metal Mass: BOL=0.875kg; EOL=0.87kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 0.04

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	12.53	25.06	0.00E+00	1.82E-09	3.64E-09
Am-241	1.1190E-03	12.53	25.06	0.00E+00	1.40E-02	2.80E-02
Am-242m	4.5425E-07	12.53	25.06	0.00E+00	5.69E-06	1.14E-05
Am-243	1.4921E-06	12.53	25.06	0.00E+00	1.87E-05	3.74E-05
C-14	5.7244E-09	12.53	25.06	0.00E+00	7.17E-08	1.43E-07
Cl-36	1.3124E-32	12.53	25.06	0.00E+00	1.64E-31	3.29E-31
Cm-243	2.3676E-07	12.53	25.06	0.00E+00	2.97E-06	5.93E-06
Cm-244	5.2042E-05	12.53	25.06	0.00E+00	6.52E-04	1.30E-03
Co-60	3.8208E-05	12.53	25.06	0.00E+00	4.79E-04	9.57E-04
Cs-134	4.8693E-01	12.53	25.06	0.00E+00	6.10E+00	1.22E+01
Cs-135	3.4477E-06	12.53	25.06	0.00E+00	4.32E-05	8.64E-05
Cs-137	2.8731E+00	12.53	25.06	0.00E+00	3.60E+01	7.20E+01
Eu-154	8.2053E-02	12.53	25.06	0.00E+00	1.03E+00	2.06E+00
Eu-155	3.9134E-02	12.53	25.06	0.00E+00	4.90E-01	9.81E-01
Fe-55	6.7429E-03	12.53	25.06	0.00E+00	8.45E-02	1.69E-01
H-3	1.0599E-02	12.53	25.06	0.00E+00	1.33E-01	2.66E-01
I-129	7.5300E-07	12.53	25.06	0.00E+00	9.43E-06	1.89E-05
Kr-85	2.8595E-01	12.53	25.06	0.00E+00	3.58E+00	7.16E+00
Np-237	9.5479E-06	12.53	25.06	0.00E+00	1.20E-04	2.39E-04
Pa-231	8.9297E-10	12.53	25.06	0.00E+00	1.12E-08	2.24E-08
Pb-210	3.7609E-12	12.53	25.06	0.00E+00	4.71E-11	9.42E-11
Pm-147	2.5452E+00	12.53	25.06	0.00E+00	3.19E+01	6.38E+01
Pu-238	2.0550E-02	12.53	25.06	0.00E+00	2.57E-01	5.15E-01
Pu-239	4.2838E-04	12.53	25.06	0.00E+00	5.37E-03	1.07E-02
Pu-240	2.4401E-04	12.53	25.06	0.00E+00	3.06E-03	6.11E-03
Pu-241	6.8764E-02	12.53	25.06	0.00E+00	8.61E-01	1.72E+00
Pu-242	3.6329E-07	12.53	25.06	0.00E+00	4.55E-06	9.10E-06
Ra-226	3.8045E-11	12.53	25.06	0.00E+00	4.77E-10	9.53E-10
Ra-228	2.9902E-15	12.53	25.06	0.00E+00	3.75E-14	7.49E-14
Ru-106	1.9055E-01	12.53	25.06	0.00E+00	2.39E+00	4.77E+00
Se-79	1.2936E-05	12.53	25.06	0.00E+00	1.62E-04	3.24E-04
Sn-126	1.1574E-05	12.53	25.06	0.00E+00	1.45E-04	2.90E-04
Sr-90	2.7505E+00	12.53	25.06	0.00E+00	3.45E+01	6.89E+01
Tc-99	4.2239E-04	12.53	25.06	0.00E+00	5.29E-03	1.06E-02
Th-229	1.8848E-12	12.53	25.06	0.00E+00	2.36E-11	4.72E-11
Th-230	1.7042E-08	12.53	25.06	0.00E+00	2.14E-07	4.27E-07
Th-232	7.8132E-15	12.53	25.06	0.00E+00	9.79E-14	1.96E-13
Tl-208	4.4063E-08	12.53	25.06	0.00E+00	5.52E-07	1.10E-06
U-232	1.3151E-07	12.53	25.06	0.00E+00	1.65E-06	3.30E-06
U-233	1.9564E-09	12.53	25.06	0.00E+00	2.45E-08	4.90E-08
U-234	1.8371E-04	12.53	25.06	0.00E+00	2.30E-03	4.60E-03
U-235	-2.7235E-06	12.53	0.00	1.78E-03	1.75E-03	1.78E-03
U-236	1.5493E-05	12.53	25.06	0.00E+00	1.94E-04	3.88E-04
U-238	-4.2851E-09	12.53	0.00	1.68E-05	1.68E-05	1.68E-05
Y-90	2.7505E+00	12.53	25.06	0.00E+00	3.45E+01	6.89E+01
Other Radionuclides					6.44E+01	1.29E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.834E+12
0.0250	1.041E+12
0.0375	9.610E+11
0.0575	9.450E+11
0.0850	6.024E+11
0.1250	5.217E+11
0.2250	5.106E+11
0.3750	2.472E+11
0.5750	3.395E+12
0.8500	4.754E+11
1.2500	8.845E+10
1.7500	3.709E+09
2.2500	7.780E+09
2.7500	4.476E+07
3.5000	4.964E+06
5.0000	1.490E+01
7.0000	1.661E+00
11.0000	1.873E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.35E-01	1.27E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	94.28571429	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	12.53	4.74
Bounding:		25.06

Basis for burnup used in estimate:
Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.05	0.38
Bounding:	0.09	

Estimated EOL HM/Given EOL HM: 0.99

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SLOWPOKE (HEU) CANADA
SNF ID #: 1065
Fuel Units & Descr: 1 - 297 ROD ARRAY
Heavy Metal Mass: BOL=0.875kg; EOL=0.87kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2010
Estimates as of: 2010
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"x18" 0.04

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	12.53	25.06	0.00E+00	1.82E-09	3.64E-09	Avg. MeV	
Am-241	1.1190E-03	12.53	25.06	0.00E+00	1.40E-02	2.80E-02	0.0150	4.834E+12
Am-242m	4.5425E-07	12.53	25.06	0.00E+00	5.69E-06	1.14E-05	0.0250	1.041E+12
Am-243	1.4921E-06	12.53	25.06	0.00E+00	1.87E-05	3.74E-05	0.0375	9.610E+11
C-14	5.7244E-09	12.53	25.06	0.00E+00	7.17E-08	1.43E-07	0.0575	9.450E+11
Cl-36	1.3124E-32	12.53	25.06	0.00E+00	1.64E-31	3.29E-31	0.0850	6.024E+11
Cm-243	2.3676E-07	12.53	25.06	0.00E+00	2.97E-06	5.93E-06	0.1250	5.217E+11
Cm-244	5.2042E-05	12.53	25.06	0.00E+00	6.52E-04	1.30E-03	0.2250	5.106E+11
Co-60	3.8208E-05	12.53	25.06	0.00E+00	4.79E-04	9.57E-04	0.3750	2.472E+11
Cs-134	4.8693E-01	12.53	25.06	0.00E+00	6.10E+00	1.22E+01	0.5750	3.395E+12
Cs-135	3.4477E-06	12.53	25.06	0.00E+00	4.32E-05	8.64E-05	0.8500	4.754E+11
Cs-137	2.8731E+00	12.53	25.06	0.00E+00	3.60E+01	7.20E+01	1.2500	8.845E+10
Eu-154	8.2053E-02	12.53	25.06	0.00E+00	1.03E+00	2.06E+00	1.7500	3.709E+09
Eu-155	3.9134E-02	12.53	25.06	0.00E+00	4.90E-01	9.81E-01	2.2500	7.780E+09
Fe-55	6.7429E-03	12.53	25.06	0.00E+00	8.45E-02	1.69E-01	2.7500	4.476E+07
H-3	1.0599E-02	12.53	25.06	0.00E+00	1.33E-01	2.66E-01	3.5000	4.964E+08
I-129	7.5300E-07	12.53	25.06	0.00E+00	9.43E-06	1.89E-05	5.0000	1.490E+01
Kr-85	2.8595E-01	12.53	25.06	0.00E+00	3.58E+00	7.16E+00	7.0000	1.661E+00
Np-237	9.5479E-06	12.53	25.06	0.00E+00	1.20E-04	2.39E-04	11.0000	1.873E-01
Pa-231	8.9297E-10	12.53	25.06	0.00E+00	1.12E-08	2.24E-08		
Pb-210	3.7609E-12	12.53	25.06	0.00E+00	4.71E-11	9.42E-11		
Pm-147	2.5452E+00	12.53	25.06	0.00E+00	3.19E+01	6.38E+01		
Pu-238	2.0550E-02	12.53	25.06	0.00E+00	2.57E-01	5.15E-01		
Pu-239	4.2838E-04	12.53	25.06	0.00E+00	5.37E-03	1.07E-02		
Pu-240	2.4401E-04	12.53	25.06	0.00E+00	3.06E-03	6.11E-03		
Pu-241	6.8764E-02	12.53	25.06	0.00E+00	8.61E-01	1.72E+00		
Pu-242	3.6329E-07	12.53	25.06	0.00E+00	4.55E-06	9.10E-06		
Ra-226	3.8045E-11	12.53	25.06	0.00E+00	4.77E-10	9.53E-10		
Ra-228	2.9902E-15	12.53	25.06	0.00E+00	3.75E-14	7.49E-14		
Ru-106	1.9055E-01	12.53	25.06	0.00E+00	2.39E+00	4.77E+00		
Se-79	1.2936E-05	12.53	25.06	0.00E+00	1.62E-04	3.24E-04		
Sn-126	1.1574E-05	12.53	25.06	0.00E+00	1.45E-04	2.90E-04		
Sr-90	2.7505E+00	12.53	25.06	0.00E+00	3.45E+01	6.89E+01		
Tc-99	4.2239E-04	12.53	25.06	0.00E+00	5.29E-03	1.06E-02		
Th-229	1.8848E-12	12.53	25.06	0.00E+00	2.36E-11	4.72E-11		
Th-230	1.7042E-08	12.53	25.06	0.00E+00	2.14E-07	4.27E-07		
Th-232	7.8132E-15	12.53	25.06	0.00E+00	9.79E-14	1.96E-13		
Tl-208	4.4063E-08	12.53	25.06	0.00E+00	5.52E-07	1.10E-06		
U-232	1.3151E-07	12.53	25.06	0.00E+00	1.65E-06	3.30E-06		
U-233	1.9564E-09	12.53	25.06	0.00E+00	2.45E-08	4.90E-08		
U-234	1.8371E-04	12.53	25.06	0.00E+00	2.30E-03	4.60E-03		
U-235	-2.7235E-06	12.53	0.00	1.78E-03	1.75E-03	1.78E-03		
U-238	1.5493E-05	12.53	25.06	0.00E+00	1.94E-04	3.88E-04		
U-238	-4.2851E-09	12.53	0.00	1.68E-05	1.68E-05	1.68E-05		
Y-90	2.7505E+00	12.53	25.06	0.00E+00	3.45E+01	6.89E+01		
Other Radionuclides					6.44E+01	1.29E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.35E-01	1.27E+00
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	94.28571429	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	12.53	4.74
Bounding:		25.06

Basis for burnup used in estimate:
Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.05	0.38
Bounding:	0.09	

Estimated EOL HM/Given EOL HM: 0.99

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SPERT-III
SNF ID #: 209
Fuel Units & Descr: 3 - CANISTER OF SCRAP
Heavy Metal Mass: BOL= ; EOL=9.74kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1966
Estimates as of: 2010
Template: PWR (Light Water, Zirc, 0 to 5%, U)
[2]Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time: 35 years

Estimated Canister usage: HIC = 1.00

II. Estimates

	a	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	9,262.37	9,262.37	0.00E+00	8.13E-06	8.13E-06
Am-241	1.4352E-01	9,262.37	9,262.37	0.00E+00	1.33E+03	1.33E+03
Am-242m	2.8698E-04	9,262.37	9,262.37	0.00E+00	2.66E+00	2.66E+00
Am-243	6.2565E-04	9,262.37	9,262.37	0.00E+00	5.79E+00	5.79E+00
C-14	4.7901E-05	9,262.37	9,262.37	0.00E+00	4.44E-01	4.44E-01
Cl-36	8.0297E-07	9,262.37	9,262.37	0.00E+00	7.44E-03	7.44E-03
Cm-243	2.5061E-04	9,262.37	9,262.37	0.00E+00	2.32E+00	2.32E+00
Cm-244	4.9015E-02	9,262.37	9,262.37	0.00E+00	4.54E+02	4.54E+02
Co-60	2.5581E-03	9,262.37	9,262.37	0.00E+00	2.37E+01	2.37E+01
Cs-134	4.0536E-05	9,262.37	9,262.37	0.00E+00	3.75E-01	3.75E-01
Cs-135	1.4433E-05	9,262.37	9,262.37	0.00E+00	1.34E-01	1.34E-01
Cs-137	1.3979E+00	9,262.37	9,262.37	0.00E+00	1.29E+04	1.29E+04
Eu-154	2.0203E-02	9,262.37	9,262.37	0.00E+00	1.87E+02	1.87E+02
Eu-155	1.7684E-03	9,262.37	9,262.37	0.00E+00	1.64E+01	1.64E+01
Fe-55	4.3136E-05	9,262.37	9,262.37	0.00E+00	4.00E-01	4.00E-01
H-3	2.0769E-02	9,262.37	9,262.37	0.00E+00	1.92E+02	1.92E+02
I-129	9.8288E-07	9,262.37	9,262.37	0.00E+00	9.10E-03	9.10E-03
Kr-85	2.8214E-02	9,262.37	9,262.37	0.00E+00	2.61E+02	2.61E+02
Np-237	1.1218E-05	9,262.37	9,262.37	0.00E+00	1.04E-01	1.04E-01
Pa-231	1.3036E-09	9,262.37	9,262.37	0.00E+00	1.21E-05	1.21E-05
Pb-210	8.5078E-11	9,262.37	9,262.37	0.00E+00	7.88E-07	7.88E-07
Pm-147	3.6531E-04	9,262.37	9,262.37	0.00E+00	3.38E+00	3.38E+00
Pu-238	7.4564E-02	9,262.37	9,262.37	0.00E+00	6.91E+02	6.91E+02
Pu-239	1.1623E-02	9,262.37	9,262.37	0.00E+00	1.08E+02	1.08E+02
Pu-240	1.5132E-02	9,262.37	9,262.37	0.00E+00	1.40E+02	1.40E+02
Pu-241	9.0036E-01	9,262.37	9,262.37	0.00E+00	8.34E+03	8.34E+03
Pu-242	6.4260E-05	9,262.37	9,262.37	0.00E+00	5.95E-01	5.95E-01
Ra-226	2.2804E-10	9,262.37	9,262.37	0.00E+00	2.11E-06	2.11E-06
Ra-228	5.2713E-12	9,262.37	9,262.37	0.00E+00	4.88E-08	4.88E-08
Ru-106	6.1160E-10	9,262.37	9,262.37	0.00E+00	5.66E-06	5.66E-06
Se-79	1.2377E-05	9,262.37	9,262.37	0.00E+00	1.15E-01	1.15E-01
Sn-126	2.5210E-05	9,262.37	9,262.37	0.00E+00	2.34E-01	2.34E-01
Sr-90	9.1667E-01	9,262.37	9,262.37	0.00E+00	8.49E+03	8.49E+03
Tc-99	3.9357E-04	9,262.37	9,262.37	0.00E+00	3.65E+00	3.65E+00
Th-229	1.2057E-10	9,262.37	9,262.37	0.00E+00	1.12E-06	1.12E-06
Th-230	2.1043E-08	9,262.37	9,262.37	0.00E+00	1.95E-04	1.95E-04
Th-232	5.2972E-12	9,262.37	9,262.37	0.00E+00	4.91E-08	4.91E-08
Tl-208	1.7474E-07	9,262.37	9,262.37	0.00E+00	1.62E-03	1.62E-03
U-232	4.7368E-07	9,262.37	9,262.37	0.00E+00	4.39E-03	4.39E-03
U-233	2.5097E-08	9,262.37	9,262.37	0.00E+00	2.32E-04	2.32E-04
U-234	5.0000E-05	9,262.37	9,262.37	0.00E+00	4.63E-01	4.63E-01
U-235	-1.4489E-06	9,262.37	0.00	1.35E-03	0.00E+00	1.35E-03
U-236	7.5824E-06	9,262.37	9,262.37	0.00E+00	7.02E-02	7.02E-02
U-238	-2.6129E-07	9,262.37	0.00	6.33E-03	3.91E-03	6.33E-03
Y-90	9.1699E-01	9,262.37	9,262.37	0.00E+00	8.49E+03	8.49E+03
Other Radionuclides					1.24E+04	1.24E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.984E+14
0.0250	1.005E+14
0.0375	9.585E+13
0.0575	1.107E+14
0.0850	5.576E+13
0.1250	3.870E+13
0.2250	4.782E+13
0.3750	2.056E+13
0.5750	4.782E+14
0.8500	6.616E+12
1.2500	6.499E+12
1.7500	1.946E+11
2.2500	3.134E+07
2.7500	6.420E+07
3.5000	6.611E+06
5.0000	2.826E+06
7.0000	3.258E+05
11.0000	3.742E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.13E+02	2.13E+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 %:		0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment (unknown).

