

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

¹Fuel decay start date 2010
Estimates as of 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
5.92

II. Estimates							Gamma Sources	
	m	x _n	x _b	b	y _n	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1.4545E-10	16,809.59	33,619.19	0.00E+00	2.44E-06	4.89E-06	0.0150	6.486E+15
Am-241	1.1190E-03	16,809.59	33,619.19	0.00E+00	1.88E+01	3.76E+01	0.0250	1.397E+15
Am-242m	4.5425E-07	16,809.59	33,619.19	0.00E+00	7.64E-03	1.53E-02	0.0375	1.289E+15
Am-243	1.4921E-06	16,809.59	33,619.19	0.00E+00	2.51E-02	5.02E-02	0.0575	1.268E+15
C-14	5.7244E-09	16,809.59	33,619.19	0.00E+00	9.62E-05	1.92E-04	0.0850	8.083E+14
Cl-36	1.3124E-32	16,809.59	33,619.19	0.00E+00	2.21E-28	4.41E-28	0.1250	7.000E+14
Cm-243	2.3676E-07	16,809.59	33,619.19	0.00E+00	3.98E-03	7.96E-03	0.2250	6.851E+14
Cm-244	5.2042E-05	16,809.59	33,619.19	0.00E+00	8.75E-01	1.75E+00	0.3750	3.316E+14
Co-60	3.8208E-05	16,809.59	33,619.19	0.00E+00	6.42E-01	1.28E+00	0.5750	4.555E+15
Cs-134	4.8693E-01	16,809.59	33,619.19	0.00E+00	8.19E+03	1.64E+04	0.8500	6.379E+14
Cs-135	3.4477E-06	16,809.59	33,619.19	0.00E+00	5.80E-02	1.16E-01	1.2500	1.187E+14
Cs-137	2.8731E+00	16,809.59	33,619.19	0.00E+00	4.83E+04	9.66E+04	1.7500	4.977E+12
Eu-154	8.2053E-02	16,809.59	33,619.19	0.00E+00	1.38E+03	2.76E+03	2.2500	1.044E+13
Eu-155	3.9134E-02	16,809.59	33,619.19	0.00E+00	6.58E+02	1.32E+03	2.7500	6.006E+10
Fe-55	6.7429E-03	16,809.59	33,619.19	0.00E+00	1.13E+02	2.27E+02	3.5000	6.661E+09
H-3	1.0599E-02	16,809.59	33,619.19	0.00E+00	1.78E+02	3.56E+02	5.0000	2.002E+04
I-129	7.5300E-07	16,809.59	33,619.19	0.00E+00	1.27E-02	2.53E-02	7.0000	2.232E+03
Kr-85	2.8595E-01	16,809.59	33,619.19	0.00E+00	4.81E+03	9.61E+03	11.0000	2.516E+02
Np-237	9.5479E-06	16,809.59	33,619.19	0.00E+00	1.60E-01	3.21E-01		
Pa-231	8.8297E-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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
	LIGHT WATER	LIGHT WATER	
	ALUM	ALUM	
	U	U	
	20	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Nominal		16.809.59	
Bounding		33.619.19	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 1.01
Nominal	0.30		
Bounding	0.60		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U308-LEU) PERU
SNF ID #: 504
Fuel Units & Descr: 23 - ASSEMBLY
Heavy Metal Mass: BOL=32.2kg, EOL=28.98kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.96

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	3,049.40	6,098.80	0.00E+00	4.44E-07	8.87E-07	Avg. MeV	
Am-241	1.1190E-03	3,049.40	6,098.80	0.00E+00	3.41E+00	6.82E+00	0.0150	1.177E+15
Am-242m	4.5425E-07	3,049.40	6,098.80	0.00E+00	1.39E-03	2.77E-03	0.0250	2.535E+14
Am-243	1.4921E-06	3,049.40	6,098.80	0.00E+00	4.55E-03	9.10E-03	0.0375	2.339E+14
C-14	5.7244E-09	3,049.40	6,098.80	0.00E+00	1.75E-05	3.49E-05	0.0575	2.300E+14
Cl-36	1.3124E-32	3,049.40	6,098.80	0.00E+00	4.00E-29	8.00E-29	0.0850	1.466E+14
Cm-243	2.3676E-07	3,049.40	6,098.80	0.00E+00	7.22E-04	1.44E-03	0.1250	1.270E+14
Cm-244	5.2042E-05	3,049.40	6,098.80	0.00E+00	1.59E-01	3.17E-01	0.2250	1.243E+14
Co-60	3.8208E-05	3,049.40	6,098.80	0.00E+00	1.17E-01	2.33E-01	0.3750	6.016E+13
Cs-134	4.8693E-01	3,049.40	6,098.80	0.00E+00	1.48E+03	2.97E+03	0.5750	8.263E+14
Cs-135	3.4477E-06	3,049.40	6,098.80	0.00E+00	1.05E-02	2.10E-02	0.8500	1.157E+14
Cs-137	2.8731E+00	3,049.40	6,098.80	0.00E+00	8.76E+03	1.75E+04	1.2500	2.153E+13
Eu-154	8.2053E-02	3,049.40	6,098.80	0.00E+00	2.50E+02	5.00E+02	1.7500	9.028E+11
Eu-155	3.9134E-02	3,049.40	6,098.80	0.00E+00	1.19E+02	2.39E+02	2.2500	1.894E+12
Fe-55	6.7429E-03	3,049.40	6,098.80	0.00E+00	2.06E+01	4.11E+01	2.7500	1.089E+10
H-3	1.0599E-02	3,049.40	6,098.80	0.00E+00	3.23E+01	6.46E+01	3.5000	1.208E+09
I-129	7.5300E-07	3,049.40	6,098.80	0.00E+00	2.30E-03	4.59E-03	5.0000	3.633E+03
Kr-85	2.8595E-01	3,049.40	6,098.80	0.00E+00	8.72E+02	1.74E+03	7.0000	4.050E+02
Np-237	9.5479E-06	3,049.40	6,098.80	0.00E+00	2.91E-02	5.82E-02	11.0000	4.566E+01
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	16.42857201	60 to 100	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		3,049.40	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding		6,098.80	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.30		1.01
Bounding	0.60		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR MTR-S (U3Si2 LEU) CANADA
SNF ID # 513
Fuel Units & Descr: 35 - ASSEMBLY
Heavy Metal Mass: BOL=50.75kg EOL=45.675kg
ROD Storage Site SRS

¹Fuel decay start date 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
1.46

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	1.4545E-10	4,806.12	9,612.25	0.00E+00	6.99E-07	1.40E-06	Avg MeV	
Am-241	1.1190E-03	4,806.12	9,612.25	0.00E+00	5.38E+00	1.08E+01	0.0150	1.854E+15
Am-242m	4.5425E-07	4,806.12	9,612.25	0.00E+00	2.18E-03	4.37E-03	0.0250	3.995E+14
Am-243	1.4921E-06	4,806.12	9,612.25	0.00E+00	7.17E-03	1.43E-02	0.0375	3.687E+14
C-14	5.7244E-09	4,806.12	9,612.25	0.00E+00	2.75E-05	5.50E-05	0.0575	3.625E+14
Cl-36	1.3124E-32	4,806.12	9,612.25	0.00E+00	6.31E-29	1.26E-28	0.0850	2.311E+14
Cm-243	2.3676E-07	4,806.12	9,612.25	0.00E+00	1.14E-03	2.28E-03	0.1250	2.001E+14
Cm-244	5.2042E-05	4,806.12	9,612.25	0.00E+00	2.50E-01	5.00E-01	0.2250	1.959E+14
Co-60	3.8208E-05	4,806.12	9,612.25	0.00E+00	1.84E-01	3.67E-01	0.3750	9.481E+13
Cs-134	4.8693E-01	4,806.12	9,612.25	0.00E+00	2.34E+03	4.68E+03	0.5750	1.302E+15
Cs-135	3.4477E-06	4,806.12	9,612.25	0.00E+00	1.66E-02	3.31E-02	0.8500	1.824E+14
Cs-137	2.8731E+00	4,806.12	9,612.25	0.00E+00	1.38E+04	2.76E+04	1.2500	3.393E+14
Eu-154	8.2053E-02	4,806.12	9,612.25	0.00E+00	3.94E+02	7.89E+02	1.7500	1.423E+12
Eu-155	3.9134E-02	4,806.12	9,612.25	0.00E+00	1.88E+02	3.76E+02	2.2500	2.985E+12
Fe-55	6.7429E-03	4,806.12	9,612.25	0.00E+00	3.24E+01	6.48E+01	2.7500	1.717E+10
H-3	1.0599E-02	4,806.12	9,612.25	0.00E+00	5.09E+01	1.02E+02	3.5000	1.904E+09
I-129	7.5300E-07	4,806.12	9,612.25	0.00E+00	3.62E-03	7.24E-03	5.0000	5.724E+03
Kr-85	2.8595E-01	4,806.12	9,612.25	0.00E+00	1.37E+03	2.75E+03	7.0000	6.382E+02
Np-237	9.5479E-06	4,806.12	9,612.25	0.00E+00	4.59E-02	9.18E-02	11.0000	7.195E+01
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	Thermal Power	
U-233	1.9564E-09	4,806.12	9,612.25	0.00E+00	9.40E-06	1.88E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8371E-04	4,806.12	9,612.25	0.00E+00	8.83E-01	1.77E+00	2.44E+02	4.87E+02
U-235	-2.7235E-06	4,806.12	0.00	2.19E-02	8.84E-03	2.19E-02	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
	LIGHT WATER	LIGHT WATER	
	ALUM	ALUM	
	U	U	
	20	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Nominal		4,806.12	
Bounding		9,612.25	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 1.01
Nominal	0.30		
Bounding	0.60		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (U3Si2 LEU) GERMANY
 SNF ID #: 519
 Fuel Units & Descr: 97 - ASSEMBLY
 Heavy Metal Mass BOL=155.2kg, EOL=131.804kg
 ROD Storage Site SRS

¹Fuel decay start date: 2010
 Estimates as of: 2010
 Template: TRIGA-AI (LW/U-Zrx Alurn, 10 to 20%, U)
²Template Burnup(MWd): 8.65
 Template BOL Heavy Metal Mass (MT): 0.00018
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 4.04

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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	2.7584E+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		
Ti-208	1.9459E-08	22,332.30	44,664.59	0.00E+00	4.35E-04	8.69E-04		
U-232	5.6015E-08	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-08	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences ¹
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19.9999963	10 to 20.1	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		22,332.30	
Bounding		44,664.59	

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	3.89		
Bounding	7.79		

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR MTR-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

¹Fuel decay start date 2010
Estimates as of: 2010
Template ATR (Light Water Alum, 60 to 100% U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 5 years

Estimated
Canister usage:
18"x10"
0.29

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	1,670.54	3,341.08	0.00E+00	2.43E-07	4.86E-07	Avg MeV	
Am-241	1.1190E-03	1,670.54	3,341.08	0.00E+00	1.87E+00	3.74E+00	0.0150	6.446E+14
Am-242m	4.5425E-07	1,670.54	3,341.08	0.00E+00	7.59E-04	1.52E-03	0.0250	1.389E+14
Am-243	1.4921E-06	1,670.54	3,341.08	0.00E+00	2.49E-03	4.99E-03	0.0375	1.281E+14
C-14	5.7244E-09	1,670.54	3,341.08	0.00E+00	9.56E-06	1.91E-05	0.0575	1.260E+14
Cl-36	1.3124E-32	1,670.54	3,341.08	0.00E+00	2.19E-29	4.38E-29	0.0850	8.033E+13
Cm-243	2.3676E-07	1,670.54	3,341.08	0.00E+00	3.96E-04	7.91E-04	0.1250	6.956E+13
Cm-244	5.2042E-05	1,670.54	3,341.08	0.00E+00	8.69E-02	1.74E-01	0.2250	6.808E+13
Co-60	3.8208E-05	1,670.54	3,341.08	0.00E+00	6.38E-02	1.28E-01	0.3750	3.296E+13
Cs-134	4.8693E-01	1,670.54	3,341.08	0.00E+00	8.13E+02	1.63E+03	0.5750	4.527E+14
Cs-135	3.4477E-06	1,670.54	3,341.08	0.00E+00	5.76E-03	1.15E-02	0.8500	6.339E+13
Cs-137	2.8731E+00	1,670.54	3,341.08	0.00E+00	4.80E+03	9.60E+03	1.2500	1.179E+13
Eu-154	8.2053E-02	1,670.54	3,341.08	0.00E+00	1.37E+02	2.74E+02	1.7500	4.946E+11
Eu-155	3.9134E-02	1,670.54	3,341.08	0.00E+00	6.54E+01	1.31E+02	2.2500	1.037E+12
Fe-55	6.7429E-03	1,670.54	3,341.08	0.00E+00	1.13E+01	2.25E+01	2.7500	5.968E+09
H-3	1.0599E-02	1,670.54	3,341.08	0.00E+00	1.77E+01	3.54E+01	3.5000	6.619E+08
I-129	7.5300E-07	1,670.54	3,341.08	0.00E+00	1.26E-03	2.52E-03	5.0000	1.988E+03
Kr-85	2.8595E-01	1,670.54	3,341.08	0.00E+00	4.78E+02	9.55E+02	7.0000	2.216E+02
Np-237	9.5479E-06	1,670.54	3,341.08	0.00E+00	1.60E-02	3.19E-02	11.0000	2.498E+01
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		
Ti-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		

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 %	20.0000028	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR MTR-S (U3S2 LEU) JAPAN
SNF ID # 506
Fuel Units & Descr: 70 - ASSEMBLY
Heavy Metal Mass BOL=73.5kg, EOL=70 413kg
ROD Storage Site SRS

Fuel decay start date: 2010
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
*Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT): 0.0016689
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
2 92

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1.4545E-10	2,923.45	5,846.90	0.00E+00	4.25E-07	8.50E-07	0.0150	1.128E+15
Am-241	1.1190E-03	2,923.45	5,846.90	0.00E+00	3.27E+00	6.54E+00	0.0250	2.430E+14
Am-242m	4.5425E-07	2,923.45	5,846.90	0.00E+00	1.33E-03	2.66E-03	0.0375	2.243E+14
Am-243	1.4921E-06	2,923.45	5,846.90	0.00E+00	4.36E-03	8.72E-03	0.0575	2.205E+14
C-14	5.7244E-09	2,923.45	5,846.90	0.00E+00	1.67E-05	3.35E-05	0.0850	1.406E+14
Cl-36	1.3124E-32	2,923.45	5,846.90	0.00E+00	3.84E-29	7.67E-29	0.1250	1.217E+14
Cm-243	2.3676E-07	2,923.45	5,846.90	0.00E+00	6.92E-04	1.38E-03	0.2250	1.191E+14
Cm-244	5.2042E-05	2,923.45	5,846.90	0.00E+00	1.52E-01	3.04E-01	0.3750	5.767E+13
Co-60	3.8208E-05	2,923.45	5,846.90	0.00E+00	1.12E-01	2.23E-01	0.5750	7.922E+14
Cs-134	4.8693E-01	2,923.45	5,846.90	0.00E+00	1.42E+03	2.85E+03	0.8500	1.109E+14
Cs-135	3.4477E-06	2,923.45	5,846.90	0.00E+00	1.01E-02	2.02E-02	1.2500	2.064E+13
Cs-137	2.8731E+00	2,923.45	5,846.90	0.00E+00	8.40E+03	1.68E+04	1.7500	8.655E+11
Eu-154	8.2053E-02	2,923.45	5,846.90	0.00E+00	2.40E+02	4.80E+02	2.2500	1.815E+12
Eu-155	3.9134E-02	2,923.45	5,846.90	0.00E+00	1.14E+02	2.29E+02	2.7500	1.044E+10
Fe-55	6.7429E-03	2,923.45	5,846.90	0.00E+00	1.97E+01	3.94E+01	3.5000	1.158E+09
H-3	1.0599E-02	2,923.45	5,846.90	0.00E+00	3.10E+01	6.20E+01	5.0000	3.508E+03
I-129	7.5300E-07	2,923.45	5,846.90	0.00E+00	2.20E-03	4.40E-03	7.0000	3.913E+02
Kr-85	2.8595E-01	2,923.45	5,846.90	0.00E+00	8.36E+02	1.67E+03	11.0000	4.411E+01
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	LIGHT WATER	LIGHT WATER
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment %	20.0000028	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

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

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

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd), 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
6.21

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	11,683.57	23,367.15	0.00E+00	1.70E-06	3.40E-06	Avg. MeV	
Am-241	1.1190E-03	11,683.57	23,367.15	0.00E+00	1.31E+01	2.61E+01	0.0150	4.508E+15
Am-242m	4.5425E-07	11,683.57	23,367.15	0.00E+00	5.31E-03	1.06E-02	0.0250	9.712E+14
Am-243	1.4921E-06	11,683.57	23,367.15	0.00E+00	1.74E-02	3.49E-02	0.0375	8.962E+14
C-14	5.7244E-09	11,683.57	23,367.15	0.00E+00	6.69E-05	1.34E-04	0.0575	8.813E+14
Cl-36	1.3124E-32	11,683.57	23,367.15	0.00E+00	1.53E-28	3.07E-28	0.0850	5.618E+14
Cm-243	2.3676E-07	11,683.57	23,367.15	0.00E+00	2.77E-03	5.53E-03	0.1250	4.865E+14
Cm-244	5.2042E-05	11,683.57	23,367.15	0.00E+00	6.08E-01	1.22E+00	0.2250	4.762E+14
Co-60	3.8208E-05	11,683.57	23,367.15	0.00E+00	4.46E-01	8.93E-01	0.3750	2.305E+14
Cs-134	4.8693E-01	11,683.57	23,367.15	0.00E+00	5.69E+03	1.14E+04	0.5750	3.166E+15
Cs-135	3.4477E-06	11,683.57	23,367.15	0.00E+00	4.03E-02	8.06E-02	0.8500	4.434E+14
Cs-137	2.8731E+00	11,683.57	23,367.15	0.00E+00	3.36E+04	6.71E+04	1.2500	8.249E+13
Eu-154	8.2053E-02	11,683.57	23,367.15	0.00E+00	9.59E+02	1.92E+03	1.7500	3.459E+12
Eu-155	3.9134E-02	11,683.57	23,367.15	0.00E+00	4.57E+02	9.14E+02	2.2500	7.255E+12
Fe-55	6.7429E-03	11,683.57	23,367.15	0.00E+00	7.88E+01	1.58E+02	2.7500	4.174E+10
H-3	1.0599E-02	11,683.57	23,367.15	0.00E+00	1.24E+02	2.48E+02	3.5000	4.629E+09
I-129	7.5300E-07	11,683.57	23,367.15	0.00E+00	8.80E-03	1.76E-02	5.0000	1.397E+04
Kr-85	2.8595E-01	11,683.57	23,367.15	0.00E+00	3.34E+03	6.68E+03	7.0000	1.557E+03
Np-237	9.5479E-06	11,683.57	23,367.15	0.00E+00	1.12E-01	2.23E-01	11.0000	1.756E+02
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		
Th-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-06	11,683.57	0.00	8.89E-02	5.70E-02	8.89E-02		
U-236	1.5493E-05	11,683.57	23,367.15	0.00E+00	1.81E-01	3.62E-01		
U-238	-4.2851E-09	11,683.57	0.00	5.53E-02	5.52E-02	5.53E-02		
Y-90	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons.
Fuel Cladding	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents	U	U	
BOL Enrichment %	19.99999957	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		11.683.57	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		23,367.15	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.18		1.00
Bounding	0.36		

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

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

¹Fuel decay start date 2010
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0.88

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	1,481.61	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	5.66E-02	1.13E-01	0.2250	6.038E+13
Co-60	3.8208E-05	1,481.61	2,963.22	0.00E+00	7.21E-02	1.44E+03	0.3750	2.923E+13
Cs-134	4.8693E-01	1,481.61	2,963.22	0.00E+00	5.11E-03	1.02E-02	0.5750	4.015E+14
Cs-135	3.4477E-06	1,481.61	2,963.22	0.00E+00	4.26E+03	8.51E+03	0.8500	5.622E+13
Cs-137	2.8731E+00	1,481.61	2,963.22	0.00E+00	1.22E+02	2.43E+02	1.2500	1.046E+13
Eu-154	8.2053E-02	1,481.61	2,963.22	0.00E+00	5.80E+01	1.16E+02	1.7500	4.387E+11
Eu-155	3.9134E-02	1,481.61	2,963.22	0.00E+00	9.99E+00	2.00E+01	2.2500	9.201E+11
Fe-55	6.7429E-03	1,481.61	2,963.22	0.00E+00	1.57E+01	3.14E+01	2.7500	5.293E+09
H-3	1.0599E-02	1,481.61	2,963.22	0.00E+00	1.12E-03	2.23E-03	3.5000	5.871E+08
I-129	7.5300E-07	1,481.61	2,963.22	0.00E+00	4.24E+02	8.47E+02	5.0000	1.755E+03
Kr-85	2.8595E-01	1,481.61	2,963.22	0.00E+00	1.41E-02	2.83E-02	7.0000	1.957E+02
Np-237	9.5479E-06	1,481.61	2,963.22	0.00E+00	1.32E-06	2.65E-06	11.0000	2.206E+01
Pa-231	8.9297E-10	1,481.61	2,963.22	0.00E+00	5.57E-09	1.11E-08		
Pb-210	3.7609E-12	1,481.61	2,963.22	0.00E+00	3.77E+03	7.54E+03		
Pm-147	2.5452E+00	1,481.61	2,963.22	0.00E+00	3.04E+01	6.09E+01		
Pu-238	2.0550E-02	1,481.61	2,963.22	0.00E+00	6.35E-01	1.27E+00		
Pu-239	4.2838E-04	1,481.61	2,963.22	0.00E+00	3.62E-01	7.23E-01		
Pu-240	2.4401E-04	1,481.61	2,963.22	0.00E+00	1.02E+02	2.04E+02		
Pu-241	6.8764E-02	1,481.61	2,963.22	0.00E+00	5.38E-04	1.08E-03		
Pu-242	3.6329E-07	1,481.61	2,963.22	0.00E+00	5.64E-08	1.13E-07		
Ra-226	3.8045E-11	1,481.61	2,963.22	0.00E+00	4.43E-12	8.86E-12		
Ra-228	2.9902E-15	1,481.61	2,963.22	0.00E+00	2.82E+02	5.65E+02		
Ru-106	1.9055E-01	1,481.61	2,963.22	0.00E+00	1.92E-02	3.83E-02		
Se-79	1.2936E-05	1,481.61	2,963.22	0.00E+00	1.71E-02	3.43E-02		
Sn-126	1.1574E-05	1,481.61	2,963.22	0.00E+00	4.08E+03	8.15E+03		
Sr-90	2.7505E+00	1,481.61	2,963.22	0.00E+00	6.26E-01	1.25E+00		
Tc-99	4.2239E-04	1,481.61	2,963.22	0.00E+00	2.79E-09	5.59E-09		
Th-229	1.8848E-12	1,481.61	2,963.22	0.00E+00	2.53E-05	5.05E-05		
Th-230	1.7042E-08	1,481.61	2,963.22	0.00E+00	1.16E-11	2.32E-11		
Th-232	7.8132E-15	1,481.61	2,963.22	0.00E+00	6.53E-05	1.31E-04		
Ti-208	4.4063E-08	1,481.61	2,963.22	0.00E+00	1.95E-04	3.90E-04		
U-232	1.3151E-07	1,481.61	2,963.22	0.00E+00	2.90E-06	5.80E-06		
U-233	1.9564E-09	1,481.61	2,963.22	0.00E+00	2.72E-01	5.44E-01		
U-234	1.8371E-04	1,481.61	2,963.22	0.00E+00	4.86E-03	8.90E-03		
U-235	-2.7235E-06	1,481.61	0.00	8.90E-03	2.30E-02	4.59E-02		
U-236	1.5493E-05	1,481.61	2,963.22	0.00E+00	9.78E-05	1.04E-04		
U-238	-4.2851E-09	1,481.61	0.00	1.04E-04	4.08E+03	8.15E+03		
Y-90	2.7505E+00	1,481.61	2,963.22	0.00E+00	7.62E+03	1.52E+04		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences*
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	92.9999478	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate*
Nominal		1,481.61	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		2,963.22	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	1.06		1.03
Bounding	2.13		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (UALX-HEU) GERMANY
SNF ID #: 582
Fuel Units & Descr: 1 - MTR TYPE
Heavy Metal Mass: BOL=0.176kg; EOL=0.126kg
ROD Storage Site: SRS

Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0.04

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	48.11	96.22	0.00E+00	7.00E-09	1.40E-08	Avg. MeV	
Am-241	1.1190E-03	48.11	96.22	0.00E+00	5.38E-02	1.08E-01	0.0150	1.856E+13
Am-242m	4.5425E-07	48.11	96.22	0.00E+00	2.19E-05	4.37E-05	0.0250	3.999E+12
Am-243	1.4921E-06	48.11	96.22	0.00E+00	7.18E-05	1.44E-04	0.0375	3.690E+12
C-14	5.7244E-09	48.11	96.22	0.00E+00	2.75E-07	5.51E-07	0.0575	3.629E+12
Cl-36	1.3124E-32	48.11	96.22	0.00E+00	6.31E-31	1.26E-30	0.0850	2.313E+12
Cm-243	2.3676E-07	48.11	96.22	0.00E+00	1.14E-05	2.28E-05	0.1250	2.003E+12
Cm-244	5.2042E-05	48.11	96.22	0.00E+00	2.50E-03	5.01E-03	0.2250	1.961E+12
Co-60	3.8208E-05	48.11	96.22	0.00E+00	1.84E-03	3.68E-03	0.3750	9.491E+11
Cs-134	4.8693E-01	48.11	96.22	0.00E+00	2.34E+01	4.69E+01	0.5750	1.304E+13
Cs-135	3.4477E-06	48.11	96.22	0.00E+00	1.66E-04	3.32E-04	0.8500	1.826E+12
Cs-137	2.8731E+00	48.11	96.22	0.00E+00	1.38E+02	2.76E+02	1.2500	3.397E+11
Eu-154	8.2053E-02	48.11	96.22	0.00E+00	3.95E+00	7.89E+00	1.7500	1.424E+10
Eu-155	3.9134E-02	48.11	96.22	0.00E+00	1.88E+00	3.77E+00	2.2500	2.987E+10
Fe-55	6.7429E-03	48.11	96.22	0.00E+00	3.24E-01	6.49E-01	2.7500	1.719E+08
H-3	1.0599E-02	48.11	96.22	0.00E+00	5.10E-01	1.02E+00	3.5000	1.906E+07
I-129	7.5300E-07	48.11	96.22	0.00E+00	3.62E-05	7.25E-05	5.0000	5.700E+01
Kr-85	2.8595E-01	48.11	96.22	0.00E+00	1.38E+01	2.75E+01	7.0000	6.354E+00
Np-237	9.5479E-06	48.11	96.22	0.00E+00	4.59E-04	9.19E-04	11.0000	7.162E-01
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		
Ti-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-06	48.11	0.00	3.54E-04	2.23E-04	3.54E-04		
U-236	1.5493E-05	48.11	96.22	0.00E+00	7.45E-04	1.49E-03		
U-238	4.2851E-09	48.11	0.00	4.15E-06	3.94E-06	4.15E-06		
Y-90	2.7505E+00	48.11	96.22	0.00E+00	1.32E+02	2.65E+02		
Other Radionuclides					2.47E+02	4.95E+02		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ALUM	ALUM	
	U	U	
	92.99999263	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal Bounding	From SFD	Estimated	
		48.11 96.22	
Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup			

Checks			Estimated EOL HM/Given EOL HM
Nominal Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0.87 1.73		
			1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR MTR-S (UALX-HEU) GERMANY
SNF ID # 584
Fuel Units & Descr 44 - MTR TYPE
Heavy Metal Mass BOL=8 136kg EOL=5 944kg
ROD Storage Site SRS

Fuel decay start date 2010
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100% U)
*Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT) 0 00116689
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
1 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	2.075 11	4.150 22	0.00E+00	3.02E-07	6.04E-07	Avg MeV	
Am-241	1.1190E-03	2.075 11	4.150 22	0.00E+00	2.32E+00	4.64E+00	0.0150	8.007E+14
Am-242m	4.5425E-07	2.075 11	4.150 22	0.00E+00	9.43E-04	1.89E-03	0.0250	1.725E+14
Am-243	1.4921E-06	2.075 11	4.150 22	0.00E+00	3.10E-03	6.19E-03	0.0375	1.592E+14
C-14	5.7244E-09	2.075 11	4.150 22	0.00E+00	1.19E-05	2.38E-05	0.0575	1.565E+14
Cl-36	1.3124E-32	2.075 11	4.150 22	0.00E+00	2.72E-29	5.45E-29	0.0850	9.978E+13
Cm-243	2.3676E-07	2.075 11	4.150 22	0.00E+00	4.91E-04	9.83E-04	0.1250	8.641E+13
Cm-244	5.2042E-05	2.075 11	4.150 22	0.00E+00	1.08E-01	2.16E-01	0.2250	8.457E+13
Co-60	3.8208E-05	2.075 11	4.150 22	0.00E+00	7.93E-02	1.59E-01	0.3750	4.094E+13
Cs-134	4.8693E-01	2.075 11	4.150 22	0.00E+00	1.01E+03	2.02E+03	0.5750	5.623E+14
Cs-135	3.4477E-06	2.075 11	4.150 22	0.00E+00	7.15E-03	1.43E-02	0.8500	7.875E+13
Cs-137	2.8731E+00	2.075 11	4.150 22	0.00E+00	5.96E+03	1.19E+04	1.2500	1.465E+13
Eu-154	8.2063E-02	2.075 11	4.150 22	0.00E+00	1.70E+02	3.41E+02	1.7500	6.144E+11
Eu-155	3.9134E-02	2.075 11	4.150 22	0.00E+00	8.12E+01	1.62E+02	2.2500	1.289E+12
Fe-55	6.7429E-03	2.075 11	4.150 22	0.00E+00	1.40E+01	2.80E+01	2.7500	7.414E+09
H-3	1.0599E-02	2.075 11	4.150 22	0.00E+00	2.20E+01	4.40E+01	3.5000	8.222E+08
I-129	7.5300E-07	2.075 11	4.150 22	0.00E+00	1.56E-03	3.13E-03	5.0000	2.459E+03
Kr-85	2.8595E-01	2.075 11	4.150 22	0.00E+00	5.93E+02	1.19E+03	7.0000	2.741E+02
Np-237	9.5479E-06	2.075 11	4.150 22	0.00E+00	1.98E-02	3.96E-02	11.0000	3.089E+01
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD LIGHT WATER	Used LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93.00001838	60 to 100	
Burnup Summary (MWd) ²			Basis for burnup used in estimate*
Nominal	From SFD	Estimated 2.075 11	
Bounding		4.150 22	
			Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
Burnup Multiplier	Estimated Burnup/ Given Burnup		
Nominal Bounding	0.81 1.62		
			1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: TRIGA-AI (LW/U-Zrx, Alum, 10 to 20%, U)
²Template Burnup(MWd): 6 65
Template BOL Heavy Metal Mass (MT): 0 00018
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
2 08

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8 0632E-10	4,810.77	9,234.97	0 00E+00	3 88E-06	7 45E-06	Avg. MeV	
Am-241	2 2586E-03	4,810.77	9,234.97	0 00E+00	1 09E+01	2 09E+01	0 0150	1.563E+15
Am-242m	1 9925E-06	4 810.77	9,234.97	0 00E+00	9 59E-03	1 84E-02	0 0250	3.392E+14
Am-243	2 3323E-07	4,810.77	9,234.97	0 00E+00	1 12E-03	2 15E-03	0 0375	4.226E+14
C-14	4 3308E-05	4,810.77	9,234.97	0 00E+00	2 08E-01	4 00E-01	0 0575	3.239E+14
Cl-36	4 3023E-08	4,810.77	9,234.97	0 00E+00	2 07E-04	3 97E-04	0 0850	2.268E+14
Cm-243	2 7429E-07	4,810.77	9,234.97	0 00E+00	1 32E-03	2 53E-03	0 1250	3.391E+14
Cm-244	3 1504E-06	4,810.77	9,234.97	0 00E+00	1 52E-02	2 91E-02	0 2250	1.893E+14
Co-60	3 1008E-02	4,810.77	9,234.97	0 00E+00	1 49E+02	2 86E+02	0 3750	8 425E+13
Cs-134	1 0367E-01	4,810.77	9,234.97	0 00E+00	4 99E+02	9 57E+02	0 5750	1 068E+15
Cs-135	3 1549E-05	4,810.77	9,234.97	0 00E+00	1 52E-01	2 91E-01	0 8500	2 629E+14
Cs-137	2 7564E+00	4,810.77	9,234.97	0 00E+00	1 33E+04	2 55E+04	1.2500	2.725E+14
Eu-154	1 3490E+00	4,810.77	9,234.97	0 00E+00	6 49E+03	1.25E+04	1 7500	7 800E+12
Eu-155	4 3880E-01	4,810.77	9,234.97	0 00E+00	2 11E+03	4 05E+03	2.2500	9 481E+11
Fe-55	8 6782E-03	4,810.77	9,234.97	0 00E+00	4 17E+01	8 01E+01	2.7500	7 701E+09
H-3	1 0805E-02	4,810.77	9,234.97	0 00E+00	5.20E+01	9 98E+01	3 5000	9 001E+08
I-129	7 3805E-07	4,810.77	9,234.97	0 00E+00	3.55E-03	6 82E-03	5 0000	5 269E+03
Kr-85	2 5218E-01	4,810.77	9,234.97	0 00E+00	1.21E+03	2.33E+03	7 0000	5 962E+02
Np-237	1 4463E-06	4,810.77	9,234.97	0 00E+00	6 96E-03	1 34E-02	11 0000	6 790E+01
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		
Ti-208	1 9459E-08	4,810.77	9,234.97	0 00E+00	9 36E-05	1 80E-04		
U-232	5 6015E-08	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	This Template was used for the following reasons.
Fuel Cladding	ALUM	ALUM	This fuel matches on all parameters except enrichment.
BOL HM Constituents	U	U	
BOL Enrichment %	92 9999938	10 to 20 1	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		4 810.77	Nominal burnup calculated from the heavy metal mass destroyed
Bounding		9,234.97	Bounding burnup calculated assuming all BOL heavy metal burned.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	13.46		1.02
Bounding	25.84		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name 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