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		9,262.37
Bounding:		9,262.37

Basis for burnup used in estimate:
Nominal burnup set equal to bounding burnup.
Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	13.58	
Bounding:	13.58	

Estimated EOL HM/Given EOL HM: 1.58

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: THOR (UALX-HEU) TAIWAN
SNF ID #: 629
Fuel Units & Descr: 35 - MTR TYPE
Heavy Metal Mass: BOL=5.061kg; EOL=4.098kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1997
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 10 years

Estimated Canister usage: 18"x10' 1.46

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.2892E-09	918.72	1,837.45	0.00E+00	1.18E-06	2.37E-06
Am-241	2.9429E-03	918.72	1,837.45	0.00E+00	2.70E+00	5.41E+00
Am-242m	1.9489E-06	918.72	1,837.45	0.00E+00	1.79E-03	3.58E-03
Am-243	2.3308E-07	918.72	1,837.45	0.00E+00	2.14E-04	4.28E-04
C-14	4.3278E-05	918.72	1,837.45	0.00E+00	3.98E-02	7.95E-02
Cl-36	4.3023E-08	918.72	1,837.45	0.00E+00	3.95E-05	7.91E-05
Cm-243	2.4286E-07	918.72	1,837.45	0.00E+00	2.23E-04	4.46E-04
Cm-244	2.6015E-06	918.72	1,837.45	0.00E+00	2.39E-03	4.78E-03
Co-60	1.6075E-02	918.72	1,837.45	0.00E+00	1.48E+01	2.95E+01
Cs-134	1.9323E-02	918.72	1,837.45	0.00E+00	1.78E+01	3.55E+01
Cs-135	3.1549E-05	918.72	1,837.45	0.00E+00	2.90E-02	5.80E-02
Cs-137	2.4556E+00	918.72	1,837.45	0.00E+00	2.26E+03	4.51E+03
Eu-154	9.0180E-01	918.72	1,837.45	0.00E+00	8.29E+02	1.66E+03
Eu-155	2.1820E-01	918.72	1,837.45	0.00E+00	2.00E+02	4.01E+02
Fe-55	2.2902E-03	918.72	1,837.45	0.00E+00	2.10E+00	4.21E+00
H-3	8.1609E-03	918.72	1,837.45	0.00E+00	7.50E+00	1.50E+01
I-129	7.3805E-07	918.72	1,837.45	0.00E+00	6.78E-04	1.36E-03
Kr-85	1.8256E-01	918.72	1,837.45	0.00E+00	1.68E+02	3.35E+02
Np-237	1.4505E-06	918.72	1,837.45	0.00E+00	1.33E-03	2.67E-03
Pa-231	4.5564E-09	918.72	1,837.45	0.00E+00	4.19E-06	8.37E-06
Pb-210	1.8842E-14	918.72	1,837.45	0.00E+00	1.73E-11	3.46E-11
Pm-147	5.5459E-01	918.72	1,837.45	0.00E+00	5.10E+02	1.02E+03
Pu-238	1.2992E-03	918.72	1,837.45	0.00E+00	1.19E+00	2.39E+00
Pu-239	5.6932E-03	918.72	1,837.45	0.00E+00	5.23E+00	1.05E+01
Pu-240	2.2632E-03	918.72	1,837.45	0.00E+00	2.08E+00	4.16E+00
Pu-241	9.8857E-02	918.72	1,837.45	0.00E+00	9.08E+01	1.82E+02
Pu-242	3.0602E-07	918.72	1,837.45	0.00E+00	2.81E-04	5.62E-04
Ra-226	1.0823E-13	918.72	1,837.45	0.00E+00	9.94E-11	1.99E-10
Ra-228	2.0406E-10	918.72	1,837.45	0.00E+00	1.87E-07	3.75E-07
Ru-106	3.0180E-03	918.72	1,837.45	0.00E+00	2.77E+00	5.55E+00
Se-79	1.2937E-05	918.72	1,837.45	0.00E+00	1.19E-02	2.38E-02
Sn-126	1.2238E-05	918.72	1,837.45	0.00E+00	1.12E-02	2.25E-02
Sr-90	2.3098E+00	918.72	1,837.45	0.00E+00	2.12E+03	4.24E+03
Tc-99	4.4120E-04	918.72	1,837.45	0.00E+00	4.05E-01	8.11E-01
Th-229	2.0932E-10	918.72	1,837.45	0.00E+00	1.92E-07	3.85E-07
Th-230	2.7744E-11	918.72	1,837.45	0.00E+00	2.55E-08	5.10E-08
Th-232	2.3744E-10	918.72	1,837.45	0.00E+00	2.18E-07	4.36E-07
Tl-208	1.9459E-08	918.72	1,837.45	0.00E+00	1.79E-05	3.58E-05
U-232	5.3850E-08	918.72	1,837.45	0.00E+00	4.95E-05	9.89E-05
U-233	1.3135E-07	918.72	1,837.45	0.00E+00	1.21E-04	2.41E-04
U-234	1.9143E-07	918.72	1,837.45	0.00E+00	1.76E-04	3.52E-04
U-235	-2.6159E-06	918.72	0.00	1.02E-02	7.79E-03	1.02E-02
U-236	1.2719E-05	918.72	1,837.45	0.00E+00	1.17E-02	2.34E-02
U-238	-3.8857E-08	918.72	0.00	1.16E-04	8.06E-05	1.16E-04
Y-90	2.3098E+00	918.72	1,837.45	0.00E+00	2.12E+03	4.24E+03
Other Radionuclides					2.42E+03	4.85E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.470E+14
0.0250	5.166E+13
0.0375	6.101E+13
0.0575	5.045E+13
0.0850	3.279E+13
0.1250	4.538E+13
0.2250	2.879E+13
0.3750	1.185E+13
0.5750	1.765E+14
0.8500	3.215E+13
1.2500	3.535E+13
1.7500	1.014E+12
2.2500	2.411E+09
2.7500	4.728E+07
3.5000	5.768E+06
5.0000	1.041E+03
7.0000	1.177E+02
11.0000	1.340E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.41E+01	6.82E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.16330608	10 to 20.1

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		918.72
Bounding:		1,837.45

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	4.91	
Bounding:	9.83	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: TRR-1 (UALX-HEU) THAILAND
SNF ID #: 633
Fuel Units & Descr: 31 - MTR TYPE
Heavy Metal Mass: BOL=5.295kg; EOL=4.771kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1998
Estimates as of: 2010
Template: TRIGA-Al (LW/U-Zrx, Alum., 10 to 20%, U)
[2]Template Burnup(MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 10 years

Estimated Canister usage: 18"x10' 1.29

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.2892E-09	500.07	1,000.14	0.00E+00	6.45E-07	1.29E-06
Am-241	2.9429E-03	500.07	1,000.14	0.00E+00	1.47E+00	2.94E+00
Am-242m	1.9489E-06	500.07	1,000.14	0.00E+00	9.75E-04	1.95E-03
Am-243	2.3308E-07	500.07	1,000.14	0.00E+00	1.17E-04	2.33E-04
C-14	4.3278E-05	500.07	1,000.14	0.00E+00	2.16E-02	4.33E-02
Cl-36	4.3023E-08	500.07	1,000.14	0.00E+00	2.15E-05	4.30E-05
Cm-243	2.4286E-07	500.07	1,000.14	0.00E+00	1.21E-04	2.43E-04
Cm-244	2.6015E-06	500.07	1,000.14	0.00E+00	1.30E-03	2.60E-03
Co-60	1.6075E-02	500.07	1,000.14	0.00E+00	8.04E+00	1.61E+01
Cs-134	1.9323E-02	500.07	1,000.14	0.00E+00	9.66E+00	1.93E+01
Cs-135	3.1549E-05	500.07	1,000.14	0.00E+00	1.58E-02	3.16E-02
Cs-137	2.4556E+00	500.07	1,000.14	0.00E+00	1.23E+03	2.46E+03
Eu-154	9.0180E-01	500.07	1,000.14	0.00E+00	4.51E+02	9.02E+02
Eu-155	2.1820E-01	500.07	1,000.14	0.00E+00	1.09E+02	2.18E+02
Fe-55	2.2902E-03	500.07	1,000.14	0.00E+00	1.15E+00	2.29E+00
H-3	8.1609E-03	500.07	1,000.14	0.00E+00	4.08E+00	8.16E+00
I-129	7.3805E-07	500.07	1,000.14	0.00E+00	3.69E-04	7.38E-04
Kr-85	1.8256E-01	500.07	1,000.14	0.00E+00	9.13E+01	1.83E+02
Np-237	1.4505E-06	500.07	1,000.14	0.00E+00	7.25E-04	1.45E-03
Pa-231	4.5564E-09	500.07	1,000.14	0.00E+00	2.28E-06	4.56E-06
Pb-210	1.8842E-14	500.07	1,000.14	0.00E+00	9.42E-12	1.88E-11
Pm-147	5.5459E-01	500.07	1,000.14	0.00E+00	2.77E+02	5.55E+02
Pu-238	1.2992E-03	500.07	1,000.14	0.00E+00	6.50E-01	1.30E+00
Pu-239	5.6932E-03	500.07	1,000.14	0.00E+00	2.85E+00	5.69E+00
Pu-240	2.2632E-03	500.07	1,000.14	0.00E+00	1.13E+00	2.26E+00
Pu-241	9.8857E-02	500.07	1,000.14	0.00E+00	4.94E+01	9.89E+01
Pu-242	3.0602E-07	500.07	1,000.14	0.00E+00	1.53E-04	3.06E-04
Ra-226	1.0823E-13	500.07	1,000.14	0.00E+00	5.41E-11	1.08E-10
Ra-228	2.0406E-10	500.07	1,000.14	0.00E+00	1.02E-07	2.04E-07
Ru-106	3.0180E-03	500.07	1,000.14	0.00E+00	1.51E+00	3.02E+00
Se-79	1.2937E-05	500.07	1,000.14	0.00E+00	6.47E-03	1.29E-02
Sn-126	1.2238E-05	500.07	1,000.14	0.00E+00	6.12E-03	1.22E-02
Sr-90	2.3098E+00	500.07	1,000.14	0.00E+00	1.16E+03	2.31E+03
Tc-99	4.4120E-04	500.07	1,000.14	0.00E+00	2.21E-01	4.41E-01
Th-229	2.0932E-10	500.07	1,000.14	0.00E+00	1.05E-07	2.09E-07
Th-230	2.7744E-11	500.07	1,000.14	0.00E+00	1.39E-08	2.77E-08
Th-232	2.3744E-10	500.07	1,000.14	0.00E+00	1.19E-07	2.37E-07
Tl-206	1.9459E-06	500.07	1,000.14	0.00E+00	9.73E-06	1.95E-05
U-232	5.3850E-06	500.07	1,000.14	0.00E+00	2.69E-05	5.39E-05
U-233	1.3135E-07	500.07	1,000.14	0.00E+00	6.57E-05	1.31E-04
U-234	1.9143E-07	500.07	1,000.14	0.00E+00	9.57E-05	1.91E-04
U-235	-2.6159E-06	500.07	0.00	1.03E-02	6.98E-03	1.03E-02
U-236	1.2719E-05	500.07	1,000.14	0.00E+00	6.36E-03	1.27E-02
U-238	-3.8857E-08	500.07	0.00	1.80E-04	1.60E-04	1.80E-04
Y-90	2.3098E+00	500.07	1,000.14	0.00E+00	1.16E+03	2.31E+03
Other Radionuclides					1.32E+03	2.64E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.345E+14
0.0250	2.812E+13
0.0375	3.321E+13
0.0575	2.746E+13
0.0850	1.785E+13
0.1250	2.470E+13
0.2250	1.567E+13
0.3750	6.448E+12
0.5750	9.606E+13
0.8500	1.750E+13
1.2500	1.924E+13
1.7500	5.517E+11
2.2500	1.313E+09
2.7500	2.574E+07
3.5000	3.140E+06
5.0000	5.672E+02
7.0000	6.411E+01
11.0000	7.297E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.85E+01	3.71E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	89.90758798	10 to 20.1

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		500.07
Bounding:		1,000.14

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	2.56	
Bounding:	5.11	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UMRR (HEU) ROLLA
SNF ID #: 881
Fuel Units & Descr: 28 - 24 CURVED PLATES
Heavy Metal Mass: BOL=5.096kg; EOL=4.771kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1996
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' 1.17

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.8404E-10	307.59	615.18	0.00E+00	8.74E-08	1.75E-07
Am-241	1.4935E-03	307.59	615.18	0.00E+00	4.59E-01	9.19E-01
Am-242m	4.4390E-07	307.59	615.18	0.00E+00	1.37E-04	2.73E-04
Am-243	1.4913E-06	307.59	615.18	0.00E+00	4.59E-04	9.17E-04
C-14	5.7217E-09	307.59	615.18	0.00E+00	1.76E-06	3.52E-06
Cl-36	1.3124E-32	307.59	615.18	0.00E+00	4.04E-30	8.07E-30
Cm-243	2.0967E-07	307.59	615.18	0.00E+00	6.45E-05	1.29E-04
Cm-244	4.3001E-05	307.59	615.18	0.00E+00	1.32E-02	2.65E-02
Co-60	1.9798E-05	307.59	615.18	0.00E+00	6.09E-03	1.22E-02
Cs-134	9.0795E-02	307.59	615.18	0.00E+00	2.79E+01	5.59E+01
Cs-135	3.4477E-06	307.59	615.18	0.00E+00	1.06E-03	2.12E-03
Cs-137	2.5588E+00	307.59	615.18	0.00E+00	7.87E+02	1.57E+03
Eu-154	5.4847E-02	307.59	615.18	0.00E+00	1.69E+01	3.37E+01
Eu-155	1.9469E-02	307.59	615.18	0.00E+00	5.99E+00	1.20E+01
Fe-55	1.7797E-03	307.59	615.18	0.00E+00	5.47E-01	1.09E+00
H-3	8.0065E-03	307.59	615.18	0.00E+00	2.46E+00	4.93E+00
I-129	7.5300E-07	307.59	615.18	0.00E+00	2.32E-04	4.63E-04
Kr-85	2.0705E-01	307.59	615.18	0.00E+00	6.37E+01	1.27E+02
Np-237	9.5507E-06	307.59	615.18	0.00E+00	2.94E-03	5.88E-03
Pa-231	1.2740E-09	307.59	615.18	0.00E+00	3.92E-07	7.84E-07
Pb-210	1.1838E-11	307.59	615.18	0.00E+00	3.64E-09	7.28E-09
Pm-147	6.7974E-01	307.59	615.18	0.00E+00	2.09E+02	4.18E+02
Pu-238	1.9755E-02	307.59	615.18	0.00E+00	6.08E+00	1.22E+01
Pu-239	4.2838E-04	307.59	615.18	0.00E+00	1.32E-01	2.64E-01
Pu-240	2.4390E-04	307.59	615.18	0.00E+00	7.50E-02	1.50E-01
Pu-241	5.4058E-02	307.59	615.18	0.00E+00	1.66E+01	3.33E+01
Pu-242	3.6329E-07	307.59	615.18	0.00E+00	1.12E-04	2.23E-04
Ra-226	8.3742E-11	307.59	615.18	0.00E+00	2.58E-08	5.15E-08
Ra-228	5.7734E-15	307.59	615.18	0.00E+00	1.78E-12	3.55E-12
Ru-106	6.1356E-03	307.59	615.18	0.00E+00	1.89E+00	3.77E+00
Se-79	1.2936E-05	307.59	615.18	0.00E+00	3.98E-03	7.96E-03
Sn-126	1.1574E-05	307.59	615.18	0.00E+00	3.56E-03	7.12E-03
Sr-90	2.4417E+00	307.59	615.18	0.00E+00	7.51E+02	1.50E+03
Tc-99	4.2239E-04	307.59	615.18	0.00E+00	1.30E-01	2.60E-01
Th-229	2.8568E-12	307.59	615.18	0.00E+00	8.79E-10	1.76E-09
Th-230	2.5310E-08	307.59	615.18	0.00E+00	7.79E-06	1.56E-05
Th-232	1.1631E-14	307.59	615.18	0.00E+00	3.58E-12	7.16E-12
Tl-208	4.6705E-08	307.59	615.18	0.00E+00	1.44E-05	2.87E-05
U-232	1.3151E-07	307.59	615.18	0.00E+00	4.05E-05	8.09E-05
U-233	2.1650E-09	307.59	615.18	0.00E+00	6.66E-07	1.33E-06
U-234	1.8399E-04	307.59	615.18	0.00E+00	5.66E-02	1.13E-01
U-235	-2.7235E-06	307.59	0.00	1.03E-02	9.45E-03	1.03E-02
U-236	1.5493E-05	307.59	615.18	0.00E+00	4.77E-03	9.53E-03
U-238	-4.2851E-09	307.59	0.00	1.13E-04	1.12E-04	1.13E-04
Y-90	2.4423E+00	307.59	615.18	0.00E+00	7.51E+02	1.50E+03
Other Radionuclides					7.65E+02	1.53E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	8.367E+13
0.0250	1.761E+13
0.0375	1.535E+13
0.0575	1.622E+13
0.0850	9.867E+12
0.1250	6.902E+12
0.2250	8.473E+12
0.3750	3.798E+12
0.5750	6.165E+13
0.8500	3.007E+12
1.2500	9.788E+11
1.7500	3.574E+10
2.2500	2.363E+09
2.7500	3.297E+07
3.5000	3.925E+08
5.0000	3.264E+02
7.0000	3.627E+01
11.0000	4.080E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.73E+00	1.95E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.40659341	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		307.59
Bounding:		615.18

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.19	
Bounding:	0.38	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UMRR (LEU) ROLLA
SNF ID #: 146
Fuel Units & Descr: 28 - 24 CURVED PLATES
Heavy Metal Mass: BOL=31.898kg; EOL=26.46kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 0.78

II. Estimates

	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	1.4545E-10	5,149.51	10,299.02	0.00E+00	7.49E-07	1.50E-06
Am-241	1.1190E-03	5,149.51	10,299.02	0.00E+00	5.76E+00	1.15E+01
Am-242m	4.5425E-07	5,149.51	10,299.02	0.00E+00	2.34E-03	4.68E-03
Am-243	1.4921E-06	5,149.51	10,299.02	0.00E+00	7.68E-03	1.54E-02
C-14	5.7244E-09	5,149.51	10,299.02	0.00E+00	2.95E-05	5.90E-05
Cl-36	1.3124E-32	5,149.51	10,299.02	0.00E+00	6.76E-29	1.35E-28
Cm-243	2.3676E-07	5,149.51	10,299.02	0.00E+00	1.22E-03	2.44E-03
Cm-244	5.2042E-05	5,149.51	10,299.02	0.00E+00	2.68E-01	5.36E-01
Co-60	3.8208E-05	5,149.51	10,299.02	0.00E+00	1.97E-01	3.94E-01
Cs-134	4.8693E-01	5,149.51	10,299.02	0.00E+00	2.51E+03	5.01E+03
Cs-135	3.4477E-06	5,149.51	10,299.02	0.00E+00	1.78E-02	3.55E-02
Cs-137	2.8731E+00	5,149.51	10,299.02	0.00E+00	1.48E+04	2.96E+04
Eu-154	8.2053E-02	5,149.51	10,299.02	0.00E+00	4.23E+02	8.45E+02
Eu-155	3.9134E-02	5,149.51	10,299.02	0.00E+00	2.02E+02	4.03E+02
Fe-55	6.7429E-03	5,149.51	10,299.02	0.00E+00	3.47E+01	6.94E+01
H-3	1.0599E-02	5,149.51	10,299.02	0.00E+00	5.46E+01	1.09E+02
I-129	7.5300E-07	5,149.51	10,299.02	0.00E+00	3.88E-03	7.76E-03
Kr-85	2.8595E-01	5,149.51	10,299.02	0.00E+00	1.47E+03	2.94E+03
Np-237	9.5479E-06	5,149.51	10,299.02	0.00E+00	4.92E-02	9.83E-02
Pa-231	8.9297E-10	5,149.51	10,299.02	0.00E+00	4.60E-06	9.20E-06
Pb-210	3.7609E-12	5,149.51	10,299.02	0.00E+00	1.94E-08	3.87E-08
Pm-147	2.5452E+00	5,149.51	10,299.02	0.00E+00	1.31E+04	2.62E+04
Pu-238	2.0550E-02	5,149.51	10,299.02	0.00E+00	1.06E+02	2.12E+02
Pu-239	4.2838E-04	5,149.51	10,299.02	0.00E+00	2.21E+00	4.41E+00
Pu-240	2.4401E-04	5,149.51	10,299.02	0.00E+00	1.26E+00	2.51E+00
Pu-241	6.8764E-02	5,149.51	10,299.02	0.00E+00	3.54E+02	7.08E+02
Pu-242	3.6329E-07	5,149.51	10,299.02	0.00E+00	1.87E-03	3.74E-03
Ra-226	3.8045E-11	5,149.51	10,299.02	0.00E+00	1.96E-07	3.92E-07
Ra-228	2.9902E-15	5,149.51	10,299.02	0.00E+00	1.54E-11	3.08E-11
Ru-106	1.9055E-01	5,149.51	10,299.02	0.00E+00	9.81E+02	1.96E+03
Se-79	1.2936E-05	5,149.51	10,299.02	0.00E+00	6.66E-02	1.33E-01
Sn-126	1.1574E-05	5,149.51	10,299.02	0.00E+00	5.96E-02	1.19E-01
Sr-90	2.7505E+00	5,149.51	10,299.02	0.00E+00	1.42E+04	2.83E+04
Tc-99	4.2239E-04	5,149.51	10,299.02	0.00E+00	2.18E+00	4.35E+00
Th-229	1.8848E-12	5,149.51	10,299.02	0.00E+00	9.71E-09	1.94E-08
Th-230	1.7042E-08	5,149.51	10,299.02	0.00E+00	8.78E-05	1.76E-04
Th-232	7.8132E-15	5,149.51	10,299.02	0.00E+00	4.02E-11	8.05E-11
Tl-208	4.4063E-08	5,149.51	10,299.02	0.00E+00	2.27E-04	4.54E-04
U-232	1.3151E-07	5,149.51	10,299.02	0.00E+00	6.77E-04	1.35E-03
U-233	1.9564E-09	5,149.51	10,299.02	0.00E+00	1.01E-05	2.01E-05
U-234	1.8371E-04	5,149.51	10,299.02	0.00E+00	9.46E-01	1.89E+00
U-235	-2.7235E-06	5,149.51	0.00	1.36E-02	0.00E+00	1.36E-02
U-236	1.5493E-05	5,149.51	10,299.02	0.00E+00	7.98E-02	1.60E-01
U-238	-4.2851E-09	5,149.51	0.00	8.60E-03	8.58E-03	8.60E-03
Y-90	2.7505E+00	5,149.51	10,299.02	0.00E+00	1.42E+04	2.83E+04
Other Radionuclides					2.65E+04	5.30E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.987E+15
0.0250	4.281E+14
0.0375	3.950E+14
0.0575	3.884E+14
0.0850	2.476E+14
0.1250	2.144E+14
0.2250	2.099E+14
0.3750	1.016E+14
0.5750	1.395E+15
0.8500	1.954E+14
1.2500	3.636E+13
1.7500	1.525E+12
2.2500	3.198E+12
2.7500	1.840E+10
3.5000	2.040E+09
5.0000	6.119E+03
7.0000	6.822E+02
11.0000	7.690E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.61E+02	5.22E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.7500078	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		5,149.51
Bounding:		10,299.02

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.51	
Bounding:	1.03	

Estimated EOL HM/Given EOL HM: 1.02

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF FLORIDA (ARGONAUT) HEU
SNF ID #: 272
Fuel Units & Descr: 259 - ELEMENT
Heavy Metal Mass: BOL=4.144kg; EOL=4.092kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2010
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"x18" 7.19

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	49.06	98.11	0.00E+00	7.14E-09	1.43E-08
Am-241	1.1190E-03	49.06	98.11	0.00E+00	5.49E-02	1.10E-01
Am-242m	4.5425E-07	49.06	98.11	0.00E+00	2.23E-05	4.46E-05
Am-243	1.4921E-06	49.06	98.11	0.00E+00	7.32E-05	1.46E-04
C-14	5.7244E-09	49.06	98.11	0.00E+00	2.81E-07	5.62E-07
Cl-36	1.3124E-32	49.06	98.11	0.00E+00	6.44E-31	1.29E-30
Cm-243	2.3676E-07	49.06	98.11	0.00E+00	1.16E-05	2.32E-05
Cm-244	5.2042E-05	49.06	98.11	0.00E+00	2.55E-03	5.11E-03
Co-60	3.8208E-05	49.06	98.11	0.00E+00	1.87E-03	3.75E-03
Cs-134	4.8693E-01	49.06	98.11	0.00E+00	2.39E+01	4.78E+01
Cs-135	3.4477E-06	49.06	98.11	0.00E+00	1.69E-04	3.38E-04
Cs-137	2.8731E+00	49.06	98.11	0.00E+00	1.41E+02	2.82E+02
Eu-154	8.2053E-02	49.06	98.11	0.00E+00	4.03E+00	8.05E+00
Eu-155	3.9134E-02	49.06	98.11	0.00E+00	1.92E+00	3.84E+00
Fe-55	6.7429E-03	49.06	98.11	0.00E+00	3.31E-01	6.62E-01
H-3	1.0599E-02	49.06	98.11	0.00E+00	5.20E-01	1.04E+00
I-129	7.5300E-07	49.06	98.11	0.00E+00	3.69E-05	7.39E-05
Kr-85	2.8595E-01	49.06	98.11	0.00E+00	1.40E+01	2.81E+01
Np-237	9.5479E-06	49.06	98.11	0.00E+00	4.68E-04	9.37E-04
Pa-231	8.9297E-10	49.06	98.11	0.00E+00	4.38E-08	8.76E-08
Pb-210	3.7609E-12	49.06	98.11	0.00E+00	1.84E-10	3.69E-10
Pm-147	2.5452E+00	49.06	98.11	0.00E+00	1.25E+02	2.50E+02
Pu-238	2.0550E-02	49.06	98.11	0.00E+00	1.01E+00	2.02E+00
Pu-239	4.2838E-04	49.06	98.11	0.00E+00	2.10E-02	4.20E-02
Pu-240	2.4401E-04	49.06	98.11	0.00E+00	1.20E-02	2.39E-02
Pu-241	6.8764E-02	49.06	98.11	0.00E+00	3.37E+00	6.75E+00
Pu-242	3.6329E-07	49.06	98.11	0.00E+00	1.78E-05	3.56E-05
Ra-226	3.8045E-11	49.06	98.11	0.00E+00	1.87E-09	3.73E-09
Ra-228	2.9902E-15	49.06	98.11	0.00E+00	1.47E-13	2.93E-13
Ru-106	1.9055E-01	49.06	98.11	0.00E+00	9.35E+00	1.87E+01
Se-79	1.2936E-05	49.06	98.11	0.00E+00	6.35E-04	1.27E-03
Sn-126	1.1574E-05	49.06	98.11	0.00E+00	5.68E-04	1.14E-03
Sr-90	2.7505E+00	49.06	98.11	0.00E+00	1.35E+02	2.70E+02
Tc-99	4.2239E-04	49.06	98.11	0.00E+00	2.07E-02	4.14E-02
Th-229	1.8848E-12	49.06	98.11	0.00E+00	9.25E-11	1.85E-10
Th-230	1.7042E-08	49.06	98.11	0.00E+00	8.36E-07	1.67E-06
Th-232	7.8132E-15	49.06	98.11	0.00E+00	3.83E-13	7.67E-13
Tl-208	4.4063E-08	49.06	98.11	0.00E+00	2.16E-06	4.32E-06
U-232	1.3151E-07	49.06	98.11	0.00E+00	6.45E-06	1.29E-05
U-233	1.9564E-09	49.06	98.11	0.00E+00	9.60E-08	1.92E-07
U-234	1.8371E-04	49.06	98.11	0.00E+00	9.01E-03	1.80E-02
U-235	-2.7235E-06	49.06	0.00	8.34E-03	8.21E-03	8.34E-03
U-236	1.5493E-05	49.06	98.11	0.00E+00	7.60E-04	1.52E-03
U-238	-4.2851E-09	49.06	0.00	9.54E-05	9.52E-05	9.54E-05
Y-90	2.7505E+00	49.06	98.11	0.00E+00	1.35E+02	2.70E+02
Other Radionuclides					2.52E+02	5.05E+02

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.893E+13
0.0250	4.078E+12
0.0375	3.763E+12
0.0575	3.700E+12
0.0850	2.359E+12
0.1250	2.043E+12
0.2250	1.999E+12
0.3750	9.677E+11
0.5750	1.329E+13
0.8500	1.862E+12
1.2500	3.463E+11
1.7500	1.452E+10
2.2500	3.046E+10
2.7500	1.753E+08
3.5000	1.944E+07
5.0000	5.844E+01
7.0000	6.515E+00
11.0000	7.344E-01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.49E+09	4.97E+09
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.15	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	28.18	49.06
Bounding:		98.11

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.04	1.74
Bounding:	0.08	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF FLORIDA (ARGONAUT) LEU
SNF ID #: 273
Fuel Units & Descr: 14 - ELEMENT
Heavy Metal Mass: *BOL=0.995kg; EOL=0.995kg*
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' = 0.58

II. Estimates

Radionuclide	m: Ci/MWd From Template	x_n: Nominal Fuel Burnup (MWd)[2]	x_b: Bounding Fuel Burnup (MWd)[2]	b: Initial Activity (Ci)	y_n: Nominal Fuel Inventories(Ci)	y_b: Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	0.60	1.19	0.00E+00	8.69E-11	1.74E-10
Am-241	1.1190E-03	0.60	1.19	0.00E+00	6.68E-04	1.34E-03
Am-242m	4.5425E-07	0.60	1.19	0.00E+00	2.71E-07	5.43E-07
Am-243	1.4921E-06	0.60	1.19	0.00E+00	8.91E-07	1.78E-06
C-14	5.7244E-09	0.60	1.19	0.00E+00	3.42E-09	6.84E-09
Cl-36	1.3124E-32	0.60	1.19	0.00E+00	7.84E-33	1.57E-32
Cm-243	2.3676E-07	0.60	1.19	0.00E+00	1.41E-07	2.83E-07
Cm-244	5.2042E-05	0.60	1.19	0.00E+00	3.11E-05	6.22E-05
Co-60	3.8208E-05	0.60	1.19	0.00E+00	2.28E-05	4.56E-05
Cs-134	4.8693E-01	0.60	1.19	0.00E+00	2.91E-01	5.82E-01
Cs-135	3.4477E-06	0.60	1.19	0.00E+00	2.06E-06	4.12E-06
Cs-137	2.8731E+00	0.60	1.19	0.00E+00	1.72E+00	3.43E+00
Eu-154	8.2053E-02	0.60	1.19	0.00E+00	4.90E-02	9.80E-02
Eu-155	3.9134E-02	0.60	1.19	0.00E+00	2.34E-02	4.67E-02
Fe-55	6.7429E-03	0.60	1.19	0.00E+00	4.03E-03	8.05E-03
H-3	1.0599E-02	0.60	1.19	0.00E+00	6.33E-03	1.27E-02
I-129	7.5300E-07	0.60	1.19	0.00E+00	4.50E-07	8.99E-07
Kr-85	2.8595E-01	0.60	1.19	0.00E+00	1.71E-01	3.42E-01
Np-237	9.5479E-06	0.60	1.19	0.00E+00	5.70E-06	1.14E-05
Pa-231	8.9297E-10	0.60	1.19	0.00E+00	5.33E-10	1.07E-09
Pb-210	3.7609E-12	0.60	1.19	0.00E+00	2.25E-12	4.49E-12
Pm-147	2.5452E+00	0.60	1.19	0.00E+00	1.52E+00	3.04E+00
Pu-238	2.0550E-02	0.60	1.19	0.00E+00	1.23E-02	2.45E-02
Pu-239	4.2838E-04	0.60	1.19	0.00E+00	2.56E-04	5.12E-04
Pu-240	2.4401E-04	0.60	1.19	0.00E+00	1.46E-04	2.91E-04
Pu-241	6.8764E-02	0.60	1.19	0.00E+00	4.11E-02	8.21E-02
Pu-242	3.6329E-07	0.60	1.19	0.00E+00	2.17E-07	4.34E-07
Ra-226	3.8045E-11	0.60	1.19	0.00E+00	2.27E-11	4.54E-11
Ra-228	2.9902E-15	0.60	1.19	0.00E+00	1.79E-15	3.57E-15
Ru-106	1.9055E-01	0.60	1.19	0.00E+00	1.14E-01	2.28E-01
Se-79	1.2936E-05	0.60	1.19	0.00E+00	7.73E-06	1.55E-05
Sn-126	1.1574E-05	0.60	1.19	0.00E+00	6.91E-06	1.38E-05
Sr-90	2.7505E+00	0.60	1.19	0.00E+00	1.64E+00	3.29E+00
Tc-99	4.2239E-04	0.60	1.19	0.00E+00	2.52E-04	5.05E-04
Th-229	1.8848E-12	0.60	1.19	0.00E+00	1.13E-12	2.25E-12
Th-230	1.7042E-08	0.60	1.19	0.00E+00	1.02E-08	2.04E-08
Th-232	7.8132E-15	0.60	1.19	0.00E+00	4.67E-15	9.33E-15
Tl-208	4.4063E-08	0.60	1.19	0.00E+00	2.63E-08	5.26E-08
U-232	1.3151E-07	0.60	1.19	0.00E+00	7.85E-08	1.57E-07
U-233	1.9564E-09	0.60	1.19	0.00E+00	1.17E-09	2.34E-09
U-234	1.8371E-04	0.60	1.19	0.00E+00	1.10E-04	2.19E-04
U-235	-2.7235E-06	0.60	0.00	4.27E-04	4.25E-04	4.27E-04
U-236	1.5493E-05	0.60	1.19	0.00E+00	9.25E-06	1.85E-05
U-238	-4.2851E-09	0.60	0.00	2.68E-04	2.68E-04	2.68E-04
Y-90	2.7505E+00	0.60	1.19	0.00E+00	1.64E+00	3.29E+00
Other Radionuclides					3.07E+00	6.14E+00

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.305E+11
0.0250	4.965E+10
0.0375	4.581E+10
0.0575	4.505E+10
0.0850	2.872E+10
0.1250	2.487E+10
0.2250	2.435E+10
0.3750	1.178E+10
0.5750	1.618E+11
0.8500	2.266E+10
1.2500	4.217E+09
1.7500	1.768E+08
2.2500	3.709E+06
2.7500	2.134E+06
3.5000	2.366E+05
5.0000	1.327E+00
7.0000	1.502E-01
11.0000	1.710E-02

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.83E-02	6.06E-02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.8359342	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:	0.60	
Bounding:		1.19

Basis for burnup used in estimate:
Nominal burnup taken directly from SFD (converted to MWd).
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	0.00
Bounding:	0.00	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF MASS-LOWELL (HEU)
SNF ID #: 274
Fuel Units & Descr: 34 - 18 FLAT PLATES
Heavy Metal Mass: BOL=4.784kg; EOL=4.498kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.94

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	270.47	540.94	0.00E+00	3.93E-08	7.87E-08
Am-241	1.1190E-03	270.47	540.94	0.00E+00	3.03E-01	6.05E-01
Am-242m	4.5425E-07	270.47	540.94	0.00E+00	1.23E-04	2.46E-04
Am-243	1.4921E-06	270.47	540.94	0.00E+00	4.04E-04	8.07E-04
C-14	5.7244E-09	270.47	540.94	0.00E+00	1.55E-06	3.10E-06
Cl-36	1.3124E-32	270.47	540.94	0.00E+00	3.55E-30	7.10E-30
Cm-243	2.3676E-07	270.47	540.94	0.00E+00	6.40E-05	1.28E-04
Cm-244	5.2042E-05	270.47	540.94	0.00E+00	1.41E-02	2.82E-02
Co-60	3.8208E-05	270.47	540.94	0.00E+00	1.03E-02	2.07E-02
Cs-134	4.8693E-01	270.47	540.94	0.00E+00	1.32E+02	2.63E+02
Cs-135	3.4477E-06	270.47	540.94	0.00E+00	9.32E-04	1.86E-03
Cs-137	2.8731E+00	270.47	540.94	0.00E+00	7.77E+02	1.55E+03
Eu-154	8.2053E-02	270.47	540.94	0.00E+00	2.22E+01	4.44E+01
Eu-155	3.9134E-02	270.47	540.94	0.00E+00	1.06E+01	2.12E+01
Fe-55	6.7429E-03	270.47	540.94	0.00E+00	1.82E+00	3.65E+00
H-3	1.0599E-02	270.47	540.94	0.00E+00	2.87E+00	5.73E+00
I-129	7.5300E-07	270.47	540.94	0.00E+00	2.04E-04	4.07E-04
Kr-85	2.8595E-01	270.47	540.94	0.00E+00	7.73E+01	1.55E+02
Np-237	9.5479E-06	270.47	540.94	0.00E+00	2.58E-03	5.16E-03
Pa-231	8.9297E-10	270.47	540.94	0.00E+00	2.42E-07	4.83E-07
Pb-210	3.7609E-12	270.47	540.94	0.00E+00	1.02E-09	2.03E-09
Pm-147	2.5452E+00	270.47	540.94	0.00E+00	6.88E+02	1.38E+03
Pu-238	2.0550E-02	270.47	540.94	0.00E+00	5.56E+00	1.11E+01
Pu-239	4.2838E-04	270.47	540.94	0.00E+00	1.16E-01	2.32E-01
Pu-240	2.4401E-04	270.47	540.94	0.00E+00	6.60E-02	1.32E-01
Pu-241	6.8764E-02	270.47	540.94	0.00E+00	1.86E+01	3.72E+01
Pu-242	3.6329E-07	270.47	540.94	0.00E+00	9.83E-05	1.97E-04
Ra-226	3.8045E-11	270.47	540.94	0.00E+00	1.03E-08	2.06E-08
Ra-228	2.9902E-15	270.47	540.94	0.00E+00	8.09E-13	1.62E-12
Ru-106	1.9055E-01	270.47	540.94	0.00E+00	5.15E+01	1.03E+02
Se-79	1.2936E-05	270.47	540.94	0.00E+00	3.50E-03	7.00E-03
Sn-126	1.1574E-05	270.47	540.94	0.00E+00	3.13E-03	6.26E-03
Sr-90	2.7505E+00	270.47	540.94	0.00E+00	7.44E+02	1.49E+03
Tc-99	4.2239E-04	270.47	540.94	0.00E+00	1.14E-01	2.28E-01
Th-229	1.8848E-12	270.47	540.94	0.00E+00	5.10E-10	1.02E-09
Th-230	1.7042E-06	270.47	540.94	0.00E+00	4.61E-06	9.22E-06
Th-232	7.8132E-15	270.47	540.94	0.00E+00	2.11E-12	4.23E-12
Tl-208	4.4063E-06	270.47	540.94	0.00E+00	1.19E-05	2.38E-05
U-232	1.3151E-07	270.47	540.94	0.00E+00	3.56E-05	7.11E-05
U-233	1.9564E-09	270.47	540.94	0.00E+00	5.29E-07	1.06E-06
U-234	1.8371E-04	270.47	540.94	0.00E+00	4.97E-02	9.94E-02
U-235	-2.7235E-06	270.47	0.00	9.63E-03	8.89E-03	9.63E-03
U-236	1.5493E-05	270.47	540.94	0.00E+00	4.19E-03	8.38E-03
U-238	-4.2851E-09	270.47	0.00	1.10E-04	1.09E-04	1.10E-04
Y-90	2.7505E+00	270.47	540.94	0.00E+00	7.44E+02	1.49E+03
Other Radionuclides					1.39E+03	2.78E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.044E+14
0.0250	2.248E+13
0.0375	2.075E+13
0.0575	2.040E+13
0.0850	1.301E+13
0.1250	1.126E+13
0.2250	1.102E+13
0.3750	5.336E+12
0.5750	7.329E+13
0.8500	1.026E+13
1.2500	1.910E+12
1.7500	8.008E+10
2.2500	1.680E+11
2.7500	9.663E+08
3.5000	1.072E+08
5.0000	3.207E+02
7.0000	3.576E+01
11.0000	4.030E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.37E+01	2.74E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	93.16325044	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		270.47
Bounding:		540.94