¹Fuel decay start date: 2010
Estimates as of: 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.08

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1.4545E-10	124.06	248.12	0.00E+00	1.80E-08	3.61E-08	0.0150	4.787E+13
Am-241	1.1190E-03	124.06	248.12	0.00E+00	1.39E-01	2.78E-01	0.0250	1.031E+13
Am-242m	4.5425E-07	124.06	248.12	0.00E+00	5.64E-05	1.13E-04	0.0375	9.516E+12
Am-243	1.4921E-06	124.06	248.12	0.00E+00	1.85E-04	3.70E-04	0.0575	9.357E+12
C-14	5.7244E-09	124.06	248.12	0.00E+00	7.10E-07	1.42E-06	0.0850	5.965E+12
Cl-36	1.3124E-32	124.06	248.12	0.00E+00	1.63E-30	3.26E-30	0.1250	5.166E+12
Cm-243	2.3676E-07	124.06	248.12	0.00E+00	2.94E-05	5.87E-05	0.2250	5.056E+12
Cm-244	5.2042E-05	124.06	248.12	0.00E+00	6.46E-03	1.29E-02	0.3750	2.447E+12
Co-60	3.8208E-05	124.06	248.12	0.00E+00	4.74E-03	9.48E-03	0.5750	3.362E+13
Cs-134	4.8693E-01	124.06	248.12	0.00E+00	6.04E+01	1.21E+02	0.8500	4.708E+12
Cs-135	3.4477E-06	124.06	248.12	0.00E+00	4.28E-04	8.55E-04	1.2500	8.759E+11
Cs-137	2.8731E+00	124.06	248.12	0.00E+00	3.56E+02	7.13E+02	1.7500	3.673E+10
Eu-154	8.2053E-02	124.06	248.12	0.00E+00	1.02E+01	2.04E+01	2.2500	7.704E+10
Eu-155	3.9134E-02	124.06	248.12	0.00E+00	4.85E+00	9.71E+00	2.7500	4.432E+08
Fe-55	6.7429E-03	124.06	248.12	0.00E+00	8.37E-01	1.67E+00	3.5000	4.916E+07
H-3	1.0599E-02	124.06	248.12	0.00E+00	1.31E+00	2.63E+00	5.0000	1.470E+02
I-129	7.5300E-07	124.06	248.12	0.00E+00	9.34E-05	1.87E-04	7.0000	1.639E+01
Kr-85	2.8595E-01	124.06	248.12	0.00E+00	3.55E+01	7.09E+01	11.0000	1.847E+00
Np-237	9.5479E-06	124.06	248.12	0.00E+00	1.18E-03	2.37E-03		
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		
Th-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	90.00000989	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		124.06	
Bounding		248.12	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.97		
Bounding	1.95		1.03

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (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

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100% U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.0016689
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
1.67

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	1,636.45	3,272.90	0.00E+00	2.38E-07	4.76E-07	Avg MeV	
Am-241	1.1190E-03	1,636.45	3,272.90	0.00E+00	1.83E+00	3.66E+00	0.0150	6.314E+14
Am-242m	4.5425E-07	1,636.45	3,272.90	0.00E+00	7.43E-04	1.49E-03	0.0250	1.360E+14
Am-243	1.4921E-06	1,636.45	3,272.90	0.00E+00	2.44E-03	4.88E-03	0.0375	1.255E+14
C-14	5.7244E-09	1,636.45	3,272.90	0.00E+00	9.37E-06	1.87E-05	0.0575	1.234E+14
Cl-36	1.3124E-32	1,636.45	3,272.90	0.00E+00	2.15E-29	4.30E-29	0.0850	7.869E+13
Cm-243	2.3676E-07	1,636.45	3,272.90	0.00E+00	3.87E-04	7.75E-04	0.1250	6.814E+13
Cm-244	5.2042E-05	1,636.45	3,272.90	0.00E+00	8.52E-02	1.70E-01	0.2250	6.669E+13
Co-60	3.8208E-05	1,636.45	3,272.90	0.00E+00	6.25E-02	1.25E-01	0.3750	3.228E+13
Cs-134	4.8693E-01	1,636.45	3,272.90	0.00E+00	7.97E+02	1.59E+03	0.5750	4.434E+14
Cs-135	3.4477E-06	1,636.45	3,272.90	0.00E+00	5.64E-03	1.13E-02	0.8500	6.210E+13
Cs-137	2.8731E+00	1,636.45	3,272.90	0.00E+00	4.70E+03	9.40E+03	1.2500	1.155E+13
Eu-154	8.2053E-02	1,636.45	3,272.90	0.00E+00	1.34E+02	2.69E+02	1.7500	4.845E+11
Eu-155	3.9134E-02	1,636.45	3,272.90	0.00E+00	6.40E+01	1.28E+02	2.2500	1.016E+11
Fe-55	6.7429E-03	1,636.45	3,272.90	0.00E+00	1.10E+01	2.21E+01	2.7500	5.847E+09
H-3	1.0599E-02	1,636.45	3,272.90	0.00E+00	1.73E+01	3.47E+01	3.5000	6.484E+08
I-129	7.5300E-07	1,636.45	3,272.90	0.00E+00	1.23E-03	2.46E-03	5.0000	1.939E+03
Kr-85	2.8595E-01	1,636.45	3,272.90	0.00E+00	4.68E+02	9.36E+02	7.0000	2.161E+02
Np-237	9.5479E-06	1,636.45	3,272.90	0.00E+00	1.56E-02	3.12E-02	11.0000	2.436E+01
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		
Ti-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-06	1,636.45	0.00	1.56E-02	1.11E-02	1.56E-02		
U-236	1.5493E-05	1,636.45	3,272.90	0.00E+00	2.54E-02	5.07E-02		
U-238	-4.2851E-09	1,636.45	0.00	1.82E-04	1.75E-04	1.82E-04		
Y-90	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		

III. Template Selection Summary, Burnup Summary, and 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

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

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

¹Fuel decay start date 2010
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100% U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0.79

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1.4545E-10	899.67	1,799.34	0.00E+00	1.31E-07	2.62E-07	0.0150	3.471E+14
Am-241	1.1190E-03	899.67	1,799.34	0.00E+00	1.01E+00	2.01E+00	0.0250	7.479E+13
Am-242m	4.5425E-07	899.67	1,799.34	0.00E+00	4.09E-04	8.17E-04	0.0375	6.901E+13
Am-243	1.4921E-06	899.67	1,799.34	0.00E+00	1.34E-03	2.68E-03	0.0575	6.786E+13
C-14	5.7244E-09	899.67	1,799.34	0.00E+00	5.15E-06	1.03E-05	0.0850	4.326E+13
Cf-252	1.3124E-32	899.67	1,799.34	0.00E+00	1.18E-29	2.36E-29	0.1250	3.746E+13
Cm-243	2.3676E-07	899.67	1,799.34	0.00E+00	2.13E-04	4.26E-04	0.2250	3.667E+13
Cm-244	5.2042E-05	899.67	1,799.34	0.00E+00	4.68E-02	9.36E-02	0.3750	1.775E+13
Co-60	3.8208E-05	899.67	1,799.34	0.00E+00	3.44E-02	6.87E-02	0.5750	2.438E+14
Cs-134	4.8693E-01	899.67	1,799.34	0.00E+00	4.38E+02	8.76E+02	0.8500	3.414E+13
Cs-135	3.4477E-06	899.67	1,799.34	0.00E+00	3.10E-03	6.20E-03	1.2500	6.352E+12
Cs-137	2.8731E+00	899.67	1,799.34	0.00E+00	2.58E+03	5.17E+03	1.7500	2.664E+11
Eu-154	8.2053E-02	899.67	1,799.34	0.00E+00	7.38E+01	1.48E+02	2.2500	5.587E+11
Eu-155	3.9134E-02	899.67	1,799.34	0.00E+00	3.52E+01	7.04E+01	2.7500	3.214E+09
Fe-55	6.7429E-03	899.67	1,799.34	0.00E+00	6.07E+00	1.21E+01	3.5000	3.565E+08
H-3	1.0599E-02	899.67	1,799.34	0.00E+00	9.54E+00	1.91E+01	5.0000	1.066E+03
I-129	7.5300E-07	899.67	1,799.34	0.00E+00	6.77E-04	1.35E-03	7.0000	1.188E+02
Kr-85	2.8595E-01	899.67	1,799.34	0.00E+00	2.57E+02	5.15E+02	11.0000	1.339E+01
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		
Ti-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	Thermal Power	
U-233	1.9564E-09	899.67	1,799.34	0.00E+00	1.76E-06	3.52E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8371E-04	899.67	1,799.34	0.00E+00	1.65E-01	3.31E-01	4.56E+01	9.12E+01
U-235	-2.7235E-06	899.67	0.00	4.10E-03	1.39E-02	2.79E-02	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and 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
Nominal		899.67
Bounding		1,799.34

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1.40	
Bounding	2.80	

Estimated EOL HM/Given EOL HM

1.05

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR MTR-S (JALX-HEU) NETHERLANDS
SNF ID #: 608
Fuel Units & Descr: 61 - MTR TYPE
Heavy Metal Mass: BOL=12 462kg; EOL=6 667kg
ROD Storage Site: SRS

Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
2 54

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 454E-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		
Ti-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			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	92 99998578	60 to 100	

Burnup Summary (MWd) ⁴			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		5 487.98	
Bounding		10 975.95	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	1.40		
Bounding	2.80		1 05

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR MTR-S (UALX-HEU) PORTUGAL
SNF ID # 632
Fuel Units & Descr 22 - MTR TYPE
Heavy Metal Mass BOL=6.246kg EOL=3.923kg
ROD Storage Site SRS

Fuel decay start date: 2010
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0.92

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	1.4545E-10	2,200.12	4,400.23	0.00E+00	3.20E-07	6.40E-07	Avg MeV	
Am-241	1.1190E-03	2,200.12	4,400.23	0.00E+00	2.46E+00	4.92E+00	0.0150	8.489E+14
Am-242m	4.5425E-07	2,200.12	4,400.23	0.00E+00	9.99E-04	2.00E-03	0.0250	1.829E+14
Am-243	1.4921E-06	2,200.12	4,400.23	0.00E+00	3.28E-03	6.57E-03	0.0375	1.688E+14
C-14	5.7244E-09	2,200.12	4,400.23	0.00E+00	1.26E-05	2.52E-05	0.0575	1.659E+14
Ct-36	1.3124E-32	2,200.12	4,400.23	0.00E+00	2.89E-29	5.77E-29	0.0850	1.058E+14
Cm-243	2.3676E-07	2,200.12	4,400.23	0.00E+00	5.21E-04	1.04E-03	0.1250	9.161E+13
Cm-244	5.2042E-05	2,200.12	4,400.23	0.00E+00	1.14E-01	2.29E-01	0.2250	8.966E+13
Co-60	3.8208E-05	2,200.12	4,400.23	0.00E+00	8.41E-02	1.68E-01	0.3750	4.340E+13
Cs-134	4.8693E-01	2,200.12	4,400.23	0.00E+00	1.07E+03	2.14E+03	0.5750	5.962E+14
Cs-135	3.4477E-06	2,200.12	4,400.23	0.00E+00	7.59E-03	1.52E-02	0.8500	8.349E+13
Cs-137	2.8731E+00	2,200.12	4,400.23	0.00E+00	6.32E+03	1.26E+04	1.2500	1.553E+13
Eu-154	8.2053E-02	2,200.12	4,400.23	0.00E+00	1.81E+02	3.61E+02	1.7500	6.514E+11
Eu-155	3.9134E-02	2,200.12	4,400.23	0.00E+00	8.61E+01	1.72E+02	2.2500	1.366E+12
Fe-55	6.7429E-03	2,200.12	4,400.23	0.00E+00	1.48E+01	2.97E+01	2.7500	7.860E+09
H-3	1.0599E-02	2,200.12	4,400.23	0.00E+00	2.33E+01	4.66E+01	3.5000	8.718E+08
I-129	7.5300E-07	2,200.12	4,400.23	0.00E+00	1.66E-03	3.31E-03	5.0000	2.506E+03
Kr-85	2.8595E-01	2,200.12	4,400.23	0.00E+00	6.29E+02	1.26E+03	7.0000	2.906E+02
Np-237	9.5479E-06	2,200.12	4,400.23	0.00E+00	2.10E-02	4.20E-02	11.0000	3.275E+01
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	92.99999055	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
		2,200.12	
Bounding		4,400.23	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	1.12		
Bounding	2.24		1.03

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
2 29

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-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	2.996E+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		
Ti-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		
U-233	1.9564E-09	10,135 95	15,792 50	0.00E+00	1.98E-05	3.09E-05		
U-234	1.8371E-04	10,135 95	15,792 50	0.00E+00	1.86E+00	2.90E+00		
U-235	2.7235E-06	10,135 95	0.00	3.35E-02	5.91E-03	3.35E-02		
U-236	1.5493E-05	10,135 95	15,792 50	0.00E+00	1.57E-01	2.45E-01		
U-238	4.2851E-09	10,135 95	0.00	3.92E-04	3.49E-04	3.92E-04		
Y-90	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			Basis for Parameter Differences:
Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ALUM	ALUM	
	U	U	
	93.00000816	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal Bounding	From SFD	Estimated	
		10.135 95 15.792 50	

Nominal burnup calculated from the heavy metal mass destroyed.
Bounding burnup calculated assuming all BOL heavy metal burned.

Checks			Estimated EOL HM/Given EOL HM
Nominal Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	1.93 3.01		

1.10

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR MTR-S (UALX-HEU) TURKEY
SNF ID #: 644
Fuel Units & Descr: 18 - MTR TYPE
Heavy Metal Mass: BOL=5.42kg EOL=2.9kg
ROD Storage Site: SRS

Fuel decay start date 2010
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
*Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.75

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	2,386.49	4,772.98	0.00E+00	3.47E-07	6.94E-07	Avg MeV	
Am-241	1.1190E-03	2,386.49	4,772.98	0.00E+00	2.67E+00	5.34E+00	0.0150	9.208E+14
Am-242m	4.5425E-07	2,386.49	4,772.98	0.00E+00	1.08E-03	2.17E-03	0.0250	1.984E+14
Am-243	1.4921E-06	2,386.49	4,772.98	0.00E+00	3.56E-03	7.12E-03	0.0375	1.831E+14
C-14	5.7244E-09	2,386.49	4,772.98	0.00E+00	1.37E-05	2.73E-05	0.0575	1.800E+14
Cl-36	1.3124E-32	2,386.49	4,772.98	0.00E+00	3.13E-29	6.26E-29	0.0850	1.148E+14
Cm-243	2.3676E-07	2,386.49	4,772.98	0.00E+00	5.65E-04	1.13E-03	0.1250	9.937E+13
Cm-244	5.2042E-05	2,386.49	4,772.98	0.00E+00	1.24E-01	2.48E-01	0.2250	9.726E+13
Co-60	3.8208E-05	2,386.49	4,772.98	0.00E+00	9.12E-02	1.82E-01	0.3750	4.708E+13
Cs-134	4.8693E-01	2,386.49	4,772.98	0.00E+00	1.16E+03	2.32E+03	0.5750	6.467E+14
Cs-135	3.4477E-06	2,386.49	4,772.98	0.00E+00	8.23E-03	1.65E-02	0.8500	9.056E+13
Cs-137	2.8731E+00	2,386.49	4,772.98	0.00E+00	6.86E+03	1.37E+04	1.2500	1.685E+13
Eu-154	8.2053E-02	2,386.49	4,772.98	0.00E+00	1.96E+02	3.92E+02	1.7500	7.066E+11
Eu-155	3.9134E-02	2,386.49	4,772.98	0.00E+00	9.34E+01	1.87E+02	2.2500	1.482E+12
Fe-55	6.7429E-03	2,386.49	4,772.98	0.00E+00	1.61E+01	3.22E+01	2.7500	8.526E+09
H-3	1.0599E-02	2,386.49	4,772.98	0.00E+00	2.53E+01	5.06E+01	3.5000	9.456E+08
I-129	7.5300E-07	2,386.49	4,772.98	0.00E+00	1.80E-03	3.59E-03	5.0000	2.827E+03
Kr-85	2.8595E-01	2,386.49	4,772.98	0.00E+00	6.82E+02	1.36E+03	7.0000	3.152E+02
Np-237	9.5479E-06	2,386.49	4,772.98	0.00E+00	2.28E-02	4.56E-02	11.0000	3.552E+01
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		
Ti-208	4.4063E-08	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		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and 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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

Fuel decay start date: 2010
Estimates as of: 2010
Template: HFBR (Heavy Water, Alum, 10 to 20%, U)
Template Burnup(MWd): 15
Template BOL Heavy Metal Mass (MT) 0.00034251
Template Decay Time 5 years

Estimated
Canister usage:
18"x10"
19.83

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ¹	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.7533E-10	77,499.76	154,999.52	0.00E+00	1.36E-05	2.72E-05	Avg MeV	
Am-241	1.2780E-02	77,499.76	154,999.52	0.00E+00	9.90E+02	1.98E+03	0.0150	2.812E+16
Am-242m	9.5467E-06	77,499.76	154,999.52	0.00E+00	7.40E-01	1.48E+00	0.0250	6.060E+15
Am-243	8.4100E-06	77,499.76	154,999.52	0.00E+00	4.97E-01	9.94E-01	0.0375	5.522E+15
C-14	2.9673E-08	77,499.76	154,999.52	0.00E+00	2.30E-03	4.60E-03	0.0575	5.512E+15
Cl-36	5.9513E-35	77,499.76	154,999.52	0.00E+00	4.61E-30	9.22E-30	0.0850	3.472E+15
Cm-243	3.1807E-06	77,499.76	154,999.52	0.00E+00	2.47E-01	4.93E-01	0.1250	2.899E+15
Cm-244	1.9540E-04	77,499.76	154,999.52	0.00E+00	1.51E+01	3.03E+01	0.2250	2.961E+15
Co-60	1.1753E-04	77,499.76	154,999.52	0.00E+00	9.11E+00	1.82E+01	0.3750	1.436E+15
Cs-134	3.3060E-01	77,499.76	154,999.52	0.00E+00	2.56E+04	5.12E+04	0.5750	1.982E+16
Cs-135	4.8607E-06	77,499.76	154,999.52	0.00E+00	3.77E-01	7.53E-01	0.8500	2.103E+15
Cs-137	2.8607E+00	77,499.76	154,999.52	0.00E+00	2.22E+05	4.43E+05	1.2500	4.647E+14
Eu-154	6.9933E-02	77,499.76	154,999.52	0.00E+00	5.42E+03	1.08E+04	1.7500	2.212E+13
Eu-155	3.3253E-02	77,499.76	154,999.52	0.00E+00	2.58E+03	5.15E+03	2.2500	3.847E+13
Fe-55	7.7267E-02	77,499.76	154,999.52	0.00E+00	5.99E+03	1.20E+04	2.7500	3.480E+11
H-3	1.0827E-02	77,499.76	154,999.52	0.00E+00	8.39E+02	1.68E+03	3.5000	4.122E+10
I-129	7.1600E-07	77,499.76	154,999.52	0.00E+00	5.55E-02	1.11E-01	5.0000	4.035E+05
Kr-85	2.7007E-01	77,499.76	154,999.52	0.00E+00	2.09E+04	4.19E+04	7.0000	4.597E+04
Np-237	3.6327E-06	77,499.76	154,999.52	0.00E+00	2.82E-01	5.63E-01	11.0000	5.250E+03
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		
Ti-208	7.4667E-09	77,499.76	154,999.52	0.00E+00	5.79E-04	1.16E-03		
U-232	2.1927E-08	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-08	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding	HEAVY WATER	HEAVY WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	20	10 to 20	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
Bounding	77,499.76	154,999.52	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/Given Burnup	
Bounding	2.48	4.96	1.03

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 2010
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x10"
 0.25

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	235.24	470.48	0.00E+00	3.42E-08	6.84E-08	Avg MeV	
Am-241	1.1190E-03	235.24	470.48	0.00E+00	2.63E-01	5.26E-01	0.0150	9.077E+13
Am-242m	4.5425E-07	235.24	470.48	0.00E+00	1.07E-04	2.14E-04	0.0250	1.955E+13
Am-243	1.4921E-06	235.24	470.48	0.00E+00	3.51E-04	7.02E-04	0.0375	1.804E+13
C-14	5.7244E-09	235.24	470.48	0.00E+00	1.35E-06	2.69E-06	0.0575	1.774E+13
Cl-36	1.3124E-32	235.24	470.48	0.00E+00	3.09E-30	6.17E-30	0.0850	1.131E+13
Cm-243	2.3676E-07	235.24	470.48	0.00E+00	5.57E-05	1.11E-04	0.1250	9.796E+12
Cm-244	5.2042E-05	235.24	470.48	0.00E+00	1.22E-02	2.45E-02	0.2250	9.587E+12
Co-60	3.8208E-05	235.24	470.48	0.00E+00	8.99E-03	1.80E-02	0.3750	4.641E+12
Cs-134	4.8693E-01	235.24	470.48	0.00E+00	1.15E+02	2.29E+02	0.5750	6.374E+13
Cs-135	3.4477E-06	235.24	470.48	0.00E+00	8.11E-04	1.62E-03	0.8500	8.927E+12
Cs-137	2.8731E+00	235.24	470.48	0.00E+00	6.76E+02	1.35E+03	1.2500	1.661E+12
Eu-154	8.2053E-02	235.24	470.48	0.00E+00	1.93E+01	3.86E+01	1.7500	6.965E+10
Eu-155	3.9134E-02	235.24	470.48	0.00E+00	9.21E+00	1.84E+01	2.2500	1.461E+11
Fe-55	6.7429E-03	235.24	470.48	0.00E+00	1.59E+00	3.17E+00	2.7500	8.404E+08
H-3	1.0599E-02	235.24	470.48	0.00E+00	2.49E+00	4.99E+00	3.5000	9.321E+07
I-129	7.5300E-07	235.24	470.48	0.00E+00	1.77E-04	3.54E-04	5.0000	2.820E+02
Kr-85	2.8595E-01	235.24	470.48	0.00E+00	6.73E+01	1.35E+02	7.0000	3.145E+01
Np-237	9.5479E-06	235.24	470.48	0.00E+00	2.25E-03	4.49E-03	11.0000	3.546E+00
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-08	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		

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 %	20.0000132	60 to 100

Basis for Parameter Differences:

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

Burnup Summary (MWd)¹

	From SFD	Estimated
Nominal		235.24
Bounding		470.48

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.14	
Bounding	0.28	

Estimated EOL HM/Given EOL HM

1.00

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

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

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.0016689
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
1.17

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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	3,513.44	7,026.88	0.00E+00	5.11E-07	1.02E-06	Avg. MeV	
Am-241	1.1190E-03	3,513.44	7,026.88	0.00E+00	3.93E+00	7.86E+00	0.0150	1.356E+15
Am-242m	4.5425E-07	3,513.44	7,026.88	0.00E+00	1.60E-03	3.19E-03	0.0250	2.921E+14
Am-243	1.4921E-06	3,513.44	7,026.88	0.00E+00	5.24E-03	1.05E-02	0.0375	2.695E+14
C-14	5.7244E-09	3,513.44	7,026.88	0.00E+00	2.01E-05	4.02E-05	0.0575	2.650E+14
Cl-36	1.3124E-32	3,513.44	7,026.88	0.00E+00	4.61E-29	9.22E-29	0.0850	1.689E+14
Cm-243	2.3676E-07	3,513.44	7,026.88	0.00E+00	8.32E-04	1.66E-03	0.1250	1.463E+14
Cm-244	5.2042E-05	3,513.44	7,026.88	0.00E+00	1.83E-01	3.66E-01	0.2250	1.432E+14
Co-60	3.8208E-05	3,513.44	7,026.88	0.00E+00	1.34E-01	2.68E-01	0.3750	6.931E+13
Cs-134	4.8693E-01	3,513.44	7,026.88	0.00E+00	1.71E+03	3.42E+03	0.5750	9.521E+14
Cs-135	3.4477E-06	3,513.44	7,026.88	0.00E+00	1.21E-02	2.42E-02	0.8500	1.333E+14
Cs-137	2.8731E+00	3,513.44	7,026.88	0.00E+00	1.01E+04	2.02E+04	1.2500	2.481E+13
Eu-154	8.2053E-02	3,513.44	7,026.88	0.00E+00	2.88E+02	5.77E+02	1.7500	1.040E+12
Eu-155	3.9134E-02	3,513.44	7,026.88	0.00E+00	1.37E+02	2.75E+02	2.2500	2.182E+12
Fe-55	6.7429E-03	3,513.44	7,026.88	0.00E+00	2.37E+01	4.74E+01	2.7500	1.255E+10
H-3	1.0599E-02	3,513.44	7,026.88	0.00E+00	3.72E+01	7.45E+01	3.5000	1.392E+09
I-129	7.5300E-07	3,513.44	7,026.88	0.00E+00	2.65E-03	5.29E-03	5.0000	4.167E+03
Kr-85	2.8595E-01	3,513.44	7,026.88	0.00E+00	1.00E+03	2.01E+03	7.0000	4.646E+02
Np-237	9.5479E-06	3,513.44	7,026.88	0.00E+00	3.35E-02	6.71E-02	11.0000	5.237E+01
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		
Th-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		

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			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	45.07	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
		3,513.44	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding		7,026.88	

Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/Given Burnup	
	0.87		1.02
Bounding	1.73		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 2010
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x15"
 4.00

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-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	2.653E+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		
Ti-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		
U-233	1.9564E-09	6,991.28	13,982.55	0.00E+00	1.37E-05	2.74E-05		
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-236	1.5493E-05	6,991.28	13,982.55	0.00E+00	1.08E-01	2.17E-01		
U-238	-4.2851E-09	6,991.28	0.00	1.60E-02	1.60E-02	1.60E-02		
Y-90	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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.54E+02	7.09E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences*
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %:	19.99999952	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		6,991.28	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding:		13,982.55	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.37		1.01
Bounding	0.75		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 2010
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
 Template BOL Heavy Metal Mass (MT): 0 00116689
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x15"
 18 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 4545E-10	79 521.22	112,314 13	0 00E+00	1 16E-05	1.63E-05	Avg MeV	
Am-241	1 1190E-03	79,521.22	112,314 13	0 00E+00	8 90E+01	1.26E+02	0 0150	2.167E+16
Am-242m	4 5425E-07	79,521 22	112,314.13	0 00E+00	3 61E-02	5.10E-02	0 0250	4 668E+15
Am-243	1 4921E-06	79,521 22	112,314.13	0 00E+00	1 19E-01	1 68E-01	0 0375	4 308E+15
C-14	5 7244E-09	79,521 22	112,314.13	0 00E+00	4 55E-04	6 43E-04	0 0575	4 236E+15
Cf-252	1 3124E-32	79,521 22	112,314 13	0.00E+00	1 04E-27	1 47E-27	0 0850	2.700E+15
Cm-243	2.3676E-07	79,521 22	112,314 13	0.00E+00	1 88E-02	2 66E-02	0 1250	2.338E+15
Cm-244	5 2042E-05	79,521 22	112,314 13	0 00E+00	4 14E+00	5 85E+00	0 2250	2.289E+15
Co-60	3 8208E-05	79,521 22	112,314 13	0 00E+00	3 04E+00	4 29E+00	0 3750	1 108E+15
Cs-134	4 8693E-01	79,521.22	112,314 13	0 00E+00	3 87E+04	5 47E+04	0 5750	1 522E+16
Cs-135	3 4477E-06	79,521.22	112,314 13	0 00E+00	2 74E-01	3 87E-01	0 8500	2 131E+15
Cs-137	2 8731E+00	79,521.22	112,314 13	0 00E+00	2 28E+05	3.23E+05	1.2500	3 965E+14
Eu-154	8 2053E-02	79,521 22	112,314 13	0 00E+00	6 52E+03	9.22E+03	1 7500	1 663E+13
Eu-155	3 9134E-02	79,521.22	112,314 13	0 00E+00	3 11E+03	4.40E+03	2.2500	3 487E+13
Fe-55	6 7429E-03	79,521.22	112,314 13	0 00E+00	5 36E+02	7.57E+02	2 7500	2 006E+11
H-3	1 0599E-02	79,521.22	112,314 13	0 00E+00	8 43E+02	1.19E+03	3 5000	2.225E+10
I-129	7 5300E-07	79,521.22	112,314 13	0 00E+00	5 99E-02	8 46E-02	5 0000	6 653E+04
Kr-85	2 8595E-01	79,521 22	112,314.13	0 00E+00	2 27E+04	3.21E+04	7 0000	7 416E+03
Np-237	9 5479E-06	79,521 22	112,314.13	0 00E+00	7 59E-01	1 07E+00	11 0000	8.359E+02
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		
Th-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93.14999856	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	- Estimated	
Nominal	79,521 22		
Bounding	112,314 13		Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup calculated assuming all BOL heavy metal burned.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	2 13		
Bounding	3 01		1 14

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR PIN CLUSTER UALX HEU CANADA
SNF ID # 662
Fuel Units & Descr: 741 - MULTI-PIN CLUSTER
Heavy Metal Mass: BOL=395 694kg EOL=97.59kg
ROD Storage Site SRS

¹Fuel decay start date 2010
Estimates as of 2010
Template HFBR (Heavy Water, Alum, 40 to 100%, U)
²Template Burnup(MWd): 164.6
Template BOL Heavy Metal Mass (MT) 0.000377
Template Decay Time 5 years

Estimated
Canister usage
18"x15"
61.75

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6950E-11	274,584.76	364,474.92	0.00E+00	1.84E-05	2.44E-05	Avg MeV	
Am-241	4.4557E-03	274,584.76	364,474.92	0.00E+00	1.22E+03	1.62E+03	0.0150	7.241E+16
Am-242m	1.4666E-06	274,584.76	364,474.92	0.00E+00	4.03E-01	5.35E-01	0.0250	1.543E+16
Am-243	3.7151E-05	274,584.76	364,474.92	0.00E+00	1.02E+01	1.35E+01	0.0375	1.489E+16
C-14	2.6513E-08	274,584.76	364,474.92	0.00E+00	7.28E-03	9.66E-03	0.0575	1.421E+16
Cl-36	4.4441E-31	274,584.76	364,474.92	0.00E+00	1.22E-25	1.62E-25	0.0850	9.306E+15
Cm-243	8.2139E-06	274,584.76	364,474.92	0.00E+00	2.26E+00	2.99E+00	0.1250	8.490E+15
Cm-244	8.2625E-03	274,584.76	364,474.92	0.00E+00	2.27E+03	3.01E+03	0.2250	7.666E+15
Co-60	3.4951E-04	274,584.76	364,474.92	0.00E+00	9.60E+01	1.27E+02	0.3750	3.631E+15
Cs-134	1.6409E+00	274,584.76	364,474.92	0.00E+00	4.51E+05	5.98E+05	0.5750	6.948E+16
Cs-135	4.2564E-06	274,584.76	364,474.92	0.00E+00	1.17E+00	1.55E+00	0.8500	2.125E+16
Cs-137	2.8791E+00	274,584.76	364,474.92	0.00E+00	7.91E+05	1.05E+06	1.2500	2.901E+15
Eu-154	1.7388E-01	274,584.76	364,474.92	0.00E+00	4.77E+04	6.34E+04	1.7500	7.628E+13
Eu-155	1.1616E-01	274,584.76	364,474.92	0.00E+00	3.19E+04	4.23E+04	2.2500	1.206E+14
Fe-55	7.3755E-02	274,584.76	364,474.92	0.00E+00	2.03E+04	2.69E+04	2.7500	7.421E+11
H-3	1.0729E-02	274,584.76	364,474.92	0.00E+00	2.95E+03	3.91E+03	3.5000	8.334E+10
I-129	6.6403E-07	274,584.76	364,474.92	0.00E+00	1.82E-01	2.42E-01	5.0000	1.896E+07
Kr-85	2.8487E-01	274,584.76	364,474.92	0.00E+00	7.82E+04	1.04E+05	7.0000	2.181E+06
Np-237	3.1507E-05	274,584.76	364,474.92	0.00E+00	8.65E+00	1.15E+01	11.0000	2.501E+05
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		
Ti-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	Thermal Power	
U-233	1.7023E-09	274,584.76	364,474.92	0.00E+00	4.67E-04	6.20E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
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	1.90E+04	2.52E+04
U-238	-9.4194E-09	274,584.76	0.00	9.31E-03	6.72E-03	9.31E-03	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	
	HEAVY WATER	HEAVY WATER	
	ALUM	ALUM	
	U	U	
	92.99999565	40 to 100	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
		274,584.76	
Bounding		364,474.92	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup calculated assuming all BOL heavy metal burned
Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	1.59		
	2.11		
Bounding			1.07

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR PIN CLUSTER UALX HEU CANADA
SNF ID #: 663
Fuel Units & Descr: 131 - MULTI-PIN CLUSTER
Heavy Metal Mass BOL=76.648kg; EOL=32.383kg
ROD Storage Site SRS

Fuel decay start date: 2010
Estimates as of: 2010
Template: HFBR (Heavy Water, Alum, 40 to 100%, U)
Template Burnup(MWd): 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 5 years