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.18	
Bounding:	0.36	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF MASS-LOWELL (LEU)
SNF ID #: 275
Fuel Units & Descr: 41 - 18 FLAT PLATES
Heavy Metal Mass: BOL=14.321kg; EOL=14.321kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 1.14

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	271.25	542.50	0.00E+00	3.95E-08	7.89E-08
Am-241	1.1190E-03	271.25	542.50	0.00E+00	3.04E-01	6.07E-01
Am-242m	4.5425E-07	271.25	542.50	0.00E+00	1.23E-04	2.46E-04
Am-243	1.4921E-06	271.25	542.50	0.00E+00	4.05E-04	8.09E-04
C-14	5.7244E-09	271.25	542.50	0.00E+00	1.55E-06	3.11E-06
Cl-36	1.3124E-32	271.25	542.50	0.00E+00	3.56E-30	7.12E-30
Cm-243	2.3676E-07	271.25	542.50	0.00E+00	6.42E-05	1.28E-04
Cm-244	5.2042E-05	271.25	542.50	0.00E+00	1.41E-02	2.82E-02
Co-60	3.8208E-05	271.25	542.50	0.00E+00	1.04E-02	2.07E-02
Cs-134	4.8693E-01	271.25	542.50	0.00E+00	1.32E+02	2.64E+02
Cs-135	3.4477E-06	271.25	542.50	0.00E+00	9.35E-04	1.87E-03
Cs-137	2.8731E+00	271.25	542.50	0.00E+00	7.79E+02	1.56E+03
Eu-154	8.2053E-02	271.25	542.50	0.00E+00	2.23E+01	4.45E+01
Eu-155	3.9134E-02	271.25	542.50	0.00E+00	1.06E+01	2.12E+01
Fe-55	6.7429E-03	271.25	542.50	0.00E+00	1.83E+00	3.66E+00
H-3	1.0599E-02	271.25	542.50	0.00E+00	2.88E+00	5.75E+00
I-129	7.5300E-07	271.25	542.50	0.00E+00	2.04E-04	4.09E-04
Kr-85	2.8595E-01	271.25	542.50	0.00E+00	7.76E+01	1.55E+02
Np-237	9.5479E-06	271.25	542.50	0.00E+00	2.59E-03	5.18E-03
Pa-231	8.9297E-10	271.25	542.50	0.00E+00	2.42E-07	4.84E-07
Pb-210	3.7609E-12	271.25	542.50	0.00E+00	1.02E-09	2.04E-09
Pm-147	2.5452E+00	271.25	542.50	0.00E+00	6.90E+02	1.38E+03
Pu-238	2.0550E-02	271.25	542.50	0.00E+00	5.57E+00	1.11E+01
Pu-239	4.2838E-04	271.25	542.50	0.00E+00	1.16E-01	2.32E-01
Pu-240	2.4401E-04	271.25	542.50	0.00E+00	6.62E-02	1.32E-01
Pu-241	6.8764E-02	271.25	542.50	0.00E+00	1.87E+01	3.73E+01
Pu-242	3.6329E-07	271.25	542.50	0.00E+00	9.85E-05	1.97E-04
Ra-226	3.8045E-11	271.25	542.50	0.00E+00	1.03E-08	2.06E-08
Ra-228	2.9902E-15	271.25	542.50	0.00E+00	8.11E-13	1.62E-12
Ru-106	1.9055E-01	271.25	542.50	0.00E+00	5.17E+01	1.03E+02
Se-79	1.2936E-05	271.25	542.50	0.00E+00	3.51E-03	7.02E-03
Sn-126	1.1574E-05	271.25	542.50	0.00E+00	3.14E-03	6.28E-03
Sr-90	2.7505E+00	271.25	542.50	0.00E+00	7.46E+02	1.49E+03
Tc-99	4.2239E-04	271.25	542.50	0.00E+00	1.15E-01	2.29E-01
Th-229	1.8848E-12	271.25	542.50	0.00E+00	5.11E-10	1.02E-09
Th-230	1.7042E-08	271.25	542.50	0.00E+00	4.62E-06	9.25E-06
Th-232	7.8132E-15	271.25	542.50	0.00E+00	2.12E-12	4.24E-12
Tl-208	4.4063E-08	271.25	542.50	0.00E+00	1.20E-05	2.39E-05
U-232	1.3151E-07	271.25	542.50	0.00E+00	3.57E-05	7.13E-05
U-233	1.9564E-09	271.25	542.50	0.00E+00	5.31E-07	1.06E-06
U-234	1.8371E-04	271.25	542.50	0.00E+00	4.98E-02	9.97E-02
U-235	-2.7235E-06	271.25	0.00	6.10E-03	5.36E-03	6.10E-03
U-236	1.5493E-05	271.25	542.50	0.00E+00	4.20E-03	8.40E-03
U-238	-4.2851E-09	271.25	0.00	3.86E-03	3.86E-03	3.86E-03
Y-90	2.7505E+00	271.25	542.50	0.00E+00	7.46E+02	1.49E+03
Other Radionuclides					1.40E+03	2.79E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.047E+14
0.0250	2.255E+13
0.0375	2.081E+13
0.0575	2.046E+13
0.0850	1.304E+13
0.1250	1.130E+13
0.2250	1.105E+13
0.3750	5.351E+12
0.5750	7.350E+13
0.8500	1.029E+13
1.2500	1.915E+12
1.7500	8.031E+10
2.2500	1.684E+11
2.7500	9.691E+08
3.5000	1.075E+08
5.0000	3.302E+02
7.0000	3.684E+01
11.0000	4.155E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.38E+01	2.75E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.71401492	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		271.25
Bounding:		542.50

Basis for burnup used in estimate:
Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.06	
Bounding:	0.12	

Estimated EOL HM/Given EOL HM: 0.98

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF MICHIGAN
SNF ID #: 276
Fuel Units & Descr: 130 - 18 CURVED PLATES
Heavy Metal Mass: BOL=100.854kg; EOL=89.882kg
RCD Storage Site: SRS

[1]Fuel decay start date: 1992
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 5.42

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	10,390.70	20,781.39	0.00E+00	4.77E-06	9.53E-06	Avg. MeV	
Am-241	1.7832E-03	10,390.70	20,781.39	0.00E+00	1.85E+01	3.71E+01	0.0150	2.479E+15
Am-242m	4.3410E-07	10,390.70	20,781.39	0.00E+00	4.51E-03	9.02E-03	0.0250	5.170E+14
Am-243	1.4907E-06	10,390.70	20,781.39	0.00E+00	1.55E-02	3.10E-02	0.0375	4.514E+14
C-14	5.7162E-09	10,390.70	20,781.39	0.00E+00	5.94E-05	1.19E-04	0.0575	4.814E+14
Cl-36	1.3124E-32	10,390.70	20,781.39	0.00E+00	1.36E-28	2.73E-28	0.0850	2.916E+14
Cm-243	1.8568E-07	10,390.70	20,781.39	0.00E+00	1.93E-03	3.86E-03	0.1250	1.999E+14
Cm-244	3.5512E-05	10,390.70	20,781.39	0.00E+00	3.69E-01	7.38E-01	0.2250	2.512E+14
Co-60	1.0261E-05	10,390.70	20,781.39	0.00E+00	1.07E-01	2.13E-01	0.3750	1.101E+14
Cs-134	1.6931E-02	10,390.70	20,781.39	0.00E+00	1.76E+02	3.52E+02	0.5750	1.786E+15
Cs-135	3.4477E-06	10,390.70	20,781.39	0.00E+00	3.58E-02	7.16E-02	0.8500	4.243E+13
Cs-137	2.2800E+00	10,390.70	20,781.39	0.00E+00	2.37E+04	4.74E+04	1.2500	2.143E+13
Eu-154	3.6656E-02	10,390.70	20,781.39	0.00E+00	3.81E+02	7.62E+02	1.7500	8.981E+11
Eu-155	9.6841E-03	10,390.70	20,781.39	0.00E+00	1.01E+02	2.01E+02	2.2500	1.124E+09
Fe-55	4.6977E-04	10,390.70	20,781.39	0.00E+00	4.88E+00	9.76E+00	2.7500	6.752E+07
H-3	6.0485E-03	10,390.70	20,781.39	0.00E+00	6.28E+01	1.26E+02	3.5000	4.292E+08
I-129	7.5300E-07	10,390.70	20,781.39	0.00E+00	7.82E-03	1.56E-02	5.0000	9.987E+03
Kr-85	1.4989E-01	10,390.70	20,781.39	0.00E+00	1.56E+03	3.11E+03	7.0000	1.106E+03
Np-237	9.5534E-06	10,390.70	20,781.39	0.00E+00	9.93E-02	1.99E-01	11.0000	1.242E+02
Pa-231	1.6550E-09	10,390.70	20,781.39	0.00E+00	1.72E-05	3.44E-05		
Pb-210	2.6631E-11	10,390.70	20,781.39	0.00E+00	2.77E-07	5.53E-07		
Pm-147	1.8156E-01	10,390.70	20,781.39	0.00E+00	1.89E+03	3.77E+03		
Pu-238	1.8990E-02	10,390.70	20,781.39	0.00E+00	1.97E+02	3.95E+02		
Pu-239	4.2838E-04	10,390.70	20,781.39	0.00E+00	4.45E+00	8.90E+00		
Pu-240	2.4379E-04	10,390.70	20,781.39	0.00E+00	2.53E+00	5.07E+00		
Pu-241	4.2511E-02	10,390.70	20,781.39	0.00E+00	4.42E+02	8.83E+02		
Pu-242	3.6329E-07	10,390.70	20,781.39	0.00E+00	3.77E-03	7.55E-03		
Ra-226	1.4725E-10	10,390.70	20,781.39	0.00E+00	1.53E-06	3.06E-06		
Ra-228	8.9760E-15	10,390.70	20,781.39	0.00E+00	9.33E-11	1.87E-10		
Ru-106	1.9752E-04	10,390.70	20,781.39	0.00E+00	2.05E+00	4.10E+00		
Se-79	1.2933E-05	10,390.70	20,781.39	0.00E+00	1.34E-01	2.69E-01		
Sn-126	1.1574E-05	10,390.70	20,781.39	0.00E+00	1.20E-01	2.41E-01		
Sr-90	2.1680E+00	10,390.70	20,781.39	0.00E+00	2.25E+04	4.51E+04		
Tc-99	4.2239E-04	10,390.70	20,781.39	0.00E+00	4.39E+00	8.78E+00		
Th-229	3.9270E-12	10,390.70	20,781.39	0.00E+00	4.08E-08	8.16E-08		
Th-230	3.3578E-08	10,390.70	20,781.39	0.00E+00	3.49E-04	6.98E-04		
Th-232	1.5452E-14	10,390.70	20,781.39	0.00E+00	1.61E-10	3.21E-10		
Tl-208	4.6705E-08	10,390.70	20,781.39	0.00E+00	4.85E-04	9.71E-04		
U-232	1.3045E-07	10,390.70	20,781.39	0.00E+00	1.36E-03	2.71E-03		
U-233	2.3739E-09	10,390.70	20,781.39	0.00E+00	2.47E-05	4.93E-05		
U-234	1.8423E-04	10,390.70	20,781.39	0.00E+00	1.91E+00	3.83E+00		
U-235	-2.7235E-06	10,390.70	0.00	4.31E-02	1.48E-02	4.31E-02		
U-236	1.5493E-05	10,390.70	20,781.39	0.00E+00	1.61E-01	3.22E-01		
U-238	-4.2851E-09	10,390.70	0.00	2.72E-02	2.71E-02	2.72E-02		
Y-90	2.1686E+00	10,390.70	20,781.39	0.00E+00	2.25E+04	4.51E+04		
Other Radionuclides					2.26E+04	4.52E+04		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.81E+02	5.62E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.7909823	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		10,390.70
Bounding:		20,781.39

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.33	
Bounding:	0.65	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF MICHIGAN (CONTROL)
SNF ID #: 1005
Fuel Units & Descr: 82 - 9 CURVED PLATES
Heavy Metal Mass: BOL=34.67kg; EOL=32.866kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 3.42

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	1.4545E-10	1,708.42	3,416.85	0.00E+00	2.48E-07	4.97E-07
Am-241	1.1190E-03	1,708.42	3,416.85	0.00E+00	1.91E+00	3.82E+00
Am-242m	4.5425E-07	1,708.42	3,416.85	0.00E+00	7.76E-04	1.55E-03
Am-243	1.4921E-06	1,708.42	3,416.85	0.00E+00	2.55E-03	5.10E-03
C-14	5.7244E-09	1,708.42	3,416.85	0.00E+00	9.78E-06	1.96E-05
Cl-36	1.3124E-32	1,708.42	3,416.85	0.00E+00	2.24E-29	4.48E-29
Cm-243	2.3676E-07	1,708.42	3,416.85	0.00E+00	4.04E-04	8.09E-04
Cm-244	5.2042E-05	1,708.42	3,416.85	0.00E+00	8.89E-02	1.78E-01
Co-60	3.8208E-05	1,708.42	3,416.85	0.00E+00	6.53E-02	1.31E-01
Cs-134	4.8693E-01	1,708.42	3,416.85	0.00E+00	8.32E+02	1.66E+03
Cs-135	3.4477E-06	1,708.42	3,416.85	0.00E+00	5.89E-03	1.18E-02
Cs-137	2.8731E+00	1,708.42	3,416.85	0.00E+00	4.91E+03	9.82E+03
Eu-154	8.2053E-02	1,708.42	3,416.85	0.00E+00	1.40E+02	2.80E+02
Eu-155	3.9134E-02	1,708.42	3,416.85	0.00E+00	6.69E+01	1.34E+02
Fe-55	6.7429E-03	1,708.42	3,416.85	0.00E+00	1.15E+01	2.30E+01
H-3	1.0599E-02	1,708.42	3,416.85	0.00E+00	1.81E+01	3.62E+01
I-129	7.5300E-07	1,708.42	3,416.85	0.00E+00	1.29E-03	2.57E-03
Kr-85	2.8595E-01	1,708.42	3,416.85	0.00E+00	4.89E+02	9.77E+02
Np-237	9.5479E-06	1,708.42	3,416.85	0.00E+00	1.63E-02	3.26E-02
Pa-231	8.9297E-10	1,708.42	3,416.85	0.00E+00	1.53E-06	3.05E-06
Pb-210	3.7609E-12	1,708.42	3,416.85	0.00E+00	6.43E-09	1.29E-08
Pm-147	2.5452E+00	1,708.42	3,416.85	0.00E+00	4.35E+03	8.70E+03
Pu-238	2.0550E-02	1,708.42	3,416.85	0.00E+00	3.51E+01	7.02E+01
Pu-239	4.2838E-04	1,708.42	3,416.85	0.00E+00	7.32E-01	1.46E+00
Pu-240	2.4401E-04	1,708.42	3,416.85	0.00E+00	4.17E-01	8.34E-01
Pu-241	6.8764E-02	1,708.42	3,416.85	0.00E+00	1.17E+02	2.35E+02
Pu-242	3.6329E-07	1,708.42	3,416.85	0.00E+00	6.21E-04	1.24E-03
Ra-226	3.8045E-11	1,708.42	3,416.85	0.00E+00	6.50E-08	1.30E-07
Ra-228	2.9902E-15	1,708.42	3,416.85	0.00E+00	5.11E-12	1.02E-11
Ru-106	1.9055E-01	1,708.42	3,416.85	0.00E+00	3.26E+02	6.51E+02
Se-79	1.2936E-05	1,708.42	3,416.85	0.00E+00	2.21E-02	4.42E-02
Sn-126	1.1574E-05	1,708.42	3,416.85	0.00E+00	1.98E-02	3.95E-02
Sr-90	2.7505E+00	1,708.42	3,416.85	0.00E+00	4.70E+03	9.40E+03
Tc-99	4.2239E-04	1,708.42	3,416.85	0.00E+00	7.22E-01	1.44E+00
Th-229	1.8848E-12	1,708.42	3,416.85	0.00E+00	3.22E-09	6.44E-09
Th-230	1.7042E-08	1,708.42	3,416.85	0.00E+00	2.91E-05	5.82E-05
Th-232	7.8132E-15	1,708.42	3,416.85	0.00E+00	1.33E-11	2.67E-11
Tl-208	4.4063E-08	1,708.42	3,416.85	0.00E+00	7.53E-05	1.51E-04
U-232	1.3151E-07	1,708.42	3,416.85	0.00E+00	2.25E-04	4.49E-04
U-233	1.9564E-09	1,708.42	3,416.85	0.00E+00	3.34E-06	6.68E-06
U-234	1.8371E-04	1,708.42	3,416.85	0.00E+00	3.14E-01	6.28E-01
U-235	-2.7235E-06	1,708.42	0.00	1.48E-02	1.01E-02	1.48E-02
U-236	1.5493E-05	1,708.42	3,416.85	0.00E+00	2.65E-02	5.29E-02
U-238	-4.2851E-09	1,708.42	0.00	9.35E-03	9.34E-03	9.35E-03
Y-90	2.7505E+00	1,708.42	3,416.85	0.00E+00	4.70E+03	9.40E+03
Other Radionuclides					8.79E+03	1.76E+04

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	6.592E+14
0.0250	1.420E+14
0.0375	1.311E+14
0.0575	1.289E+14
0.0850	8.215E+13
0.1250	7.114E+13
0.2250	6.963E+13
0.3750	3.370E+13
0.5750	4.629E+14
0.8500	6.483E+13
1.2500	1.206E+13
1.7500	5.058E+11
2.2500	1.061E+12
2.7500	6.104E+09
3.5000	6.769E+08
5.0000	2.045E+03
7.0000	2.281E+02
11.0000	2.571E+01

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.66E+01	1.73E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.74999113	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		1,708.42
Bounding:		3,416.85

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.16	
Bounding:	0.31	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF MICHIGAN (REG)
SNF ID #: 277
Fuel Units & Descr: 225 - 18 CURVED PLATES
Heavy Metal Mass: BOL=190.26kg; EOL=174.082kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10" 9.38

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	15,320.41	30,640.81	0.00E+00	2.23E-06	4.46E-06	Avg. MeV	
Am-241	1.1190E-03	15,320.41	30,640.81	0.00E+00	1.71E+01	3.43E+01	0.0150	5.911E+15
Am-242m	4.5425E-07	15,320.41	30,640.81	0.00E+00	6.96E-03	1.39E-02	0.0250	1.274E+15
Am-243	1.4921E-06	15,320.41	30,640.81	0.00E+00	2.29E-02	4.57E-02	0.0375	1.175E+15
C-14	5.7244E-09	15,320.41	30,640.81	0.00E+00	8.77E-05	1.75E-04	0.0575	1.156E+15
Cl-36	1.3124E-32	15,320.41	30,640.81	0.00E+00	2.01E-28	4.02E-28	0.0850	7.367E+14
Cm-243	2.3676E-07	15,320.41	30,640.81	0.00E+00	3.63E-03	7.25E-03	0.1250	6.380E+14
Cm-244	5.2042E-05	15,320.41	30,640.81	0.00E+00	7.97E-01	1.59E+00	0.2250	6.244E+14
Co-60	3.8208E-05	15,320.41	30,640.81	0.00E+00	5.85E-01	1.17E+00	0.3750	3.022E+14
Cs-134	4.8693E-01	15,320.41	30,640.81	0.00E+00	7.46E+03	1.49E+04	0.5750	4.151E+15
Cs-135	3.4477E-06	15,320.41	30,640.81	0.00E+00	5.28E-02	1.06E-01	0.8500	5.814E+14
Cs-137	2.8731E+00	15,320.41	30,640.81	0.00E+00	4.40E+04	8.80E+04	1.2500	1.082E+14
Eu-154	8.2053E-02	15,320.41	30,640.81	0.00E+00	1.26E+03	2.51E+03	1.7500	4.536E+12
Eu-155	3.9134E-02	15,320.41	30,640.81	0.00E+00	6.00E+02	1.20E+03	2.2500	9.514E+12
Fe-55	6.7429E-03	15,320.41	30,640.81	0.00E+00	1.03E+02	2.07E+02	2.7500	5.474E+10
H-3	1.0599E-02	15,320.41	30,640.81	0.00E+00	1.62E+02	3.25E+02	3.5000	6.070E+09
I-129	7.5300E-07	15,320.41	30,640.81	0.00E+00	1.15E-02	2.31E-02	5.0000	1.826E+04
Kr-85	2.8595E-01	15,320.41	30,640.81	0.00E+00	4.38E+03	8.76E+03	7.0000	2.037E+03
Np-237	9.5479E-06	15,320.41	30,640.81	0.00E+00	1.46E-01	2.93E-01	11.0000	2.296E+02
Pa-231	8.9297E-10	15,320.41	30,640.81	0.00E+00	1.37E-05	2.74E-05		
Pb-210	3.7609E-12	15,320.41	30,640.81	0.00E+00	5.76E-08	1.15E-07		
Pm-147	2.5452E+00	15,320.41	30,640.81	0.00E+00	3.90E+04	7.80E+04		
Pu-238	2.0550E-02	15,320.41	30,640.81	0.00E+00	3.15E+02	6.30E+02		
Pu-239	4.2838E-04	15,320.41	30,640.81	0.00E+00	6.56E+00	1.31E+01		
Pu-240	2.4401E-04	15,320.41	30,640.81	0.00E+00	3.74E+00	7.48E+00		
Pu-241	6.8764E-02	15,320.41	30,640.81	0.00E+00	1.05E+03	2.11E+03		
Pu-242	3.6329E-07	15,320.41	30,640.81	0.00E+00	5.57E-03	1.11E-02		
Ra-226	3.8045E-11	15,320.41	30,640.81	0.00E+00	5.83E-07	1.17E-06		
Ra-228	2.9902E-15	15,320.41	30,640.81	0.00E+00	4.58E-11	9.16E-11		
Ru-106	1.9055E-01	15,320.41	30,640.81	0.00E+00	2.92E+03	5.84E+03		
Se-79	1.2936E-05	15,320.41	30,640.81	0.00E+00	1.98E-01	3.96E-01		
Sn-126	1.1574E-05	15,320.41	30,640.81	0.00E+00	1.77E-01	3.55E-01		
Sr-90	2.7505E+00	15,320.41	30,640.81	0.00E+00	4.21E+04	8.43E+04		
Tc-99	4.2239E-04	15,320.41	30,640.81	0.00E+00	6.47E+00	1.29E+01		
Th-229	1.8848E-12	15,320.41	30,640.81	0.00E+00	2.89E-08	5.78E-08		
Th-230	1.7042E-08	15,320.41	30,640.81	0.00E+00	2.61E-04	5.22E-04		
Th-232	7.8132E-15	15,320.41	30,640.81	0.00E+00	1.20E-10	2.39E-10		
Tl-208	4.4063E-08	15,320.41	30,640.81	0.00E+00	6.75E-04	1.35E-03		
U-232	1.3151E-07	15,320.41	30,640.81	0.00E+00	2.01E-03	4.03E-03		
U-233	1.9564E-09	15,320.41	30,640.81	0.00E+00	3.00E-05	5.99E-05		
U-234	1.8371E-04	15,320.41	30,640.81	0.00E+00	2.81E+00	5.63E+00		
U-235	-2.7235E-06	15,320.41	0.00	8.12E-02	3.95E-02	8.12E-02		
U-236	1.5493E-05	15,320.41	30,640.81	0.00E+00	2.37E-01	4.75E-01		
U-238	-4.2851E-09	15,320.41	0.00	5.13E-02	5.13E-02	5.13E-02		
Y-90	2.7505E+00	15,320.41	30,640.81	0.00E+00	4.21E+04	8.43E+04		
Other Radionuclides					7.88E+04	1.58E+05		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
7.77E+02	1.55E+03
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.74999113	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		15,320.41
Bounding:		30,640.81

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.26	
Bounding:	0.51	

Estimated EOL HM/Given EOL HM: 1.01

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF VIRGINIA (U3SI2 LEU)
SNF ID #: 952
Fuel Units & Descr: 20 - 22 FLAT PLATES
Heavy Metal Mass: BOL=24.31kg; EOL=23.964kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1993
Estimates as of: 2010
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: 15 years

Estimated Canister usage: 18"x10' 0.83

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	327.67	655.34	0.00E+00	1.50E-07	3.01E-07	Avg. MeV	
Am-241	1.7832E-03	327.67	655.34	0.00E+00	5.84E-01	1.17E+00	0.0150	7.818E+13
Am-242m	4.3410E-07	327.67	655.34	0.00E+00	1.42E-04	2.84E-04	0.0250	1.630E+13
Am-243	1.4907E-06	327.67	655.34	0.00E+00	4.88E-04	9.77E-04	0.0375	1.424E+13
C-14	5.7162E-09	327.67	655.34	0.00E+00	1.87E-06	3.75E-06	0.0575	1.518E+13
Cl-36	1.3124E-32	327.67	655.34	0.00E+00	4.30E-30	8.60E-30	0.0850	9.195E+12
Cm-243	1.8568E-07	327.67	655.34	0.00E+00	6.08E-05	1.22E-04	0.1250	6.304E+12
Cm-244	3.5512E-05	327.67	655.34	0.00E+00	1.16E-02	2.33E-02	0.2250	7.922E+12
Co-60	1.0261E-05	327.67	655.34	0.00E+00	3.36E-03	6.72E-03	0.3750	3.470E+12
Cs-134	1.6931E-02	327.67	655.34	0.00E+00	5.55E+00	1.11E+01	0.5750	5.633E+13
Cs-135	3.4477E-06	327.67	655.34	0.00E+00	1.13E-03	2.26E-03	0.8500	1.338E+12
Cs-137	2.2800E+00	327.67	655.34	0.00E+00	7.47E+02	1.49E+03	1.2500	6.759E+11
Eu-154	3.6656E-02	327.67	655.34	0.00E+00	1.20E+01	2.40E+01	1.7500	2.832E+10
Eu-155	9.6841E-03	327.67	655.34	0.00E+00	3.17E+00	6.35E+00	2.2500	3.543E+07
Fe-55	4.6977E-04	327.67	655.34	0.00E+00	1.54E-01	3.08E-01	2.7500	2.129E+06
H-3	6.0485E-03	327.67	655.34	0.00E+00	1.98E+00	3.96E+00	3.5000	1.954E+05
I-129	7.5300E-07	327.67	655.34	0.00E+00	2.47E-04	4.93E-04	5.0000	3.281E+02
Kr-85	1.4989E-01	327.67	655.34	0.00E+00	4.91E+01	9.82E+01	7.0000	3.640E+01
Np-237	9.5534E-06	327.67	655.34	0.00E+00	3.13E-03	6.26E-03	11.0000	4.092E+00
Pa-231	1.6550E-09	327.67	655.34	0.00E+00	5.42E-07	1.08E-06		
Pb-210	2.6631E-11	327.67	655.34	0.00E+00	8.73E-09	1.75E-08		
Pm-147	1.8156E-01	327.67	655.34	0.00E+00	5.95E+01	1.19E+02		
Pu-238	1.8990E-02	327.67	655.34	0.00E+00	6.22E+00	1.24E+01		
Pu-239	4.2838E-04	327.67	655.34	0.00E+00	1.40E-01	2.81E-01		
Pu-240	2.4379E-04	327.67	655.34	0.00E+00	7.99E-02	1.60E-01		
Pu-241	4.2511E-02	327.67	655.34	0.00E+00	1.39E+01	2.79E+01		
Pu-242	3.6329E-07	327.67	655.34	0.00E+00	1.19E-04	2.38E-04		
Ra-226	1.4725E-10	327.67	655.34	0.00E+00	4.82E-08	9.65E-08		
Ra-228	8.9760E-15	327.67	655.34	0.00E+00	2.94E-12	5.88E-12		
Ru-106	1.9752E-04	327.67	655.34	0.00E+00	6.47E-02	1.29E-01		
Se-79	1.2933E-05	327.67	655.34	0.00E+00	4.24E-03	8.48E-03		
Sn-126	1.1574E-05	327.67	655.34	0.00E+00	3.79E-03	7.58E-03		
Sr-90	2.1680E+00	327.67	655.34	0.00E+00	7.10E+02	1.42E+03		
Tc-99	4.2239E-04	327.67	655.34	0.00E+00	1.38E-01	2.77E-01		
Th-229	3.9270E-12	327.67	655.34	0.00E+00	1.29E-09	2.57E-09		
Th-230	3.3578E-08	327.67	655.34	0.00E+00	1.10E-05	2.20E-05		
Th-232	1.5452E-14	327.67	655.34	0.00E+00	5.06E-12	1.01E-11		
Tl-208	4.6705E-08	327.67	655.34	0.00E+00	1.53E-05	3.06E-05		
U-232	1.3045E-07	327.67	655.34	0.00E+00	4.27E-05	8.55E-05	Thermal Power	
U-233	2.3739E-09	327.67	655.34	0.00E+00	7.78E-07	1.56E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8423E-04	327.67	655.34	0.00E+00	6.04E-02	1.21E-01	6.87E+00	1.77E+01
U-235	-2.7235E-06	327.67	0.00	1.04E-02	9.50E-03	1.04E-02	Total	Total
U-236	1.5493E-05	327.67	655.34	0.00E+00	5.08E-03	1.02E-02		
U-238	-4.2851E-09	327.67	0.00	6.55E-03	6.55E-03	6.55E-03		
Y-90	2.1686E+00	327.67	655.34	0.00E+00	7.11E+02	1.42E+03		
Other Radionuclides					7.13E+02	1.43E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.77478682	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		327.67
Bounding:		655.34

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.04	
Bounding:	0.09	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF VIRGINIA (ULAX HEU)
SNF ID #: 279
Fuel Units & Descr: 44 - 22 FLAT PLATES
Heavy Metal Mass: BOL=7.924kg; EOL=6.855kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1966
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated Canister usage: 18"x10' 1.83

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	1,012.55	2,025.11	0.00E+00	2.03E-06	4.06E-06	Avg. MeV	
Am-241	2.5251E-03	1,012.55	2,025.11	0.00E+00	2.56E+00	5.11E+00	0.0150	1.492E+14
Am-242m	3.9624E-07	1,012.55	2,025.11	0.00E+00	4.01E-04	8.02E-04	0.0250	3.097E+13
Am-243	1.4880E-06	1,012.55	2,025.11	0.00E+00	1.51E-03	3.01E-03	0.0375	2.692E+13
C-14	5.7053E-09	1,012.55	2,025.11	0.00E+00	5.78E-06	1.16E-05	0.0575	2.898E+13
Cl-36	1.3124E-32	1,012.55	2,025.11	0.00E+00	1.33E-29	2.66E-29	0.0850	1.746E+13
Cm-243	1.1419E-07	1,012.55	2,025.11	0.00E+00	1.16E-04	2.31E-04	0.1250	1.153E+13
Cm-244	1.6522E-05	1,012.55	2,025.11	0.00E+00	1.67E-02	3.35E-02	0.2250	1.507E+13
Co-60	7.4047E-07	1,012.55	2,025.11	0.00E+00	7.50E-04	1.50E-03	0.3750	6.557E+12
Cs-134	2.0455E-05	1,012.55	2,025.11	0.00E+00	2.07E-02	4.14E-02	0.5750	1.064E+14
Cs-135	3.4477E-06	1,012.55	2,025.11	0.00E+00	3.49E-03	6.98E-03	0.8500	1.324E+12
Cs-137	1.4365E+00	1,012.55	2,025.11	0.00E+00	1.45E+03	2.91E+03	1.2500	6.402E+11
Eu-154	7.3230E-03	1,012.55	2,025.11	0.00E+00	7.41E+00	1.48E+01	1.7500	3.603E+10
Eu-155	5.9259E-04	1,012.55	2,025.11	0.00E+00	6.00E-01	1.20E+00	2.2500	3.013E+08
Fe-55	2.2791E-06	1,012.55	2,025.11	0.00E+00	2.31E-03	4.62E-03	2.7500	2.876E+06
H-3	1.9698E-03	1,012.55	2,025.11	0.00E+00	1.99E+00	3.99E+00	3.5000	1.667E+03
I-129	7.5300E-07	1,012.55	2,025.11	0.00E+00	7.62E-04	1.52E-03	5.0000	6.812E+02
Kr-85	4.1176E-02	1,012.55	2,025.11	0.00E+00	4.17E+01	8.34E+01	7.0000	7.454E+01
Np-237	9.5752E-06	1,012.55	2,025.11	0.00E+00	9.70E-03	1.94E-02	11.0000	8.311E+00
Pa-231	3.9379E-09	1,012.55	2,025.11	0.00E+00	3.99E-06	7.97E-06		
Pb-210	3.3115E-10	1,012.55	2,025.11	0.00E+00	3.35E-07	6.71E-07		
Pm-147	9.2402E-04	1,012.55	2,025.11	0.00E+00	9.36E-01	1.87E+00		
Pu-238	1.6217E-02	1,012.55	2,025.11	0.00E+00	1.64E+01	3.28E+01		
Pu-239	4.2810E-04	1,012.55	2,025.11	0.00E+00	4.33E-01	8.67E-01		
Pu-240	2.4333E-04	1,012.55	2,025.11	0.00E+00	2.46E-01	4.93E-01		
Pu-241	1.6242E-02	1,012.55	2,025.11	0.00E+00	1.64E+01	3.29E+01		
Pu-242	3.6329E-07	1,012.55	2,025.11	0.00E+00	3.68E-04	7.36E-04		
Ra-226	9.0114E-10	1,012.55	2,025.11	0.00E+00	9.12E-07	1.82E-06		
Ra-228	3.1019E-14	1,012.55	2,025.11	0.00E+00	3.14E-11	6.28E-11		
Ru-106	2.1225E-10	1,012.55	2,025.11	0.00E+00	2.15E-07	4.30E-07		
Se-79	1.2930E-05	1,012.55	2,025.11	0.00E+00	1.31E-02	2.62E-02		
Sn-126	1.1571E-05	1,012.55	2,025.11	0.00E+00	1.17E-02	2.34E-02		
Sr-90	1.3472E+00	1,012.55	2,025.11	0.00E+00	1.36E+03	2.73E+03		
Tc-99	4.2239E-04	1,012.55	2,025.11	0.00E+00	4.28E-01	8.55E-01		
Th-229	1.2407E-11	1,012.55	2,025.11	0.00E+00	1.26E-08	2.51E-08		
Th-230	8.3497E-08	1,012.55	2,025.11	0.00E+00	8.45E-05	1.69E-04		
Th-232	3.8371E-14	1,012.55	2,025.11	0.00E+00	3.89E-11	7.77E-11		
Tl-208	4.0414E-08	1,012.55	2,025.11	0.00E+00	4.09E-05	8.18E-05		
U-232	1.0948E-07	1,012.55	2,025.11	0.00E+00	1.11E-04	2.22E-04		
U-233	3.6275E-09	1,012.55	2,025.11	0.00E+00	3.67E-06	7.35E-06		
U-234	1.8562E-04	1,012.55	2,025.11	0.00E+00	1.88E-01	3.76E-01		
U-235	-2.7235E-06	1,012.55	0.00	1.59E-02	1.32E-02	1.59E-02		
U-236	1.5493E-05	1,012.55	2,025.11	0.00E+00	1.57E-02	3.14E-02		
U-238	-4.2851E-09	1,012.55	0.00	1.88E-04	1.84E-04	1.88E-04		
Y-90	1.3475E+00	1,012.55	2,025.11	0.00E+00	1.36E+03	2.73E+03		
Other Radionuclides					1.39E+03	2.77E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.69E+01	3.39E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	92.93756073	60 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)[2]

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	230.24	1,012.55	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:	230.84	2,025.11	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.41	4.40	1.01
Bounding:	0.81	7.21	

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: VBWR (UO2)
SNF ID #: 855
Fuel Units & Descr: 7 - ROD
Heavy Metal Mass: BOL=6.578kg; EOL=4.04kg
ROD Storage Site: INEEL

[1]Fuel decay start date: 1962
Estimates as of: 2010
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'
0.19