Estimated
Canister usage:
18"x15"
10.92

II. Estimates:	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6950E-11	40,772.53	70,600.79	0.00E+00	2.73E-06	4.73E-06	Avg MeV	
Am-241	4.4557E-03	40,772.53	70,600.79	0.00E+00	1.82E+02	3.15E+02	0.0150	1.403E+16
Am-242m	1.4666E-06	40,772.53	70,600.79	0.00E+00	5.98E-02	1.04E-01	0.0250	2.988E+15
Am-243	3.7151E-05	40,772.53	70,600.79	0.00E+00	1.51E+00	2.62E+00	0.0375	2.885E+15
C-14	2.6513E-08	40,772.53	70,600.79	0.00E+00	1.08E-03	1.87E-03	0.0575	2.752E+15
Cl-36	4.4441E-31	40,772.53	70,600.79	0.00E+00	1.81E-26	3.14E-26	0.0850	1.803E+15
Cm-243	8.2139E-06	40,772.53	70,600.79	0.00E+00	3.35E-01	5.80E-01	0.1250	1.645E+15
Cm-244	8.2625E-03	40,772.53	70,600.79	0.00E+00	3.37E+02	5.83E+02	0.2250	1.485E+15
Co-60	3.4951E-04	40,772.53	70,600.79	0.00E+00	1.43E+01	2.47E+01	0.3750	7.033E+14
Cs-134	1.6409E+00	40,772.53	70,600.79	0.00E+00	6.69E+04	1.16E+05	0.5750	1.346E+16
Cs-135	4.2564E-06	40,772.53	70,600.79	0.00E+00	1.74E-01	3.01E-01	0.8500	4.115E+15
Cs-137	2.8791E+00	40,772.53	70,600.79	0.00E+00	1.17E+05	2.03E+05	1.2500	5.619E+14
Eu-154	1.7388E-01	40,772.53	70,600.79	0.00E+00	7.09E+03	1.23E+04	1.7500	1.478E+13
Eu-155	1.1616E-01	40,772.53	70,600.79	0.00E+00	4.74E+03	8.20E+03	2.2500	2.337E+13
Fe-55	7.3755E-02	40,772.53	70,600.79	0.00E+00	3.01E+03	5.21E+03	2.7500	1.438E+11
H-3	1.0729E-02	40,772.53	70,600.79	0.00E+00	4.37E+02	7.57E+02	3.5000	1.614E+10
I-129	6.6403E-07	40,772.53	70,600.79	0.00E+00	2.71E-02	4.69E-02	5.0000	3.673E+06
Kr-85	2.8487E-01	40,772.53	70,600.79	0.00E+00	1.16E+04	2.01E+04	7.0000	4.224E+05
Np-237	3.1507E-05	40,772.53	70,600.79	0.00E+00	1.28E+00	2.22E+00	11.0000	4.845E+04
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	HEAVY WATER	HEAVY WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93.15000501	40 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		40,772.53	
Bounding		70,600.79	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	Estimated EOL HM/Given EOL HM
Nominal	1.22		
Bounding	2.11		1.03

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR 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

¹Fuel decay start date: 2010
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100% U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0 08

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1 4545E-10	28.24	56.48	0 00E+00	4 11E-09	8.22E-09	0 0150	1 090E+13
Am-241	1 1190E-03	28.24	56.48	0 00E+00	3.16E-02	6 32E-02	0 0250	2.347E+12
Am-242m	4 5425E-07	28.24	56.48	0 00E+00	1.28E-05	2 57E-05	0 0375	2 166E+12
Am-243	1 4921E-06	28.24	56.48	0 00E+00	4.21E-05	8 43E-05	0.0575	2 130E+12
C-14	5 7244E-09	28.24	56.48	0 00E+00	1 62E-07	3 23E-07	0.0850	1 358E+12
Cl-36	1 3124E-32	28.24	56.48	0 00E+00	3 71E-31	7 41E-31	0 1250	1 176E+12
Cm-243	2 3676E-07	28.24	56.48	0 00E+00	6 69E-06	1 34E-05	0.2250	1 151E+12
Cm-244	5.2042E-05	28.24	56.48	0 00E+00	1 47E-03	2 94E-03	0 3750	5 571E+11
Co-60	3 8208E-05	28.24	56.48	0 00E+00	1 08E-03	2 16E-03	0.5750	7 652E+12
Cs-134	4 8693E-01	28.24	56.48	0 00E+00	1 38E+01	2 75E+01	0 8500	1.072E+12
Cs-135	3 4477E-06	28.24	56.48	0 00E+00	9 74E-05	1 94E-04	1.2500	1.994E+11
Cs-137	2 8731E+00	28.24	56.48	0 00E+00	8 11E+01	1 62E+02	1 7500	8 361E+09
Eu-154	6 2053E-02	28.24	56.48	0 00E+00	2.32E+00	4 63E+00	2.2500	1 754E+10
Eu-155	3 9134E-02	28.24	56.48	0 00E+00	1.11E+00	2.21E+00	2.7500	1 009E+08
Fe-55	6 7429E-03	28.24	56.48	0 00E+00	1.90E-01	3 81E-01	3.5000	1 119E+07
H-3	1 0599E-02	28.24	56.48	0 00E+00	2 99E-01	5 99E-01	5 0000	3 359E+01
I-129	7.5300E-07	28.24	56.48	0 00E+00	2 13E-05	4 25E-05	7 0000	3 745E+00
Kr-85	2.8595E-01	28.24	56.48	0 00E+00	8 08E+00	1 62E+01	11 0000	4.221E-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		
Ti-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
Nominal		28.24
Bounding		56.48

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 05	
Bounding	0 10	

Estimated EOL HM/ Given EOL HM

1 00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR SLOWPOKE (HEU) CANADA
 SNF ID #: 666
 Fuel Units & Descr: 2 - 297 ROD ARRAY
 Heavy Metal Mass: BOL=1 772kg, EOL=1 742kg
 ROD Storage Site: SRS

¹Fuel decay start date: 2010
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 5 years

Estimated
 Canister usage
 18"x10"
 0.08

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-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	1.099E+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		
Ti-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
Nominal		28.24
Bounding		56.48

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0.05	
Bounding	0.10	

Estimated EOL HM/Given EOL HM

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR SLOWPOKE (HEU) CANADA
SNF ID # 668
Fuel Units & Descr: 2 - 297 ROD ARRAY
Heavy Metal Mass BOL=1 772kg EOL=1 742kg
ROD Storage Site: SRS

¹Fuel decay start date 2010
Estimates as of 2010
Template ATR (Light Water Alum, 60 to 100% U)
²Template Burnup(MWd)- 367.2
Template BOL Heavy Metal Mass (MT) 0 00116689
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0 08

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg. MeV	
Ac-227	1 4545E-10	28 24	56 48	0 00E+00	4 11E-09	8 22E-09	0 0150	1 090E+13
Am-241	1 1190E-03	28 24	56 48	0 00E+00	3 16E-02	6 32E-02	0 0250	2 347E+12
Am-242m	4 5425E-07	28 24	56 48	0 00E+00	1 28E-05	2 57E-05	0 0375	2 166E+12
Am-243	1 4921E-06	28 24	56 48	0 00E+00	4 21E-05	8 43E-05	0 0575	2 130E+12
C-14	5 7244E-09	28 24	56 48	0 00E+00	1 62E-07	3 23E-07	0 0850	1 358E+12
Cl-36	1 3124E-32	28 24	56 48	0 00E+00	3 71E-31	7 41E-31	0 1250	1 176E+12
Cm-243	2 3676E-07	28 24	56 48	0 00E+00	6 69E-06	1 34E-05	0 2250	1 151E+12
Cm-244	5 2042E-05	28 24	56 48	0 00E+00	1 47E-03	2 94E-03	0 3750	5 571E+11
Co-60	3 8208E-05	28 24	56 48	0 00E+00	1 08E-03	2 16E-03	0 5750	7 852E+12
Cs-134	4 8693E-01	28 24	56 48	0 00E+00	1 38E+01	2 75E+01	0 8500	1 072E+12
Cs-135	3 4477E-06	28 24	56 48	0 00E+00	9 74E-05	1 95E-04	1 2500	1 994E+11
Cs-137	2 8731E+00	28 24	56 48	0 00E+00	8 11E+01	1 62E+02	1 7500	8 361E+09
Eu-154	8 2053E-02	28 24	56 48	0 00E+00	2 32E+00	4 63E+00	2 2500	1 754E+10
Eu-155	3 9134E-02	28 24	56 48	0 00E+00	1 11E+00	2 21E+00	2 7500	1 009E+08
Fe-55	6 7429E-03	28 24	56 48	0 00E+00	1 90E-01	3 81E-01	3 5000	1 119E+07
H-3	1 0599E-02	28 24	56 48	0 00E+00	2 99E-01	5 99E-01	5 0000	3 359E+01
I-129	7 5300E-07	28 24	56 48	0 00E+00	2 13E-05	4 25E-05	7 0000	3 745E+00
Kr-85	2 8595E-01	28 24	56 48	0 00E+00	8 08E+00	1 62E+01	11 0000	4 221E-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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and 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 estimate²

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	0 05	
Bounding	0 10	

Estimated EOL HM/Given EOL HM

1 00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR SLOWPOKE (HEU) CANADA
SNF ID #: 669
Fuel Units & Descr 2 - 297 ROD ARRAY
Heavy Metal Mass¹ BOL=1 772kg, EOL=1 742kg
ROD Storage Site SRS

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 5 years

Estimated
Canister usage³
18"x10"
0 08

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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		
Ti-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-06	28.22	0 00	3 57E-03	3.49E-03	3.57E-03		
U-236	1 5493E-05	28.22	56.44	0 00E+00	4 37E-04	8.74E-04		
U-238	4 2851E-09	28.22	0 00	4 10E-05	4 09E-05	4 10E-05		
Y-90	2 7505E+00	28.22	56.44	0 00E+00	7 76E+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	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93 11512415	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		28.22	
Bounding		56.44	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0 05		
Bounding	0 10		1 00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TARGET ARGENTINA
SNF ID #: 297
Fuel Units & Descr: 48 - PARTICULATE
Heavy Metal Mass: BOL=3 97kg; EOL=3 97kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
²Template Burnup(MWd): 6 01
Template BOL Heavy Metal Mass (MT): 0 00012882
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
1 33

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 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 116E+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-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		
Ti-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-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons
Fuel Cladding	NONE	SST	This fuel matches Pathfinder Template except enrichment and cladding (but substituting Stainless Steel is a good conservative assumption)
BOL HM Constituents	U	U	
BOL Enrichment %	48 34531901	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		75 00	Nominal burnup assumed to be 2% of BOL heavy metal mass
Bounding		149 99	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0 40		0 98
Bounding	0 81		

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

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

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
²Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
1.33

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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	4.116E+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-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		
Ti-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-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From SFD	Used	Basis for Parameter Differences:
Reactor Moderator: LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding: NONE	SST	This fuel matches Pathfinder Template except enrichment and cladding (but substituting Stainless Steel is a good conservative assumption).
BOL HM Constituents: U	U	
BOL Enrichment %: 48.34531901	60 to 100	

Burnup Summary (MWd)²

From SFD	Estimated	Basis for burnup used in estimate:
Nominal: 75.00	75.00	Nominal burnup assumed to be 2% of BOL heavy metal mass
Bounding: 149.99	149.99	Bounding burnup assumed to be twice nominal burnup

Checks

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

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

²Total burnup for all fuel associated with this worksheet must be 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 Gg EOL=142 618kg
 ROD Storage Site SRS

Fuel decay start date 2010
 Estimates as of: 2010
 Template* HFBR (Heavy Water, Alum, 10 to 20%, U)
 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							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg. MeV	
Ac-227	1.7533E-10	21,843.20	43,686.40	0.00E+00	3.83E-06	7.66E-06	0.0150	7.926E+15
Am-241	1.2780E-02	21,843.20	43,686.40	0.00E+00	2.79E+02	5.58E+02	0.0250	1.708E+15
Am-242m	9.5467E-06	21,843.20	43,686.40	0.00E+00	2.09E-01	4.17E-01	0.0375	1.556E+15
Am-243	6.4100E-06	21,843.20	43,686.40	0.00E+00	1.40E-01	2.80E-01	0.0575	1.554E+15
C-14	2.9673E-08	21,843.20	43,686.40	0.00E+00	6.48E-04	1.30E-03	0.0850	9.785E+14
Cl-36	5.9513E-35	21,843.20	43,686.40	0.00E+00	1.30E-30	2.60E-30	0.1250	8.170E+14
Cm-243	3.1807E-06	21,843.20	43,686.40	0.00E+00	6.95E-02	1.39E-01	0.2250	8.344E+14
Cm-244	1.9540E-04	21,843.20	43,686.40	0.00E+00	4.27E+00	8.54E+00	0.3750	4.046E+14
Co-60	1.1753E-04	21,843.20	43,686.40	0.00E+00	2.57E+00	5.13E+00	0.5750	5.587E+15
Cs-134	3.3060E-01	21,843.20	43,686.40	0.00E+00	7.22E+03	1.44E+04	0.8500	5.926E+14
Cs-135	4.8607E-06	21,843.20	43,686.40	0.00E+00	1.06E-01	2.12E-01	1.2500	1.310E+14
Cs-137	2.8607E+00	21,843.20	43,686.40	0.00E+00	6.25E+04	1.25E+05	1.7500	6.234E+12
Eu-154	6.9933E-02	21,843.20	43,686.40	0.00E+00	1.53E+03	3.06E+03	2.2500	1.084E+13
Eu-155	3.3253E-02	21,843.20	43,686.40	0.00E+00	7.26E+02	1.45E+03	2.7500	9.808E+10
Fe-55	7.7267E-02	21,843.20	43,686.40	0.00E+00	1.69E+03	3.38E+03	3.5000	1.162E+10
H-3	1.0827E-02	21,843.20	43,686.40	0.00E+00	2.36E+02	4.73E+02	5.0000	1.137E+05
I-129	7.7600E-07	21,843.20	43,686.40	0.00E+00	1.56E-02	3.13E-02	7.0000	1.295E+04
Kr-85	2.1007E-01	21,843.20	43,686.40	0.00E+00	5.90E-03	1.18E+04	11.0000	1.480E+03
Np-237	3.6327E-09	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		
Th-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-08	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences*
Reactor Moderator	HEAVY WATER	HEAVY WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	20	10 to 20	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate*
Nominal		21,843.20	
Bounding		43,686.40	

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	3.01		1.04
Bounding	6.02		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (U3Si2 LEU) GERMANY
SNF ID #: 673
Fuel Units & Descr: 135 - ASSEMBLY
Heavy Metal Mass: BOL=121.5kg EOL=109.35kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: HFBR (Heavy Water, Alum, 10 to 20%, U)
²Template 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 _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	1.7533E-10	11,548.15	23,096.29	0.00E+00	2.02E-06	4.05E-06	Avg. MeV	
Am-241	1.2780E-02	11,548.15	23,096.29	0.00E+00	1.48E+02	2.95E+02	0.0150	4.190E+15
Am-242m	9.5467E-06	11,548.15	23,096.29	0.00E+00	1.10E-01	2.20E-01	0.0250	9.029E+14
Am-243	6.4100E-06	11,548.15	23,096.29	0.00E+00	7.40E-02	1.48E-01	0.0375	8.228E+14
C-14	2.9673E-08	11,548.15	23,096.29	0.00E+00	3.43E-04	6.85E-04	0.0575	8.214E+14
Cl-36	5.9513E-35	11,548.15	23,096.29	0.00E+00	6.87E-31	1.37E-30	0.0850	5.173E+14
Cm-243	3.1807E-06	11,548.15	23,096.29	0.00E+00	3.67E-02	7.35E-02	0.1250	4.319E+14
Cm-244	1.9540E-04	11,548.15	23,096.29	0.00E+00	2.26E+00	4.51E+00	0.2250	4.412E+14
Co-60	1.1753E-04	11,548.15	23,096.29	0.00E+00	1.36E+00	2.71E+00	0.3750	2.139E+14
Cs-134	3.3060E-01	11,548.15	23,096.29	0.00E+00	3.82E+03	7.64E+03	0.5750	2.954E+15
Cs-135	4.8607E-06	11,548.15	23,096.29	0.00E+00	5.61E-02	1.12E-01	0.8500	3.133E+14
Cs-137	2.8607E+00	11,548.15	23,096.29	0.00E+00	3.30E+04	6.61E+04	1.2500	6.924E+13
Eu-154	6.9933E-02	11,548.15	23,096.29	0.00E+00	8.08E+02	1.62E+03	1.7500	3.296E+12
Eu-155	3.3253E-02	11,548.15	23,096.29	0.00E+00	3.84E+02	7.68E+02	2.2500	5.732E+12
Fe-55	7.7267E-02	11,548.15	23,096.29	0.00E+00	8.92E+02	1.78E+03	2.7500	5.185E+10
H-3	1.0827E-02	11,548.15	23,096.29	0.00E+00	1.25E+02	2.50E+02	3.5000	6.143E+09
I-129	7.1600E-07	11,548.15	23,096.29	0.00E+00	8.27E-03	1.65E-02	5.0000	6.013E+04
Kr-85	2.7007E-01	11,548.15	23,096.29	0.00E+00	3.12E+03	6.24E+03	7.0000	6.851E+03
Np-237	3.6327E-06	11,548.15	23,096.29	0.00E+00	4.20E-02	8.39E-02	11.0000	7.825E+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		
Ti-208	7.4667E-09	11,548.15	23,096.29	0.00E+00	8.62E-05	1.72E-04		
U-232	2.1927E-08	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-08	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	HEAVY WATER	HEAVY WATER
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment %	20	10 to 20

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
Nominal		11.548.15
Bounding		23.096.29

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	2.17	
Bounding	4.34	

Estimated EOL HM/Given EOL HM
1.03

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (U3Si2 LEU) GERMANY
 SNF ID #: 674
 Fuel Units & Descr: 18 - ASSEMBLY
 Heavy Metal Mass BOL=18kg EOL=16.2kg
 ROD Storage Site SRS

¹Fuel decay start date 2010
 Estimates as of 2010
 Template HFBR (Heavy Water, Alum, 10 to 20%, U)
²Template 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							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1.7533E-10	1,710.84	3,421.67	0.00E+00	3.00E-07	6.00E-07	0.0150	6.208E+14
Am-241	1.2780E-02	1,710.84	3,421.67	0.00E+00	2.19E+01	4.37E+01	0.0250	1.338E+14
Am-242m	9.5467E-06	1,710.84	3,421.67	0.00E+00	1.63E-02	3.27E-02	0.0375	1.219E+14
Am-243	6.4100E-06	1,710.84	3,421.67	0.00E+00	1.10E-02	2.19E-02	0.0575	1.217E+14
C-14	2.9673E-08	1,710.84	3,421.67	0.00E+00	5.08E-05	1.02E-04	0.0850	7.664E+13
Cl-36	5.9513E-35	1,710.84	3,421.67	0.00E+00	1.02E-31	2.04E-31	0.1250	6.399E+13
Cm-243	3.1807E-06	1,710.84	3,421.67	0.00E+00	5.44E-03	1.09E-02	0.2250	6.536E+13
Cm-244	1.9540E-04	1,710.84	3,421.67	0.00E+00	3.34E-01	6.69E-01	0.3750	3.169E+13
Co-60	1.1753E-04	1,710.84	3,421.67	0.00E+00	2.01E-01	4.02E-01	0.5750	4.376E+14
Cs-134	3.3060E-01	1,710.84	3,421.67	0.00E+00	5.66E+02	1.13E+03	0.8500	4.642E+13
Cs-135	4.8607E-06	1,710.84	3,421.67	0.00E+00	8.32E-03	1.66E-02	1.2500	1.026E+13
Cs-137	2.8607E+00	1,710.84	3,421.67	0.00E+00	4.89E+03	9.79E+03	1.7500	4.883E+11
Eu-154	6.9933E-02	1,710.84	3,421.67	0.00E+00	1.20E+02	2.39E+02	2.2500	8.492E+11
Eu-155	3.3253E-02	1,710.84	3,421.67	0.00E+00	5.69E+01	1.14E+02	2.7500	7.682E+09
Fe-55	7.7267E-02	1,710.84	3,421.67	0.00E+00	1.32E+02	2.64E+02	3.5000	9.100E+08
H-3	1.0827E-02	1,710.84	3,421.67	0.00E+00	1.85E+01	3.70E+01	5.0000	8.909E+03
I-129	7.1600E-07	1,710.84	3,421.67	0.00E+00	1.22E-03	2.45E-03	7.0000	1.015E+03
Kr-85	2.7007E-01	1,710.84	3,421.67	0.00E+00	4.62E+02	9.24E+02	11.0000	1.159E+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		
Ti-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					8.08E+03	1.62E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences
	From SFD	Used	
Reactor Moderator	HEAVY WATER	HEAVY WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	20	10 to 20	

Burnup Summary (MWd) ²			Basis for burnup used in estimate
	From SFD	Estimated	
Nominal		1,710.84	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		3,421.67	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	2.17		1.03
Bounding	4.34		

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

²Total burnup for all fuel associated with this worksheet must be 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 (U3S2 LEU) GERMANY
SNF ID #: 675
Fuel Units & Descr: 135 - ASSEMBLY
Heavy Metal Mass: BOL=151 875kg; EOL=138 688kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: HFBR (Heavy Water, Alum, 10 to 20%, U)
²Template 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 _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 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
Cf-252	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 916E+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		
Ti-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		

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		14 435 18
Bounding		28 870 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	2.17	
Bounding	4.34	

Estimated EOL HM/Given EOL HM

1 03

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR TUBES (UALX LEU) AUSTRALIA
SNF ID #: 299
Fuel Units & Descr: 289 - ASSEMBLY
Heavy Metal Mass: BOL=289kg EOL=260 1kg
ROD Storage Site SRS

Fuel decay start date 2010
Estimates as of 2010
Template HFBR (Heavy Water, Alum., 10 to 20%, U)
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							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1.7533E-10	27,468.45	54,936.90	0.00E+00	4.82E-06	9.63E-06	0.0150	9.968E+15
Am-241	1.2780E-02	27,468.45	54,936.90	0.00E+00	3.51E+02	7.02E+02	0.0250	2.148E+15
Am-242m	9.5467E-06	27,468.45	54,936.90	0.00E+00	2.62E-01	5.24E-01	0.0375	1.957E+15
Am-243	6.4100E-06	27,468.45	54,936.90	0.00E+00	1.76E-01	3.52E-01	0.0575	1.954E+15
C-14	2.9673E-08	27,468.45	54,936.90	0.00E+00	8.15E-04	1.63E-03	0.0850	1.230E+15
Cl-36	5.9513E-35	27,468.45	54,936.90	0.00E+00	1.63E-30	3.27E-30	0.1250	1.027E+15
Cm-243	3.1807E-06	27,468.45	54,936.90	0.00E+00	8.74E-02	1.75E-01	0.2250	1.049E+15
Cm-244	1.9540E-04	27,468.45	54,936.90	0.00E+00	5.37E+00	1.07E+01	0.3750	5.088E+14
Co-60	1.1753E-04	27,468.45	54,936.90	0.00E+00	3.23E+00	6.46E+00	0.5750	7.026E+15
Cs-134	3.3060E-01	27,468.45	54,936.90	0.00E+00	9.08E+03	1.82E+04	0.8500	7.452E+14
Cs-135	4.8607E-06	27,468.45	54,936.90	0.00E+00	1.34E-01	2.67E-01	1.2500	1.647E+14
Cs-137	2.8607E+00	27,468.45	54,936.90	0.00E+00	7.86E+04	1.57E+05	1.7500	7.840E+12
Eu-154	6.9933E-02	27,468.45	54,936.90	0.00E+00	1.92E+03	3.84E+03	2.2500	1.363E+13
Eu-155	3.3253E-02	27,468.45	54,936.90	0.00E+00	9.13E+02	1.83E+03	2.7500	1.233E+11
Fe-55	7.7267E-02	27,468.45	54,936.90	0.00E+00	2.12E+03	4.24E+03	3.5000	1.461E+10
H-3	1.0827E-02	27,468.45	54,936.90	0.00E+00	2.97E+02	5.95E+02	5.0000	1.430E+05
I-129	7.1600E-07	27,468.45	54,936.90	0.00E+00	1.97E-02	3.93E-02	7.0000	1.629E+04
Kr-85	2.7007E-01	27,468.45	54,936.90	0.00E+00	7.42E+03	1.48E+04	11.0000	1.861E+03
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		
Ti-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	Thermal Power	
U-233	1.9920E-10	27,468.45	54,936.90	0.00E+00	5.47E-06	1.09E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
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	1.30E+03	2.60E+03
U-236	1.3000E-05	27,468.45	54,936.90	0.00E+00	3.57E-01	7.14E-01	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
	HEAVY WATER	HEAVY WATER	
Reactor Moderator	HEAVY WATER	HEAVY WATER	This Template was used for the following reasons.
Fuel Cladding	ALUM	ALUM	This fuel matches on all parameters
BOL HM Constituents	U	U	
BOL Enrichment %	20.0000003	10 to 20	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate*
Nominal		27,468.45	
Bounding		54,936.90	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	2.17		
Bounding	4.34		1.03

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name FRR 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

*Fuel decay start date 2010
Estimates as of 2010
Template HFBR (Heavy Water, Alum, 40 to 100%, U)
*Template Burnup(MWd) 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
4.69

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6950E-11	14,025.54	28,051.09	0.00E+00	9.39E-07	1.88E-06	Avg MeV	
Am-241	4.4557E-03	14,025.54	28,051.09	0.00E+00	6.25E+01	1.25E+02	0.0150	5.573E+15
Am-242m	1.4666E-06	14,025.54	28,051.09	0.00E+00	2.06E-02	4.11E-02	0.0250	1.187E+15
Am-243	3.7151E-05	14,025.54	28,051.09	0.00E+00	5.21E-01	1.04E+00	0.0375	1.146E+15
C-14	2.6513E-08	14,025.54	28,051.09	0.00E+00	3.72E-04	7.44E-04	0.0575	1.093E+15
Cl-36	4.4441E-31	14,025.54	28,051.09	0.00E+00	6.23E-27	1.25E-26	0.0850	7.162E+14
Cm-243	8.2139E-06	14,025.54	28,051.09	0.00E+00	1.15E-01	2.30E-01	0.1250	6.534E+14
Cm-244	8.2625E-03	14,025.54	28,051.09	0.00E+00	1.16E+02	2.32E+02	0.2250	5.900E+14
Co-60	3.4951E-04	14,025.54	28,051.09	0.00E+00	4.90E+00	9.80E+00	0.3750	2.794E+14
Cs-134	1.6409E+00	14,025.54	28,051.09	0.00E+00	2.30E+04	4.60E+04	0.5750	5.347E+15
Cs-135	4.2564E-06	14,025.54	28,051.09	0.00E+00	5.97E-02	1.19E-01	0.8500	1.635E+15
Cs-137	2.8791E+00	14,025.54	28,051.09	0.00E+00	4.04E+04	8.08E+04	1.2500	2.233E+14
Eu-154	1.7388E-01	14,025.54	28,051.09	0.00E+00	2.44E+03	4.88E+03	1.7500	5.871E+12
Eu-155	1.1616E-01	14,025.54	28,051.09	0.00E+00	1.63E+03	3.26E+03	2.2500	9.285E+12
Fe-55	7.3755E-02	14,025.54	28,051.09	0.00E+00	1.03E+03	2.07E+03	2.7500	5.712E+10
H-3	1.0729E-02	14,025.54	28,051.09	0.00E+00	1.50E+02	3.01E+02	3.5000	6.414E+09
I-129	6.6403E-07	14,025.54	28,051.09	0.00E+00	9.31E-03	1.86E-02	5.0000	1.460E+06
Kr-85	2.8487E-01	14,025.54	28,051.09	0.00E+00	4.00E+03	7.99E+03	7.0000	1.678E+05
Np-237	3.1507E-05	14,025.54	28,051.09	0.00E+00	4.42E-01	8.84E-01	11.0000	1.925E+04
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		
Ti-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-06	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		

Thermal Power
Nominal Heat Output (Watts) 9.69E+02
Bounding Heat Output (Watts) 1.94E+03
Total Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
Reactor Moderator	From SFD HEAVY WATER	Used HEAVY WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	60.00000706	40 to 100	
Burnup Summary (MWd) ²			Basis for burnup used in estimate*
Nominal	From SFD	Estimated 14,025.54	
Bounding		28,051.09	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier 0.67	Estimated Burnup/ Given Burnup	
Bounding	1.34		1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UAXL-HEU) DENMARK
SNF ID #: 676
Fuel Units & Descr: 5 - ASSEMBLY
Heavy Metal Mass: BOL=0.64kg, EOL=0.336kg
ROD Storage Site: SRS

Fuel decay start date: 2010
Estimates as of: 2010
Template: HFBR (Heavy Water, Alum, 40 to 100%, U)
Template Burnup (MWd): 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 5 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	6.6950E-11	279.55	559.11	0.00E+00	1.87E-08	3.74E-08	Avg. MeV	
Am-241	4.4557E-03	279.55	559.11	0.00E+00	1.25E+00	2.49E+00	0.0150	1.111E+14
Am-242m	1.4666E-06	279.55	559.11	0.00E+00	4.10E-04	8.20E-04	0.0250	2.366E+13
Am-243	3.7151E-05	279.55	559.11	0.00E+00	1.04E-02	2.08E-02	0.0375	2.285E+13
C-14	2.6513E-08	279.55	559.11	0.00E+00	7.41E-06	1.48E-05	0.0575	2.179E+13
Cl-36	4.4441E-31	279.55	559.11	0.00E+00	1.24E-28	2.48E-28	0.0850	1.428E+13
Cm-243	8.2139E-06	279.55	559.11	0.00E+00	2.30E-03	4.59E-03	0.1250	1.302E+13
Cm-244	8.2625E-03	279.55	559.11	0.00E+00	2.31E+00	4.62E+00	0.2250	1.176E+13
Co-60	3.4951E-04	279.55	559.11	0.00E+00	9.77E-02	1.95E-01	0.3750	5.569E+12
Cs-134	1.6409E+00	279.55	559.11	0.00E+00	4.59E+02	9.17E+02	0.5750	1.066E+14
Cs-135	4.2564E-06	279.55	559.11	0.00E+00	1.19E-03	2.38E-03	0.8500	3.259E+13
Cs-137	2.8791E+00	279.55	559.11	0.00E+00	8.05E+02	1.61E+03	1.2500	4.450E+12
Eu-154	1.7388E-01	279.55	559.11	0.00E+00	4.86E+01	9.72E+01	1.7500	1.170E+11
Eu-155	1.1616E-01	279.55	559.11	0.00E+00	3.25E+01	6.49E+01	2.2500	1.851E+11
Fe-55	7.3755E-02	279.55	559.11	0.00E+00	2.06E+01	4.12E+01	2.7500	1.138E+09
H-3	1.0729E-02	279.55	559.11	0.00E+00	3.00E+00	6.00E+00	3.5000	1.278E+08
I-129	6.6403E-07	279.55	559.11	0.00E+00	1.86E-04	3.71E-04	5.0000	2.909E+04
Kr-85	2.8487E-01	279.55	559.11	0.00E+00	7.96E+01	1.59E+02	7.0000	3.345E+03
Np-237	3.1507E-05	279.55	559.11	0.00E+00	8.81E-03	1.76E-02	11.0000	3.837E+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		
Ti-208	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	
	HEAVY WATER	HEAVY WATER	
	ALUM	ALUM	
	U	U	
	92.99999218	40 to 100	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal Bounding	From SFD	Estimated	
		279.55	
		559.11	
			Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup.
Checks			Estimated EOL HM/Given EOL HM
Nominal Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	1.00		
	2.00		
			1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: FRR TUBES (UALX-HEU) GERMANY
SNF ID #: 683
Fuel Units & Descr: 105 - ASSEMBLY
Heavy Metal Mass: BOL=19 688kg EOL=13 388kg
ROD Storage Site: SRS

Fuel decay start date: 2010
Estimates as of: 2010
Template: HFBR (Heavy Water, Alum, 40 to 100%, U)
Template Burnup(MWd): 164.6
Template BOL Heavy Metal Mass (MT): 0.000377
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
2.92

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6950E-11	5,802.95	11,605.90	0.00E+00	3.89E-07	7.77E-07	Avg. MeV	
Am-241	4.4557E-03	5,802.95	11,605.90	0.00E+00	2.59E+01	5.17E+01	0.0150	2.306E+15
Am-242m	1.4666E-06	5,802.95	11,605.90	0.00E+00	8.51E-03	1.70E-02	0.0250	4.912E+14
Am-243	3.7151E-05	5,802.95	11,605.90	0.00E+00	2.16E-01	4.31E-01	0.0375	4.743E+14
C-14	2.6513E-08	5,802.95	11,605.90	0.00E+00	1.54E-04	3.08E-04	0.0575	4.523E+14
Cl-36	4.4441E-31	5,802.95	11,605.90	0.00E+00	2.58E-27	5.16E-27	0.0850	2.963E+14
Cm-243	8.2139E-06	5,802.95	11,605.90	0.00E+00	4.77E-02	9.53E-02	0.1250	2.703E+14
Cm-244	8.2625E-03	5,802.95	11,605.90	0.00E+00	4.79E+01	9.59E+01	0.2250	2.441E+14
Co-60	3.4951E-04	5,802.95	11,605.90	0.00E+00	2.03E+00	4.06E+00	0.3750	1.156E+14
Cs-134	1.6409E+00	5,802.95	11,605.90	0.00E+00	9.52E+03	1.90E+04	0.5750	2.212E+15
Cs-135	4.2564E-06	5,802.95	11,605.90	0.00E+00	2.47E-02	4.94E-02	0.8500	6.765E+14
Cs-137	2.8791E+00	5,802.95	11,605.90	0.00E+00	1.67E+04	3.34E+04	1.2500	9.237E+13
Eu-154	1.7388E-01	5,802.95	11,605.90	0.00E+00	1.01E+03	2.02E+03	1.7500	2.429E+12
Eu-155	1.1616E-01	5,802.95	11,605.90	0.00E+00	6.74E+02	1.35E+03	2.2500	3.841E+12
Fe-55	7.3755E-02	5,802.95	11,605.90	0.00E+00	4.28E+02	8.56E+02	2.7500	2.363E+10
H-3	1.0729E-02	5,802.95	11,605.90	0.00E+00	6.23E+01	1.25E+02	3.5000	2.654E+09
I-129	6.6403E-07	5,802.95	11,605.90	0.00E+00	3.85E-03	7.71E-03	5.0000	6.039E+05
Kr-85	2.8487E-01	5,802.95	11,605.90	0.00E+00	1.65E+03	3.31E+03	7.0000	6.944E+04
Np-237	3.1507E-05	5,802.95	11,605.90	0.00E+00	1.83E-01	3.66E-01	11.0000	7.965E+03
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		
Ti-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	-2.8681E-06	5,802.95	0.00	3.40E-02	1.74E-02	3.40E-02		
U-236	1.6701E-05	5,802.95	11,605.90	0.00E+00	9.69E-02	1.94E-01		
U-238	-9.4194E-09	5,802.95	0.00	1.32E-03	1.27E-03	1.32E-03		
Y-90	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		

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

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

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

¹Fuel decay start date 2010
Estimates as of 2010
Template: HFBR (Heavy Water, Alum, 40 to 100%, U)
²Template Burnup(MWd) 164.6
Template BOL Heavy Metal Mass (MT) 0.000377
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
3 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	6.6950E-11	8,142.55	16,285.10	0.00E+00	5.45E-07	1.09E-06	Avg MeV	
Am-241	4.4557E-03	8,142.55	16,285.10	0.00E+00	3.63E+01	7.26E+01	0.0150	3.235E+15
Am-242m	1.4666E-06	8,142.55	16,285.10	0.00E+00	1.19E-02	2.39E-02	0.0250	6.892E+14
Am-243	3.7151E-05	8,142.55	16,285.10	0.00E+00	3.03E-01	6.05E-01	0.0375	6.655E+14
C-14	2.6513E-08	8,142.55	16,285.10	0.00E+00	2.16E-04	4.32E-04	0.0575	6.347E+14
Cl-36	4.4441E-31	8,142.55	16,285.10	0.00E+00	3.62E-27	7.24E-27	0.0850	4.158E+14
Cm-243	8.2139E-06	8,142.55	16,285.10	0.00E+00	6.69E-02	1.34E-01	0.1250	3.793E+14
Cm-244	8.2625E-03	8,142.55	16,285.10	0.00E+00	6.73E+01	1.35E+02	0.2250	3.425E+14
Co-60	3.4951E-04	8,142.55	16,285.10	0.00E+00	2.85E+00	5.69E+00	0.3750	1.622E+14
Cs-134	1.6409E+00	8,142.55	16,285.10	0.00E+00	1.34E+04	2.67E+04	0.5750	3.104E+15
Cs-135	4.2564E-06	8,142.55	16,285.10	0.00E+00	3.47E-02	6.93E-02	0.8500	9.493E+14
Cs-137	2.8791E+00	8,142.55	16,285.10	0.00E+00	2.34E+04	4.69E+04	1.2500	1.296E+14
Eu-154	1.7388E-01	8,142.55	16,285.10	0.00E+00	1.42E+03	2.83E+03	1.7500	3.408E+12
Eu-155	1.1616E-01	8,142.55	16,285.10	0.00E+00	9.46E+02	1.89E+03	2.2500	5.390E+12
Fe-55	7.3755E-02	8,142.55	16,285.10	0.00E+00	6.01E+02	1.20E+03	2.7500	3.316E+10
H-3	1.0729E-02	8,142.55	16,285.10	0.00E+00	8.74E+01	1.75E+02	3.5000	3.724E+09
I-129	6.6403E-07	8,142.55	16,285.10	0.00E+00	2.32E+03	4.64E+03	5.0000	8.473E+05
Kr-85	2.8487E-01	8,142.55	16,285.10	0.00E+00	2.57E-01	5.13E-01	7.0000	9.744E+04
Np-237	3.1507E-05	8,142.55	16,285.10	0.00E+00	3.41E-06	6.83E-06	11.0000	1.118E+04
Pa-231	4.1938E-10	8,142.55	16,285.10	0.00E+00	6.85E-09	1.37E-08		
Pb-210	8.4083E-13	8,142.55	16,285.10	0.00E+00	1.04E+04	2.09E+04		
Pm-147	1.2807E+00	8,142.55	16,285.10	0.00E+00	1.41E+03	2.82E+03		
Pu-238	1.7290E-01	8,142.55	16,285.10	0.00E+00	5.66E+00	1.13E+01		
Pu-239	6.9563E-04	8,142.55	16,285.10	0.00E+00	3.00E+00	6.00E+00		
Pu-240	3.6865E-04	8,142.55	16,285.10	0.00E+00	2.25E+03	4.50E+03		
Pu-241	2.7643E-01	8,142.55	16,285.10	0.00E+00	2.52E-02	5.03E-02		
Pu-242	3.0911E-06	8,142.55	16,285.10	0.00E+00	7.03E-08	1.41E-07		
Ra-226	8.6330E-12	8,142.55	16,285.10	0.00E+00	2.59E-11	5.18E-11		
Ra-228	3.1817E-15	8,142.55	16,285.10	0.00E+00	1.79E+03	3.58E+03		
Ru-106	2.1981E-01	8,142.55	16,285.10	0.00E+00	1.00E-01	2.01E-01		
Se-79	1.2339E-05	8,142.55	16,285.10	0.00E+00	8.30E-02	1.66E-01		
Sn-126	1.0194E-05	8,142.55	16,285.10	0.00E+00	2.22E+04	4.44E+04		
Sr-90	2.7242E+00	8,142.55	16,285.10	0.00E+00	3.10E+00	6.20E+00		
Tc-99	3.8056E-04	8,142.55	16,285.10	0.00E+00	8.48E-09	1.70E-08		
Th-229	1.0413E-12	8,142.55	16,285.10	0.00E+00	3.23E-05	6.46E-05		
Th-230	3.9648E-09	8,142.55	16,285.10	0.00E+00	6.80E-11	1.36E-10		
Th-232	8.3536E-15	8,142.55	16,285.10	0.00E+00	3.57E-04	7.15E-04		
Th-208	4.3888E-08	8,142.55	16,285.10	0.00E+00	1.11E-03	2.22E-03		
U-232	1.3645E-07	8,142.55	16,285.10	0.00E+00	1.39E-05	2.77E-05		
U-233	1.7023E-09	8,142.55	16,285.10	0.00E+00	3.70E-01	7.39E-01		
U-234	4.5389E-05	8,142.55	16,285.10	0.00E+00	2.44E-02	4.78E-02		
U-235	-2.8661E-06	8,142.55	0.00	4.78E-02	1.36E-01	2.72E-01		
U-236	1.6701E-05	8,142.55	16,285.10	0.00E+00	1.78E-03	1.86E-03		
U-238	-9.4194E-09	8,142.55	0.00	1.86E-03	2.22E+04	4.44E+04		
Y-90	2.7248E+00	8,142.55	16,285.10	0.00E+00	4.33E+04	8.66E+04		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences
Reactor Moderator	HEAVY WATER	HEAVY WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	80	40 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		8.142.55	
Bounding		16,285.10	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.68		
Bounding	1.35		1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

Fuel decay start date: 1960
Estimates as of: 2010
Template: Pathfinder (Light Water, SST 60 to 100%, U)
Template Burnup (MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 50 years

Estimated
Canister usage:
18"x10"
2.88

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	3.4276E-08	638.77	1,277.54	0.00E+00	2.19E-05	4.38E-05	Avg MeV	
Am-241	1.1458E-04	638.77	1,277.54	0.00E+00	7.32E-02	1.46E-01	0.0150	6.662E+13
Am-242m	7.9468E-09	638.77	1,277.54	0.00E+00	5.08E-06	1.02E-05	0.0250	1.384E+13
Am-243	9.8386E-10	638.77	1,277.54	0.00E+00	6.28E-07	1.26E-06	0.0375	1.200E+13
C-14	2.2978E-04	638.77	1,277.54	0.00E+00	1.47E-01	2.94E-01	0.0575	1.291E+13
Cl-36	1.2261E-06	638.77	1,277.54	0.00E+00	7.83E-04	1.57E-03	0.0850	7.798E+12
Cm-243	1.7271E-10	638.77	1,277.54	0.00E+00	1.10E-07	2.21E-07	0.1250	5.060E+12
Cm-244	1.3058E-09	638.77	1,277.54	0.00E+00	8.34E-07	1.67E-06	0.2250	6.723E+12
Co-60	9.8636E-03	638.77	1,277.54	0.00E+00	6.30E+00	1.26E+01	0.3750	2.931E+12
Cs-134	1.9617E-08	638.77	1,277.54	0.00E+00	1.25E-05	2.51E-05	0.5750	4.881E+13
Cs-135	3.0316E-05	638.77	1,277.54	0.00E+00	1.94E-02	3.87E-02	0.8500	4.819E+11
Cs-137	1.0263E+00	638.77	1,277.54	0.00E+00	6.56E+02	1.31E+03	1.2500	1.097E+12
Eu-154	2.0017E-04	638.77	1,277.54	0.00E+00	1.28E-01	2.56E-01	1.7500	1.241E+10
Eu-155	8.5957E-05	638.77	1,277.54	0.00E+00	5.49E-02	1.10E-01	2.2500	6.288E+06
Fe-55	2.2646E-05	638.77	1,277.54	0.00E+00	1.45E-02	2.89E-02	2.7500	8.566E+05
H-3	1.0835E-03	638.77	1,277.54	0.00E+00	6.92E-01	1.38E+00	3.5000	6.688E+01
I-129	7.3195E-07	638.77	1,277.54	0.00E+00	4.68E-04	9.35E-04	5.0000	3.597E+01
Kr-85	1.5661E-02	638.77	1,277.54	0.00E+00	1.00E+01	2.00E+01	7.0000	3.966E+00
Np-237	1.1494E-06	638.77	1,277.54	0.00E+00	7.34E-04	1.47E-03	11.0000	4.482E-01
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons.
Fuel Cladding	HASTELLOY	SST	This fuel matches on all parameters except cladding (SST is conservative)
BOL HM Constituents	U		
BOL Enrichment %	92.20234775	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		638.77	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		1,277.54	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal	0.23		1.00
Bounding	0.45		

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

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

Fuel decay start date: 1960
Estimates as of 2010
Template Pathfinder (Light Water, SST, 60 to 100%, U)
Template Burnup (MWd): 6 01
Template BOL Heavy Metal Mass (MT): 0 00012882
Template Decay Time 50 years

Estimated
Canister usage*
18"x10"
0 08

II. Estimates							Gamma Sources	
Radionuclide	m	x _n	x _b	b	y _n	y _b	Photon Energy Group	Total Photons/sec (bounding)
	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Avg MeV	
Ac-227	3 4276E-08	46 19	92 39	0 00E+00	1 58E-06	3 17E-06	0 0150	4 817E+12
Am-241	1 1458E-04	46 19	92 39	0 00E+00	5 29E-03	1 06E-02	0 0250	1 001E+12
Am-242m	7 9468E-09	46 19	92 39	0 00E+00	3 67E-07	7 34E-07	0 0375	8 680E+11
Am-243	9 8386E-10	46 19	92 39	0 00E+00	4 54E-08	9 09E-08	0 0575	9 336E+11
C-14	2 2978E-04	46 19	92 39	0 00E+00	1 06E-02	2 12E-02	0 0850	5 639E+11
Cl-36	1 2261E-06	46 19	92 39	0 00E+00	5 66E-05	1 13E-04	0 1250	3 659E+11
Cm-243	1 7271E-10	46 19	92 39	0 00E+00	7 98E-09	1 60E-08	0 2250	4 860E+11
Cm-244	1 3058E-09	46 19	92 39	0 00E+00	6 03E-08	1 21E-07	0 3750	2 120E+11
Co-60	9 8636E-03	46 19	92 39	0 00E+00	4 56E-01	9 11E-01	0 5750	3 529E+12
Cs-134	1 9617E-08	46 19	92 39	0 00E+00	9 06E-07	1 81E-06	0 8500	3 485E+10
Cs-135	3 0316E-05	46 19	92 39	0 00E+00	1 40E-03	2 80E-03	1 2500	7 937E+10
Cs-137	1 0263E+00	46 19	92 39	0 00E+00	4 74E+01	9 48E+01	1 7500	8 972E+08
Eu-154	2 0017E-04	46 19	92 39	0 00E+00	9 25E-03	1 85E-02	2 2500	4 547E+05
Eu-155	8 5957E-05	46 19	92 39	0 00E+00	3 97E-03	7 94E-03	2 7500	6 194E+04
Fe-55	2 2646E-05	46 19	92 39	0 00E+00	1 05E-03	2 09E-03	3 5000	5 571E+00
H-3	1 0835E-03	46 19	92 39	0 00E+00	5 01E-02	1 00E-01	5 0000	2 301E+00
I-129	7 3195E-07	46 19	92 39	0 00E+00	3 38E-05	6 76E-05	7 0000	2 543E-01
Kr-85	1 5661E-02	46 19	92 39	0 00E+00	7 23E-01	1 45E+00	11 0000	2 855E-02
Np-237	1 1494E-06	46 19	92 39	0 00E+00	5 31E-05	1 06E-04		
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	SST	SST	
BOL HM Constituents	U	U	
BOL Enrichment %	93 671	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		46 19	
Bounding		92 39	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0 93		
Bounding	1 86		1 00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GENTR
SNF ID #: 97
Fuel Units & Descr: 16 - STACKED DISKS
Heavy Metal Mass: BOL=3 992kg, EOL=3 984kg
ROD Storage Site: SRS

¹Fuel decay start date: 2035
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0 44

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 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		
Ti-208	4 4063E-08	7 58	15 15	0 00E+00	3 34E-07	6 68E-07		
U-232	1 3151E-07	7 58	15 15	0 00E+00	9 96E-07	1 99E-06		
U-233	1 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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93 93787575	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		7 58	
Bounding		15 15	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 01		
Bounding	0 01		1 00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GRR (UALX HEU) GREECE
SNF ID #: 440
Fuel Units & Descr: 108 - MTR TYPE
Heavy Metal Mass: BOL=18 76kg EOL=14 72kg
ROD Storage Site: SRS

¹Fuel decay start date: 1993
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100% U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 15 years

Estimated
Canister usage
18"x10"
3.00

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	3.825 20	7.650 40	0.00E+00	1.75E-06	3.51E-06	Avg MeV	
Am-241	1.7832E-03	3.825 20	7.650 40	0.00E+00	6.82E+00	1.36E+01	0.0150	9.126E+14
Am-242m	4.3410E-07	3.825 20	7.650 40	0.00E+00	1.66E-03	3.32E-03	0.0250	1.903E+14
Am-243	1.4907E-06	3.825 20	7.650 40	0.00E+00	5.70E-03	1.14E-02	0.0375	1.662E+14
C-14	5.7162E-09	3.825 20	7.650 40	0.00E+00	2.19E-05	4.37E-05	0.0575	1.772E+14
Cl-36	1.3124E-32	3.825 20	7.650 40	0.00E+00	5.02E-29	1.00E-28	0.0850	1.073E+14
Cm-243	1.8568E-07	3.825 20	7.650 40	0.00E+00	7.10E-04	1.42E-03	0.1250	7.359E+13
Cm-244	3.5512E-05	3.825 20	7.650 40	0.00E+00	1.36E-01	2.72E-01	0.2250	9.248E+13
Co-60	1.0261E-05	3.825 20	7.650 40	0.00E+00	3.93E-02	7.85E-02	0.3750	4.051E+13
Cs-134	1.6931E-02	3.825 20	7.650 40	0.00E+00	6.48E+01	1.30E+02	0.5750	6.576E+14
Cs-135	3.4477E-06	3.825 20	7.650 40	0.00E+00	1.32E-02	2.64E-02	0.8500	1.562E+13
Cs-137	2.2800E+00	3.825 20	7.650 40	0.00E+00	8.72E+03	1.74E+04	1.2500	7.890E+12
Eu-154	3.6656E-02	3.825 20	7.650 40	0.00E+00	1.40E+02	2.80E+02	1.7500	3.306E+11
Eu-155	9.6841E-03	3.825 20	7.650 40	0.00E+00	3.70E+01	7.41E+01	2.2500	4.136E+08
Fe-55	4.6977E-04	3.825 20	7.650 40	0.00E+00	1.80E+00	3.59E+00	2.7500	2.486E+07
H-3	6.0485E-03	3.825 20	7.650 40	0.00E+00	2.31E+01	4.63E+01	3.5000	1.580E+06
I-129	7.5300E-07	3.825 20	7.650 40	0.00E+00	2.88E-03	5.76E-03	5.0000	3.655E+03
Kr-85	1.4989E-01	3.825 20	7.650 40	0.00E+00	5.73E+02	1.15E+03	7.0000	4.048E+02
Np-237	9.5534E-06	3.825 20	7.650 40	0.00E+00	3.65E-02	7.31E-02	11.0000	4.545E+01
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		
Th-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		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	91.93720219	60 to 100	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		3.825 20	
Bounding		7.650 40	

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.65		
Bounding	1.30		

1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 1993
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 15 years

Estimated
Canister usage:
18"x10"
1.28

II. Estimates	m	X _n	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	1,629.25	3,258.50	0.00E+00	7.47E-07	1.49E-06	Avg MeV	
Am-241	1.7832E-03	1,629.25	3,258.50	0.00E+00	2.91E+00	5.81E+00	0.0150	3.887E+14
Am-242m	4.3410E-07	1,629.25	3,258.50	0.00E+00	7.07E-04	1.41E-03	0.0250	8.107E+13
Am-243	1.4907E-06	1,629.25	3,258.50	0.00E+00	2.43E-03	4.86E-03	0.0375	7.079E+13
C-14	5.7162E-09	1,629.25	3,258.50	0.00E+00	9.31E-06	1.86E-05	0.0575	7.548E+13
Cl-36	1.3124E-32	1,629.25	3,258.50	0.00E+00	2.14E-29	4.28E-29	0.0850	4.572E+13
Cm-243	1.8568E-07	1,629.25	3,258.50	0.00E+00	3.03E-04	6.05E-04	0.1250	3.135E+13
Cm-244	3.5512E-05	1,629.25	3,258.50	0.00E+00	5.79E-02	1.16E-01	0.2250	3.939E+13
Co-60	1.0261E-05	1,629.25	3,258.50	0.00E+00	1.67E-02	3.34E-02	0.3750	1.726E+13
Cs-134	1.6931E-02	1,629.25	3,258.50	0.00E+00	2.76E+01	5.52E+01	0.5750	2.801E+14
Cs-135	3.4477E-06	1,629.25	3,258.50	0.00E+00	5.62E-03	1.12E-02	0.8500	6.653E+12
Cs-137	2.2800E+00	1,629.25	3,258.50	0.00E+00	3.71E+03	7.43E+03	1.2500	3.361E+12
Eu-154	3.6656E-02	1,629.25	3,258.50	0.00E+00	5.97E+01	1.19E+02	1.7500	1.408E+11
Eu-155	9.6841E-03	1,629.25	3,258.50	0.00E+00	1.58E+01	3.16E+01	2.2500	1.762E+08
Fe-55	4.6977E-04	1,629.25	3,258.50	0.00E+00	7.65E-01	1.53E+00	2.7500	1.059E+07
H-3	6.0485E-03	1,629.25	3,258.50	0.00E+00	9.85E+00	1.97E+01	3.5000	6.729E+05
I-129	7.5300E-07	1,629.25	3,258.50	0.00E+00	1.23E-03	2.45E-03	5.0000	1.557E+03
Kr-85	1.4989E-01	1,629.25	3,258.50	0.00E+00	2.44E+02	4.88E+02	7.0000	1.724E+02
Np-237	9.5534E-06	1,629.25	3,258.50	0.00E+00	1.56E-02	3.11E-02	11.0000	1.936E+01
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-08	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		
Th-208	4.6705E-08	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		

III. Template Selection Summary, Burnup Summary, and 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	0.65	
Bounding	1.30	

Estimated EOL HM/Given EOL HM

1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: GTRR
 SNF ID #: 87
 Fuel Units & Descr: 25 - ASSEMBLY
 Heavy Metal Mass BOL=5 05kg; EOL=4 47kg
 ROD Storage Site SRS
 Fuel decay start date 1996
 Estimates as of 2010
 Template HFBR (Heavy Water, Alum, 40 to 100%, U)
 Template Burnup(MWd) 164.6
 Template BOL Heavy Metal Mass (MT) 0 000377
 Template Decay Time 10 years

Estimated
 Canister usage
 18"x10"
 0 69

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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-08	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	1.10E+02	2 20E+02	5.0000	4 624E+04
Kr-85	2 0620E-01	534.24	1,068.48	0 00E+00	1 68E-02	3 37E-02	7.0000	5.315E+03
Np-237	3 1513E-05	534.24	1,068.48	0 00E+00	3 22E-07	6 44E-07	11 0000	6.095E+02
Pa-231	6 0304E-10	534.24	1,068.48	0 00E+00	1 44E-09	2.89E-09		
Pb-210	2 7017E-12	534.24	1,068.48	0 00E+00	1 83E+02	3 66E+02		
Pm-147	3 4210E-01	534.24	1,068.48	0 00E+00	8 88E+01	1.78E+02		
Pu-238	1 6622E-01	534.24	1,068.48	0 00E+00	3 72E-01	7 43E-01		
Pu-239	6 9563E-04	534.24	1,068.48	0 00E+00	1 99E-01	3 97E-01		
Pu-240	3 7169E-04	534.24	1,068.48	0 00E+00	1.16E+02	2 32E+02		
Pu-241	2 1731E-01	534.24	1,068.48	0 00E+00	1 65E-03	3 30E-03		
Pu-242	3 0911E-06	534.24	1,068.48	0 00E+00	1 04E-08	2 08E-08		
Ra-226	1 9435E-11	534.24	1,068.48	0 00E+00	3 30E-12	6 60E-12		
Ra-228	6 1725E-15	534.24	1,068.48	0 00E+00	3 78E+00	7 56E+00		
Ru-106	7 0778E-03	534.24	1,068.48	0 00E+00	6 59E-03	1 32E-02		
Se-79	1.2339E-05	534.24	1,068.48	0 00E+00	5 45E-03	1 09E-02		
Sn-126	1.0194E-05	534.24	1,068.48	0 00E+00	1.29E+03	2 58E+03		
Sr-90	2.4186E+00	534.24	1,068.48	0 00E+00	2 03E-01	4 07E-01		
Tc-99	3 8056E-04	534.24	1,068.48	0 00E+00	1.07E-09	2 15E-09		
Th-229	2 0097E-12	534.24	1,068.48	0 00E+00	3.24E-06	6 47E-06		
Th-230	6 0577E-09	534.24	1,068.48	0 00E+00	6 66E-12	1 33E-11		
Th-232	1 2473E-14	534.24	1,068.48	0 00E+00	2 61E-05	5 21E-05		
Ti-208	4 8791E-08	534.24	1,068.48	0 00E+00	7 38E-05	1 48E-04		
U-232	1.3821E-07	534.24	1,068.48	0 00E+00	1.28E-06	2 55E-06		
U-233	2 3906E-09	534.24	1,068.48	0 00E+00	2 55E-02	5 10E-02		
U-234	4.7697E-05	534.24	1,068.48	0 00E+00	8 63E-03	1 02E-02		
U-235	-2 8661E-06	534.24	0 00	1 02E-02	8 92E-03	1.78E-02		
U-236	1 6701E-05	534.24	1,068.48	0 00E+00	1 13E-04	1.18E-04		
U-238	-9 4194E-09	534.24	0 00	1 18E-04	1.29E+03	2.58E+03		
Y-90	2 4192E+00	534.24	1,068.48	0 00E+00	1.34E+03	2 67E+03		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	HEAVY WATER	HEAVY WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93 06930693	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		534.24	
Bounding		1 068.48	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.24		
Bounding	0.48		1 00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 1966
Estimates as of: 2010
Template: (Worst Case)
²Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 35 years

Estimated
Canister usage
18"x15"
0.04

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	2.3072E-06	25.85	51.70	0.00E+00	5.96E-05	1.19E-04	Avg. MeV	
Am-241	8.4448E+00	25.85	51.70	0.00E+00	2.18E+02	4.37E+02	0.0150	6.381E+13
Am-242m	1.6848E-02	25.85	51.70	0.00E+00	4.36E-01	8.71E-01	0.0250	1.261E+13
Am-243	1.6320E-02	25.85	51.70	0.00E+00	4.22E-01	8.44E-01	0.0375	1.101E+13
C-14	1.2090E-01	25.85	51.70	0.00E+00	3.13E+00	6.25E+00	0.0575	1.733E+13
Cl-36	2.2849E-03	25.85	51.70	0.00E+00	5.91E-02	1.18E-01	0.0850	6.763E+12
Cm-243	8.6624E-04	25.85	51.70	0.00E+00	2.24E-02	4.48E-02	0.1250	5.301E+12
Cm-244	1.6848E-01	25.85	51.70	0.00E+00	4.36E+00	8.71E+00	0.2250	5.859E+12
Co-60	2.8086E+01	25.85	51.70	0.00E+00	7.26E+02	1.45E+03	0.3750	2.506E+12
Cs-134	3.4148E-04	25.85	51.70	0.00E+00	8.83E-03	1.77E-02	0.5750	4.075E+13
Cs-135	4.3976E-04	25.85	51.70	0.00E+00	1.14E-02	2.27E-02	0.8500	1.557E+12
Cs-137	2.1049E+01	25.85	51.70	0.00E+00	5.44E+02	1.09E+03	1.2500	1.089E+14
Eu-154	1.2500E+00	25.85	51.70	0.00E+00	3.23E+01	6.46E+01	1.7500	4.815E+10
Eu-155	6.9866E-02	25.85	51.70	0.00E+00	1.78E+00	3.57E+00	2.2500	5.709E+08
Fe-55	2.9308E-01	25.85	51.70	0.00E+00	7.58E+00	1.52E+01	2.7500	1.609E+08
H-3	2.4311E-01	25.85	51.70	0.00E+00	6.28E+00	1.26E+01	3.5000	1.370E+05
I-129	1.0618E-05	25.85	51.70	0.00E+00	2.74E-04	5.49E-04	5.0000	5.818E+04
Kr-85	5.9882E-01	25.85	51.70	0.00E+00	1.55E+01	3.10E+01	7.0000	6.657E+03
Np-237	1.5668E-04	25.85	51.70	0.00E+00	4.05E-03	8.10E-03	11.0000	7.615E+02
Pa-231	2.8656E-06	25.85	51.70	0.00E+00	7.41E-05	1.48E-04		
Pb-210	2.3918E-08	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-08	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-05	3.10E-05		
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		
Th-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-05	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		25.85	
Bounding	16.42	51.70	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	1.41		
Bounding	2.82	3.15	31.57

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name HFBR
SNF ID #: 706
Fuel Units & Descr: 1050 - 18 CURVED PLATES
Heavy Metal Mass BOL=394.8kg EOL=282.24kg
ROD Storage Site SRS

¹Fuel decay start date 1982
Estimates as of 2010
Template: HFBR (Heavy Water, Akum, 40 to 100% U)
²Template Burnup(MWd) 164.6
Template BOL Heavy Metal Mass (MT) 0.000377
Template Decay Time 25 years

Estimated
Canister usage:
18"x10"
29 17

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	5.4520E-10	103,679.35	207,358.71	0.00E+00	5.65E-05	1.13E-04	Avg MeV	
Am-241	9.2284E-03	103,679.35	207,358.71	0.00E+00	9.57E+02	1.91E+03	0.0150	1.944E+16
Am-242m	1.3390E-06	103,679.35	207,358.71	0.00E+00	1.39E-01	2.78E-01	0.0250	4.001E+15
Am-243	3.7084E-05	103,679.35	207,358.71	0.00E+00	3.84E+00	7.69E+00	0.0375	3.533E+15
C-14	2.6452E-08	103,679.35	207,358.71	0.00E+00	2.74E-03	5.49E-03	0.0575	3.768E+15
Cl-36	4.4441E-31	103,679.35	207,358.71	0.00E+00	4.61E-26	9.22E-26	0.0850	2.268E+15
Cm-243	5.0498E-06	103,679.35	207,358.71	0.00E+00	5.24E-01	1.05E+00	0.1250	1.574E+15
Cm-244	3.8451E-03	103,679.35	207,358.71	0.00E+00	3.99E+02	7.97E+02	0.2250	1.958E+15
Co-60	2.5225E-05	103,679.35	207,358.71	0.00E+00	2.62E+00	5.23E+00	0.3750	8.475E+14
Cs-134	1.9830E-03	103,679.35	207,358.71	0.00E+00	2.06E+02	4.11E+02	0.5750	1.405E+16
Cs-135	4.2564E-06	103,679.35	207,358.71	0.00E+00	4.41E-01	8.83E-01	0.8500	2.768E+14
Cs-137	1.8141E+00	103,679.35	207,358.71	0.00E+00	1.88E+05	3.76E+05	1.2500	1.868E+14
Eu-154	3.4733E-02	103,679.35	207,358.71	0.00E+00	3.60E+03	7.20E+03	1.7500	7.731E+12
Eu-155	7.1081E-03	103,679.35	207,358.71	0.00E+00	7.37E+02	1.47E+03	2.2500	4.167E+08
Fe-55	3.6790E-04	103,679.35	207,358.71	0.00E+00	3.71E+01	7.42E+01	2.7500	3.582E+08
H-3	3.4945E-03	103,679.35	207,358.71	0.00E+00	3.62E+02	7.25E+02	3.5000	1.230E+07
I-129	6.6403E-07	103,679.35	207,358.71	0.00E+00	6.88E-02	1.38E-01	5.0000	5.213E+06
Kr-85	7.8250E-02	103,679.35	207,358.71	0.00E+00	8.11E+03	1.62E+04	7.0000	5.990E+05
Np-237	3.1567E-05	103,679.35	207,358.71	0.00E+00	3.27E+00	6.55E+00	11.0000	6.850E+04
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-08	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		
Ti-208	4.7272E-08	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	
	HEAVY WATER	HEAVY WATER	
	ALUM	ALUM	
	U	U	
	93.08510638	40 to 100	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
		103,679.35	
Bounding		207,358.71	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/Given Burnup	
	0.60		
	1.20		
Bounding			1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 1986
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
147.33

II. Estimates	m	X _a	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	389,072.50	778,145.01	0.00E+00	2.58E-04	5.16E-04	Avg MeV	
Am-241	2.0060E-03	389,072.50	778,145.01	0.00E+00	7.80E+02	1.56E+03	0.0150	8.214E+16
Am-242m	4.2429E-07	389,072.50	778,145.01	0.00E+00	1.65E-01	3.30E-01	0.0250	1.708E+16
Am-243	1.4899E-06	389,072.50	778,145.01	0.00E+00	5.80E-01	1.16E+00	0.0375	1.490E+16
C-14	5.7135E-09	389,072.50	778,145.01	0.00E+00	2.22E-03	4.45E-03	0.0575	1.596E+16
Cl-36	1.3124E-32	389,072.50	778,145.01	0.00E+00	5.11E-27	1.02E-26	0.0850	9.643E+15
Cm-243	1.6443E-07	389,072.50	778,145.01	0.00E+00	6.40E-02	1.28E-01	0.1250	6.526E+15
Cm-244	2.9330E-05	389,072.50	778,145.01	0.00E+00	1.14E+01	2.28E+01	0.2250	8.320E+15
Co-60	5.3186E-06	389,072.50	778,145.01	0.00E+00	2.07E+00	4.14E+00	0.3750	3.622E+15
Cs-134	3.1563E-03	389,072.50	778,145.01	0.00E+00	1.23E+03	2.46E+03	0.5750	5.908E+16
Cs-135	3.4477E-06	389,072.50	778,145.01	0.00E+00	1.34E+00	2.68E+00	0.8500	9.988E+14
Cs-137	2.0313E+00	389,072.50	778,145.01	0.00E+00	7.90E+05	1.58E+06	1.2500	5.703E+14
Eu-154	2.4513E-02	389,072.50	778,145.01	0.00E+00	9.54E+03	1.91E+04	1.7500	2.618E+13
Eu-155	4.8175E-03	389,072.50	778,145.01	0.00E+00	1.87E+03	3.75E+03	2.2500	2.296E+09
Fe-55	1.2397E-04	389,072.50	778,145.01	0.00E+00	4.82E+01	9.65E+01	2.7500	1.298E+09
H-3	4.5697E-03	389,072.50	778,145.01	0.00E+00	1.78E+03	3.56E+03	3.5000	5.963E+06
I-129	7.5300E-07	389,072.50	778,145.01	0.00E+00	2.93E-01	5.86E-01	5.0000	3.372E+05
Kr-85	1.0850E-01	389,072.50	778,145.01	0.00E+00	4.22E+04	8.44E+04	7.0000	3.722E+04
Np-237	9.5561E-06	389,072.50	778,145.01	0.00E+00	3.72E+00	7.44E+00	11.0000	4.172E+03
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	92.954	60 to 100	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	283.936.38	389.072.50	
Bounding		778.145.01	
			Nominal burnup calculated from the heavy metal mass destroyed.
			Bounding burnup assumed to be twice nominal burnup
Checks			
	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	1.00	1.37	
Bounding	2.00		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name 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
 Fuel decay start date 1986
 Estimates as of 2010
 Template ATR (Light Water Alum., 60 to 100%, U)
 Template Burnup(MWd) 367.2
 Template BOL Heavy Metal Mass (MT) 0.00116689
 Template Decay Time 20 years