II. Estimates

	m	x_n	x_b	b	y_n	y_b
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	8.7758E-10	2,413.71	4,827.42	0.00E+00	2.12E-06	4.24E-06
Am-241	1.4352E-01	2,413.71	4,827.42	0.00E+00	3.46E+02	6.93E+02
Am-242m	2.8698E-04	2,413.71	4,827.42	0.00E+00	6.93E-01	1.39E+00
Am-243	6.2565E-04	2,413.71	4,827.42	0.00E+00	1.51E+00	3.02E+00
C-14	4.7901E-05	2,413.71	4,827.42	0.00E+00	1.16E-01	2.31E-01
Cl-36	8.0297E-07	2,413.71	4,827.42	0.00E+00	1.94E-03	3.88E-03
Cm-243	2.5081E-04	2,413.71	4,827.42	0.00E+00	6.05E-01	1.21E+00
Cm-244	4.9015E-02	2,413.71	4,827.42	0.00E+00	1.18E+02	2.37E+02
Co-60	2.5581E-03	2,413.71	4,827.42	0.00E+00	6.17E+00	1.23E+01
Cs-134	4.0536E-05	2,413.71	4,827.42	0.00E+00	9.78E-02	1.96E-01
Cs-135	1.4433E-05	2,413.71	4,827.42	0.00E+00	3.48E-02	6.97E-02
Cs-137	1.3979E+00	2,413.71	4,827.42	0.00E+00	3.37E+03	6.75E+03
Eu-154	2.0203E-02	2,413.71	4,827.42	0.00E+00	4.88E+01	9.75E+01
Eu-155	1.7684E-03	2,413.71	4,827.42	0.00E+00	4.27E+00	8.54E+00
Fe-55	4.3136E-05	2,413.71	4,827.42	0.00E+00	1.04E-01	2.08E-01
H-3	2.0769E-02	2,413.71	4,827.42	0.00E+00	5.01E+01	1.00E+02
I-129	9.8288E-07	2,413.71	4,827.42	0.00E+00	2.37E-03	4.74E-03
Kr-85	2.8214E-02	2,413.71	4,827.42	0.00E+00	6.81E+01	1.36E+02
Np-237	1.1218E-05	2,413.71	4,827.42	0.00E+00	2.71E-02	5.42E-02
Pa-231	1.3036E-09	2,413.71	4,827.42	0.00E+00	3.15E-06	6.29E-06
Pb-210	8.5078E-11	2,413.71	4,827.42	0.00E+00	2.05E-07	4.11E-07
Pm-147	3.6531E-04	2,413.71	4,827.42	0.00E+00	8.82E-01	1.76E+00
Pu-238	7.4564E-02	2,413.71	4,827.42	0.00E+00	1.80E+02	3.60E+02
Pu-239	1.1623E-02	2,413.71	4,827.42	0.00E+00	2.81E+01	5.61E+01
Pu-240	1.5132E-02	2,413.71	4,827.42	0.00E+00	3.65E+01	7.31E+01
Pu-241	9.0036E-01	2,413.71	4,827.42	0.00E+00	2.17E+03	4.35E+03
Pu-242	6.4260E-05	2,413.71	4,827.42	0.00E+00	1.55E-01	3.10E-01
Ra-226	2.2804E-10	2,413.71	4,827.42	0.00E+00	5.50E-07	1.10E-06
Ra-228	5.2713E-12	2,413.71	4,827.42	0.00E+00	1.27E-08	2.54E-08
Ru-106	6.1160E-10	2,413.71	4,827.42	0.00E+00	1.48E-06	2.95E-06
Se-79	1.2377E-05	2,413.71	4,827.42	0.00E+00	2.99E-02	5.98E-02
Sn-126	2.5210E-05	2,413.71	4,827.42	0.00E+00	6.08E-02	1.22E-01
Sr-90	9.1667E-01	2,413.71	4,827.42	0.00E+00	2.21E+03	4.43E+03
Tc-99	3.9357E-04	2,413.71	4,827.42	0.00E+00	9.50E-01	1.90E+00
Th-229	1.2057E-10	2,413.71	4,827.42	0.00E+00	2.91E-07	5.82E-07
Th-230	2.1043E-08	2,413.71	4,827.42	0.00E+00	5.08E-05	1.02E-04
Th-232	5.2972E-12	2,413.71	4,827.42	0.00E+00	1.28E-08	2.56E-08
Tl-208	1.7474E-07	2,413.71	4,827.42	0.00E+00	4.22E-04	8.44E-04
U-232	4.7368E-07	2,413.71	4,827.42	0.00E+00	1.14E-03	2.29E-03
U-233	2.5097E-08	2,413.71	4,827.42	0.00E+00	6.06E-05	1.21E-04
U-234	5.0000E-05	2,413.71	4,827.42	0.00E+00	1.21E-01	2.41E-01
U-235	-1.4489E-06	2,413.71	0.00	3.29E-03	0.00E+00	3.29E-03
U-236	7.5824E-06	2,413.71	4,827.42	0.00E+00	1.83E-02	3.66E-02
U-238	-2.6129E-07	2,413.71	0.00	1.70E-03	1.07E-03	1.70E-03
Y-90	9.1699E-01	2,413.71	4,827.42	0.00E+00	2.21E+03	4.43E+03
Other Radionuclides					3.24E+03	6.48E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.597E+14
0.0250	5.238E+13
0.0375	4.996E+13
0.0575	5.772E+13
0.0650	2.906E+13
0.1250	2.017E+13
0.2250	2.492E+13
0.3750	1.072E+13
0.5750	2.493E+14
0.8500	3.448E+12
1.2500	3.387E+12
1.7500	1.014E+11
2.2500	1.633E+07
2.7500	3.346E+07
3.5000	3.445E+06
5.0000	1.473E+06
7.0000	1.698E+05
11.0000	1.950E+04

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
6.55E+01	1.11E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ZIRC	ZIRC
BOL HM Constituents:	U	U
BOL Enrichment %:	23.16820093	0 to 5

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches on all parameters except enrichment.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		2,413.71
Bounding:		4,827.42

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	10.48	
Bounding:	20.97	

Estimated EOL HM/Given EOL HM: 1.03

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: WORCESTER POLY INSTITUTE
SNF ID #: 287
Fuel Units & Descr: 26 - 18 FLAT PLATES
Heavy Metal Mass: BOL=22.776kg; EOL=22.753kg
ROD Storage Site: SRS

[1]Fuel decay start date: 2035
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
[2]Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated Canister usage: 18"x10' 0.72

II. Estimates

	m	x_n	x_b	b	y_n	y_b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd)[2]	Bounding Fuel Burnup (MWd)[2]	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	22.16	44.32	0.00E+00	3.22E-09	6.45E-09	Avg. MeV	
Am-241	1.1190E-03	22.16	44.32	0.00E+00	2.48E-02	4.96E-02	0.0150	8.551E+12
Am-242m	4.5425E-07	22.16	44.32	0.00E+00	1.01E-05	2.01E-05	0.0250	1.842E+12
Am-243	1.4921E-06	22.16	44.32	0.00E+00	3.31E-05	6.61E-05	0.0375	1.700E+12
C-14	5.7244E-09	22.16	44.32	0.00E+00	1.27E-07	2.54E-07	0.0575	1.671E+12
Cl-36	1.3124E-32	22.16	44.32	0.00E+00	2.91E-31	5.82E-31	0.0850	1.066E+12
Cm-243	2.3676E-07	22.16	44.32	0.00E+00	5.25E-06	1.05E-05	0.1250	9.228E+11
Cm-244	5.2042E-05	22.16	44.32	0.00E+00	1.15E-03	2.31E-03	0.2250	9.033E+11
Co-60	3.8208E-05	22.16	44.32	0.00E+00	8.47E-04	1.69E-03	0.3750	4.372E+11
Cs-134	4.8693E-01	22.16	44.32	0.00E+00	1.08E+01	2.16E+01	0.5750	6.005E+12
Cs-135	3.4477E-06	22.16	44.32	0.00E+00	7.64E-05	1.53E-04	0.8500	8.409E+11
Cs-137	2.8731E+00	22.16	44.32	0.00E+00	6.37E+01	1.27E+02	1.2500	1.565E+11
Eu-154	8.2053E-02	22.16	44.32	0.00E+00	1.82E+00	3.64E+00	1.7500	6.561E+09
Eu-155	3.9134E-02	22.16	44.32	0.00E+00	8.67E-01	1.73E+00	2.2500	1.376E+10
Fe-55	6.7429E-03	22.16	44.32	0.00E+00	1.49E-01	2.99E-01	2.7500	7.917E+07
H-3	1.0599E-02	22.16	44.32	0.00E+00	2.35E-01	4.70E-01	3.5000	8.781E+08
I-129	7.5300E-07	22.16	44.32	0.00E+00	1.67E-05	3.34E-05	5.0000	4.043E+01
Kr-85	2.8595E-01	22.16	44.32	0.00E+00	6.34E+00	1.27E+01	7.0000	4.559E+00
Np-237	9.5479E-06	22.16	44.32	0.00E+00	2.12E-04	4.23E-04	11.0000	5.175E-01
Pa-231	8.9297E-10	22.16	44.32	0.00E+00	1.98E-08	3.96E-08		
Pb-210	3.7609E-12	22.16	44.32	0.00E+00	8.33E-11	1.67E-10		
Pm-147	2.5452E+00	22.16	44.32	0.00E+00	5.64E+01	1.13E+02		
Pu-238	2.0550E-02	22.16	44.32	0.00E+00	4.55E-01	9.11E-01		
Pu-239	4.2838E-04	22.16	44.32	0.00E+00	9.49E-03	1.90E-02		
Pu-240	2.4401E-04	22.16	44.32	0.00E+00	5.41E-03	1.08E-02		
Pu-241	6.8764E-02	22.16	44.32	0.00E+00	1.52E+00	3.05E+00		
Pu-242	3.6329E-07	22.16	44.32	0.00E+00	8.05E-06	1.61E-05		
Ra-226	3.8045E-11	22.16	44.32	0.00E+00	8.43E-10	1.69E-09		
Ra-228	2.9902E-15	22.16	44.32	0.00E+00	6.63E-14	1.33E-13		
Ru-106	1.9055E-01	22.16	44.32	0.00E+00	4.22E+00	8.45E+00		
Se-79	1.2936E-05	22.16	44.32	0.00E+00	2.87E-04	5.73E-04		
Sn-126	1.1574E-05	22.16	44.32	0.00E+00	2.56E-04	5.13E-04		
Sr-90	2.7505E+00	22.16	44.32	0.00E+00	6.10E+01	1.22E+02		
Tc-99	4.2239E-04	22.16	44.32	0.00E+00	9.36E-03	1.87E-02		
Th-229	1.8848E-12	22.16	44.32	0.00E+00	4.18E-11	8.35E-11		
Th-230	1.7042E-08	22.16	44.32	0.00E+00	3.78E-07	7.55E-07		
Th-232	7.8132E-15	22.16	44.32	0.00E+00	1.73E-13	3.46E-13		
Tl-208	4.4063E-08	22.16	44.32	0.00E+00	9.76E-07	1.95E-06		
U-232	1.3151E-07	22.16	44.32	0.00E+00	2.91E-06	5.83E-06		
U-233	1.9564E-09	22.16	44.32	0.00E+00	4.34E-08	8.67E-08		
U-234	1.8371E-04	22.16	44.32	0.00E+00	4.07E-03	8.14E-03		
U-235	-2.7235E-06	22.16	0.00	9.78E-03	9.72E-03	9.78E-03		
U-236	1.5493E-05	22.16	44.32	0.00E+00	3.43E-04	6.87E-04		
U-238	-4.2851E-09	22.16	0.00	6.13E-03	6.13E-03	6.13E-03		
Y-90	2.7505E+00	22.16	44.32	0.00E+00	6.10E+01	1.22E+02		
Other Radionuclides					1.14E+02	2.28E+02		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.12E+06	2.25E+06
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.8630137	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		22.16
Bounding:		44.32

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.00	
Bounding:	0.01	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ZPRL (UALX-LEU) TAIWAN
SNF ID #: 554
Fuel Units & Descr: 35 - ASSEMBLY
Heavy Metal Mass: BOL=23.748kg; EOL=23.348kg
ROD Storage Site: SRS

[1]Fuel decay start date: 1997
Estimates as of: 2010
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: 10 years

Estimated Canister usage: 18"x10' = 0.97

II. Estimates

Radionuclide	m Ci/MWd From Template	x_n Nominal Fuel Burnup (MWd)[2]	x_b Bounding Fuel Burnup (MWd)[2]	b Initial Activity (Ci)	y_n Nominal Fuel Inventories(Ci)	y_b Bounding Fuel Inventories(Ci)
Ac-227	2.8404E-10	377.86	755.72	0.00E+00	1.07E-07	2.15E-07
Am-241	1.4935E-03	377.86	755.72	0.00E+00	5.64E-01	1.13E+00
Am-242m	4.4390E-07	377.86	755.72	0.00E+00	1.68E-04	3.35E-04
Am-243	1.4913E-06	377.86	755.72	0.00E+00	5.63E-04	1.13E-03
C-14	5.7217E-09	377.86	755.72	0.00E+00	2.16E-06	4.32E-06
Cl-36	1.3124E-32	377.86	755.72	0.00E+00	4.96E-30	9.92E-30
Cm-243	2.0967E-07	377.86	755.72	0.00E+00	7.92E-05	1.58E-04
Cm-244	4.3001E-05	377.86	755.72	0.00E+00	1.62E-02	3.25E-02
Co-60	1.9798E-05	377.86	755.72	0.00E+00	7.48E-03	1.50E-02
Cs-134	9.0795E-02	377.86	755.72	0.00E+00	3.43E+01	6.86E+01
Cs-135	3.4477E-06	377.86	755.72	0.00E+00	1.30E-03	2.61E-03
Cs-137	2.5588E+00	377.86	755.72	0.00E+00	9.67E+02	1.93E+03
Eu-154	5.4847E-02	377.86	755.72	0.00E+00	2.07E+01	4.14E+01
Eu-155	1.9469E-02	377.86	755.72	0.00E+00	7.36E+00	1.47E+01
Fe-55	1.7797E-03	377.86	755.72	0.00E+00	6.72E-01	1.34E+00
H-3	8.0065E-03	377.86	755.72	0.00E+00	3.03E+00	6.05E+00
I-129	7.5300E-07	377.86	755.72	0.00E+00	2.85E-04	5.69E-04
Kr-85	2.0705E-01	377.86	755.72	0.00E+00	7.82E+01	1.56E+02
Np-237	9.5507E-06	377.86	755.72	0.00E+00	3.61E-03	7.22E-03
Pa-231	1.2740E-09	377.86	755.72	0.00E+00	4.81E-07	9.63E-07
Pb-210	1.1838E-11	377.86	755.72	0.00E+00	4.47E-09	8.95E-09
Pm-147	6.7974E-01	377.86	755.72	0.00E+00	2.57E+02	5.14E+02
Pu-238	1.9755E-02	377.86	755.72	0.00E+00	7.46E+00	1.49E+01
Pu-239	4.2838E-04	377.86	755.72	0.00E+00	1.62E-01	3.24E-01
Pu-240	2.4390E-04	377.86	755.72	0.00E+00	9.22E-02	1.84E-01
Pu-241	5.4058E-02	377.86	755.72	0.00E+00	2.04E+01	4.09E+01
Pu-242	3.6329E-07	377.86	755.72	0.00E+00	1.37E-04	2.75E-04
Ra-226	8.3742E-11	377.86	755.72	0.00E+00	3.16E-08	6.33E-08
Ra-228	5.7734E-15	377.86	755.72	0.00E+00	2.18E-12	4.36E-12
Ru-106	6.1356E-03	377.86	755.72	0.00E+00	2.32E+00	4.64E+00
Se-79	1.2936E-05	377.86	755.72	0.00E+00	4.89E-03	9.78E-03
Sn-126	1.1574E-05	377.86	755.72	0.00E+00	4.37E-03	8.75E-03
Sr-90	2.4417E+00	377.86	755.72	0.00E+00	9.23E+02	1.85E+03
Tc-99	4.2239E-04	377.86	755.72	0.00E+00	1.60E-01	3.19E-01
Th-229	2.8568E-12	377.86	755.72	0.00E+00	1.08E-09	2.16E-09
Th-230	2.5310E-06	377.86	755.72	0.00E+00	9.56E-06	1.91E-05
Th-232	1.1631E-14	377.86	755.72	0.00E+00	4.39E-12	8.79E-12
Tl-208	4.6705E-08	377.86	755.72	0.00E+00	1.76E-05	3.53E-05
U-232	1.3151E-07	377.86	755.72	0.00E+00	4.97E-05	9.94E-05
U-233	2.1650E-09	377.86	755.72	0.00E+00	8.18E-07	1.64E-06
U-234	1.8399E-04	377.86	755.72	0.00E+00	6.95E-02	1.39E-01
U-235	-2.7235E-06	377.86	0.00	1.01E-02	9.11E-03	1.01E-02
U-236	1.5493E-05	377.86	755.72	0.00E+00	5.85E-03	1.17E-02
U-238	-4.2851E-09	377.86	0.00	6.41E-03	6.40E-03	6.41E-03
Y-90	2.4423E+00	377.86	755.72	0.00E+00	9.23E+02	1.85E+03
Other Radionuclides					9.39E+02	1.88E+03

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.028E+14
0.0250	2.163E+13
0.0375	1.886E+13
0.0575	1.992E+13
0.0850	1.212E+13
0.1250	8.479E+12
0.2250	1.041E+13
0.3750	4.665E+12
0.5750	7.573E+13
0.8500	3.694E+12
1.2500	1.202E+12
1.7500	4.390E+10
2.2500	2.903E+09
2.7500	4.050E+07
3.5000	4.822E+06
5.0000	4.153E+02
7.0000	4.620E+01
11.0000	5.202E+00

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.20E+01	2.39E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator:	LIGHT WATER	LIGHT WATER
Fuel Cladding:	ALUM	ALUM
BOL HM Constituents:	U	U
BOL Enrichment %:	19.74998117	60 to 100

Basis for Parameter Differences:
This Template was used for the following reasons:
This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.

Burnup Summary (MWd)[2]

	From SFD	Estimated
Nominal:		377.86
Bounding:		755.72

Basis for burnup used in estimate:
Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal:	0.05	
Bounding:	0.10	

Estimated EOL HM/Given EOL HM: 1.00

[1]Reactor shutdown, core removal, storage, shipping or other date confirming that irradiation ceased for fuel.

[2]Total burnup for all fuel associated with this worksheet must be divided by BOL heavy metal mass to get specific burnup values (MWd/MT).