Estimated
 Canister usage
 18"x10"
 18 00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	34,142.58	68,285.16	0.00E+00	2.26E-05	4.53E-05	Avg MeV	
Am-241	2.0060E-03	34,142.58	68,285.16	0.00E+00	6.85E+01	1.37E+02	0.0150	7.208E+15
Am-242m	4.2429E-07	34,142.58	68,285.16	0.00E+00	1.45E-02	2.90E-02	0.0250	1.499E+15
Am-243	1.4899E-06	34,142.58	68,285.16	0.00E+00	5.09E-02	1.02E-01	0.0375	1.307E+15
C-14	5.7135E-09	34,142.58	68,285.16	0.00E+00	1.95E-04	3.90E-04	0.0575	1.400E+15
Cl-36	1.3124E-32	34,142.58	68,285.16	0.00E+00	4.48E-28	8.96E-28	0.0850	8.462E+14
Cr-243	1.6443E-07	34,142.58	68,285.16	0.00E+00	5.61E-03	1.12E-02	0.1250	5.726E+14
Cr-244	2.9330E-05	34,142.58	68,285.16	0.00E+00	1.00E+00	2.00E+00	0.2250	7.301E+14
Co-60	5.3186E-06	34,142.58	68,285.16	0.00E+00	1.82E-01	3.63E-01	0.3750	3.178E+14
Cs-134	3.1563E-03	34,142.58	68,285.16	0.00E+00	1.08E+02	2.16E+02	0.5750	5.184E+15
Cs-135	3.4477E-06	34,142.58	68,285.16	0.00E+00	1.18E-01	2.35E-01	0.8500	8.765E+13
Cs-137	2.0313E+00	34,142.58	68,285.16	0.00E+00	6.94E+04	1.39E+05	1.2500	5.005E+13
Eu-154	2.4513E-02	34,142.58	68,285.16	0.00E+00	8.37E+02	1.67E+03	1.7500	2.297E+12
Eu-155	4.8175E-03	34,142.58	68,285.16	0.00E+00	1.64E+02	3.29E+02	2.2500	2.015E+08
Fe-55	1.2397E-04	34,142.58	68,285.16	0.00E+00	4.23E+00	8.46E+00	2.7500	1.139E+08
H-3	4.5697E-03	34,142.58	68,285.16	0.00E+00	1.56E+02	3.12E+02	3.5000	5.233E+05
I-129	7.5300E-07	34,142.58	68,285.16	0.00E+00	2.57E-02	5.14E-02	5.0000	2.959E+04
Kr-85	1.0850E-01	34,142.58	68,285.16	0.00E+00	3.70E+03	7.41E+03	7.0000	3.267E+03
Np-237	9.5561E-06	34,142.58	68,285.16	0.00E+00	3.26E-01	6.53E-01	11.0000	3.661E+02
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		
Ti-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	Thermal Power	
U-233	2.5825E-09	34,142.58	68,285.16	0.00E+00	8.82E-05	1.76E-04	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
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	8.14E+02	1.63E+03
U-238	-4.2851E-09	34,142.58	0.00	-3.42E-03	3.28E-03	3.42E-03	Total	Total
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		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator	From SFD	Used	Basis for Parameter Differences
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93.141	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	34,142.58	31,404.49	
Bounding		68,285.16	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal	0.73	0.92	
Bounding	1.46		-0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HFIR (OUTER)
 SNF ID #: 707
 Fuel Units & Descr: 54 - 369 CURVED PLATES
 Heavy Metal Mass: BOL=388 687kg; EOL=322.364kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1986
 Estimates as of: 2010
 Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 20 years

Estimated
 Canister usage:
 24"x10"
 18 00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	89,397.92	178,795.84	0.00E+00	5.93E-05	1.19E-04	Avg. MeV	
Am-241	2.0060E-03	89,397.92	178,795.84	0.00E+00	1.79E+02	3.59E+02	0.0150	1.887E+16
Am-242m	4.2429E-07	89,397.92	178,795.84	0.00E+00	3.79E-02	7.59E-02	0.0250	3.925E+15
Am-243	1.4899E-06	89,397.92	178,795.84	0.00E+00	1.33E-01	2.66E-01	0.0375	3.423E+15
C-14	5.7135E-09	89,397.92	178,795.84	0.00E+00	5.11E-04	1.02E-03	0.0575	3.666E+15
Cl-36	1.3124E-32	89,397.92	178,795.84	0.00E+00	1.17E-27	2.35E-27	0.0850	2.216E+15
Cm-243	1.6443E-07	89,397.92	178,795.84	0.00E+00	1.47E-02	2.94E-02	0.1250	1.499E+15
Cm-244	2.9330E-05	89,397.92	178,795.84	0.00E+00	2.62E+00	5.24E+00	0.2250	1.912E+15
Co-60	5.3186E-06	89,397.92	178,795.84	0.00E+00	4.75E-01	9.51E-01	0.3750	8.322E+14
Cs-134	3.1563E-03	89,397.92	178,795.84	0.00E+00	2.82E+02	5.64E+02	0.5750	1.357E+16
Cs-135	3.4477E-06	89,397.92	178,795.84	0.00E+00	3.08E-01	6.16E-01	0.8500	2.295E+14
Cs-137	2.0313E+00	89,397.92	178,795.84	0.00E+00	1.82E+05	3.63E+05	1.2500	1.310E+14
Eu-154	2.4513E-02	89,397.92	178,795.84	0.00E+00	2.19E+03	4.38E+03	1.7500	6.015E+12
Eu-155	4.8175E-03	89,397.92	178,795.84	0.00E+00	4.31E+02	8.61E+02	2.2500	5.276E+08
Fe-55	1.2397E-04	89,397.92	178,795.84	0.00E+00	1.11E+01	2.22E+01	2.7500	2.983E+08
H-3	4.5697E-03	89,397.92	178,795.84	0.00E+00	4.09E+02	8.17E+02	3.5000	1.370E+06
I-129	7.5300E-07	89,397.92	178,795.84	0.00E+00	6.73E-02	1.35E-01	5.0000	7.748E+04
Kr-85	1.0850E-01	89,397.92	178,795.84	0.00E+00	9.70E+03	1.94E+04	7.0000	8.553E+03
Np-237	9.5561E-06	89,397.92	178,795.84	0.00E+00	8.54E-01	1.71E+00	11.0000	9.586E+02
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		
Ti-208	4.6024E-08	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		

III. Template Selection Summary, Burnup Summary, and 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	89,397.92	62,808.98
Bounding		178,795.84

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	0.70
Bounding	1.46	

Estimated EOL HM/Given EOL HM

0.93

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name 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

Fuel decay start date: 1986
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 20 years

Estimated
Canister usage
24"x10"
147 33

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	6 6313E-10	879,986 15	1,759,972 29	0 00E+00	5 84E-04	1 17E-03	0 0150	1 858E+17
Am-241	2 0060E-03	879,986 15	1,759,972 29	0 00E+00	1 77E+03	3 53E+03	0 0250	3 863E+16
Am-242m	4 2429E-07	879,986 15	1,759,972 29	0 00E+00	3 73E-01	7 47E-01	0 0375	3 370E+16
Am-243	1 4899E-06	879,986 15	1,759,972 29	0 00E+00	1 31E+00	2 62E+00	0 0575	3 609E+16
C-14	5 7135E-09	879,986 15	1,759,972 29	0 00E+00	5 03E-03	1 01E-02	0 0850	2 181E+16
Cl-36	1 3124E-32	879,986 15	1,759,972 29	0 00E+00	1.15E-26	2.31E-26	0 1250	1 476E+16
Cm-243	1 6443E-07	879,986 15	1,759,972 29	0 00E+00	1.45E-01	2 89E-01	0 2250	1 882E+16
Cm-244	2 9330E-05	879,986 15	1,759,972 29	0 00E+00	2 58E+01	5 16E+01	0 3750	8 192E+15
Co-60	5 3186E-06	879,986 15	1,759,972 29	0 00E+00	4 68E+00	9 36E+00	0 5750	1 336E+17
Cs-134	3 1563E-03	879,986 15	1,759,972 29	0 00E+00	2.78E+03	5.56E+03	0 8500	2 259E+15
Cs-135	3 4477E-06	879,986 15	1,759,972 29	0 00E+00	3 03E+00	6.07E+00	1 2500	1 290E+15
Cs-137	2 0313E+00	879,986 15	1,759,972 29	0 00E+00	1 79E+06	3.58E+06	1 7500	5 921E+13
Eu-154	2 4513E-02	879,986 15	1,759,972 29	0 00E+00	2 16E+04	4.31E+04	2 2500	5 193E+09
Eu-155	4 8175E-03	879,986 15	1,759,972 29	0 00E+00	4 24E+03	8 48E+03	2 7500	2 936E+09
Fe-55	1 2397E-04	879,986 15	1,759,972 29	0 00E+00	1 09E+02	2 18E+02	3 5000	1 349E+07
H-3	4 5697E-03	879,986 15	1,759,972 29	0 00E+00	4 02E+03	8 04E+03	5 0000	7 626E+05
I-129	7 5300E-07	879,986 15	1,759,972 29	0 00E+00	6 63E-01	1 33E+00	7 0000	8 419E+04
Kr-85	1 0850E-01	879,986 15	1,759,972 29	0 00E+00	9 55E+04	1 91E+05	11 0000	9 435E+03
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-08	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		
Ti-208	4 6024E-08	879,986 15	1,759,972 29	0 00E+00	4 06E-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	Thermal Power	
U-233	2 5825E-09	879,986 15	1,759,972 29	0 00E+00	2.27E-03	4 55E-03	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
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		

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

¹Fuel decay start date, 1998
Estimates as of, 2010
Template: HFBR (Heavy Water, Alum, 40 to 100%, U)
²Template Burnup(MWd), 164.6
Template BOL Heavy Metal Mass (MT), 0.000377
Template Decay Time, 10 years

Estimated
Canister usage:
18"x10"
6.67

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.3262E-10	10,655.32	21,310.64	0.00E+00	1.41E-06	2.83E-06	Avg. MeV	
Am-241	5.9611E-03	10,655.32	21,310.64	0.00E+00	6.35E+01	1.27E+02	0.0150	2.913E+15
Am-242m	1.4332E-06	10,655.32	21,310.64	0.00E+00	1.53E-02	3.05E-02	0.0250	6.071E+14
Am-243	3.7132E-05	10,655.32	21,310.64	0.00E+00	3.96E-01	7.91E-01	0.0375	5.493E+14
C-14	2.6501E-08	10,655.32	21,310.64	0.00E+00	2.82E-04	5.65E-04	0.0575	5.652E+14
Cf-252	4.4441E-31	10,655.32	21,310.64	0.00E+00	4.74E-27	9.47E-27	0.0850	3.502E+14
Cm-243	7.2722E-06	10,655.32	21,310.64	0.00E+00	7.75E-02	1.55E-01	0.1250	2.629E+14
Cm-244	6.8226E-03	10,655.32	21,310.64	0.00E+00	7.27E+01	1.45E+02	0.2250	2.956E+14
Co-60	1.8117E-04	10,655.32	21,310.64	0.00E+00	1.93E+00	3.86E+00	0.3750	1.306E+14
Cs-134	3.0595E-01	10,655.32	21,310.64	0.00E+00	3.26E+03	6.52E+03	0.5750	2.359E+15
Cs-135	4.2564E-06	10,655.32	21,310.64	0.00E+00	4.54E-02	9.07E-02	0.8500	2.767E+14
Cs-137	2.5650E+00	10,655.32	21,310.64	0.00E+00	2.73E+04	5.47E+04	1.2500	6.953E+13
Eu-154	1.1628E-01	10,655.32	21,310.64	0.00E+00	1.24E+03	2.48E+03	1.7500	2.003E+12
Eu-155	5.7776E-02	10,655.32	21,310.64	0.00E+00	6.16E+02	1.23E+03	2.2500	8.766E+10
Fe-55	1.9465E-02	10,655.32	21,310.64	0.00E+00	2.07E+02	4.15E+02	2.7500	1.310E+09
H-3	8.1045E-03	10,655.32	21,310.64	0.00E+00	8.64E+01	1.73E+02	3.5000	1.590E+08
I-129	6.6403E-07	10,655.32	21,310.64	0.00E+00	7.08E-03	1.42E-02	5.0000	9.223E+05
Kr-85	2.0620E-01	10,655.32	21,310.64	0.00E+00	2.20E+03	4.39E+03	7.0000	1.060E+05
Np-237	3.1513E-05	10,655.32	21,310.64	0.00E+00	3.36E-01	6.72E-01	11.0000	1.216E+04
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used
Reactor Moderator	HEAVY WATER	HEAVY WATER
Fuel Cladding	ALUM	ALUM
BOL HM Constituents	U	U
BOL Enrichment %	79.82555621	40 to 100

Basis for Parameter Differences:

Burnup Summary (MWd)²

	From SFD	Estimated
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

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

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

Fuel decay start date 1988
Estimates as of 2010
Template ATR (Light Water Alum, 60 to 100%, U)
Template Burnup (MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 20 years

Estimated
Canister usage
18"x10"
1.38

II. Estimates	m	X _n	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	2,406.38	4,812.75	0.00E+00	1.60E-06	3.19E-06	Avg MeV	
Am-241	2.0060E-03	2,406.38	4,812.75	0.00E+00	4.83E+00	9.65E+00	0.0150	5.080E+14
Am-242m	4.2429E-07	2,406.38	4,812.75	0.00E+00	1.02E-03	2.04E-03	0.0250	1.056E+14
Am-243	1.4899E-06	2,406.38	4,812.75	0.00E+00	3.59E-03	7.17E-03	0.0375	9.214E+13
C-14	5.7135E-09	2,406.38	4,812.75	0.00E+00	1.37E-05	2.75E-05	0.0575	9.869E+13
Cl-36	1.3124E-32	2,406.38	4,812.75	0.00E+00	3.16E-29	6.32E-29	0.0850	5.964E+13
Cm-243	1.6443E-07	2,406.38	4,812.75	0.00E+00	3.96E-04	7.91E-04	0.1250	4.036E+13
Cm-244	2.9330E-05	2,406.38	4,812.75	0.00E+00	7.06E-02	1.41E-01	0.2250	5.146E+13
Co-60	5.3186E-06	2,406.38	4,812.75	0.00E+00	1.28E-02	2.56E-02	0.3750	2.240E+13
Cs-134	3.1563E-03	2,406.38	4,812.75	0.00E+00	7.60E+00	1.52E+01	0.5750	3.654E+14
Cs-135	3.4477E-06	2,406.38	4,812.75	0.00E+00	8.30E-03	1.66E-02	0.8500	6.177E+12
Cs-137	2.0313E+00	2,406.38	4,812.75	0.00E+00	4.89E+03	9.78E+03	1.2500	3.527E+12
Eu-154	2.4513E-02	2,406.38	4,812.75	0.00E+00	5.90E+01	1.18E+02	1.7500	1.619E+11
Eu-155	4.8175E-03	2,406.38	4,812.75	0.00E+00	1.16E+01	2.32E+01	2.2500	1.420E+07
Fe-55	1.2397E-04	2,406.38	4,812.75	0.00E+00	2.98E-01	5.97E-01	2.7500	8.029E+06
H-3	4.5697E-03	2,406.38	4,812.75	0.00E+00	1.10E+01	2.20E+01	3.5000	3.688E+04
I-129	7.5300E-07	2,406.38	4,812.75	0.00E+00	1.81E-03	3.62E-03	5.0000	2.085E+03
Kr-85	1.0850E-01	2,406.38	4,812.75	0.00E+00	2.61E+02	5.22E+02	7.0000	2.302E+02
Np-237	9.5561E-06	2,406.38	4,812.75	0.00E+00	2.30E-02	4.60E-02	11.0000	2.580E+01
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		
Th-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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.74E+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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 1961
Estimates as of: 2010
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
²Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 35 years

Estimated
Canister usage,
18"x10"
0.36

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3344E-08	482.62	965.24	0.00E+00	1.13E-05	2.25E-05	Avg MeV	
Am-241	1.1135E-04	482.62	965.24	0.00E+00	5.37E-02	1.07E-01	0.0150	7.204E+13
Am-242m	8.5075E-09	482.62	965.24	0.00E+00	4.11E-06	8.21E-06	0.0250	1.497E+13
Am-243	9.8519E-10	482.62	965.24	0.00E+00	4.75E-07	9.51E-07	0.0375	1.295E+13
C-14	2.3012E-04	482.62	965.24	0.00E+00	1.11E-01	2.22E-01	0.0575	1.396E+13
Cl-36	1.2261E-06	482.62	965.24	0.00E+00	5.92E-04	1.18E-03	0.0850	8.434E+12
Cm-243	2.4875E-10	482.62	965.24	0.00E+00	1.20E-07	2.40E-07	0.1250	5.476E+12
Cm-244	2.3178E-09	482.62	965.24	0.00E+00	1.12E-06	2.24E-06	0.2250	7.259E+12
Co-60	7.0849E-02	482.62	965.24	0.00E+00	3.42E+01	6.84E+01	0.3750	3.166E+12
Cs-134	3.0266E-06	482.62	965.24	0.00E+00	1.46E-03	2.92E-03	0.5750	5.216E+13
Cs-135	3.0316E-05	482.62	965.24	0.00E+00	1.46E-02	2.93E-02	0.8500	5.280E+11
Cs-137	1.4511E+00	482.62	965.24	0.00E+00	7.00E+02	1.40E+03	1.2500	5.248E+12
Eu-154	6.6955E-04	482.62	965.24	0.00E+00	3.23E-01	6.46E-01	1.7500	1.362E+10
Eu-155	6.9850E-04	482.62	965.24	0.00E+00	3.37E-01	6.74E-01	2.2500	2.827E+07
Fe-55	1.2318E-03	482.62	965.24	0.00E+00	5.94E-01	1.19E+00	2.7500	8.173E+05
H-3	2.5141E-03	482.62	965.24	0.00E+00	1.21E+00	2.43E+00	3.5000	5.812E+01
I-129	7.3195E-07	482.62	965.24	0.00E+00	3.53E-04	7.07E-04	5.0000	2.391E+01
Kr-85	4.1281E-02	482.62	965.24	0.00E+00	1.99E+01	3.98E+01	7.0000	2.640E+00
Np-237	1.1489E-06	482.62	965.24	0.00E+00	5.54E-04	1.11E-03	11.0000	2.963E-01
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding	NICHROME	SST	This fuel matches on all parameters except cladding (SST is conservative).
BOL HM Constituents	U		
BOL Enrichment %	93.15	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		482.62	Nominal burnup calculated from the heavy metal mass destroyed
Bounding		965.24	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal	2.27		1.00
Bounding	4.55		

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

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

Fuel decay start date 1964
Estimates as of 2010
Template HFBR (Heavy Water, Zirc., 0 to 5%, U)
*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							Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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	7,772 05	7,772 05	0 00E+00	3 65E-05	3 65E-05	Avg MeV	
Am-241	2 2880E-02	7,772 05	7,772 05	0 00E+00	1 78E+02	1 78E+02	0.0150	5 422E+14
Am-242m	3 5400E-06	7,772 05	7,772 05	0 00E+00	2 75E-02	2 75E-02	0.0250	1.123E+14
Am-243	2 0580E-06	7,772 05	7,772 05	0 00E+00	1 60E-02	1 60E-02	0.0375	9.880E+13
C-14	1.1264E-03	7,772 05	7,772 05	0 00E+00	8 75E+00	8 75E+00	0.0575	1.070E+14
Cl-36	8.3760E-11	7,772 05	7,772 05	0 00E+00	6.51E-07	6.51E-07	0.0850	6.309E+13
Cm-243	5 0340E-07	7,772 05	7,772 05	0 00E+00	3 91E-03	3 91E-03	0.1250	4 163E+13
Cm-244	1 0450E-05	7,772 05	7,772 05	0 00E+00	8 12E-02	8 12E-02	0.2250	5 435E+13
Co-60	6 4420E-02	7,772 05	7,772 05	0 00E+00	5 01E+02	5 01E+02	0.3750	2.364E+13
Cs-134	7 9240E-06	7,772 05	7,772 05	0 00E+00	6 16E-02	6 16E-02	0.5750	4 137E+14
Cs-135	7 9140E-06	7,772 05	7,772 05	0 00E+00	6 15E-02	6 15E-02	0.8500	4 775E+12
Cs-137	1 4316E+00	7,772 05	7,772 05	0 00E+00	1 11E+04	1 11E+04	1.2500	3.934E+13
Eu-154	6.7900E-03	7,772 05	7,772 05	0 00E+00	5.28E+01	5 28E+01	1.7500	1.294E+11
Eu-155	6.2800E-04	7,772 05	7,772 05	0 00E+00	4 88E+00	4 88E+00	2.2500	2.073E+08
Fe-55	5.7480E-05	7,772 05	7,772 05	0 00E+00	4 47E-01	4 47E-01	2.7500	1 326E+07
H-3	2 3800E-02	7,772 05	7,772 05	0 00E+00	1 85E+02	1.85E+02	3.5000	4 000E+04
I-129	7 5020E-07	7,772 05	7,772 05	0 00E+00	5 83E-03	5 83E-03	5.0000	1 679E+04
Kr-85	3 8220E-02	7,772 05	7,772 05	0 00E+00	2 97E+02	2 97E+02	7.0000	1.888E+03
Np-237	5 5780E-06	7,772 05	7,772 05	0 00E+00	4 34E-02	4 34E-02	11 0000	2.143E+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		
Ti-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		

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate ²
	From SFD	Estimated	
Nominal		7,772.05	Nominal burnup set equal to bounding burnup
Bounding		7,772.05	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	32.83		2.59
Bounding	32.83		

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: HWCTR DRIVER (U-ZR) HEU
SNF ID #: 117
Fuel Units & Descr: 76 - TUBE
Heavy Metal Mass: BOL = , EOL=36 13kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1964
Estimates as of: 2010
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
²Template 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 _m	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ct/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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
Cf-252	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		
Ti-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		
U-233	9.1620E-07	34,632.91	34,632.91	0.00E+00	3.17E-02	3.17E-02		
U-234	2.3440E-03	34,632.91	34,632.91	0.00E+00	8.12E+01	8.12E+01		
U-235	2.3296E-06	34,632.91	0.00	7.81E-03	0.00E+00	7.81E-03		
U-236	2.6620E-05	34,632.91	34,632.91	0.00E+00	9.22E-01	9.22E-01		
U-238	1.3291E-07	34,632.91	0.00	2.28E-02	1.82E-02	2.28E-02		
Y-90	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

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

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

¹Fuel decay start date 1964
 Estimates as of: 2010
 Template HFBR (Heavy Water, Zirc, 0 to 5%, U)
²Template 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							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	4.6920E-09	43,572.00	43,572.00	0.00E+00	2.04E-04	2.04E-04	Avg MeV	
Am-241	2.2880E-02	43,572.00	43,572.00	0.00E+00	9.97E+02	9.97E+02	0.0150	3.040E+15
Am-242m	3.5400E-06	43,572.00	43,572.00	0.00E+00	1.54E-01	1.54E-01	0.0250	6.297E+14
Am-243	2.0580E-06	43,572.00	43,572.00	0.00E+00	8.97E-02	8.97E-02	0.0375	5.539E+14
C-14	1.1264E-03	43,572.00	43,572.00	0.00E+00	4.91E+01	4.91E+01	0.0575	5.998E+14
Cl-36	8.3760E-11	43,572.00	43,572.00	0.00E+00	3.65E-06	3.65E-06	0.0850	3.537E+14
Cm-243	5.0340E-07	43,572.00	43,572.00	0.00E+00	2.19E-02	2.19E-02	0.1250	2.334E+14
Cm-244	1.0450E-05	43,572.00	43,572.00	0.00E+00	4.55E-01	4.55E-01	0.2250	3.047E+14
Co-60	6.4420E-02	43,572.00	43,572.00	0.00E+00	2.81E+03	2.81E+03	0.3750	1.325E+14
Cs-134	7.9240E-06	43,572.00	43,572.00	0.00E+00	3.45E-01	3.45E-01	0.5750	2.319E+15
Cs-135	7.9140E-06	43,572.00	43,572.00	0.00E+00	3.45E-01	3.45E-01	0.8500	2.677E+13
Cs-137	1.4316E+00	43,572.00	43,572.00	0.00E+00	6.24E+04	6.24E+04	1.2500	2.206E+14
Eu-154	6.7900E-03	43,572.00	43,572.00	0.00E+00	2.96E+02	2.96E+02	1.7500	7.254E+11
Eu-155	6.2800E-04	43,572.00	43,572.00	0.00E+00	2.74E+01	2.74E+01	2.2500	1.162E+09
Fe-55	5.7480E-05	43,572.00	43,572.00	0.00E+00	2.50E+00	2.50E+00	2.7500	7.434E+07
H-3	2.3800E-02	43,572.00	43,572.00	0.00E+00	1.04E+03	1.04E+03	3.5000	2.242E+05
I-129	7.5020E-07	43,572.00	43,572.00	0.00E+00	3.27E-02	3.27E-02	5.0000	9.411E+04
Kr-85	3.8220E-02	43,572.00	43,572.00	0.00E+00	1.67E+03	1.67E+03	7.0000	1.059E+04
Np-237	5.5780E-06	43,572.00	43,572.00	0.00E+00	2.43E-01	2.43E-01	11.0000	1.201E+03
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		
Th-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate*
Nominal		43,572.00	Nominal burnup set equal to bounding burnup
Bounding		43,572.00	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	32.83		2.59
Bounding	32.83		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 1964
Estimates as of, 2010
Template: HFBR (Heavy Water, SST, 0 to 5%, U)
²Template 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 _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	5 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+06
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		
Th-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		

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

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

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

¹Fuel decay start date 1964
Estimates as of 2010
Template: HFBR (Heavy Water, Zirc, 0 to 5% U)
²Template 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 _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4 6920E-09	5,183 09	5,183 09	0 00E+00	2 43E-05	2 43E-05	Avg MeV	
Am-241	2 2880E-02	5,183 09	5,183 09	0 00E+00	1 19E+02	1 19E+02	0 0150	3 616E+14
Am-242m	3 5400E-06	5,183 09	5,183 09	0 00E+00	1 83E-02	1 83E-02	0 0250	7 490E+13
Am-243	2 0580E-06	5,183 09	5,183 09	0 00E+00	1 07E-02	1 07E-02	0 0375	6 589E+13
C-14	1 1264E-03	5,183 09	5,183 09	0 00E+00	5 84E+00	5 84E+00	0 0575	7 135E+13
Cl-36	8 3760E-11	5,183 09	5,183 09	0 00E+00	4 34E-07	4 34E-07	0 0850	4 207E+13
Cm-243	5 0340E-07	5,183 09	5,183 09	0 00E+00	2 61E-03	2 61E-03	0 1250	2 776E+13
Cm-244	1 0450E-05	5,183 09	5,183 09	0 00E+00	5 42E-02	5 42E-02	0 2250	3 624E+13
Co-60	6 4420E-02	5,183 09	5,183 09	0 00E+00	3 34E+02	3 34E+02	0 3750	1 577E+13
Cs-134	7 9240E-06	5,183 09	5,183 09	0 00E+00	4 11E-02	4 11E-02	0 5750	2 759E+14
Cs-135	7 9140E-06	5,183 09	5,183 09	0 00E+00	4 10E-02	4 10E-02	0 8500	3 184E+12
Cs-137	1 4316E+00	5,183 09	5,183 09	0 00E+00	7 42E+03	7 42E+03	1 2500	2 624E+13
Eu-154	6 7900E-03	5,183 09	5,183 09	0 00E+00	3 52E+01	3 52E+01	1 7500	8 629E+10
Eu-155	6 2800E-04	5,183 09	5,183 09	0 00E+00	3 25E+00	3 25E+00	2 2500	1 382E+08
Fe-55	5 7480E-05	5,183 09	5,183 09	0 00E+00	2 98E-01	2 98E-01	2 7500	8 844E+06
H-3	2 3800E-02	5,183 09	5,183 09	0 00E+00	1 23E+02	1 23E+02	3 5000	2 667E+04
I-129	7 5020E-07	5,183 09	5,183 09	0 00E+00	3 89E-03	3 89E-03	5 0000	1 120E+04
Kr-85	3 8220E-02	5,183 09	5,183 09	0 00E+00	1 98E+02	1 98E+02	7 0000	1 259E+03
Np-237	5 5780E-06	5,183 09	5,183 09	0 00E+00	2 89E-02	2 89E-02	11 0000	1 429E+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		
Ti-208	4 6200E-08	5,183 09	5,183 09	0 00E+00	2 99E-04	2 99E-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-06	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL
		5,183 09	
Nominal		5,183 09	
Bounding		5,183 09	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 2.59
	32.83		
Nominal			
Bounding	32.83		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR IS (U ZR) LEU

SNF ID #: 977

Fuel Units & Descr: 3 - TUBE

Heavy Metal Mass, BOL = 15 776kg

ROD Storage Site: INEEL

Fuel decay start date: 1964

Estimates as of: 2010

Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)

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	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4 6920E-09	15,122 23	15,122 23	0 00E+00	7 10E-05	7 10E-05	Avg. MeV	
Am-241	2 2880E-02	15,122 23	15,122 23	0 00E+00	3 46E+02	3 46E+02	0 0150	1 055E+15
Am-242m	3 5400E-06	15,122 23	15,122 23	0 00E+00	5 35E-02	5 35E-02	0 0250	2 185E+14
Am-243	2 0580E-06	15,122 23	15,122 23	0 00E+00	3 11E-02	3 11E-02	0 0375	1 922E+14
C-14	1 1264E-03	15,122 23	15,122 23	0 00E+00	1 70E+01	1 70E+01	0 0575	2 082E+14
Cl-36	8 3760E-11	15,122 23	15,122 23	0 00E+00	1 27E-06	1 27E-06	0 0850	1 228E+14
Cm-243	5 0340E-07	15,122 23	15,122 23	0 00E+00	7 61E-03	7 61E-03	0 1250	8 099E+13
Cm-244	1 0450E-05	15,122 23	15,122 23	0 00E+00	1 58E-01	1 58E-01	0 2250	1 057E+14
Co-60	6 4420E-02	15,122 23	15,122 23	0 00E+00	9 74E+02	9 74E+02	0 3750	4 600E+13
Cs-134	7 9240E-06	15,122 23	15,122 23	0 00E+00	1 20E-01	1 20E-01	0 5750	8 049E+14
Cs-135	7 9140E-06	15,122 23	15,122 23	0 00E+00	1 20E-01	1 20E-01	0 8500	9 291E+12
Cs-137	1 4316E+00	15,122 23	15,122 23	0 00E+00	2 16E+04	2 16E+04	1 2500	7 655E+13
Eu-154	6 7900E-03	15,122 23	15,122 23	0 00E+00	1 03E+02	1 03E+02	1 7500	2 518E+11
Eu-155	6 2800E-04	15,122 23	15,122 23	0 00E+00	9 50E+00	9 50E+00	2 2500	4 033E+08
Fe-55	5 7480E-05	15,122 23	15,122 23	0 00E+00	8 69E-01	8 69E-01	2 7500	2 580E+07
H-3	2 3800E-02	15,122 23	15,122 23	0 00E+00	3 60E+02	3 60E+02	3 5000	7 782E+04
I-129	7 5020E-07	15,122 23	15,122 23	0 00E+00	1 13E-02	1 13E-02	5 0000	3 266E+04
Kr-85	3 8220E-02	15,122 23	15,122 23	0 00E+00	5 78E+02	5 78E+02	7 0000	3 674E+03
Np-237	5 5780E-06	15,122 23	15,122 23	0 00E+00	8 44E-02	8 44E-02	11 0000	4 169E+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-08	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		
Th-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)³

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		15 122 23	Nominal burnup set equal to bounding burnup.
Bounding		15 122 23	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	32 83		2 59
Bounding	32 83		

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

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

Fuel decay start date 1963
Estimates as of 2010
Template PWR (Light Water, Zirc, 0 to 5%, U)
Template Burnup(MWd) 61 92
Template BOL Heavy Metal Mass (MT): 0 00176911
Template Decay Time: 35 years

Estimated
Canister usage
18"x15"
0.36

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group Avg MeV Total Photons/sec (bounding)
Ac-227	8.7758E-10	209.63	209.63	0.00E+00	1.84E-07	1.84E-07	0.0150 1.128E+13
Am-241	1.4352E-01	209.63	209.63	0.00E+00	3.01E+01	3.01E+01	0.0250 2.274E+12
Am-242m	2.8698E-04	209.63	209.63	0.00E+00	6.02E-02	6.02E-02	0.0375 2.169E+12
Am-243	6.2565E-04	209.63	209.63	0.00E+00	1.31E-01	1.31E-01	0.0575 2.506E+12
C-14	4.7901E-05	209.63	209.63	0.00E+00	1.00E-02	1.00E-02	0.0850 1.262E+12
Cl-36	8.0297E-07	209.63	209.63	0.00E+00	1.68E-04	1.68E-04	0.1250 8.758E+11
Cm-243	2.5081E-04	209.63	209.63	0.00E+00	5.26E-02	5.26E-02	0.2250 1.082E+12
Cm-244	4.9015E-02	209.63	209.63	0.00E+00	1.03E+01	1.03E+01	0.3750 4.654E+11
Co-60	2.5581E-03	209.63	209.63	0.00E+00	5.36E-01	5.36E-01	0.5750 1.082E+13
Cs-134	4.0536E-05	209.63	209.63	0.00E+00	8.50E-03	8.50E-03	0.8500 1.497E+11
Cs-135	1.4433E-05	209.63	209.63	0.00E+00	3.03E-03	3.03E-03	1.2500 1.471E+11
Cs-137	1.3979E+00	209.63	209.63	0.00E+00	2.93E+02	2.93E+02	1.7500 4.405E+09
Eu-154	2.0203E-02	209.63	209.63	0.00E+00	4.24E+00	4.24E+00	2.2500 7.097E+05
Eu-155	1.7684E-03	209.63	209.63	0.00E+00	3.71E-01	3.71E-01	2.7500 1.453E+06
Fe-55	4.3136E-05	209.63	209.63	0.00E+00	9.04E-03	9.04E-03	3.5000 1.499E+05
H-3	2.0769E-02	209.63	209.63	0.00E+00	4.35E+00	4.35E+00	5.0000 6.407E+04
I-129	9.8288E-07	209.63	209.63	0.00E+00	2.06E-04	2.06E-04	7.0000 7.385E+03
Kr-85	2.8214E-02	209.63	209.63	0.00E+00	5.91E+00	5.91E+00	11.0000 8.482E+02
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	
Th-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	

Other Radionuclides

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 1964
Estimates as of: 2010
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
²Template 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 _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4 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 960E+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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Nominal:		61 103.94	
Bounding:		61 103.94	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	32 83		
Bounding	32 83		2.59

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name HWCTR SOT (UO2) LEU

SNF ID # 120

Fuel Units & Descr 96 - TUBE

Heavy Metal Mass BOL= ; EOL=249 725kg

ROD Storage Site: INEEL

Fuel decay start date 1964

Estimates as of 2010

Template HFBR (Heavy Water, Zirc., 0 to 5%, U)

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							Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4 6920E-09	239,374 53	239,374 53	0 00E+00	1 12E-03	1 12E-03	Avg MeV	
Am-241	2 2880E-02	239,374 53	239,374 53	0 00E+00	5 48E+03	5 48E+03	0 0150	1 670E+16
Am-242m	3 5400E-06	239,374 53	239,374 53	0 00E+00	8 47E-01	8 47E-01	0 0250	3 459E+15
Am-243	2 0580E-06	239,374 53	239,374 53	0 00E+00	4 93E-01	4 93E-01	0 0375	3 043E+15
C-14	1 1264E-03	239,374 53	239,374 53	0 00E+00	2 70E+02	2 70E+02	0 0575	3 295E+15
Cl-36	8 3760E-11	239,374 53	239,374 53	0 00E+00	2 01E-05	2 01E-05	0 0850	1 943E+15
Cm-243	5 0340E-07	239,374 53	239,374 53	0 00E+00	1 21E-01	1 21E-01	0 1250	1 282E+15
Cm-244	1 0450E-05	239,374 53	239,374 53	0 00E+00	2 50E+00	2 50E+00	0 2250	1 674E+15
Co-60	6 4420E-02	239,374 53	239,374 53	0 00E+00	1 54E+04	1 54E+04	0 3750	7 281E+14
Cs-134	7 9240E-06	239,374 53	239,374 53	0 00E+00	1 90E+00	1 90E+00	0 5750	1 274E+16
Cs-135	7 9140E-06	239,374 53	239,374 53	0 00E+00	1 89E+00	1 89E+00	0 8500	1 471E+14
Cs-137	1 4316E+00	239,374 53	239,374 53	0 00E+00	3 43E+05	3 43E+05	1 2500	1 212E+15
Eu-154	6 7900E-03	239,374 53	239,374 53	0 00E+00	1 63E+03	1 63E+03	1 7500	3 985E+12
Eu-155	6 2800E-04	239,374 53	239,374 53	0 00E+00	1 50E+02	1 50E+02	2 2500	6 384E+09
Fe-55	5 7480E-05	239,374 53	239,374 53	0 00E+00	1 38E+01	1 38E+01	2 7500	4 084E+08
H-3	2 3800E-02	239,374 53	239,374 53	0 00E+00	5 70E+03	5 70E+03	3 5000	1 232E+06
I-129	7 5020E-07	239,374 53	239,374 53	0 00E+00	1 80E-01	1 80E-01	5 0000	5 170E+05
Kr-85	3 8220E-02	239,374 53	239,374 53	0 00E+00	9 15E+03	9 15E+03	7 0000	5 818E+04
Np-237	5 5780E-06	239,374 53	239,374 53	0 00E+00	1 34E+00	1 34E+00	11 6000	6 600E+03
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences
Reactor Moderator	From SFD HEAVY WATER	Used HEAVY WATER	
Fuel Cladding	ZIRC	ZIRC	This Template was used for the following reasons This fuel matches on all parameters except enrichment (unknown)
BOL HM Constituents	U	U	
BOL Enrichment %		0 to 5	
Burnup Summary (MWd) ²			Basis for burnup used in estimate
Nominal	From SFD	Estimated 239,374 53	
Bounding		239,374 53	Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL
Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier 32.83	Estimated Burnup/ Given Burnup	
Bounding	32.83		2.59

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR SPR (U-Zr) LEU
SNF ID #: 783
Fuel Units & Descr: 58 - TUBE
Heavy Metal Mass: BOL = : EOL=437 679kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1964
Estimates as of, 2010
Template: HFBR (Heavy Water, Zirc., 0 to 5%, U)
²Template 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 _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.6920E-09	419,538.84	419,538.84	0.00E+00	1.97E-03	1.97E-03	Avg MeV	
Am-241	2.2880E-02	419,538.84	419,538.84	0.00E+00	9.60E+03	9.60E+03	0.0150	2.927E+16
Am-242m	3.5400E-06	419,538.84	419,538.84	0.00E+00	1.49E+00	1.49E+00	0.0250	6.063E+15
Am-243	2.0580E-06	419,538.84	419,538.84	0.00E+00	8.63E-01	8.63E-01	0.0375	5.334E+15
C-14	1.1264E-03	419,538.84	419,538.84	0.00E+00	4.73E+02	4.73E+02	0.0575	5.775E+15
Cl-36	8.3760E-11	419,538.84	419,538.84	0.00E+00	3.51E-05	3.51E-05	0.0850	3.405E+15
Cm-243	5.0340E-07	419,538.84	419,538.84	0.00E+00	2.11E-01	2.11E-01	0.1250	2.247E+15
Cm-244	1.0450E-05	419,538.84	419,538.84	0.00E+00	4.38E+00	4.38E+00	0.2250	2.934E+15
Co-60	6.4420E-02	419,538.84	419,538.84	0.00E+00	2.70E+04	2.70E+04	0.3750	1.276E+15
Cs-134	7.9240E-06	419,538.84	419,538.84	0.00E+00	3.32E+00	3.32E+00	0.5750	2.233E+16
Cs-135	7.9140E-06	419,538.84	419,538.84	0.00E+00	3.32E+00	3.32E+00	0.8500	2.578E+14
Cs-137	1.4316E+00	419,538.84	419,538.84	0.00E+00	6.01E+05	6.01E+05	1.2500	2.124E+15
Eu-154	6.7900E-03	419,538.84	419,538.84	0.00E+00	2.85E+03	2.85E+03	1.7500	6.985E+12
Eu-155	6.2800E-04	419,538.84	419,538.84	0.00E+00	2.63E+02	2.63E+02	2.2500	1.119E+10
Fe-55	5.7480E-05	419,538.84	419,538.84	0.00E+00	2.41E+01	2.41E+01	2.7500	7.158E+08
H-3	2.3800E-02	419,538.84	419,538.84	0.00E+00	9.99E+03	9.99E+03	3.5000	2.159E+06
I-129	7.5020E-07	419,538.84	419,538.84	0.00E+00	3.15E-01	3.15E-01	5.0000	9.062E+05
Kr-85	3.8220E-02	419,538.84	419,538.84	0.00E+00	1.60E+04	1.60E+04	7.0000	1.019E+05
Np-237	5.5780E-06	419,538.84	419,538.84	0.00E+00	2.34E+00	2.34E+00	11.0000	1.157E+04
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		
Th-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup. Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
Nominal		419,538.84	
Bounding		419,538.84	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM 2.59
Nominal	32.83		
Bounding	32.83		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name HWCTR SPRO (UO2) ALUM LEU
SNF ID # 115
Fuel Units & Descr: 3 - TUBE
Heavy Metal Mass BOL= , EOL=6 499kg
ROD Storage Site SRS

¹Fuel decay start date 1964
Estimates as of 2010
Template HFBR (Heavy Water, Alum, 10 to 20% U)
²Template 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							Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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 6507E-09	6,176 98	6,176 98	0 00E+00	1 64E-05	1 64E-05	Avg MeV	
Am-241	2 8587E-02	6,176 98	6,176 98	0 00E+00	1 77E+02	1 77E+02	0 0150	4.372E+14
Am-242m	8 3267E-06	6,176 98	6,176 98	0 00E+00	5 14E-02	5 14E-02	0 0250	9 064E+13
Am-243	6 3920E-06	6,176 98	6,176 98	0 00E+00	3 95E-02	3 95E-02	0 0375	7 938E+13
C-14	2 9567E-08	6,176 98	6,176 98	0 00E+00	1 83E-04	1 83E-04	0 0575	8 684E+13
Cl-36	5 9507E-35	6,176 98	6,176 98	0 00E+00	3 68E-31	3 68E-31	0 0850	5 097E+13
Cm-243	1 5333E-06	6,176 98	6,176 98	0 00E+00	9 47E-03	9 47E-03	0 1250	3 358E+13
Cm-244	6 1980E-05	6,176 98	6,176 98	0 00E+00	3 83E-01	3 83E-01	0 2250	4 395E+13
Co-60	2 2720E-06	6,176 98	6,176 98	0 00E+00	1 40E-02	1 40E-02	0 3750	1 911E+13
Cs-134	1 3787E-05	6,176 98	6,176 98	0 00E+00	8 52E-02	8 52E-02	0 5750	3 287E+14
Cs-135	4 8607E-06	6,176 98	6,176 98	0 00E+00	3 00E-02	3 00E-02	0 8500	3 773E+12
Cs-137	1 4300E+00	6,176 98	6,176 98	0 00E+00	8 83E+03	8 83E+03	1 2500	1 774E+12
Eu-154	6 2340E-03	6,176 98	6,176 98	0 00E+00	3 85E+01	3 85E+01	1 7500	1 023E+11
Eu-155	5 0213E-04	6,176 98	6,176 98	0 00E+00	3 10E+00	3 10E+00	2 2500	8 826E+06
Fe-55	2 5980E-05	6,176 98	6,176 98	0 00E+00	1 60E-01	1 60E-01	2 7500	1 474E+06
H-3	2 0100E-03	6,176 98	6,176 98	0 00E+00	1 24E+01	1 24E+01	3 5000	2 659E+04
I-129	7 1600E-07	6,176 98	6,176 98	0 00E+00	4 42E-03	4 42E-03	5 0000	1 115E+04
Kr-85	3 8813E-02	6,176 98	6,176 98	0 00E+00	2 40E+02	2 40E+02	7 0000	1 255E+03
Np-237	3 9360E-06	6,176 98	6,176 98	0 00E+00	2 43E-02	2 43E-02	11 0000	1 424E+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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

From SFD		Used	Basis for Parameter Differences*
Reactor Moderator:	HEAVY WATER	HEAVY WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %		10 to 20	

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		6 176 98	
Bounding		6,176 98	

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

Checks

Burnup Multiplier		Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	10 85		
Bounding	10 85		

2 02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR SPRO (UO2) SST LEU
SNF ID #: 978
Fuel Units & Descr: 5 - TUBE
Heavy Metal Mass BOL = 89 362kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1964
Estimates as of: 2010
Template: HFBR (Heavy Water, SST, 0 to 5%, U)
²Template 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 _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	5.6840E-09	85,315.00	85,315.00	0.00E+00	4.85E-04	4.85E-04	Avg. MeV	
Am-241	2.1380E-01	85,315.00	85,315.00	0.00E+00	1.82E+04	1.82E+04	0.0150	6.128E+15
Am-242m	1.0302E-04	85,315.00	85,315.00	0.00E+00	8.79E+00	8.79E+00	0.0250	1.199E+15
Am-243	5.2400E-05	85,315.00	85,315.00	0.00E+00	4.47E+00	4.47E+00	0.0375	1.042E+15
C-14	2.2160E-02	85,315.00	85,315.00	0.00E+00	1.89E+03	1.89E+03	0.0575	1.301E+15
Cl-36	4.1880E-04	85,315.00	85,315.00	0.00E+00	3.57E+01	3.57E+01	0.0850	6.126E+14
Cm-243	1.6766E-05	85,315.00	85,315.00	0.00E+00	1.43E+00	1.43E+00	0.1250	3.976E+14
Cm-244	7.3320E-04	85,315.00	85,315.00	0.00E+00	6.26E+01	6.26E+01	0.2250	4.978E+14
Co-60	5.1480E+00	85,315.00	85,315.00	0.00E+00	4.39E+05	4.39E+05	0.3750	2.148E+14
Cs-134	1.7300E-05	85,315.00	85,315.00	0.00E+00	1.48E+00	1.48E+00	0.5750	4.552E+15
Cs-135	3.7460E-06	85,315.00	85,315.00	0.00E+00	3.20E-01	3.20E-01	0.8500	5.070E+13
Cs-137	1.4426E+00	85,315.00	85,315.00	0.00E+00	1.23E+05	1.23E+05	1.2500	3.253E+16
Eu-154	9.2140E-03	85,315.00	85,315.00	0.00E+00	7.86E+02	7.86E+02	1.7500	1.347E+12
Eu-155	8.1360E-04	85,315.00	85,315.00	0.00E+00	6.94E+01	6.94E+01	2.2500	1.724E+11
Fe-55	5.3720E-02	85,315.00	85,315.00	0.00E+00	4.58E+03	4.58E+03	2.7500	9.934E+08
H-3	4.4560E-02	85,315.00	85,315.00	0.00E+00	3.80E+03	3.80E+03	3.5000	2.413E+06
I-129	9.1660E-07	85,315.00	85,315.00	0.00E+00	7.82E-02	7.82E-02	5.0000	1.010E+06
Kr-85	3.2380E-02	85,315.00	85,315.00	0.00E+00	2.76E+03	2.76E+03	7.0000	1.135E+05
Np-237	1.9674E-05	85,315.00	85,315.00	0.00E+00	1.68E+00	1.68E+00	11.0000	1.286E+04
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		
Ti-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		

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)³

	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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HW/CTR SPRO (UO2) ZR LEU
SNF ID #: 772
Fuel Units & Descr: 48 - TUBE
Heavy Metal Mass BOL = , EOL=180 922kg
ROD Storage Site INEEL

Fuel decay start date 1964
Estimates as of. 2010
Template HFBR (Heavy Water Zirc., 0 to 5%, U)
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	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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	173,423.00	173,423.00	0.00E+00	8.14E-04	8.14E-04	Avg MeV	
Am-241	2.2880E-02	173,423.00	173,423.00	0.00E+00	3.97E+03	3.97E+03	0.0150	1.210E+16
Am-242m	3.5400E-06	173,423.00	173,423.00	0.00E+00	6.14E-01	6.14E-01	0.0250	2.506E+15
Am-243	2.0580E-06	173,423.00	173,423.00	0.00E+00	3.57E-01	3.57E-01	0.0375	2.205E+15
C-14	1.1264E-03	173,423.00	173,423.00	0.00E+00	1.95E+02	1.95E+02	0.0575	2.387E+15
Cl-36	8.3760E-11	173,423.00	173,423.00	0.00E+00	1.45E-05	1.45E-05	0.0850	1.408E+15
Cm-243	5.0340E-07	173,423.00	173,423.00	0.00E+00	8.73E-02	8.73E-02	0.1250	9.288E+14
Cm-244	1.0450E-05	173,423.00	173,423.00	0.00E+00	1.81E+00	1.81E+00	0.2250	1.213E+15
Co-60	6.4420E-02	173,423.00	173,423.00	0.00E+00	1.12E+04	1.12E+04	0.3750	5.275E+14
Cs-134	7.9240E-06	173,423.00	173,423.00	0.00E+00	1.37E+00	1.37E+00	0.5750	9.231E+15
Cs-135	7.9140E-06	173,423.00	173,423.00	0.00E+00	1.37E+00	1.37E+00	0.8500	1.065E+14
Cs-137	1.4316E+00	173,423.00	173,423.00	0.00E+00	2.48E+05	2.48E+05	1.2500	8.779E+14
Eu-154	6.7900E-03	173,423.00	173,423.00	0.00E+00	1.18E+03	1.18E+03	1.7500	2.887E+12
Eu-155	6.2800E-04	173,423.00	173,423.00	0.00E+00	1.09E+02	1.09E+02	2.2500	4.625E+09
Fe-55	5.7480E-05	173,423.00	173,423.00	0.00E+00	9.97E+00	9.97E+00	2.7500	2.959E+08
H-3	2.3800E-02	173,423.00	173,423.00	0.00E+00	4.13E+03	4.13E+03	3.5000	8.924E+05
I-129	7.5020E-07	173,423.00	173,423.00	0.00E+00	1.30E-01	1.30E-01	5.0000	3.746E+05
Kr-85	3.8220E-02	173,423.00	173,423.00	0.00E+00	6.63E+03	6.63E+03	7.0000	4.213E+04
Np-237	5.5780E-06	173,423.00	173,423.00	0.00E+00	9.67E-01	9.67E-01	11.0000	4.781E+03
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		
Ti-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		

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			Basis for Parameter Differences*
Reactor Moderator	From SFD	Used	
Fuel Cladding	HEAVY WATER	HEAVY WATER	This template was used for the following reasons: This fuel matches on all parameters except enrichment (unknown)
BOL HM Constituents	ZIRC	ZIRC	
BOL Enrichment %	U	U	
		0 to 5	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		173,423.00	Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL
Bounding		173,423.00	
Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	32.83		2.59
Bounding	32.83		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR TFEN (U-ZR) LEU
SNF ID #: 880
Fuel Units & Descr: 11 - TUBE
Heavy Metal Mass: BOL = : EOL=162.082kg
ROD Storage Site: INEEL

Fuel decay start date: 1964
Estimates as of: 2010
Template: HFBR (Heavy Water, Zirc, 0 to 5%, U)
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	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.6920E-09	155,363.95	155,363.95	0.00E+00	7.29E-04	7.29E-04	Avg MeV	
Am-241	2.2880E-02	155,363.95	155,363.95	0.00E+00	3.55E+03	3.55E+03	0.0150	1.084E+16
Am-242m	3.5400E-06	155,363.95	155,363.95	0.00E+00	5.50E-01	5.50E-01	0.0250	2.245E+15
Am-243	2.0580E-06	155,363.95	155,363.95	0.00E+00	3.20E-01	3.20E-01	0.0375	1.975E+15
C-14	1.1264E-03	155,363.95	155,363.95	0.00E+00	1.75E+02	1.75E+02	0.0575	2.139E+15
Cl-36	8.3760E-11	155,363.95	155,363.95	0.00E+00	1.30E-05	1.30E-05	0.0850	1.261E+15
Cm-243	5.0340E-07	155,363.95	155,363.95	0.00E+00	7.82E-02	7.82E-02	0.1250	8.321E+14
Cm-244	1.0450E-05	155,363.95	155,363.95	0.00E+00	1.62E+00	1.62E+00	0.2250	1.086E+15
Co-60	6.4420E-02	155,363.95	155,363.95	0.00E+00	1.00E+04	1.00E+04	0.3750	4.726E+14
Cs-134	7.9240E-06	155,363.95	155,363.95	0.00E+00	1.23E+00	1.23E+00	0.5750	8.270E+15
Cs-135	7.9140E-06	155,363.95	155,363.95	0.00E+00	1.23E+00	1.23E+00	0.8500	9.545E+13
Cs-137	1.4316E+00	155,363.95	155,363.95	0.00E+00	2.22E+05	2.22E+05	1.2500	7.865E+14
Eu-154	6.7900E-03	155,363.95	155,363.95	0.00E+00	1.05E+03	1.05E+03	1.7500	2.587E+12
Eu-155	6.2800E-04	155,363.95	155,363.95	0.00E+00	9.76E+01	9.76E+01	2.2500	4.144E+09
Fe-55	5.7480E-05	155,363.95	155,363.95	0.00E+00	8.93E+00	8.93E+00	2.7500	2.651E+08
H-3	2.3800E-02	155,363.95	155,363.95	0.00E+00	3.70E+03	3.70E+03	3.5000	7.995E+05
I-129	7.5020E-07	155,363.95	155,363.95	0.00E+00	1.17E-01	1.17E-01	5.0000	3.356E+05
Kr-85	3.8220E-02	155,363.95	155,363.95	0.00E+00	5.94E+03	5.94E+03	7.0000	3.775E+04
Np-237	5.5780E-06	155,363.95	155,363.95	0.00E+00	8.67E-01	8.67E-01	11.0000	4.284E+03
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		
Ti-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		

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

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

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

¹Fuel decay start date 1964
Estimates as of: 2010
Template: (Worst Case)
²Template Burnup(MWd) 62.5
Template BOL Heavy Metal Mass (MT) 0.00186865
Template Decay Time 35 years

Estimated
Canister usage
18"x15"
0.09

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	2.3072E-06	273.69	547.39	0.00E+00	6.31E-04	1.26E-03	0.0150	6.812E+14
Am-241	8.4448E+00	273.69	547.39	0.00E+00	2.31E+03	4.62E+03	0.0250	1.335E+14
Am-242m	1.6848E-02	273.69	547.39	0.00E+00	4.61E+00	9.22E+00	0.0375	1.166E+14
Am-243	1.6320E-02	273.69	547.39	0.00E+00	4.47E+00	8.93E+00	0.0575	1.835E+14
C-14	1.2090E-01	273.69	547.39	0.00E+00	3.31E+01	6.62E+01	0.0850	7.161E+13
Cl-36	2.2849E-03	273.69	547.39	0.00E+00	6.25E-01	1.25E+00	0.1250	5.613E+13
Cm-243	8.6624E-04	273.69	547.39	0.00E+00	2.37E-01	4.74E-01	0.2250	6.204E+13
Cm-244	1.6848E-01	273.69	547.39	0.00E+00	4.61E+01	9.22E+01	0.3750	2.653E+13
Co-60	2.8086E+01	273.69	547.39	0.00E+00	7.69E+03	1.54E+04	0.5750	4.315E+14
Cs-134	3.4148E-04	273.69	547.39	0.00E+00	9.35E-02	1.87E-01	0.8500	1.649E+13
Cs-135	4.3976E-04	273.69	547.39	0.00E+00	1.20E-01	2.41E-01	1.2500	1.153E+15
Cs-137	2.1049E+01	273.69	547.39	0.00E+00	5.76E+03	1.15E+04	1.7500	5.099E+11
Eu-154	1.2500E+00	273.69	547.39	0.00E+00	3.42E+02	6.84E+02	2.2500	6.045E+09
Eu-155	6.8986E-02	273.69	547.39	0.00E+00	1.89E+01	3.78E+01	2.7500	1.704E+09
Fe-55	2.9308E-01	273.69	547.39	0.00E+00	8.02E+01	1.60E+02	3.5000	1.548E+06
H-3	2.4311E-01	273.69	547.39	0.00E+00	6.65E+01	1.33E+02	5.0000	6.566E+05
I-129	1.0618E-05	273.69	547.39	0.00E+00	2.91E-03	5.81E-03	7.0000	7.506E+04
Kr-85	5.9882E-01	273.69	547.39	0.00E+00	1.64E+02	3.28E+02	11.0000	8.582E+03
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	2.9808E+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		
Ti-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	3.84E-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		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		273.69	
Bounding		547.39	Nominal burnup taken from SFD and converted to MWd using BOL=78.198kg Bounding burnup assumed to be twice nominal burnup

Checks

Nominal Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
	0.10 0.21		2.74

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: HWCTR TWNT (U METAL) LEU
SNF ID #: 791
Fuel Units & Descr: 15 - TUBE
Heavy Metal Mass: BOL = ; EOL=321.82kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1964
Estimates as of: 2010
Template HFBR (Heavy Water, Zirc, 0 to 5%, U)
²Template 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	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.6920E-09	308,482.10	308,482.10	0.00E+00	1.45E-03	1.45E-03	Avg. MeV	
Am-241	2.2880E-02	308,482.10	308,482.10	0.00E+00	7.06E+03	7.06E+03	0.0150	2.152E+16
Am-242m	3.5400E-06	308,482.10	308,482.10	0.00E+00	1.09E+00	1.09E+00	0.0250	4.458E+15
Am-243	2.0580E-06	308,482.10	308,482.10	0.00E+00	6.35E-01	6.35E-01	0.0375	3.922E+15
C-14	1.1264E-03	308,482.10	308,482.10	0.00E+00	3.47E+02	3.47E+02	0.0575	4.246E+15
Cl-36	8.3760E-11	308,482.10	308,482.10	0.00E+00	2.58E-05	2.58E-05	0.0850	2.504E+15
Cm-243	5.0340E-07	308,482.10	308,482.10	0.00E+00	1.55E-01	1.55E-01	0.1250	1.652E+15
Cm-244	1.0450E-05	308,482.10	308,482.10	0.00E+00	3.22E+00	3.22E+00	0.2250	2.157E+15
Co-60	6.4420E-02	308,482.10	308,482.10	0.00E+00	1.99E+04	1.99E+04	0.3750	9.383E+14
Cs-134	7.9240E-06	308,482.10	308,482.10	0.00E+00	2.44E+00	2.44E+00	0.5750	1.642E+16
Cs-135	7.9140E-06	308,482.10	308,482.10	0.00E+00	2.44E+00	2.44E+00	0.8500	1.895E+14
Cs-137	1.4316E+00	308,482.10	308,482.10	0.00E+00	4.42E+05	4.42E+05	1.2500	1.562E+15
Eu-154	6.7900E-03	308,482.10	308,482.10	0.00E+00	2.09E+03	2.09E+03	1.7500	5.136E+12
Eu-155	6.2800E-04	308,482.10	308,482.10	0.00E+00	1.94E+02	1.94E+02	2.2500	8.227E+09
Fe-55	5.7480E-05	308,482.10	308,482.10	0.00E+00	1.77E+01	1.77E+01	2.7500	5.263E+08
H-3	2.3800E-02	308,482.10	308,482.10	0.00E+00	7.34E+03	7.34E+03	3.5000	1.587E+06
I-129	7.5020E-07	308,482.10	308,482.10	0.00E+00	2.31E-01	2.31E-01	5.0000	6.663E+05
Kr-85	3.8220E-02	308,482.10	308,482.10	0.00E+00	1.18E+04	1.18E+04	7.0000	7.495E+04
Np-237	5.5780E-06	308,482.10	308,482.10	0.00E+00	1.72E+00	1.72E+00	11.0000	8.505E+03
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-08	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		
Ti-208	4.6200E-08	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		308,482.10	Nominal burnup set equal to bounding burnup
Bounding		308,482.10	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	32.83		2.59
Bounding	32.83		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name 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
Fuel decay start date 1994
Estimates as of. 2010
Template ATR (Light Water Alum, 60 to 100%, U)
*Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 15 years

Estimated
Canister usage:
18"x10"
0.67

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	104.55	209.10	0.00E+00	4.79E-08	9.59E-08	Avg. MeV	
Am-241	1.7832E-03	104.55	209.10	0.00E+00	1.86E-01	3.73E-01	0.0150	2.494E+13
Am-242m	4.3410E-07	104.55	209.10	0.00E+00	4.54E-05	9.08E-05	0.0250	5.202E+12
Am-243	1.4907E-06	104.55	209.10	0.00E+00	1.56E-04	3.12E-04	0.0375	4.542E+12
C-14	5.7162E-09	104.55	209.10	0.00E+00	5.98E-07	1.20E-06	0.0575	4.844E+12
Cl-36	1.3124E-32	104.55	209.10	0.00E+00	1.37E-30	2.74E-30	0.0850	2.934E+12
Cm-243	1.8568E-07	104.55	209.10	0.00E+00	1.94E-05	3.88E-05	0.1250	2.012E+12
Cm-244	3.5512E-05	104.55	209.10	0.00E+00	3.71E-03	7.43E-03	0.2250	2.528E+12
Co-60	1.0261E-05	104.55	209.10	0.00E+00	1.07E-03	2.15E-03	0.3750	1.107E+12
Cs-134	1.6931E-02	104.55	209.10	0.00E+00	1.77E+00	3.54E+00	0.5750	1.797E+13
Cs-135	3.4477E-06	104.55	209.10	0.00E+00	3.60E-04	7.21E-04	0.8500	4.269E+11
Cs-137	2.2800E+00	104.55	209.10	0.00E+00	2.38E+02	4.77E+02	1.2500	2.157E+11
Eu-154	3.6656E-02	104.55	209.10	0.00E+00	3.83E+00	7.66E+00	1.7500	9.037E+09
Eu-155	9.6841E-03	104.55	209.10	0.00E+00	1.01E+00	2.02E+00	2.2500	1.131E+07
Fe-55	4.6977E-04	104.55	209.10	0.00E+00	4.91E-02	9.82E-02	2.7500	6.794E+05
H-3	6.0485E-03	104.55	209.10	0.00E+00	6.32E-01	1.26E+00	3.5000	4.318E+04
I-129	7.5300E-07	104.55	209.10	0.00E+00	7.87E-05	1.57E-04	5.0000	1.001E+02
Kr-85	1.4989E-01	104.55	209.10	0.00E+00	1.57E+01	3.13E+01	7.0000	1.108E+01
Np-237	9.5534E-06	104.55	209.10	0.00E+00	9.99E-04	2.00E-03	11.0000	1.244E+00
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93.20235261	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		104.55	
Bounding		209.10	

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

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.13		
Bounding	0.26		

Estimated EOL HM/Given EOL HM: 1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date

1996

Estimates as of:

2010

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

²Template Burnup(MWd):

367.2

Template BOL Heavy Metal Mass (MT):

0.00116689

Template Decay Time:

10 years

Estimated

Canister usage

18"x10"

0.21

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8404E-10	12.97	25.95	0.00E+00	3.69E-09	7.37E-09	Avg MeV	
Am-241	1.4935E-03	12.97	25.95	0.00E+00	1.94E-02	3.88E-02	0.0150	3.529E+12
Am-242m	4.4390E-07	12.97	25.95	0.00E+00	5.76E-06	1.15E-05	0.0250	7.427E+11
Am-243	1.4913E-06	12.97	25.95	0.00E+00	1.93E-05	3.87E-05	0.0375	6.475E+11
C-14	5.7217E-09	12.97	25.95	0.00E+00	7.42E-08	1.48E-07	0.0575	6.840E+11
Cl-36	1.3124E-32	12.97	25.95	0.00E+00	1.70E-31	3.41E-31	0.0850	4.162E+11
Cm-243	2.0667E-07	12.97	25.95	0.00E+00	2.72E-06	5.44E-06	0.1250	2.911E+11
Cm-244	4.3001E-05	12.97	25.95	0.00E+00	5.58E-04	1.12E-03	0.2250	3.574E+11
Co-60	1.9798E-05	12.97	25.95	0.00E+00	2.57E-04	5.14E-04	0.3750	1.602E+11
Cs-134	9.0795E-02	12.97	25.95	0.00E+00	1.18E+00	2.36E+00	0.5750	2.600E+12
Cs-135	3.4477E-06	12.97	25.95	0.00E+00	4.47E-05	8.95E-05	0.8500	1.268E+11
Cs-137	2.5588E+00	12.97	25.95	0.00E+00	3.32E+01	6.64E+01	1.2500	4.128E+10
Eu-154	5.4847E-02	12.97	25.95	0.00E+00	7.12E-01	1.42E+00	1.7500	1.507E+09
Eu-155	1.9469E-02	12.97	25.95	0.00E+00	2.53E-01	5.05E-01	2.2500	9.966E+07
Fe-55	1.7797E-03	12.97	25.95	0.00E+00	2.31E-02	4.62E-02	2.7500	1.391E+06
H-3	8.0065E-03	12.97	25.95	0.00E+00	1.04E-01	2.08E-01	3.5000	1.656E+05
I-129	7.5300E-07	12.97	25.95	0.00E+00	9.77E-06	1.95E-05	5.0000	1.381E+01
Kr-85	2.0705E-01	12.97	25.95	0.00E+00	2.69E+00	5.37E+00	7.0000	1.534E+00
Np-237	9.5507E-06	12.97	25.95	0.00E+00	1.24E-04	2.48E-04	11.0000	1.726E-01
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-08	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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and 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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IEA-R1 (UALX HEU) BRAZIL
SNF ID #: 954
Fuel Units & Descr: 43 - ASSEMBLY
Heavy Metal Mass: BOL=8.295kg EOL=4.975kg
ROD Storage Site: SRS

¹Fuel decay start date: 1998
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 10 years

Estimated
Canister usage
18"x10"
1 19

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ct/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8404E-10	3,143.73	6,287.45	0.00E+00	8.93E-07	1.79E-06	Avg MeV	
Am-241	1.4935E-03	3,143.73	6,287.45	0.00E+00	4.70E+00	9.39E+00	0.0150	8.551E+14
Am-242m	4.4390E-07	3,143.73	6,287.45	0.00E+00	1.40E-03	2.79E-03	0.0250	1.800E+14
Am-243	1.4913E-06	3,143.73	6,287.45	0.00E+00	4.69E-03	9.38E-03	0.0375	1.569E+14
C-14	5.7217E-09	3,143.73	6,287.45	0.00E+00	1.80E-05	3.60E-05	0.0575	1.657E+14
Cl-36	1.3124E-32	3,143.73	6,287.45	0.00E+00	4.13E-29	8.25E-29	0.0850	1.008E+14
Cm-243	2.0967E-07	3,143.73	6,287.45	0.00E+00	6.59E-04	1.32E-03	0.1250	7.054E+13
Cm-244	4.3001E-05	3,143.73	6,287.45	0.00E+00	1.35E-01	2.70E-01	0.2250	8.660E+13
Co-60	1.9798E-05	3,143.73	6,287.45	0.00E+00	6.22E-02	1.24E-01	0.3750	3.881E+13
Cs-134	9.0795E-02	3,143.73	6,287.45	0.00E+00	2.85E+02	5.71E+02	0.5750	6.301E+14
Cs-135	3.4477E-06	3,143.73	6,287.45	0.00E+00	1.08E-02	2.17E-02	0.8500	3.074E+13
Cs-137	2.5588E+00	3,143.73	6,287.45	0.00E+00	8.04E+03	1.61E+04	1.2500	1.000E+13
Eu-154	5.4847E-02	3,143.73	6,287.45	0.00E+00	1.72E+02	3.45E+02	1.7500	3.652E+11
Eu-155	1.9469E-02	3,143.73	6,287.45	0.00E+00	6.12E+01	1.22E+02	2.2500	2.415E+10
Fe-55	1.7797E-03	3,143.73	6,287.45	0.00E+00	5.59E+00	1.12E+01	2.7500	3.369E+08
H-3	8.0065E-03	3,143.73	6,287.45	0.00E+00	2.52E+01	5.03E+01	3.5000	4.012E+07
I-129	7.5300E-07	3,143.73	6,287.45	0.00E+00	2.37E-03	4.73E-03	5.0000	3.333E+03
Kr-85	2.0705E-01	3,143.73	6,287.45	0.00E+00	6.51E+02	1.30E+03	7.0000	3.703E+02
Np-237	9.5507E-06	3,143.73	6,287.45	0.00E+00	3.00E-02	6.00E-02	11.0000	4.166E+01
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		
Ti-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	Thermal Power	
U-233	2.1650E-09	3,143.73	6,287.45	0.00E+00	6.81E-06	1.36E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8399E-04	3,143.73	6,287.45	0.00E+00	5.78E-01	1.16E+00	9.95E+01	1.99E+02
U-235	-2.7235E-06	3,143.73	0.00	1.67E-02	8.13E-03	1.67E-02	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93.10655847	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		3.143.73	
Bounding		6,287.45	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	1.20		
Bounding	2.41		1.04