2010 Summary, Totals for all Spent Fuels

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.69E+02	3.17E+02
Am-241	2.61E+06	3.74E+06
Am-242m	6.62E+03	1.04E+04
Am-243	5.45E+03	8.48E+03
C-14	2.93E+04	3.86E+04
Cl-36	5.09E+02	6.83E+02
Cm-243	1.80E+03	3.18E+03
Cm-244	2.55E+05	4.40E+05
Co-60	2.02E+07	2.60E+07
Cs-134	1.82E+06	3.26E+06
Cs-135	4.00E+02	5.77E+02
Cs-137	4.16E+07	6.52E+07
Eu-154	1.12E+06	1.76E+06
Eu-155	3.27E+05	5.65E+05
Fe-55	3.13E+06	5.33E+06
H-3	2.87E+05	4.40E+05
I-129	2.23E+01	3.28E+01
Kr-85	2.05E+06	3.44E+06
Np-237	1.99E+02	3.10E+02
Pa-231	3.41E+02	4.08E+02
Pb-210	5.02E-02	5.92E-02
Pm-147	7.35E+06	1.42E+07
Pu-238	9.38E+05	1.53E+06
Pu-239	4.80E+05	5.87E+05
Pu-240	3.50E+05	4.55E+05
Pu-241	1.61E+07	2.99E+07
Pu-242	4.96E+02	7.26E+02
Ra-226	8.79E-02	1.02E-01
Ra-228	1.38E+01	1.67E+01
Ru-106	6.12E+05	1.17E+06
Se-79	3.68E+02	5.32E+02
Sn-126	3.88E+02	6.00E+02
Sr-90	3.54E+07	5.53E+07
Tc-99	9.53E+03	1.44E+04
Th-229	1.79E+02	2.08E+02
Th-230	6.24E+00	7.48E+00
Th-232	8.04E+00	8.40E+00
Tl-208	4.03E+04	4.89E+04
U-232	1.09E+05	1.32E+05
U-233	1.74E+04	2.16E+04
U-234	1.01E+04	1.25E+04
U-235	1.93E+02	2.66E+02
U-236	2.83E+02	4.19E+02
U-238	7.89E+02	8.00E+02
Y-90	3.54E+07	5.53E+07
Other Radionuclides	5.69E+07	8.87E+07

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.390E+18
0.0250	7.048E+17
0.0375	6.421E+17
0.0575	6.967E+17
0.0850	3.991E+17
0.1250	3.026E+17
0.2250	3.409E+17
0.3750	1.527E+17
0.5750	2.613E+18
0.8500	1.631E+17
1.2500	1.975E+18
1.7500	2.158E+15
2.2500	1.595E+15
2.7500	1.728E+15
3.5000	1.220E+12
5.0000	2.831E+09
7.0000	3.258E+08
11.0000	3.739E+07

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.00E+06	1.47E+06
Total	Total

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	1402.9	1446.1	165.3	27.0	162.4	403.0

Bare Fuel Transfers	
166	Assemblies

2010 Summary, Totals for 18" x 10' Canister

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.99E+00	6.87E+00
Am-241	1.29E+06	1.78E+06
Am-242m	2.77E+03	3.82E+03
Am-243	2.61E+03	3.61E+03
C-14	2.26E+04	2.92E+04
Cl-36	4.18E+02	5.42E+02
Cm-243	2.33E+02	3.51E+02
Cm-244	4.70E+04	6.71E+04
Co-60	1.51E+07	1.70E+07
Cs-134	9.86E+05	1.95E+06
Cs-135	9.74E+01	1.47E+02
Cs-137	1.43E+07	2.49E+07
Eu-154	6.53E+05	9.96E+05
Eu-155	1.55E+05	2.73E+05
Fe-55	1.00E+06	1.15E+06
H-3	1.09E+05	1.56E+05
I-129	5.20E+00	8.83E+00
Kr-85	9.32E+05	1.71E+06
Np-237	7.46E+01	1.26E+02
Pa-231	3.76E+00	8.56E+00
Pb-210	5.19E-03	7.12E-03
Pm-147	4.87E+06	9.64E+06
Pu-238	2.90E+05	5.04E+05
Pu-239	1.15E+05	1.31E+05
Pu-240	6.09E+04	8.66E+04
Pu-241	4.40E+06	1.13E+07
Pu-242	1.51E+02	1.88E+02
Ra-226	1.44E-02	1.91E-02
Ra-228	2.17E-01	4.27E-01
Ru-106	3.57E+05	7.12E+05
Se-79	9.21E+01	1.54E+02
Sn-126	8.62E+01	1.47E+02
Sr-90	1.33E+07	2.32E+07
Tc-99	2.98E+03	5.00E+03
Th-229	1.98E+00	4.56E+00
Th-230	1.46E+00	1.92E+00
Th-232	5.98E-01	6.31E-01
Tl-208	3.98E+02	9.40E+02
U-232	1.08E+03	2.54E+03
U-233	1.85E+03	1.96E+03
U-234	3.89E+03	5.18E+03
U-235	1.09E+02	1.51E+02
U-236	1.11E+02	1.82E+02
U-238	2.69E+01	3.34E+01
Y-90	1.33E+07	2.32E+07
Other Radionuclides	2.58E+07	4.24E+07

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.483E+18
0.0250	3.101E+17
0.0375	2.806E+17
0.0575	3.072E+17
0.0850	1.751E+17
0.1250	1.417E+17
0.2250	1.491E+17
0.3750	6.826E+16
0.5750	1.040E+18
0.8500	9.240E+16
1.2500	1.289E+18
1.7500	1.080E+15
2.2500	1.092E+15
2.7500	3.961E+13
3.5000	7.412E+11
5.0000	4.408E+06
7.0000	5.059E+07
11.0000	5.796E+06

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.95E+05	7.03E+05
Total	Total

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	1402.9	0.0	0.0	0.0	0.0	0.0

Bare Fuel Transfers	
0	Assemblies

2010 Summary, Totals for 18" x 15' Canister

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.42E+02	2.53E+02
Am-241	4.51E+05	6.92E+05
Am-242m	2.49E+03	4.52E+03
Am-243	1.32E+03	2.21E+03
C-14	3.98E+03	4.45E+03
Cl-36	5.00E+01	5.77E+01
Cm-243	1.02E+03	1.91E+03
Cm-244	1.11E+05	1.98E+05
Co-60	4.60E+06	7.96E+06
Cs-134	8.22E+05	1.29E+06
Cs-135	1.96E+02	2.76E+02
Cs-137	1.54E+07	2.26E+07
Eu-154	3.31E+05	5.30E+05
Eu-155	1.48E+05	2.56E+05
Fe-55	2.12E+06	4.16E+06
H-3	1.13E+05	1.73E+05
I-129	9.51E+00	1.30E+01
Kr-85	7.52E+05	1.13E+06
Np-237	5.14E+01	7.84E+01
Pa-231	3.02E+02	3.18E+02
Pb-210	4.08E-02	4.27E-02
Pm-147	2.38E+06	4.36E+06
Pu-238	3.71E+05	5.97E+05
Pu-239	1.93E+05	2.44E+05
Pu-240	1.42E+05	1.80E+05
Pu-241	6.70E+06	9.79E+06
Pu-242	1.38E+02	2.34E+02
Ra-226	6.71E-02	6.98E-02
Ra-228	1.22E+01	1.32E+01
Ru-106	2.53E+05	4.53E+05
Se-79	1.71E+02	2.20E+02
Sn-126	2.25E+02	3.14E+02
Sr-90	1.31E+07	1.83E+07
Tc-99	3.34E+03	4.73E+03
Th-229	1.63E+02	1.72E+02
Th-230	4.22E+00	4.43E+00
Th-232	3.48E+00	3.77E+00
Tl-208	3.54E+04	3.75E+04
U-232	9.58E+04	1.02E+05
U-233	3.18E+03	6.22E+03
U-234	5.16E+03	5.49E+03
U-235	2.20E+01	3.15E+01
U-236	7.84E+01	1.06E+02
U-238	4.20E+01	4.30E+01
Y-90	1.31E+07	1.83E+07
Other Radionuclides	1.88E+07	2.76E+07

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.119E+18
0.0250	2.333E+17
0.0375	2.145E+17
0.0575	2.230E+17
0.0850	1.335E+17
0.1250	9.930E+16
0.2250	1.138E+17
0.3750	5.080E+16
0.5750	9.122E+17
0.8500	6.058E+16
1.2500	6.055E+17
1.7500	7.656E+14
2.2500	5.023E+14
2.7500	1.322E+15
3.5000	4.742E+11
5.0000	1.263E+09
7.0000	1.454E+08
11.0000	1.670E+07

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.26E+05	4.89E+05
Total	Total

Total Canister Usage Summary

	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	1446.1	0.0	0.0	0.0	0.0

Bare Fuel Transfers

0	Assemblies

2010 Summary, Totals for 24" x 10' Canister

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	6.43E-04	1.29E-03
Am-241	1.94E+03	3.89E+03
Am-242m	4.11E-01	8.23E-01
Am-243	1.44E+00	2.89E+00
C-14	5.54E-03	1.11E-02
Cl-36	1.27E-26	2.54E-26
Cm-243	1.59E-01	3.19E-01
Cm-244	2.84E+01	5.69E+01
Co-60	5.16E+00	1.03E+01
Cs-134	3.06E+03	6.12E+03
Cs-135	3.34E+00	6.68E+00
Cs-137	1.97E+06	3.94E+06
Eu-154	2.38E+04	4.75E+04
Eu-155	4.67E+03	9.34E+03
Fe-55	1.20E+02	2.40E+02
H-3	4.43E+03	8.86E+03
I-129	7.30E-01	1.46E+00
Kr-85	1.05E+05	2.10E+05
Np-237	9.26E+00	1.85E+01
Pa-231	1.97E-03	3.95E-03
Pb-210	4.82E-05	9.64E-05
Pm-147	4.70E+04	9.40E+04
Pu-238	1.77E+04	3.54E+04
Pu-239	4.15E+02	8.30E+02
Pu-240	2.36E+02	4.72E+02
Pu-241	3.24E+04	6.48E+04
Pu-242	3.52E-01	7.04E-01
Ra-226	2.22E-04	4.43E-04
Ra-228	1.20E-08	2.41E-08
Ru-106	6.16E+00	1.23E+01
Se-79	1.25E+01	2.51E+01
Sn-126	1.12E+01	2.24E+01
Sr-90	1.87E+06	3.73E+06
Tc-99	4.09E+02	8.19E+02
Th-229	4.94E-06	9.88E-06
Th-230	4.06E-02	8.12E-02
Th-232	1.87E-08	3.74E-08
Tl-208	4.46E-02	8.92E-02
U-232	1.22E-01	2.44E-01
U-233	2.50E-03	5.01E-03
U-234	1.79E+02	3.58E+02
U-235	4.64E+00	7.28E+00
U-236	1.50E+01	3.00E+01
U-238	8.14E-02	8.55E-02
Y-90	1.87E+06	3.73E+06
Other Radionuclides	1.87E+06	3.75E+06

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	2.047E+17
0.0250	4.256E+16
0.0375	3.712E+16
0.0575	3.976E+16
0.0850	2.402E+16
0.1250	1.626E+16
0.2250	2.073E+16
0.3750	9.024E+15
0.5750	1.472E+17
0.8500	2.489E+15
1.2500	1.421E+15
1.7500	6.522E+13
2.2500	5.721E+09
2.7500	3.234E+09
3.5000	1.486E+07
5.0000	8.401E+05
7.0000	9.274E+04
11.0000	1.039E+04

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.31E+04	4.62E+04
Total	Total

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	0.0	165.3	0.0	0.0	0.0

Bare Fuel Transfers	
0	Assemblies

2010 Summary, Totals for 24" x 15' Canister

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.35E+01	4.15E+01
Am-241	6.30E+01	1.11E+02
Am-242m	4.37E-01	7.72E-01
Am-243	8.78E-02	1.55E-01
C-14	2.61E+01	4.60E+01
Cl-36	5.10E-01	9.01E-01
Cm-243	1.10E-01	1.94E-01
Cm-244	5.84E+00	1.03E+01
Co-60	9.17E+02	1.62E+03
Cs-134	2.08E+02	3.67E+02
Cs-135	8.06E+00	1.42E+01
Cs-137	5.24E+05	9.26E+05
Eu-154	5.42E+03	9.58E+03
Eu-155	7.52E+02	1.33E+03
Fe-55	9.32E+00	1.65E+01
H-3	1.05E+03	1.86E+03
I-129	4.46E-01	7.89E-01
Kr-85	3.37E+04	5.95E+04
Np-237	3.52E-02	6.23E-02
Pa-231	3.38E+01	5.98E+01
Pb-210	3.36E-03	5.94E-03
Pm-147	1.04E+03	1.83E+03
Pu-238	1.29E+02	2.29E+02
Pu-239	7.75E+00	1.37E+01
Pu-240	4.56E+00	8.05E+00
Pu-241	6.70E+02	1.18E+03
Pu-242	1.15E-02	2.03E-02
Ra-226	4.07E-03	7.20E-03
Ra-228	1.29E+00	2.27E+00
Ru-106	1.10E-02	1.94E-02
Se-79	9.97E+00	1.76E+01
Sn-126	1.12E+01	1.98E+01
Sr-90	5.33E+05	9.42E+05
Tc-99	9.16E+01	1.62E+02
Th-229	1.32E+01	2.33E+01
Th-230	2.91E-01	5.14E-01
Th-232	3.60E+00	3.62E+00
Tl-208	4.33E+03	7.65E+03
U-232	1.17E+04	2.07E+04
U-233	1.12E+04	1.22E+04
U-234	2.30E+02	4.07E+02
U-235	1.88E-02	3.13E-02
U-236	3.74E-02	6.60E-02
U-238	1.51E-03	1.59E-03
Y-90	5.33E+05	9.42E+05
Other Radionuclides	5.80E+05	1.02E+06

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	5.208E+16
0.0250	1.075E+16
0.0375	9.202E+15
0.0575	1.004E+16
0.0850	6.368E+15
0.1250	4.078E+15
0.2250	5.685E+15
0.3750	2.307E+15
0.5750	3.494E+16
0.8500	6.914E+14
1.2500	4.374E+14
1.7500	4.170E+13
2.2500	1.679E+09
2.7500	2.688E+14
3.5000	1.091E+06
5.0000	3.394E+05
7.0000	2.540E+04
11.0000	2.006E+03

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.44E+03	1.65E+04
Total	Total

Total Canister Usage Summary

	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	0.0	0.0	27.0	0.0	0.0

Bare Fuel Transfers

0	Assemblies

2010 Summary, Totals for High Integrity Canister (HIC)

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.00E+00	1.50E+01
Am-241	2.81E+04	3.20E+04
Am-242m	3.41E+02	3.50E+02
Am-243	8.99E+01	1.08E+02
C-14	2.40E+01	4.11E+01
Cl-36	3.43E-01	6.73E-01
Cm-243	1.20E+02	1.29E+02
Cm-244	7.27E+03	9.24E+03
Co-60	8.70E+03	1.05E+04
Cs-134	5.23E+03	5.46E+03
Cs-135	1.42E+01	1.95E+01
Cs-137	7.21E+05	1.09E+06
Eu-154	1.04E+04	1.49E+04
Eu-155	1.06E+04	1.14E+04
Fe-55	1.58E+03	2.18E+03
H-3	5.66E+03	7.28E+03
I-129	4.44E-01	7.40E-01
Kr-85	2.92E+04	5.10E+04
Np-237	1.91E+00	2.27E+00
Pa-231	1.45E+00	2.16E+01
Pb-210	1.49E-04	2.16E-03
Pm-147	4.93E+04	5.16E+04
Pu-238	1.19E+04	1.44E+04
Pu-239	3.16E+03	8.31E+03
Pu-240	7.17E+03	7.61E+03
Pu-241	1.64E+05	2.88E+05
Pu-242	8.80E+00	1.07E+01
Ra-226	1.92E-04	2.63E-03
Ra-228	5.48E-02	8.22E-01
Ru-106	1.64E+03	1.71E+03
Se-79	5.17E+00	1.15E+01
Sn-126	1.36E+01	2.10E+01
Sr-90	4.54E+05	8.08E+05
Tc-99	1.59E+02	2.26E+02
Th-229	5.61E-01	8.43E+00
Th-230	1.45E-02	1.88E-01
Th-232	3.55E-01	3.56E-01
Tl-208	1.84E+02	2.77E+03
U-232	4.99E+02	7.50E+03
U-233	1.16E+03	1.20E+03
U-234	1.64E+01	1.55E+02
U-235	1.77E-01	3.83E-01
U-236	2.39E+00	2.66E+00
U-238	4.32E-01	4.95E-01
Y-90	4.54E+05	8.08E+05
Other Radionuclides	7.26E+05	1.12E+06

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.614E+16
0.0250	9.605E+15
0.0375	8.867E+15
0.0575	9.243E+15
0.0850	5.516E+15
0.1250	3.708E+15
0.2250	4.723E+15
0.3750	2.054E+15
0.5750	4.077E+16
0.8500	8.119E+14
1.2500	1.189E+15
1.7500	2.680E+13
2.2500	2.990E+11
2.7500	9.729E+13
3.5000	1.918E+09
5.0000	5.858E+07
7.0000	6.746E+06
11.0000	7.744E+05

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
8.99E+03	1.54E+04
Total	Total

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	0.0	0.0	0.0	162.4	0.0

Bare Fuel Transfers	
0	Assemblies

2010 Summary, Totals for MCO

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.52E-03	3.18E-03
Am-241	5.51E+05	6.77E+05
Am-242m	4.21E+02	5.84E+02
Am-243	5.06E+02	8.08E+02
C-14	4.87E+02	5.69E+02
Cl-36	3.48E-01	6.96E-01
Cm-243	1.09E+02	2.18E+02
Cm-244	2.36E+04	4.51E+04
Co-60	1.43E+03	2.58E+03
Cs-134	8.87E+01	1.16E+02
Cs-135	5.73E+01	7.02E+01
Cs-137	6.66E+06	8.06E+06
Eu-154	4.24E+04	5.56E+04
Eu-155	2.24E+03	3.20E+03
Fe-55	3.33E+01	5.39E+01
H-3	1.97E+04	3.01E+04
I-129	4.78E+00	5.78E+00
Kr-85	1.48E+05	1.78E+05
Np-237	4.82E+01	5.88E+01
Pa-231	6.90E-03	8.29E-03
Pb-210	1.54E-04	2.06E-04
Pm-147	3.19E+03	3.75E+03
Pu-238	1.34E+05	1.79E+05
Pu-239	1.51E+05	1.75E+05
Pu-240	1.22E+05	1.44E+05
Pu-241	3.48E+06	4.28E+06
Pu-242	1.01E+02	1.39E+02
Ra-226	5.94E-04	7.58E-04
Ra-228	2.34E-06	4.64E-06
Ru-106	3.27E-03	3.92E-03
Se-79	6.06E+01	7.32E+01
Sn-126	1.09E+01	2.19E+01
Sr-90	4.70E+06	5.66E+06
Tc-99	2.02E+03	2.43E+03
Th-229	5.88E-05	1.12E-04
Th-230	9.17E-02	1.12E-01
Th-232	2.38E-06	4.69E-06
Tl-208	7.58E-02	1.52E-01
U-232	2.05E-01	4.11E-01
U-233	1.59E-02	2.75E-02
U-234	3.54E+02	4.19E+02
U-235	4.57E+01	5.25E+01
U-236	6.38E+01	7.51E+01
U-238	7.03E+02	7.05E+02
Y-90	4.70E+06	5.66E+06
Other Radionuclides	6.39E+06	7.73E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	3.251E+17
0.0250	6.632E+16
0.0375	6.163E+16
0.0575	7.046E+16
0.0850	3.682E+16
0.1250	2.461E+16
0.2250	3.159E+16
0.3750	1.366E+16
0.5750	2.979E+17
0.8500	3.191E+15
1.2500	2.011E+15
1.7500	8.934E+13
2.2500	8.684E+09
2.7500	6.150E+09
3.5000	7.413E+08
5.0000	3.163E+08
7.0000	3.636E+07
11.0000	4.171E+06

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
9.64E+04	1.18E+05
Total	Total

Total Canister Usage Summary

	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	0.0	0.0	0.0	0.0	403.0

Bare Fuel Transfers

0	Assemblies

2010 Summary, Totals for Bare Fuel Transfers

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	4.09E-02	8.16E-02
Am-241	2.88E+05	5.50E+05
Am-242m	5.95E+02	1.13E+03
Am-243	9.30E+02	1.74E+03
C-14	2.14E+03	4.26E+03
Cl-36	4.02E+01	8.03E+01
Cm-243	3.12E+02	5.71E+02
Cm-244	6.58E+04	1.21E+05
Co-60	4.91E+05	9.82E+05
Cs-134	6.44E+02	1.21E+03
Cs-135	2.29E+01	4.32E+01
Cs-137	2.02E+06	3.76E+06
Eu-154	5.57E+04	1.06E+05
Eu-155	5.88E+03	1.11E+04
Fe-55	5.42E+03	1.08E+04
H-3	3.40E+04	6.32E+04
I-129	1.21E+00	2.24E+00
Kr-85	5.37E+04	1.00E+05
Np-237	1.40E+01	2.59E+01
Pa-231	5.13E-02	1.02E-01
Pb-210	4.73E-04	9.34E-04
Pm-147	3.20E+03	6.04E+03
Pu-238	1.13E+05	1.94E+05
Pu-239	1.70E+04	2.77E+04
Pu-240	1.78E+04	3.58E+04
Pu-241	1.32E+06	4.14E+06
Pu-242	9.65E+01	1.53E+02
Ra-226	1.29E-03	2.54E-03
Ra-228	1.03E-02	2.07E-02
Ru-106	3.28E-01	6.18E-01
Se-79	1.63E+01	3.03E+01
Sn-126	2.92E+01	5.36E+01
Sr-90	1.44E+06	2.69E+06
Tc-99	5.31E+02	9.87E+02
Th-229	3.03E-02	6.05E-02
Th-230	1.20E-01	2.36E-01
Th-232	1.04E-02	2.08E-02
Tl-208	1.70E+00	3.37E+00
U-232	4.60E+00	9.11E+00
U-233	6.25E+00	1.25E+01
U-234	2.71E+02	5.32E+02
U-235	1.17E+01	2.31E+01
U-236	1.21E+01	2.28E+01
U-238	1.62E+01	1.85E+01
Y-90	1.44E+06	2.69E+06
Other Radionuclides	2.66E+06	5.05E+06