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IEA-R1 (UALX LEU) BRAZIL
SNF ID #: 545
Fuel Units & Descr: 84 - ASSEMBLY
Heavy Metal Mass: BOL=63 554kg EOL=61 732kg
ROD Storage Site: SRS

¹Fuel decay start date: 1998
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 10 years

Estimated
Canister usage:
18"x10"
3 50

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2 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
C-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-08	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		
Ti-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	Thermal Power	
U-234	1 8399E-04	1,726.23	3,452.45	0.00E+00	3 18E-01	6 35E-01	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
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	5 46E+01	1 09E+02
U-238	-4 2851E-09	1,726.23	0 00	1 72E-02	1 72E-02	1 72E-02	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	The Template was used for the following reasons
Fuel Cladding	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents	U	U	
BOL Enrichment %	19 66156126	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		1,726.23	Nominal burnup calculated from the heavy metal mass destroyed
Bounding		3 452.45	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0 09		1 00
Bounding	0 17		

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

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

¹Fuel decay start date 1998
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100% U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT) 0 00116689
Template Decay Time 10 years

Estimated
Canister usage:
18"x10"
1 63

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	2 8404E-10	801.46	1,602.93	0 00E+00	2.28E-07	4 55E-07	0 0150	2 180E+14
Am-241	1 4935E-03	801.46	1,602.93	0 00E+00	1.20E+00	2 39E+00	0 0250	4 588E+13
Am-242m	4 4390E-07	801.46	1,602.93	0 00E+00	3 56E-04	7 12E-04	0.0375	4 000E+13
Am-243	1 4913E-06	801.46	1,602.93	0 00E+00	1 20E-03	2 39E-03	0.0575	4.226E+13
C-14	5 7217E-09	801.46	1,602.93	0 00E+00	4 59E-06	9.17E-06	0 0850	2.571E+13
Cl-36	1.3124E-32	801.46	1,602.93	0 00E+00	1 05E-29	2.10E-29	0 1250	1 798E+13
Cm-243	2 0967E-07	801.46	1,602.93	0 00E+00	1 68E-04	3.36E-04	0.2250	2.208E+13
Cm-244	4 3001E-05	801.46	1,602.93	0 00E+00	3 45E-02	6 89E-02	0 3750	9.895E+12
Co-60	1 9798E-05	801.46	1,602.93	0 00E+00	1 59E-02	3 17E-02	0 5750	1 606E+14
Cs-134	9 0795E-02	801.46	1,602.93	0 00E+00	7.28E+01	1 46E+02	0 8500	7.836E+12
Cs-135	3 4477E-06	801.46	1,602.93	0 00E+00	2 76E-03	5 53E-03	1.2500	2.550E+12
Cs-137	2 5588E+00	801.46	1,602.93	0 00E+00	2 05E+03	4 10E+03	1.7500	9 312E+10
Eu-154	5 4847E-02	801.46	1,602.93	0 00E+00	4 40E+01	8 79E+01	2.2500	6 156E+09
Eu-155	1 9469E-02	801.46	1,602.93	0 00E+00	1 56E+01	3 12E+01	2.7500	8 590E+07
Fe-55	1 7797E-03	801.46	1,602.93	0 00E+00	1 43E+00	2 85E+00	3.5000	1 023E+07
H-3	8 0065E-03	801.46	1,602.93	0 00E+00	6 42E+00	1.28E+01	5 0000	8 679E+02
I-129	7.5300E-07	801.46	1,602.93	0 00E+00	6 03E-04	1.21E-03	7 0000	9 651E+01
Kr-85	2.0705E-01	801.46	1,602.93	0 00E+00	1 66E+02	3.32E+02	11 0000	1 086E+01
Np-237	9 5507E-06	801.46	1,602.93	0 00E+00	7 65E-03	1.53E-02		
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		
Ti-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	Thermal Power	
U-233	2 1650E-09	801.46	1,602.93	0 00E+00	1 74E-06	3 47E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
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	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences ¹
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %	19 66156126	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		801.46	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		1,602.93	Bounding burnup assumed to be twice nominal burnup

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: IOWA ST. UNIV (HEU UALX)
SNF ID #: 792
Fuel Units & Descr: 22 - FLAT PLATES IN CAN
Heavy Metal Mass: BOL=3 478kg; EOL=3 474kg
ROD Storage Site: SRS

¹Fuel decay start date: 1996
Estimates as of: 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT) 0 0016689
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
Cf-252	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		
Ti-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-06	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		

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 %	93.30981127	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		4 17	
Bounding ³		8 33	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0 00		
Bounding	0 01		1 00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name IOWA STATE UNIVERSITY (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

¹Fuel decay start date 1998
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100% U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 10 years

Estimated
Canister usage
18"x10"
0.67

II. Estimates							Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8404E-10	9.09	18.18	0.00E+00	2.58E-09	5.16E-09	Avg MeV	
Am-241	1.4935E-03	9.09	18.18	0.00E+00	1.36E-02	2.72E-02	0.0150	2.473E+12
Am-242m	4.4390E-07	9.09	18.18	0.00E+00	4.04E-06	8.07E-06	0.0250	5.204E+11
Am-243	1.4913E-06	9.09	18.18	0.00E+00	1.36E-05	2.71E-05	0.0375	4.537E+11
C-14	5.7217E-09	9.09	18.18	0.00E+00	5.20E-08	1.04E-07	0.0575	4.793E+11
Cl-36	1.3124E-32	9.09	18.18	0.00E+00	1.19E-31	2.39E-31	0.0850	2.916E+11
Cm-243	2.0967E-07	9.09	18.18	0.00E+00	1.91E-06	3.81E-06	0.1250	2.040E+11
Cm-244	4.3001E-05	9.09	18.18	0.00E+00	3.91E-04	7.82E-04	0.2250	2.506E+11
Co-60	1.9798E-05	9.09	18.18	0.00E+00	1.80E-04	3.60E-04	0.3750	1.122E+11
Cs-134	9.0795E-02	9.09	18.18	0.00E+00	8.25E-01	1.65E+00	0.5750	1.822E+12
Cs-135	3.4477E-06	9.09	18.18	0.00E+00	3.13E-05	6.27E-05	0.8500	8.889E+10
Cs-137	2.5588E+00	9.09	18.18	0.00E+00	2.33E+01	4.65E+01	1.2500	2.893E+10
Eu-154	5.4847E-02	9.09	18.18	0.00E+00	4.99E-01	9.97E-01	1.7500	1.056E+09
Eu-155	1.9469E-02	9.09	18.18	0.00E+00	1.77E-01	3.54E-01	2.2500	6.983E+09
Fe-55	1.7797E-03	9.09	18.18	0.00E+00	1.62E-02	3.24E-02	2.7500	9.745E+05
H-3	8.0065E-03	9.09	18.18	0.00E+00	7.28E-02	1.46E-01	3.5000	1.160E+05
I-129	7.5300E-07	9.09	18.18	0.00E+00	6.85E-06	1.37E-05	5.0000	2.161E+01
Kr-85	2.0705E-01	9.09	18.18	0.00E+00	1.88E+00	3.76E+00	7.0000	2.449E+00
Np-237	9.5507E-06	9.09	18.18	0.00E+00	8.68E-05	1.74E-04	11.0000	2.789E-01
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-08	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		
Ti-208	4.6705E-08	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	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-236	1.5493E-05	9.09	18.18	0.00E+00	1.41E-04	2.82E-04	2.88E-01	5.76E-01
U-238	-4.2851E-09	9.09	0.00	5.18E-03	5.18E-03	5.18E-03	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match
	LIGHT WATER ALUM U 19.76527712	LIGHT WATER ALUM U 60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
	0.02	9.09	
Nominal			
Bounding		18.18	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
	0.00	473.39	
Nominal			
Bounding	0.00		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JEN-1 (HEU UALX) SPAIN

SNF ID #: 795

Fuel Units & Descr: 23 - 16 CURVED PLATES

Heavy Metal Mass: BOL=4 002kg, EOL=3 783kg

ROD Storage Site: SRS

Fuel decay start date: 1995

Estimates as of: 2010

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

*Template Burnup(MWd): 367.2

Template BOL Heavy Metal Mass (MT): 0 00116689

Template Decay Time: 15 years

Estimated
Canister usage:

18"x10"

0 96

II. Estimates

	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4 5861E-10	206 92	413 85	0 00E+00	9 49E-08	1 90E-07	Avg MeV	
Am-241	1 7832E-03	206 92	413 85	0 00E+00	3 69E-01	7 38E-01	0 0150	4 937E+13
Am-242m	4 3410E-07	206 92	413 85	0 00E+00	8 98E-05	1 80E-04	0 0250	1 030E+13
Am-243	1 4907E-06	206 92	413 85	0 00E+00	3 08E-04	6 17E-04	0 0375	8 990E+12
C-14	5 7162E-09	206 92	413 85	0 00E+00	1 18E-06	2 37E-06	0 0575	9 586E+12
Cl-36	1 3124E-32	206 92	413 85	0 00E+00	2 72E-30	5 43E-30	0 0850	5 807E+12
Cm-243	1 8568E-07	206 92	413 85	0 00E+00	3 84E-05	7 68E-05	0 1250	3 981E+12
Cm-244	3 5512E-05	206 92	413 85	0 00E+00	7 35E-03	1 47E-02	0 2250	5 003E+12
Co-60	1 0261E-05	206 92	413 85	0 00E+00	2 12E-03	4 25E-03	0 3750	2 192E+12
Cs-134	1 6931E-02	206 92	413 85	0 00E+00	3 50E+00	7 01E+00	0 5750	3 557E+13
Cs-135	3 4477E-06	206 92	413 85	0 00E+00	7 13E-04	1 43E-03	0 8500	8 450E+11
Cs-137	2 2800E+00	206 92	413 85	0 00E+00	4 72E+02	9 44E+02	1 2500	4 268E+11
Eu-154	3 6656E-02	206 92	413 85	0 00E+00	7 58E+00	1 52E+01	1 7500	1 789E+10
Eu-155	9 6841E-03	206 92	413 85	0 00E+00	2 00E+00	4 01E+00	2 2500	2 237E+07
Fe-55	4 6977E-04	206 92	413 85	0 00E+00	9 72E-02	1 94E-01	2 7500	1 345E+06
H-3	6 0485E-03	206 92	413 85	0 00E+00	1 25E+00	2 50E+00	3 5000	8 547E+04
I-129	7 5300E-07	206 92	413 85	0 00E+00	1 56E-04	3 12E-04	5 0000	1 984E+02
Kr-85	1 4989E-01	206 92	413 85	0 00E+00	3 10E+01	6 20E+01	7 0000	2 198E+01
Np-237	9 5534E-06	206 92	413 85	0 00E+00	1 98E-03	3 95E-03	11 0000	2 468E+00
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-08	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		
Ti-208	4 6705E-08	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %	77 58892697	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		206 92	
Bounding		413 85	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 16		
Bounding	0 33		1 00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name JEN-1 (UALX LEU) SPAIN
SNF ID # 749

Fuel Units & Descr: 18 - 16 CURVED PLATES
Heavy Metal Mass: BOL=12.64kg EOL=12.447kg
ROD Storage Site SRS

Fuel decay start date 1995
Estimates as of 2010
Template ATR (Light Water Alum, 60 to 100%, U)
Template Burnup (MWd) 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time 15 years

Estimated
Canister usage:
18"x10"
0.75

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Avg MeV	
Ac-227	4.5861E-10	182.40	364.79	0.00E+00	8.36E-08	1.67E-07	0.0150	4.352E+13
Am-241	1.7832E-03	182.40	364.79	0.00E+00	3.25E-01	6.51E-01	0.0250	9.076E+12
Am-242m	4.3410E-07	182.40	364.79	0.00E+00	7.92E-05	1.58E-04	0.0375	7.925E+12
Am-243	1.4907E-06	182.40	364.79	0.00E+00	2.72E-04	5.44E-04	0.0575	8.450E+12
C-14	5.7162E-09	182.40	364.79	0.00E+00	1.04E-06	2.09E-06	0.0850	5.118E+12
Cl-36	1.3124E-32	182.40	364.79	0.00E+00	2.39E-30	4.79E-30	0.1250	3.509E+12
Cm-243	1.8568E-07	182.40	364.79	0.00E+00	3.39E-05	6.77E-05	0.2250	4.410E+12
Cm-244	3.5512E-05	182.40	364.79	0.00E+00	6.48E-03	1.30E-02	0.3750	1.932E+12
Co-60	1.0261E-05	182.40	364.79	0.00E+00	1.87E-03	3.74E-03	0.5750	3.136E+13
Cs-134	1.6931E-02	182.40	364.79	0.00E+00	3.09E+00	6.18E+00	0.8500	7.448E+11
Cs-135	3.4477E-06	182.40	364.79	0.00E+00	6.29E-04	1.26E-03	1.2500	3.762E+11
Cs-137	2.2800E+00	182.40	364.79	0.00E+00	4.16E+02	8.32E+02	1.7500	1.577E+10
Eu-154	3.6656E-02	182.40	364.79	0.00E+00	6.69E+00	1.34E+01	2.2500	1.972E+07
Eu-155	9.6841E-03	182.40	364.79	0.00E+00	1.77E+00	3.53E+00	2.7500	1.185E+06
Fe-55	4.6977E-04	182.40	364.79	0.00E+00	8.57E-02	1.71E-01	3.5000	7.536E+04
H-3	6.0485E-03	182.40	364.79	0.00E+00	1.10E+00	2.21E+00	5.0000	1.821E+02
I-129	7.5300E-07	182.40	364.79	0.00E+00	1.37E-04	2.75E-04	7.0000	2.020E+01
Kr-85	1.4989E-01	182.40	364.79	0.00E+00	2.73E+01	5.47E+01	11.0000	2.271E+00
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		
Ti-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

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19.22438767	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Nominal		182.40	
Bounding		364.79	

Checks

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

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: JMTR
SNF ID #: 507
Fuel Units & Descr: 574 - ASSEMBLY
Heavy Metal Mass: BOL=1176 7kg; EOL=1106 096kg
ROD Storage Site: SRS

¹Fuel decay start date: 1983
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100% U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 25 years

Estimated
Canister usage:
18"x10"
23.92

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-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
Ci-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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding	ALUM	ALUM	This fuel matches on all parameters except enrichment.
BOL HM Constituents:	U	U	
BOL Enrichment %:	20.00000029	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		66,861.47	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		133,722.93	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.18		1.00
Bounding	0.36		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JMTR (UALX 45% MEU) JAPAN
SNF ID #: 886
Fuel Units & Descr: 570 - MTR TYPE
Heavy Metal Mass: BOL=349 353kg EOL=323 646kg
ROD Storage Site: SRS

*Fuel decay start date: 1989
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100% U)
*Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
15 83

II. Estimates		m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	24,345 03	48,690 06	0.00E+00	1.61E-05	3.23E-05	0.0150	5.140E+15	
Am-241	2.0060E-03	24,345 03	48,690 06	0.00E+00	4.88E+01	9.77E+01	0.0250	1.069E+15	
Am-242m	4.2429E-07	24,345 03	48,690 06	0.00E+00	1.03E-02	2.07E-02	0.0375	9.322E+14	
Am-243	1.4899E-06	24,345 03	48,690 06	0.00E+00	3.63E-02	7.25E-02	0.0575	9.984E+14	
C-14	5.7135E-09	24,345 03	48,690 06	0.00E+00	1.39E-04	2.78E-04	0.0850	6.034E+14	
Cl-36	1.3124E-32	24,345 03	48,690 06	0.00E+00	3.19E-28	6.39E-28	0.1250	4.083E+14	
Cm-243	1.6443E-07	24,345 03	48,690 06	0.00E+00	4.00E-03	8.01E-03	0.2250	5.206E+14	
Cm-244	2.9330E-05	24,345 03	48,690 06	0.00E+00	7.14E-01	1.43E+00	0.3750	2.266E+14	
Co-60	5.3186E-06	24,345 03	48,690 06	0.00E+00	1.29E-01	2.59E-01	0.5750	3.697E+15	
Cs-134	3.1563E-03	24,345 03	48,690 06	0.00E+00	7.68E+01	1.54E+02	0.8500	6.250E+13	
Cs-135	3.4477E-06	24,345 03	48,690 06	0.00E+00	8.39E-02	1.68E-01	1.2500	3.569E+13	
Cs-137	2.0313E+00	24,345 03	48,690 06	0.00E+00	4.95E+04	9.89E+04	1.7500	1.638E+12	
Eu-154	2.4513E-02	24,345 03	48,690 06	0.00E+00	5.97E+02	1.19E+03	2.2500	1.437E+08	
Eu-155	4.8175E-03	24,345 03	48,690 06	0.00E+00	1.17E+02	2.35E+02	2.7500	8.123E+07	
Fe-55	1.2397E-04	24,345 03	48,690 06	0.00E+00	3.02E+00	6.04E+00	3.5000	3.735E+05	
H-3	4.5697E-03	24,345 03	48,690 06	0.00E+00	1.11E+02	2.22E+02	5.0000	2.124E+04	
I-129	7.5300E-07	24,345 03	48,690 06	0.00E+00	1.83E-02	3.67E-02	7.0000	2.346E+03	
Kr-85	1.0850E-01	24,345 03	48,690 06	0.00E+00	2.64E+03	5.28E+03	11.0000	2.630E+02	
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	6.06E-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			
Ti-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			

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
	LIGHT WATER	LIGHT WATER	
Reactor Moderator			This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %:	45.011	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		24,345 03	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding		48 690 06	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.22		1.00
Bounding	0.44		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 1989

Estimates as of: 2010

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

²Template Burnup(MWd): 367.2

Template BOL Heavy Metal Mass (MT): 0.00116689

Template Decay Time: 20 years

Estimated
Canister usage
18"x10"
4 22

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	6.794 30	13,588 59	0.00E+00	4.51E-06	9.01E-06	Avg MeV	
Am-241	2.0060E-03	6,794 30	13,588 59	0.00E+00	1.36E+01	2.73E+01	0.0150	1.434E+15
Am-242m	4.2429E-07	6,794 30	13,588 59	0.00E+00	2.88E-03	5.77E-03	0.0250	2.983E+14
Am-243	1.4899E-06	6,794 30	13,588 59	0.00E+00	1.01E-02	2.02E-02	0.0375	2.602E+14
C-14	5.7135E-09	6,794 30	13,588 59	0.00E+00	3.88E-05	7.76E-05	0.0575	2.786E+14
Cl-36	1.3124E-32	6,794 30	13,588 59	0.00E+00	8.92E-29	1.78E-28	0.0850	1.684E+14
Cm-243	1.6443E-07	6,794 30	13,588 59	0.00E+00	1.12E-03	2.23E-03	0.1250	1.139E+14
Cm-244	2.9330E-05	6,794 30	13,588 59	0.00E+00	1.99E-01	3.99E-01	0.2250	1.453E+14
Co-60	5.3186E-06	6,794 30	13,588 59	0.00E+00	3.61E-02	7.23E-02	0.3750	6.325E+13
Cs-134	3.1563E-03	6,794 30	13,588 59	0.00E+00	2.14E+01	4.29E+01	0.5750	1.032E+15
Cs-135	3.4477E-06	6,794 30	13,588 59	0.00E+00	2.34E-02	4.68E-02	0.8500	1.744E+13
Cs-137	2.0313E+00	6,794 30	13,588 59	0.00E+00	1.38E+04	2.76E+04	1.2500	9.959E+12
Eu-154	2.4513E-02	6,794 30	13,588 59	0.00E+00	1.67E+02	3.33E+02	1.7500	4.571E+11
Eu-155	4.8175E-03	6,794 30	13,588 59	0.00E+00	3.27E+01	6.55E+01	2.2500	4.010E+07
Fe-55	1.2397E-04	6,794 30	13,588 59	0.00E+00	8.42E-01	1.68E+00	2.7500	2.267E+07
H-3	4.5697E-03	6,794 30	13,588 59	0.00E+00	3.10E+01	6.21E+01	3.5000	1.041E+05
I-129	7.5300E-07	6,794 30	13,588 59	0.00E+00	5.12E-03	1.02E-02	5.0000	5.889E+03
Kr-85	1.0850E-01	6,794 30	13,588 59	0.00E+00	7.37E+02	1.47E+03	7.0000	6.502E+02
Np-237	9.5561E-06	6,794 30	13,588 59	0.00E+00	6.49E-02	1.30E-01	11.0000	7.287E+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		
Th-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-06	6,794 30	0.00	8.94E-02	7.09E-02	8.94E-02		
U-236	1.5493E-05	6,794 30	13,588 59	0.00E+00	1.05E-01	2.11E-01		
U-238	-4.2851E-09	6,794 30	0.00	1.02E-03	9.87E-04	1.02E-03		
Y-90	1.9254E+00	6,794 30	13,588 59	0.00E+00	1.31E+04	2.62E+04		
Other Radionuclides					1.31E+04	2.63E+04		

III. Template Selection Summary, Burnup Summary, and 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

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

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

¹Fuel decay start date 1989
Estimates as of 2010
Template HFBR (Heavy Water, Alum, 40 to 100%, U)
²Template Burnup(MWd) 164.6
Template BOL Heavy Metal Mass (MT) 0.000377
Template Decay Time³ 20 years

Estimated
Canister usage
18"x10"
4.00

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	3.1355E-10	7,122.71	14,245.41	0.00E+00	2.23E-06	4.47E-06	0.0150	1.506E+15
Am-241	8.0194E-03	7,122.71	14,245.41	0.00E+00	5.71E+01	1.14E+02	0.0250	3.104E+14
Am-242m	1.3694E-06	7,122.71	14,245.41	0.00E+00	9.75E-03	1.95E-02	0.0375	2.758E+14
Am-243	3.7096E-05	7,122.71	14,245.41	0.00E+00	2.64E-01	5.28E-01	0.0575	2.920E+14
C-14	2.6464E-08	7,122.71	14,245.41	0.00E+00	1.88E-04	3.77E-04	0.0850	1.768E+14
Cl-36	4.4411E-31	7,122.71	14,245.41	0.00E+00	3.17E-27	6.33E-27	0.1250	1.252E+14
Cm-243	5.7029E-06	7,122.71	14,245.41	0.00E+00	4.06E-02	8.12E-02	0.2250	1.521E+14
Cm-244	4.6555E-03	7,122.71	14,245.41	0.00E+00	3.32E+01	6.63E+01	0.3750	6.585E+13
Co-60	4.8663E-05	7,122.71	14,245.41	0.00E+00	3.47E-01	6.93E-01	0.5750	1.090E+15
Cs-134	1.0638E-02	7,122.71	14,245.41	0.00E+00	7.58E+01	1.52E+02	0.8500	2.854E+13
Cs-135	4.2564E-06	7,122.71	14,245.41	0.00E+00	3.03E-02	6.06E-02	1.2500	1.830E+13
Cs-137	2.0358E+00	7,122.71	14,245.41	0.00E+00	1.45E+04	2.90E+04	1.7500	7.051E+11
Eu-154	5.1956E-02	7,122.71	14,245.41	0.00E+00	3.70E+02	7.40E+02	2.2500	4.509E+07
Eu-155	1.4295E-02	7,122.71	14,245.41	0.00E+00	1.02E+02	2.04E+02	2.7500	2.638E+07
Fe-55	1.3560E-03	7,122.71	14,245.41	0.00E+00	9.66E+00	1.93E+01	3.5000	1.115E+06
H-3	4.6258E-03	7,122.71	14,245.41	0.00E+00	3.29E+01	6.59E+01	5.0000	4.286E+05
I-129	6.6403E-07	7,122.71	14,245.41	0.00E+00	4.73E-03	9.46E-03	7.0000	4.920E+04
Kr-85	1.0808E-01	7,122.71	14,245.41	0.00E+00	7.70E+02	1.54E+03	11.0000	5.638E+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	1.0647E-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		
Ti-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		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences
	HEAVY WATER	HEAVY WATER	
Reactor Moderator	HEAVY WATER	HEAVY WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	44.93930164	40 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		7,122.71	
Bounding		14,245.41	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.23		
Bounding	0.46		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JRR-3M (ULAX LEU)
 SNF ID #: 1056
 Fuel Units & Descr: 111 - 20 FLAT PLATES
 Heavy Metal Mass: BOL=165 701kg EOL=157 043kg
 ROD Storage Site: SRS
 Fuel decay start date: 1989
 Estimates as of: 2010
 Template: HFBR (Heavy Water, Alum, 10 to 20%, U)
 Template Burnup (MWd): 15
 Template BOL Heavy Metal Mass (MT): 0 00034251
 Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x10"
 4 63

II. Estimates							Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.5333E-10	8,229 12	16,458 25	0 00E+00	7 02E-06	1 40E-05	Avg MeV	
Am-241	2.2753E-02	8,229 12	16,458 25	0 00E+00	1 87E+02	3 74E+02	0 0150	1.668E+15
Am-242m	8 9133E-06	8,229 12	16,458 25	0.00E+00	7.33E-02	1.47E-01	0 0250	3 464E+14
Am-243	6 4007E-06	8,229 12	16,458 25	0 00E+00	5.27E-02	1.05E-01	0 0375	3 043E+14
C-14	2 9620E-08	8,229 12	16,458 25	0 00E+00	2 44E-04	4 87E-04	0 0575	3 278E+14
Cl-36	5 9513E-35	8,229 12	16,458 25	0 00E+00	4 90E-31	9 79E-31	0 0850	1 951E+14
Cm-243	2 2087E-06	8,229 12	16,458 25	0 00E+00	1 82E-02	3 64E-02	0 1250	1 314E+14
Cm-244	1 1007E-04	8,229 12	16,458 25	0 00E+00	9 06E-01	1 81E+00	0 2250	1 682E+14
Co-60	1 6340E-05	8,229 12	16,458 25	0 00E+00	1 34E-01	2 69E-01	0 3750	7 320E+13
Cs-134	2 1353E-03	8,229 12	16,458 25	0 00E+00	1 76E+01	3 51E+01	0 5750	1 242E+15
Cs-135	4 8607E-06	8,229 12	16,458 25	0 00E+00	4 00E-02	8 00E-02	0 8500	1 898E+13
Cs-137	2 0227E+00	8,229 12	16,458 25	0 00E+00	1 66E+04	3 33E+04	1 2500	1 069E+13
Eu-154	2 0887E-02	8,229 12	16,458 25	0 00E+00	1 72E+02	3 44E+02	1 7500	5 047E+11
Eu-155	4 0867E-03	8,229 12	16,458 25	0 00E+00	3 36E+01	6 73E+01	2 2500	4 733E+07
Fe-55	1 4167E-03	8,229 12	16,458 25	0 00E+00	1 17E+01	2 33E+01	2 7500	5 600E+06
H-3	4 6653E-03	8,229 12	16,458 25	0 00E+00	3 84E+01	7 68E+01	3 5000	2 270E+05
I-129	7 1600E-07	8,229 12	16,458 25	0 00E+00	5 89E-03	1 18E-02	5 0000	3 452E+04
Kr-85	1 0240E-01	8,229 12	16,458 25	0 00E+00	8 43E+02	1 69E+03	7 0000	3 906E+03
Np-237	3 7227E-06	8,229 12	16,458 25	0 00E+00	3 06E-02	6 13E-02	11 0000	4 445E+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		
Ti-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		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences
	HEAVY WATER	HEAVY WATER	
Reactor Moderator	HEAVY WATER	HEAVY WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19.837	10 to 20	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate
Nominal		8,229 12	
Bounding		16 458 25	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	1 13		
Bounding	2 27		1 01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: JRR-4 (U3Si2 LEU)
 SNF ID #: 1071
 Fuel Units & Descr: 47 - ASSEMBLY
 Heavy Metal Mass: BOL=47kg, EOL=44 655kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1989
 Estimates as of: 2010
 Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 20 years

Estimated
 Canister usage:
 18"x10"
 1.96

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg. MeV	
Ac-227	6.6313E-10	2,221.04	4,442.09	0.00E+00	1.47E-06	2.95E-06	0.0150	4.689E+14
Am-241	2.0060E-03	2,221.04	4,442.09	0.00E+00	4.46E+00	8.91E+00	0.0250	9.751E+13
Am-242m	4.2429E-07	2,221.04	4,442.09	0.00E+00	9.42E-04	1.88E-03	0.0375	8.505E+13
Am-243	1.4899E-06	2,221.04	4,442.09	0.00E+00	3.31E-03	6.62E-03	0.0575	9.109E+13
C-14	5.7135E-09	2,221.04	4,442.09	0.00E+00	1.27E-05	2.54E-05	0.0850	5.504E+13
Cl-36	1.3124E-32	2,221.04	4,442.09	0.00E+00	2.91E-29	5.83E-29	0.1250	3.725E+13
Cm-243	1.6443E-07	2,221.04	4,442.09	0.00E+00	3.65E-04	7.30E-04	0.2250	4.750E+13
Cm-244	2.9330E-05	2,221.04	4,442.09	0.00E+00	6.51E-02	1.30E-01	0.3750	2.068E+13
Co-60	5.3186E-06	2,221.04	4,442.09	0.00E+00	1.18E-02	2.36E-02	0.5750	3.373E+14
Cs-134	3.1563E-03	2,221.04	4,442.09	0.00E+00	7.01E+00	1.40E+01	0.8500	5.702E+12
Cs-135	3.4477E-06	2,221.04	4,442.09	0.00E+00	7.66E-03	1.53E-02	1.2500	3.256E+12
Cs-137	2.0313E+00	2,221.04	4,442.09	0.00E+00	4.51E+03	9.02E+03	1.7500	1.494E+11
Eu-154	2.4513E-02	2,221.04	4,442.09	0.00E+00	5.44E+01	1.09E+02	2.2500	1.311E+07
Eu-155	4.8175E-03	2,221.04	4,442.09	0.00E+00	1.07E+01	2.14E+01	2.7500	7.411E+06
Fe-55	1.2397E-04	2,221.04	4,442.09	0.00E+00	2.75E-01	5.51E-01	3.5000	3.411E+04
H-3	4.5697E-03	2,221.04	4,442.09	0.00E+00	1.01E+01	2.03E+01	5.0000	1.953E+03
I-129	7.5300E-07	2,221.04	4,442.09	0.00E+00	1.67E-03	3.34E-03	7.0000	2.158E+02
Kr-85	1.0850E-01	2,221.04	4,442.09	0.00E+00	2.41E+02	4.82E+02	11.0000	2.419E+01
Np-237	9.5561E-06	2,221.04	4,442.09	0.00E+00	2.12E-02	4.24E-02		
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		
Ti-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		
U-233	2.5825E-09	2,221.04	4,442.09	0.00E+00	5.74E-06	1.15E-05		
U-234	1.8450E-04	2,221.04	4,442.09	0.00E+00	4.10E-01	8.20E-01		
U-235	-2.7235E-06	2,221.04	0.00	2.03E-02	1.43E-02	2.03E-02		
U-236	1.5493E-05	2,221.04	4,442.09	0.00E+00	3.44E-02	6.88E-02		
U-238	-4.2851E-09	2,221.04	0.00	1.26E-02	1.26E-02	1.26E-02		
Y-90	1.9254E+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			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	20	60 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup.
	From SFD	Estimated	
Nominal:		2,221.04	
Bounding:		4,442.09	

Checks			Estimated EOL HM/Given EOL HM 1.00
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal:	0.15		
Bounding:	0.30		

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

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

¹Fuel decay start date 1989
Estimates as of 2010
Template: ATR (Light Water, Alum, 60 to 100% U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 20 years