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.601E+17
0.0250	3.218E+16
0.0375	3.017E+16
0.0575	3.705E+16
0.0850	1.777E+16
0.1250	1.301E+16
0.2250	1.528E+16
0.3750	6.558E+15
0.5750	1.395E+17
0.8500	2.970E+15
1.2500	7.509E+16
1.7500	8.912E+13
2.2500	3.915E+11
2.7500	1.213E+11
3.5000	1.758E+09
5.0000	7.513E+08
7.0000	8.657E+07
11.0000	9.941E+06

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
4.47E+04	8.42E+04
Total	Total

Total Canister Usage Summary

	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	0.0	0.0	0.0	0.0	0.0

Bare Fuel Transfers		BWR	PWR
166	Assemblies	87	79

2010 Summary, DBE category: Stable Metals, Intact

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.98E-03	5.93E-03
Am-241	2.32E+04	4.51E+04
Am-242m	1.46E+01	2.88E+01
Am-243	4.31E+01	7.70E+01
C-14	3.46E+01	6.92E+01
Cl-36	6.27E-01	1.25E+00
Cm-243	8.86E+00	1.57E+01
Cm-244	5.57E+03	9.19E+03
Co-60	9.04E+03	1.80E+04
Cs-134	1.73E+06	3.09E+06
Cs-135	2.18E+01	4.23E+01
Cs-137	1.36E+07	2.64E+07
Eu-154	3.86E+05	7.26E+05
Eu-155	1.72E+05	3.17E+05
Fe-55	9.85E+04	1.81E+05
H-3	4.29E+04	8.26E+04
I-129	4.07E+00	7.94E+00
Kr-85	1.10E+06	2.11E+06
Np-237	6.47E+01	1.21E+02
Pa-231	8.89E-03	1.76E-02
Pb-210	1.79E-04	3.57E-04
Pm-147	6.75E+06	1.31E+07
Pu-238	2.07E+05	3.70E+05
Pu-239	1.02E+04	2.03E+04
Pu-240	5.45E+03	1.08E+04
Pu-241	9.45E+05	1.82E+06
Pu-242	6.75E+00	1.27E+01
Ra-226	7.57E-04	1.51E-03
Ra-228	1.70E-04	3.41E-04
Ru-106	5.81E+05	1.11E+06
Se-79	7.09E+01	1.38E+02
Sn-126	6.29E+01	1.23E+02
Sr-90	1.29E+07	2.49E+07
Tc-99	2.32E+03	4.52E+03
Th-229	5.02E-04	1.00E-03
Th-230	1.41E-01	2.80E-01
Th-232	1.59E-03	1.60E-03
Tl-208	2.45E-01	4.76E-01
U-232	6.96E-01	1.35E+00
U-233	1.15E-01	2.29E-01
U-234	7.77E+02	1.53E+03
U-235	2.22E+01	3.74E+01
U-236	8.47E+01	1.64E+02
U-238	3.54E+00	3.61E+00
Y-90	1.29E+07	2.49E+07
Other Radionuclides	1.94E+07	3.73E+07

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.587E+18
0.0250	3.374E+17
0.0375	3.067E+17
0.0575	3.099E+17
0.0850	1.940E+17
0.1250	1.562E+17
0.2250	1.652E+17
0.3750	7.699E+16
0.5750	1.158E+18
0.8500	1.263E+17
1.2500	2.825E+16
1.7500	1.062E+15
2.2500	1.545E+15
2.7500	1.016E+13
3.5000	1.152E+12
5.0000	6.245E+07
7.0000	7.158E+06
11.0000	8.195E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.14E+05	4.10E+05
Total	Total

Total Canister Usage Summary

	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	1017.1	235.9	165.3	0.0	1.0	0.0

Bare Fuel Transfers

0	Assemblies

2010 Summary, DBE category: Stable Metals, Not Intact

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	0.00E+00	0.00E+00
Am-241	0.00E+00	0.00E+00
Am-242m	0.00E+00	0.00E+00
Am-243	0.00E+00	0.00E+00
C-14	0.00E+00	0.00E+00
Cl-36	0.00E+00	0.00E+00
Cm-243	0.00E+00	0.00E+00
Cm-244	0.00E+00	0.00E+00
Co-60	0.00E+00	0.00E+00
Cs-134	0.00E+00	0.00E+00
Cs-135	0.00E+00	0.00E+00
Cs-137	0.00E+00	0.00E+00
Eu-154	0.00E+00	0.00E+00
Eu-155	0.00E+00	0.00E+00
Fe-55	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00
I-129	0.00E+00	0.00E+00
Kr-85	0.00E+00	0.00E+00
Np-237	0.00E+00	0.00E+00
Pa-231	0.00E+00	0.00E+00
Pb-210	0.00E+00	0.00E+00
Pm-147	0.00E+00	0.00E+00
Pu-238	0.00E+00	0.00E+00
Pu-239	0.00E+00	0.00E+00
Pu-240	0.00E+00	0.00E+00
Pu-241	0.00E+00	0.00E+00
Pu-242	0.00E+00	0.00E+00
Ra-226	0.00E+00	0.00E+00
Ra-228	0.00E+00	0.00E+00
Ru-106	0.00E+00	0.00E+00
Se-79	0.00E+00	0.00E+00
Sn-126	0.00E+00	0.00E+00
Sr-90	0.00E+00	0.00E+00
Tc-99	0.00E+00	0.00E+00
Th-229	0.00E+00	0.00E+00
Th-230	0.00E+00	0.00E+00
Th-232	0.00E+00	0.00E+00
Tl-208	0.00E+00	0.00E+00
U-232	0.00E+00	0.00E+00
U-233	0.00E+00	0.00E+00
U-234	0.00E+00	0.00E+00
U-235	0.00E+00	0.00E+00
U-236	0.00E+00	0.00E+00
U-238	0.00E+00	0.00E+00
Y-90	0.00E+00	0.00E+00
Other Radionuclides	0.00E+00	0.00E+00

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	0.000E+00
0.0250	0.000E+00
0.0375	0.000E+00
0.0575	0.000E+00
0.0850	0.000E+00
0.1250	0.000E+00
0.2250	0.000E+00
0.3750	0.000E+00
0.5750	0.000E+00
0.8500	0.000E+00
1.2500	0.000E+00
1.7500	0.000E+00
2.2500	0.000E+00
2.7500	0.000E+00
3.5000	0.000E+00
5.0000	0.000E+00
7.0000	0.000E+00
11.0000	0.000E+00

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
0.00E+00	0.00E+00
Total	Total

Total Canister Usage Summary

	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	0.0	0.0	0.0	0.0	0.0

Bare Fuel Transfers	
0	Assemblies

2010 Summary, DBE category: Non-Metals, Intact

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	2.68E+02	3.01E+02
Am-241	1.07E+06	2.02E+06
Am-242m	3.73E+03	7.21E+03
Am-243	2.94E+03	5.58E+03
C-14	1.12E+04	1.97E+04
Cl-36	2.01E+02	3.60E+02
Cm-243	1.42E+03	2.66E+03
Cm-244	1.87E+05	3.42E+05
Co-60	2.57E+06	4.61E+06
Cs-134	6.01E+04	1.14E+05
Cs-135	2.30E+02	3.62E+02
Cs-137	1.50E+07	2.36E+07
Eu-154	3.01E+05	5.35E+05
Eu-155	8.96E+04	1.67E+05
Fe-55	8.47E+04	1.63E+05
H-3	1.32E+05	2.26E+05
I-129	1.06E+01	1.58E+01
Kr-85	5.49E+05	8.45E+05
Np-237	5.90E+01	1.03E+02
Pa-231	3.39E+02	3.86E+02
Pb-210	4.36E-02	5.03E-02
Pm-147	3.43E+05	6.66E+05
Pu-238	5.17E+05	8.49E+05
Pu-239	2.15E+05	2.76E+05
Pu-240	1.63E+05	2.35E+05
Pu-241	7.24E+06	1.72E+07
Pu-242	3.21E+02	4.87E+02
Ra-226	6.92E-02	8.04E-02
Ra-228	1.37E+01	1.58E+01
Ru-106	1.89E+04	3.70E+04
Se-79	1.87E+02	2.63E+02
Sn-126	2.60E+02	3.92E+02
Sr-90	1.21E+07	1.84E+07
Tc-99	3.53E+03	5.62E+03
Th-229	1.78E+02	2.00E+02
Th-230	4.29E+00	5.19E+00
Th-232	7.64E+00	7.99E+00
Tl-208	4.01E+04	4.61E+04
U-232	1.09E+05	1.25E+05
U-233	1.61E+04	2.02E+04
U-234	4.81E+03	6.22E+03
U-235	4.94E+01	9.45E+01
U-236	6.72E+01	1.10E+02
U-238	4.18E+01	5.07E+01
Y-90	1.21E+07	1.84E+07
Other Radionuclides	1.88E+07	3.03E+07

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.068E+18
0.0250	2.186E+17
0.0375	2.003E+17
0.0575	2.284E+17
0.0850	1.239E+17
0.1250	8.677E+16
0.2250	1.068E+17
0.3750	4.590E+16
0.5750	8.870E+17
0.8500	2.135E+16
1.2500	3.545E+17
1.7500	6.662E+14
2.2500	1.773E+13
2.7500	1.620E+15
3.5000	4.350E+10
5.0000	2.164E+09
7.0000	2.492E+08
11.0000	2.861E+07

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.98E+05	4.75E+05
Total	Total

Total Canister Usage Summary

	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	166.9	848.3	0.0	27.0	4.0	18.0

Bare Fuel Transfers

166	Assemblies

2010 Summary, DBE category: Non-Metals, Not Intact

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.06E+00	1.51E+01
Am-241	2.79E+05	3.55E+05
Am-242m	9.53E+02	1.15E+03
Am-243	7.34E+02	1.01E+03
C-14	3.68E+03	4.40E+03
Cl-36	6.82E+01	8.18E+01
Cm-243	2.45E+02	3.49E+02
Cm-244	3.53E+04	5.85E+04
Co-60	7.86E+06	1.16E+07
Cs-134	2.72E+04	4.69E+04
Cs-135	3.88E+01	5.15E+01
Cs-137	2.53E+06	3.62E+06
Eu-154	1.44E+05	2.02E+05
Eu-155	3.50E+04	4.94E+04
Fe-55	2.57E+06	4.60E+06
H-3	3.18E+04	4.77E+04
I-129	1.21E+00	1.85E+00
Kr-85	1.06E+05	1.59E+05
Np-237	9.60E+00	1.37E+01
Pa-231	1.54E+00	2.18E+01
Pb-210	5.20E-04	2.57E-03
Pm-147	2.01E+05	3.42E+05
Pu-238	9.71E+04	1.47E+05
Pu-239	1.25E+04	2.39E+04
Pu-240	1.98E+04	2.71E+04
Pu-241	3.00E+06	4.54E+06
Pu-242	7.11E+01	1.06E+02
Ra-226	1.29E-03	3.87E-03
Ra-228	7.16E-02	8.42E-01
Ru-106	1.16E+04	2.16E+04
Se-79	1.78E+01	2.90E+01
Sn-126	2.65E+01	4.22E+01
Sr-90	2.04E+06	2.94E+06
Tc-99	6.07E+02	8.32E+02
Th-229	5.98E-01	8.48E+00
Th-230	1.38E-01	3.33E-01
Th-232	3.97E-01	4.00E-01
Tl-208	1.88E+02	2.77E+03
U-232	5.08E+02	7.51E+03
U-233	1.25E+03	1.30E+03
U-234	4.05E+02	6.29E+02
U-235	2.29E+01	2.77E+01
U-236	1.64E+01	2.05E+01
U-238	3.07E+01	3.15E+01
Y-90	2.04E+06	2.94E+06
Other Radionuclides	3.98E+06	5.45E+06

Gamma Sources	
Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	1.954E+17
0.0250	3.939E+16
0.0375	3.568E+16
0.0575	4.015E+16
0.0850	2.124E+16
0.1250	1.665E+16
0.2250	1.762E+16
0.3750	7.646E+15
0.5750	1.379E+17
0.8500	6.524E+15
1.2500	8.596E+17
1.7500	1.639E+14
2.2500	2.830E+13
2.7500	9.764E+13
3.5000	2.327E+10
5.0000	3.667E+08
7.0000	4.223E+07
11.0000	4.849E+06

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.69E+05	2.48E+05
Total	Total

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	196.7	352.8	0.0	0.0	148.4	0.0

Bare Fuel Transfers	
0	Assemblies

2010 Summary, DBE category: Other, Intact

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.22E-02	1.89E-02
Am-241	6.13E+04	7.15E+04
Am-242m	5.96E+01	1.13E+02
Am-243	4.89E+01	8.92E+01
C-14	3.15E+03	3.15E+03
Cl-36	3.72E+01	3.72E+01
Cm-243	2.71E+01	5.39E+01
Cm-244	3.30E+03	6.37E+03
Co-60	5.24E+05	5.25E+05
Cs-134	6.32E+02	1.43E+03
Cs-135	1.33E+01	1.82E+01
Cs-137	1.84E+06	2.06E+06
Eu-154	9.88E+03	1.20E+04
Eu-155	1.86E+03	3.24E+03
Fe-55	4.90E+03	5.01E+03
H-3	3.06E+04	3.22E+04
I-129	1.03E+00	1.19E+00
Kr-85	4.83E+04	5.40E+04
Np-237	8.57E+00	9.54E+00
Pa-231	2.24E-02	3.57E-02
Pb-210	4.95E-03	4.95E-03
Pm-147	4.37E+03	8.53E+03
Pu-238	1.52E+04	2.03E+04
Pu-239	9.32E+04	9.58E+04
Pu-240	4.60E+04	4.73E+04
Pu-241	1.84E+06	1.90E+06
Pu-242	1.69E+01	2.11E+01
Ra-226	1.33E-02	1.33E-02
Ra-228	1.26E-03	1.26E-03
Ru-106	1.95E+02	4.45E+02
Se-79	1.77E+01	1.98E+01
Sn-126	1.90E+01	2.39E+01
Sr-90	1.57E+06	1.72E+06
Tc-99	5.62E+02	6.25E+02
Th-229	4.73E-03	4.74E-03
Th-230	1.21E+00	1.22E+00
Th-232	1.27E-03	1.27E-03
Tl-208	8.07E-02	1.01E-01
U-232	2.18E-01	2.74E-01
U-233	9.97E-01	9.99E-01
U-234	2.65E+03	2.65E+03
U-235	2.23E+00	2.68E+00
U-236	3.15E+01	3.29E+01
U-238	4.52E+00	4.73E+00
Y-90	1.57E+06	1.72E+06
Other Radionuclides	2.40E+06	2.62E+06

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	9.739E+16
0.0250	2.000E+16
0.0375	1.777E+16
0.0575	1.949E+16
0.0850	1.117E+16
0.1250	7.390E+15
0.2250	9.562E+15
0.3750	4.166E+15
0.5750	7.658E+16
0.8500	9.342E+14
1.2500	3.928E+16
1.7500	2.436E+13
2.2500	2.472E+11
2.7500	7.867E+09
3.5000	5.816E+08
5.0000	5.065E+07
7.0000	5.816E+06
11.0000	6.669E+05

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.50E+04	3.79E+04
Total	Total

Total Canister Usage Summary

	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	21.7	9.0	0.0	0.0	1.0	0.0

Bare Fuel Transfers

0	Assemblies

2010 Summary, DBE category: Other, Not Intact

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)
Ac-227	1.80E-01	1.82E-01
Am-241	1.18E+06	1.24E+06
Am-242m	1.86E+03	1.90E+03
Am-243	1.69E+03	1.72E+03
C-14	1.12E+04	1.12E+04
Cl-36	2.02E+02	2.02E+02
Cm-243	9.78E+01	9.78E+01
Cm-244	2.42E+04	2.45E+04
Co-60	9.28E+06	9.28E+06
Cs-134	1.06E+03	1.07E+03
Cs-135	9.57E+01	1.03E+02
Cs-137	8.68E+06	9.50E+06
Eu-154	2.82E+05	2.86E+05
Eu-155	2.85E+04	2.87E+04
Fe-55	3.75E+05	3.75E+05
H-3	4.96E+04	5.11E+04
I-129	5.44E+00	6.03E+00
Kr-85	2.54E+05	2.72E+05
Np-237	5.76E+01	6.34E+01
Pa-231	2.71E-01	2.75E-01
Pb-210	9.38E-04	9.54E-04
Pm-147	4.89E+04	4.94E+04
Pu-238	1.02E+05	1.39E+05
Pu-239	1.48E+05	1.71E+05
Pu-240	1.16E+05	1.34E+05
Pu-241	3.09E+06	4.45E+06
Pu-242	7.95E+01	9.93E+01
Ra-226	3.34E-03	3.41E-03
Ra-228	5.23E-02	5.23E-02
Ru-106	2.98E+01	2.98E+01
Se-79	7.43E+01	8.19E+01
Sn-126	1.92E+01	1.99E+01
Sr-90	6.78E+06	7.36E+06
Tc-99	2.51E+03	2.76E+03
Th-229	1.10E-01	1.10E-01
Th-230	4.50E-01	4.60E-01
Th-232	3.41E-03	3.79E-03
Tl-208	8.54E+00	8.54E+00
U-232	2.31E+01	2.31E+01
U-233	3.20E+01	3.20E+01
U-234	1.46E+03	1.51E+03
U-235	9.67E+01	1.03E+02
U-236	8.30E+01	9.12E+01
U-238	7.08E+02	7.10E+02
Y-90	6.78E+06	7.36E+06
Other Radionuclides	1.23E+07	1.31E+07

Gamma Sources

Photon Energy Group	Total Photons/sec (bounding)
Avg. MeV	
0.0150	4.417E+17
0.0250	8.945E+16
0.0375	8.161E+16
0.0575	9.876E+16
0.0850	4.884E+16
0.1250	3.559E+16
0.2250	4.176E+16
0.3750	1.795E+16
0.5750	3.528E+17
0.8500	8.009E+15
1.2500	6.930E+17
1.7500	2.414E+14
2.2500	3.652E+12
2.7500	3.119E+11
3.5000	4.714E+08
5.0000	1.871E+08
7.0000	2.141E+07
11.0000	2.450E+06

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.87E+05	3.00E+05
Total	Total

Total Canister Usage Summary

	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.5	0.0	0.0	0.0	8.0	385.0

Bare Fuel Transfers

0	Assemblies