Estimated
Canister usage
18"x10"
119

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6.6313E-10	1,266.45	2,532.90	0.00E+00	8.40E-07	1.68E-06	Avg MeV	
Am-241	2.0060E-03	1,266.45	2,532.90	0.00E+00	2.54E+00	5.08E+00	0.0150	2.674E+14
Am-242m	4.2429E-07	1,266.45	2,532.90	0.00E+00	5.37E-04	1.07E-03	0.0250	5.560E+13
Am-243	1.4899E-06	1,266.45	2,532.90	0.00E+00	1.89E-03	3.77E-03	0.0375	4.849E+13
C-14	5.7135E-09	1,266.45	2,532.90	0.00E+00	7.24E-06	1.45E-05	0.0575	5.194E+13
Cl-36	1.3124E-32	1,266.45	2,532.90	0.00E+00	1.66E-29	3.32E-29	0.0850	3.139E+13
Cm-243	1.6443E-07	1,266.45	2,532.90	0.00E+00	2.08E-04	4.16E-04	0.1250	2.124E+13
Cm-244	2.9330E-05	1,266.45	2,532.90	0.00E+00	3.71E-02	7.43E-02	0.2250	2.708E+13
Co-60	5.3186E-06	1,266.45	2,532.90	0.00E+00	6.74E-03	1.35E-02	0.3750	1.179E+13
Cs-134	3.1563E-03	1,266.45	2,532.90	0.00E+00	4.00E+00	7.99E+00	0.5750	1.923E+14
Cs-135	3.4477E-06	1,266.45	2,532.90	0.00E+00	4.37E-03	8.73E-03	0.8500	3.251E+12
Cs-137	2.0313E+00	1,266.45	2,532.90	0.00E+00	2.57E+03	5.15E+03	1.2500	1.856E+12
Eu-154	2.4513E-02	1,266.45	2,532.90	0.00E+00	3.10E+01	6.21E+01	1.7500	8.521E+10
Eu-155	4.8175E-03	1,266.45	2,532.90	0.00E+00	6.10E+00	1.22E+01	2.2500	7.474E+06
Fe-55	1.2397E-04	1,266.45	2,532.90	0.00E+00	1.57E-01	3.14E-01	2.7500	4.226E+06
H-3	4.5697E-03	1,266.45	2,532.90	0.00E+00	5.79E+00	1.16E+01	3.5000	1.941E+04
I-129	7.5300E-07	1,266.45	2,532.90	0.00E+00	9.54E-04	1.91E-03	5.0000	1.098E+03
Kr-85	1.0850E-01	1,266.45	2,532.90	0.00E+00	1.37E+02	2.75E+02	7.0000	1.212E+02
Np-237	9.5561E-06	1,266.45	2,532.90	0.00E+00	1.21E-02	2.42E-02	11.0000	1.358E+01
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		
Ti-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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
3.02E+01	6.04E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences ¹
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	93.03204799	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		1,266.45	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		2,532.90	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.52		1.01
Bounding	1.05		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 1989
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 20 years

Estimated
Canister usage:
18"x10"
0.31

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6 6313E-10	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+06
Fe-55	1 2397E-04	323 98	647 95	0 00E+00	4 02E-02	8 03E-02	2 7500	1 081E+06
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and 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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name KURR (JALX-HEU) JAPAN
SNF ID # 601
Fuel Units & Descr 240 - 18 CURVED PLATES
Heavy Metal Mass BOL=40.824kg EOL=33.48kg
ROD Storage Site SRS

Fuel decay start date 2006
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
*Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
6.67

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	6,954.91	13,909.82	0.00E+00	1.01E-06	2.02E-06	Avg MeV	
Am-241	1.1190E-03	6,954.91	13,909.82	0.00E+00	7.78E+00	1.56E+01	0.0150	2.684E+15
Am-242m	4.5425E-07	6,954.91	13,909.82	0.00E+00	3.16E-03	6.32E-03	0.0250	5.781E+14
Am-243	1.4921E-06	6,954.91	13,909.82	0.00E+00	1.04E-02	2.08E-02	0.0375	5.335E+14
C-14	5.7244E-09	6,954.91	13,909.82	0.00E+00	3.98E-05	7.96E-05	0.0575	5.246E+14
Cl-36	1.3124E-32	6,954.91	13,909.82	0.00E+00	9.13E-29	1.83E-28	0.0850	3.344E+14
Cm-243	2.3676E-07	6,954.91	13,909.82	0.00E+00	1.65E-03	3.29E-03	0.1250	2.896E+14
Cm-244	5.2042E-05	6,954.91	13,909.82	0.00E+00	3.62E-01	7.24E-01	0.2250	2.834E+14
Co-60	3.8208E-05	6,954.91	13,909.82	0.00E+00	2.66E-01	5.31E-01	0.3750	1.372E+14
Cs-134	4.8693E-01	6,954.91	13,909.82	0.00E+00	3.39E+03	6.77E+03	0.5750	1.885E+15
Cs-135	3.4477E-06	6,954.91	13,909.82	0.00E+00	2.40E-02	4.80E-02	0.8500	2.639E+14
Cs-137	2.8731E+00	6,954.91	13,909.82	0.00E+00	2.00E+04	4.00E+04	1.2500	4.910E+13
Eu-154	8.2053E-02	6,954.91	13,909.82	0.00E+00	5.71E+02	1.14E+03	1.7500	2.059E+12
Eu-155	3.9134E-02	6,954.91	13,909.82	0.00E+00	2.72E+02	5.44E+02	2.2500	4.319E+12
Fe-55	6.7429E-03	6,954.91	13,909.82	0.00E+00	4.69E+01	9.38E+01	2.7500	2.485E+10
H-3	1.0699E-02	6,954.91	13,909.82	0.00E+00	7.37E+01	1.47E+02	3.5000	2.756E+09
I-129	7.5300E-07	6,954.91	13,909.82	0.00E+00	5.24E-03	1.05E-02	5.0000	8.241E+03
Kr-85	2.8595E-01	6,954.91	13,909.82	0.00E+00	1.99E+03	3.98E+03	7.0000	9.187E+02
Np-237	9.5479E-06	6,954.91	13,909.82	0.00E+00	6.64E-02	1.33E-01	11.0000	1.036E+02
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
LIGHT WATER <td></td> <td>LIGHT WATER</td> <td></td>		LIGHT WATER	
Fuel Cladding: <td></td> <td>ALUM</td> <td></td>		ALUM	
BOL HM Constituents <td></td> <td>U</td> <td></td>		U	
BOL Enrichment %: <td>93.175</td> <td>60 to 100</td> <td></td>	93.175	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
6,954.91		6,954.91	Nominal burnup calculated from the heavy metal mass destroyed.
13,909.82		13,909.82	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/Given Burnup	
0.54			1.01
1.08			

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: LWR SAMPLES
SNF ID #: 134
Fuel Units & Descr: 5 - ROD
Heavy Metal Mass: BOL = , EOL=12.74kg
ROD Storage Site, INEEL

¹Fuel decay start date. 1966
Estimates as of: 2010
Template. (Worst Case)
²Template Burnup(MWd): 62.5
Template BOL Heavy Metal Mass (MT): 0.00186865
Template Decay Time: 35 years

Estimated
Canister usage
18"x15"
0.18

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	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+08
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-06	12,107.49	12,107.49	0.00E+00	2.12E-02	2.12E-02		
Th-230	5.8704E-06	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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		12,107.49	Nominal burnup set equal to bounding burnup.
Bounding		12,107.49	Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name MIT
SNF ID # 135
Fuel Units & Descr 525 - 15 FLAT PLATES
Heavy Metal Mass BOL=286.02kg EOL=232.68kg
ROD Storage Site SRS
Fuel decay start date 2035
Estimates as of 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
17.50

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	95,816.70	191,633.40	0.00E+00	1.39E-05	2.79E-05	0.0150	3.697E+16
Am-241	1.1190E-03	95,816.70	191,633.40	0.00E+00	1.07E+02	2.14E+02	0.0250	7.965E+15
Am-242m	4.5425E-07	95,816.70	191,633.40	0.00E+00	4.35E-02	8.70E-02	0.0375	7.350E+15
Am-243	1.4921E-06	95,816.70	191,633.40	0.00E+00	1.43E-01	2.86E-01	0.0575	7.227E+15
C-14	5.7244E-09	95,816.70	191,633.40	0.00E+00	5.48E-04	1.10E-03	0.0850	4.607E+15
Cl-36	1.3124E-32	95,816.70	191,633.40	0.00E+00	1.26E-27	2.51E-27	0.1250	3.990E+15
Cm-243	2.3678E-07	95,816.70	191,633.40	0.00E+00	4.99E+00	9.97E+00	0.2250	3.805E+15
Cm-244	5.2042E-05	95,816.70	191,633.40	0.00E+00	3.66E+00	7.32E+00	0.3750	1.890E+15
Co-60	3.8208E-05	95,816.70	191,633.40	0.00E+00	4.67E+04	9.33E+04	0.5750	2.596E+16
Cs-134	4.8693E-01	95,816.70	191,633.40	0.00E+00	3.30E-01	6.61E-01	0.8500	3.636E+15
Cs-135	3.4477E-06	95,816.70	191,633.40	0.00E+00	2.75E+05	5.51E+05	1.2500	6.765E+14
Cs-137	2.8731E+00	95,816.70	191,633.40	0.00E+00	7.86E+03	1.57E+04	1.7500	2.837E+13
Eu-154	8.2053E-02	95,816.70	191,633.40	0.00E+00	3.75E+03	7.50E+03	2.2500	5.950E+13
Eu-155	3.9134E-02	95,816.70	191,633.40	0.00E+00	6.46E+02	1.29E+03	2.7500	3.423E+11
Fe-55	6.7429E-03	95,816.70	191,633.40	0.00E+00	1.02E+03	2.03E+03	3.5000	3.797E+10
H-3	1.0599E-02	95,816.70	191,633.40	0.00E+00	7.21E-02	1.44E-01	5.0000	1.135E+05
I-129	7.5300E-07	95,816.70	191,633.40	0.00E+00	2.74E+04	5.48E+04	7.0000	1.265E+04
Kr-85	2.8595E-01	95,816.70	191,633.40	0.00E+00	9.15E-01	1.83E+00	11.0000	1.426E+03
Np-237	9.5479E-06	95,816.70	191,633.40	0.00E+00	8.56E-05	1.71E-04		
Pa-231	8.9297E-10	95,816.70	191,633.40	0.00E+00	3.60E-07	7.21E-07		
Pb-210	3.7609E-12	95,816.70	191,633.40	0.00E+00	2.44E+05	4.88E+05		
Pm-147	2.5452E+00	95,816.70	191,633.40	0.00E+00	1.97E+03	3.94E+03		
Pu-238	2.0550E-02	95,816.70	191,633.40	0.00E+00	4.10E+01	8.21E+01		
Pu-239	4.2838E-04	95,816.70	191,633.40	0.00E+00	2.34E+01	4.68E+01		
Pu-240	2.4401E-04	95,816.70	191,633.40	0.00E+00	6.59E+03	1.32E+04		
Pu-241	6.8764E-02	95,816.70	191,633.40	0.00E+00	3.48E-02	6.96E-02		
Pu-242	3.6329E-07	95,816.70	191,633.40	0.00E+00	3.65E-06	7.29E-06		
Ra-226	3.8045E-11	95,816.70	191,633.40	0.00E+00	2.87E-10	5.73E-10		
Ra-228	2.9902E-15	95,816.70	191,633.40	0.00E+00	1.83E+04	3.65E+04		
Ru-106	1.9055E-01	95,816.70	191,633.40	0.00E+00	1.24E+00	2.48E+00		
Se-79	1.2936E-05	95,816.70	191,633.40	0.00E+00	1.11E+00	2.22E+00		
Sn-126	1.1574E-05	95,816.70	191,633.40	0.00E+00	2.64E+05	5.27E+05		
Sr-90	2.7505E+00	95,816.70	191,633.40	0.00E+00	4.05E+01	8.09E+01		
Tc-99	4.2239E-04	95,816.70	191,633.40	0.00E+00	1.81E-07	3.61E-07		
Th-229	1.8848E-12	95,816.70	191,633.40	0.00E+00	1.63E-03	3.27E-03		
Th-230	1.7042E-08	95,816.70	191,633.40	0.00E+00	7.49E-10	1.50E-09		
Th-232	7.8132E-15	95,816.70	191,633.40	0.00E+00	4.22E-03	8.44E-03		
Th-208	4.4063E-08	95,816.70	191,633.40	0.00E+00	1.26E-02	2.52E-02		
U-232	1.3151E-07	95,816.70	191,633.40	0.00E+00	1.87E-04	3.75E-04		
U-233	1.9564E-09	95,816.70	191,633.40	0.00E+00	1.76E+01	3.52E+01		
U-234	1.8371E-04	95,816.70	0.00	5.76E-01	3.15E-01	5.76E-01		
U-235	-2.7235E-06	95,816.70	191,633.40	0.00E+00	1.48E+00	2.97E+00		
U-236	1.5493E-05	95,816.70	0.00	6.61E-03	6.20E-03	6.61E-03		
U-238	-4.2851E-09	95,816.70	191,633.40	0.00E+00	2.64E+05	5.27E+05		
Y-90	2.7505E+00	95,816.70	191,633.40	0.00E+00	4.93E+05	9.86E+05		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93.1245618	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate
	From SFD	Estimated	
Nominal	95,816.70	50,514.01	Nominal burnup taken directly from SFD (converted to MWd)
Bounding		191,633.40	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	1.06	0.53	0.82
Bounding	2.13		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name MIT
SNF ID #: 136
Fuel Units & Descr: 120 - 15 FLAT PLATES
Heavy Metal Mass BOL=65 46kg, EOL=43.032kg
ROD Storage Site: SRS

¹Fuel decay start date 1994
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 15 years

Estimated
Canister usage
18"x10"
4.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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+06
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and 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
Nominal		21,239.75
Bounding		42,479.50

Basis for burnup used in estimate:

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1.03	
Bounding	2.06	

Estimated EOL HM/Given EOL HM

1.03

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

²Total burnup for all fuel associated with this worksheet must be 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 (GCRC)
SNF ID #: 137
Fuel Units & Descr: 67 - 19 ROD ASSEMBLY
Heavy Metal Mass: BOL=58.625kg EOL=58.29kg
ROD Storage Site: INEEL
Fuel decay start date: 1965
Estimates as of: 2010
Template: Pathfinder (Light Water, SST, 60 to 100% U)
Template Burnup (MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 35 years

Estimated
Canister usage
18"x10"
372

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	316.46	632.91	0.00E+00	7.39E-06	1.48E-05	Avg MeV	
Am-241	1.1135E-04	316.46	632.91	0.00E+00	3.52E-02	7.05E-02	0.0150	4.724E+13
Am-242m	8.5075E-09	316.46	632.91	0.00E+00	2.69E-06	5.38E-06	0.0250	8.817E+12
Am-243	9.8519E-10	316.46	632.91	0.00E+00	3.12E-07	6.24E-07	0.0375	8.491E+12
C-14	2.3012E-04	316.46	632.91	0.00E+00	7.28E-02	1.46E-01	0.0575	9.152E+12
Cl-36	1.2261E-06	316.46	632.91	0.00E+00	3.88E-04	7.76E-04	0.0850	5.530E+12
Cm-243	2.4875E-10	316.46	632.91	0.00E+00	7.87E-08	1.57E-07	0.1250	3.591E+12
Cm-244	2.3178E-09	316.46	632.91	0.00E+00	7.33E-07	1.47E-06	0.2250	4.762E+12
Co-60	7.0849E-02	316.46	632.91	0.00E+00	2.24E+01	4.48E+01	0.3750	2.076E+12
Cs-134	3.0266E-06	316.46	632.91	0.00E+00	9.58E-04	1.92E-03	0.5750	3.420E+13
Cs-135	3.0316E-05	316.46	632.91	0.00E+00	9.59E-03	1.92E-02	0.8500	3.462E+11
Cs-137	1.4511E+00	316.46	632.91	0.00E+00	4.59E+02	9.18E+02	1.2500	3.441E+12
Eu-154	6.6955E-04	316.46	632.91	0.00E+00	2.12E-01	4.24E-01	1.7500	8.929E+09
Eu-155	6.9850E-04	316.46	632.91	0.00E+00	2.21E-01	4.42E-01	2.2500	1.854E+07
Fe-55	1.2318E-03	316.46	632.91	0.00E+00	3.90E-01	7.80E-01	2.7500	5.359E+05
H-3	2.5141E-03	316.46	632.91	0.00E+00	7.96E-01	1.59E+00	3.5000	4.872E+01
I-129	7.3195E-07	316.46	632.91	0.00E+00	2.32E-04	4.63E-04	5.0000	2.014E+01
Kr-85	4.1281E-02	316.46	632.91	0.00E+00	1.31E+01	2.61E+01	7.0000	2.234E+00
Np-237	1.1489E-06	316.46	632.91	0.00E+00	3.64E-04	7.27E-04	11.0000	2.514E-01
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		
Ti-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	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	3.8769E-07	316.46	632.91	0.00E+00	1.23E-04	2.45E-04	5.53E+00	1.11E+01
U-235	-2.7761E-06	316.46	0.00	1.18E-01	1.17E-01	1.18E-01	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
Reactor Moderator:	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons
BOL HM Constituents	HASTEALLOY	SST	This fuel matches on all parameters except cladding (SST is conservative)
BOL Enrichment %	U	U	
	93.143	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		316.46	Nominal burnup calculated from the heavy metal mass destroyed
Bounding		632.91	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.12		1.00
Bounding	0.23		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 2006
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
2 31

II. Estimates	m	x _m	x _b	b	y _m	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 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			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	93 11672336	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		4,118.78	
Bounding:		8 237.55	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.89		
Bounding:	1.77		1.02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name 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

¹Fuel decay start date 2006
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0.31

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	545.86	1,091.72	0.00E+00	7.94E-08	1.59E-07	Avg MeV	
Am-241	1.1190E-03	545.86	1,091.72	0.00E+00	6.11E-01	1.22E+00	0.0150	2.106E+14
Am-242m	4.5425E-07	545.86	1,091.72	0.00E+00	2.48E-04	4.96E-04	0.0250	4.538E+13
Am-243	1.4921E-06	545.86	1,091.72	0.00E+00	8.14E-04	1.63E-03	0.0375	4.187E+13
C-14	5.7244E-09	545.86	1,091.72	0.00E+00	3.12E-06	6.25E-06	0.0575	4.117E+13
Cl-36	1.3124E-32	545.86	1,091.72	0.00E+00	7.16E-30	1.43E-29	0.0850	2.625E+13
Cm-243	2.3676E-07	545.86	1,091.72	0.00E+00	1.29E-04	2.58E-04	0.1250	2.273E+13
Cm-244	5.2042E-05	545.86	1,091.72	0.00E+00	2.84E-02	5.68E-02	0.2250	2.225E+13
Co-60	3.8208E-05	545.86	1,091.72	0.00E+00	2.09E-02	4.17E-02	0.3750	1.077E+13
Cs-134	4.8693E-01	545.86	1,091.72	0.00E+00	2.66E+02	5.32E+02	0.5750	1.479E+14
Cs-135	3.4477E-06	545.86	1,091.72	0.00E+00	1.88E-03	3.76E-03	0.8500	2.071E+13
Cs-137	2.8731E+00	545.86	1,091.72	0.00E+00	1.57E+03	3.14E+03	1.2500	3.854E+12
Eu-154	8.2053E-02	545.86	1,091.72	0.00E+00	4.48E+01	8.96E+01	1.7500	1.616E+11
Eu-155	3.9134E-02	545.86	1,091.72	0.00E+00	2.14E+01	4.27E+01	2.2500	3.390E+11
Fe-55	6.7429E-03	545.86	1,091.72	0.00E+00	3.68E+00	7.36E+00	2.7500	1.950E+09
H-3	1.0599E-02	545.86	1,091.72	0.00E+00	5.79E+00	1.16E+01	3.5000	2.163E+08
I-129	7.5300E-07	545.86	1,091.72	0.00E+00	4.11E-04	8.22E-04	5.0000	6.467E+02
Kr-85	2.8595E-01	545.86	1,091.72	0.00E+00	1.56E+02	3.12E+02	7.0000	7.209E+01
Np-237	9.5479E-06	545.86	1,091.72	0.00E+00	5.21E-03	1.04E-02	11.0000	8.126E+00
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		
Ti-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	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8371E-04	545.86	1,091.72	0.00E+00	1.00E-01	2.01E-01	2.77E+01	5.54E+01
U-235	-2.7235E-06	545.86	0.00	3.94E-03	2.46E-03	3.94E-03	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and 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

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

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

¹Fuel decay start date: 2035
Estimates as of 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time 5 years

Estimated
Canister usage:
18"x10"
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) ³	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	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+05
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-06	97,941.50	195,883.01	0.00E+00	9.35E-01	1.87E+00	11.0000	1.458E+03
Pa-231	8.9297E-10	97,941.50	195,883.01	0.00E+00	8.75E-05	1.75E-04		
Pb-210	3.7609E-12	97,941.50	195,883.01	0.00E+00	3.68E-07	7.37E-07		
Pm-147	2.5452E+00	97,941.50	195,883.01	0.00E+00	2.49E+05	4.99E+05		
Pu-238	2.0550E-02	97,941.50	195,883.01	0.00E+00	2.01E+03	4.03E+03		
Pu-239	4.2838E-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		
Th-208	4.4063E-08	97,941.50	195,883.01	0.00E+00	4.32E-03	8.63E-03		
U-232	1.3151E-07	97,941.50	195,883.01	0.00E+00	1.29E-02	2.58E-02		
U-233	1.9564E-09	97,941.50	195,883.01	0.00E+00	1.92E-04	3.83E-04		
U-234	1.8371E-04	97,941.50	195,883.01	0.00E+00	1.80E+01	3.60E+01		
U-235	-2.7235E-06	97,941.50	0.00	1.63E+00	1.36E+00	1.63E+00		
U-236	1.5493E-05	97,941.50	195,883.01	0.00E+00	1.52E+00	3.03E+00		
U-238	-4.2851E-09	97,941.50	0.00	1.83E-02	1.79E-02	1.83E-02		
Y-90	2.7505E+00	97,941.50	195,883.01	0.00E+00	2.69E+05	5.39E+05		
Other Radionuclides					5.04E+05	1.01E+06		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93.26113117	60 to 100	

Burnup Summary (MWd)³

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		97,941.50	
Bounding		195,883.01	

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.39		
Bounding:	0.77		

1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name MURR (ULAX HEU) COLUMBIA
SNF ID # 143
Fuel Units & Descr: 312 - 24 CURVED PLATES
Heavy Metal Mass BOL=259 022kg EOL=213 065kg
ROD Storage Site SRS
Fuel decay start date 1990
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT) 0 00116689
Template Decay Time: 20 years

Estimated
Canister usage
18"x10"
13 00

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	6 6313E-10	43,522 74	87,045 48	0 00E+00	2 89E-05	5 77E-05	Avg MeV	
Am-241	2 0060E-03	43,522 74	87,045 48	0 00E+00	8 73E+01	1 75E+02	0 0150	9 188E+15
Am-242m	4 2429E-07	43,522 74	87,045 48	0 00E+00	1 85E-02	3 69E-02	0 0250	1 911E+15
Am-243	1 4899E-06	43,522 74	87,045 48	0 00E+00	6 48E-02	1 30E-01	0 0375	1 667E+15
C-14	5 7135E-09	43,522 74	87,045 48	0 00E+00	2 49E-04	4 97E-04	0 0575	1 785E+15
Cl-36	1 3124E-32	43,522 74	87,045 48	0 00E+00	5 71E-28	1 14E-27	0 0850	1 079E+15
Cm-243	1 6443E-07	43,522 74	87,045 48	0 00E+00	7 16E-03	1 43E-02	0 1250	7 299E+14
Cm-244	2 9330E-05	43,522 74	87,045 48	0 00E+00	1 28E+00	2 55E+00	0 2250	9 307E+14
Co-60	5 3186E-06	43,522 74	87,045 48	0 00E+00	2 31E-01	4 63E-01	0 3750	4 051E+14
Cs-134	3 1563E-03	43,522 74	87,045 48	0 00E+00	1 37E+02	2 75E+02	0 5750	6 609E+15
Cs-135	3 4477E-06	43,522 74	87,045 48	0 00E+00	1 50E-01	3 00E-01	0 8500	1 117E+14
Cs-137	2 0313E+00	43,522 74	87,045 48	0 00E+00	8 84E+04	1 77E+05	1 2500	6 380E+13
Eu-154	2 4513E-02	43,522 74	87,045 48	0 00E+00	1 07E+03	2 13E+03	1 7500	2 928E+12
Eu-155	4 8175E-03	43,522 74	87,045 48	0 00E+00	2 10E+02	4 19E+02	2 2500	2 569E+08
Fe-55	1 2397E-04	43,522 74	87,045 48	0 00E+00	5 40E+00	1 08E+01	2 7500	1 452E+08
H-3	4 5697E-03	43,522 74	87,045 48	0 00E+00	1 99E+02	3 98E+02	3 5000	6 671E+05
I-129	7 5300E-07	43,522 74	87,045 48	0 00E+00	3 28E-02	6 55E-02	5 0000	3 772E+04
Kr-85	1 0850E-01	43,522 74	87,045 48	0 00E+00	4 72E+03	9 44E+03	7 0000	4 165E+03
Np-237	9 5561E-06	43,522 74	87,045 48	0 00E+00	4 16E-01	8 32E-01	11 0000	4 668E+02
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		
Th-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	93 137	60 to 100	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		43,522.74	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		87,045 48	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0 53		1 01
Bounding	1 07		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: N S SAVANNAH (UO2)
SNF ID #: 854
Fuel Units & Descr: 12 - UNKNOWN
Heavy Metal Mass: BOL= , EOL=21 09kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1963
Estimates as of: 2010
Template: PWR (Light Water, Zirc 0 to 5%, U)
²Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT): 0.00176911
Template Decay Time*: 35 years

Estimated
Canister usage
18"x10"
12.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CvMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	8.7758E-10	31.68	31.68	0.00E+00	2.78E-08	2.78E-08	Avg MeV	
Am-241	1.4352E-01	31.68	31.68	0.00E+00	4.55E+00	4.55E+00	0.0150	1.705E+12
Am-242m	2.8698E-04	31.68	31.68	0.00E+00	9.09E-03	9.09E-03	0.0250	3.438E+11
Am-243	6.2565E-04	31.68	31.68	0.00E+00	1.98E-02	1.98E-02	0.0375	3.279E+11
C-14	4.7901E-05	31.68	31.68	0.00E+00	1.52E-03	1.52E-03	0.0575	3.789E+11
Cl-36	8.0297E-07	31.68	31.68	0.00E+00	2.54E-05	2.54E-05	0.0850	1.908E+11
Cm-243	2.5081E-04	31.68	31.68	0.00E+00	7.95E-03	7.95E-03	0.1250	1.324E+11
Cm-244	4.9015E-02	31.68	31.68	0.00E+00	1.55E+00	1.55E+00	0.2250	1.636E+11
Co-60	2.5581E-03	31.68	31.68	0.00E+00	8.11E-02	8.11E-02	0.3750	7.034E+10
Cs-134	4.0536E-05	31.68	31.68	0.00E+00	1.28E-03	1.28E-03	0.5750	1.636E+12
Cs-135	1.4433E-05	31.68	31.68	0.00E+00	4.57E-04	4.57E-04	0.8500	2.263E+10
Cs-137	1.3979E+00	31.68	31.68	0.00E+00	4.43E+01	4.43E+01	1.2500	2.223E+10
Eu-154	2.0203E-02	31.68	31.68	0.00E+00	6.40E-01	6.40E-01	1.7500	6.658E+08
Eu-155	1.7684E-03	31.68	31.68	0.00E+00	5.60E-02	5.60E-02	2.2500	1.073E+05
Fe-55	4.3136E-05	31.68	31.68	0.00E+00	1.37E-03	1.37E-03	2.7500	2.197E+05
H-3	2.0769E-02	31.68	31.68	0.00E+00	6.58E-01	6.58E-01	3.5000	2.265E+04
I-129	9.8288E-07	31.68	31.68	0.00E+00	3.11E-05	3.11E-05	5.0000	9.684E+03
Kr-85	2.8214E-02	31.68	31.68	0.00E+00	8.94E-01	8.94E-01	7.0000	1.116E+03
Np-237	1.1218E-05	31.68	31.68	0.00E+00	3.55E-04	3.55E-04	11.0000	1.282E+02
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		
Ti-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		

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)³

	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

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

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

¹Fuel decay start date 1982
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100% U)
²Template Burnup(MWd)- 367.2
Template BOL Heavy Metal Mass (MT)- 0.00116689
Template Decay Time- 25 years

Estimated
Canister usage
18"x10"
1.92

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.1465E-09	21.27	42.53	0.00E+00	2.44E-08	4.88E-08	Avg MeV	
Am-241	2.3056E-03	21.27	42.53	0.00E+00	4.90E-02	9.81E-02	0.0150	3.981E+12
Am-242m	4.1476E-07	21.27	42.53	0.00E+00	8.82E-06	1.76E-05	0.0250	8.268E+11
Am-243	1.4894E-06	21.27	42.53	0.00E+00	3.17E-05	6.33E-05	0.0375	7.200E+11
C-14	5.7108E-09	21.27	42.53	0.00E+00	1.21E-07	2.43E-07	0.0575	7.732E+11
Cl-36	1.3124E-32	21.27	42.53	0.00E+00	2.79E-31	5.58E-31	0.0850	4.667E+11
Cm-243	1.4562E-07	21.27	42.53	0.00E+00	3.10E-06	6.19E-06	0.1250	3.129E+11
Cm-244	2.4221E-05	21.27	42.53	0.00E+00	5.15E-04	1.03E-03	0.2250	4.042E+11
Co-60	2.7560E-06	21.27	42.53	0.00E+00	5.86E-05	1.17E-04	0.3750	1.751E+11
Cs-134	5.8851E-04	21.27	42.53	0.00E+00	1.25E-02	2.50E-02	0.5750	2.871E+12
Cs-135	3.4477E-06	21.27	42.53	0.00E+00	7.33E-05	1.47E-04	0.8500	4.137E+10
Cs-137	1.8099E+00	21.27	42.53	0.00E+00	3.85E+01	7.70E+01	1.2500	2.300E+10
Eu-154	1.6386E-02	21.27	42.53	0.00E+00	3.48E-01	6.97E-01	1.7500	1.137E+09
Eu-155	2.3957E-03	21.27	42.53	0.00E+00	5.09E-02	1.02E-01	2.2500	8.102E+04
Fe-55	3.2707E-05	21.27	42.53	0.00E+00	6.96E-04	1.39E-03	2.7500	6.633E+04
H-3	3.4504E-03	21.27	42.53	0.00E+00	7.34E-02	1.47E-01	3.5000	5.622E+01
I-129	7.5300E-07	21.27	42.53	0.00E+00	1.60E-05	3.20E-05	5.0000	1.943E+01
Kr-85	7.8540E-02	21.27	42.53	0.00E+00	1.67E+00	3.34E+00	7.0000	2.144E+00
Np-237	9.5615E-06	21.27	42.53	0.00E+00	2.03E-04	4.07E-04	11.0000	2.403E-01
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate
Nominal		21.27	Nominal burnup taken from SFD and converted to MWd using BOL=35.442kg
Bounding		42.53	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.00		0.98
Bounding	0.00		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: NIST
 SNF ID #: 154
 Fuel Units & Descr: 980 - 17 CURVED PLATES
 Heavy Metal Mass: BOL=367 5kg, EOL=159 74kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1997
 Estimates as of: 2010
 Template: HFBR (Heavy Water, Alum, 40 to 100%, U)
²Template Burnup(MWd): 164 6
 Template BOL Heavy Metal Mass (MT): 0 000377
 Template Decay Time: 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		
Ti-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		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator	From SFD	Used	Basis for Parameter Differences:
Fuel Cladding	HEAVY WATER	HEAVY WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	93.33333333	40 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	191,368 36	191,368 36	
Bounding	190 365 00	338,505 35	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	Estimated EOL HM/Given EOL HM
Nominal	1.19		
Bounding	2.11	1.78	1.03

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name NIST (U308 HEU)
 SNF ID #: 752
 Fuel Units & Descr: 420 - 17 CURVED PLATES
 Heavy Metal Mass BOL=72 156kg EOL=33 894kg
 ROD Storage Site SRS

¹Fuel decay start date 1997
 Estimates as of: 2010
 Template HFBR (Heavy Water, Alum, 40 to 100%, U)
²Template Burnup(MWd) 164.6
 Template BOL Heavy Metal Mass (MT) 0.000377
 Template Decay Time 10 years

Estimated
 Canister usage
 18"x10"
 11.67

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1.3262E-10	35,243.24	66,463.11	0.00E+00	4.67E-06	8.81E-06	0.0150	9.084E+15
Am-241	5.9611E-03	35,243.24	66,463.11	0.00E+00	2.10E+02	3.96E+02	0.0250	1.893E+15
Am-242m	1.4332E-06	35,243.24	66,463.11	0.00E+00	5.05E-02	9.53E-02	0.0375	1.713E+15
Am-243	3.7132E-05	35,243.24	66,463.11	0.00E+00	1.31E+00	2.47E+00	0.0575	1.763E+15
C-14	2.6501E-08	35,243.24	66,463.11	0.00E+00	9.34E-04	1.76E-03	0.0850	1.092E+15
Cl-36	4.4441E-31	35,243.24	66,463.11	0.00E+00	1.57E-26	2.95E-26	0.1250	8.199E+14
Cm-243	7.2722E-06	35,243.24	66,463.11	0.00E+00	2.56E-01	4.83E-01	0.2250	9.219E+14
Cm-244	6.8226E-03	35,243.24	66,463.11	0.00E+00	2.40E+02	4.53E+02	0.3750	4.073E+14
Co-60	1.8117E-04	35,243.24	66,463.11	0.00E+00	6.38E+00	1.20E+01	0.5750	7.358E+15
Cs-134	3.0595E-01	35,243.24	66,463.11	0.00E+00	1.08E+04	2.03E+04	0.8500	8.629E+14
Cs-135	4.2564E-06	35,243.24	66,463.11	0.00E+00	1.50E-01	2.83E-01	1.2500	2.169E+14
Cs-137	2.5650E+00	35,243.24	66,463.11	0.00E+00	9.04E+04	1.70E+05	1.7500	6.245E+12
Eu-154	1.1628E-01	35,243.24	66,463.11	0.00E+00	4.10E+03	7.73E+03	2.2500	2.734E+11
Eu-155	5.7776E-02	35,243.24	66,463.11	0.00E+00	2.04E+03	3.84E+03	2.7500	4.085E+09
Fe-55	1.9465E-02	35,243.24	66,463.11	0.00E+00	6.86E+02	1.29E+03	3.5000	4.958E+08
H-3	8.1045E-03	35,243.24	66,463.11	0.00E+00	2.86E+02	5.39E+02	5.0000	2.877E+06
I-129	6.6403E-07	35,243.24	66,463.11	0.00E+00	2.34E-02	4.41E-02	7.0000	3.306E+05
Kr-85	2.0620E-01	35,243.24	66,463.11	0.00E+00	7.27E+03	1.37E+04	11.0000	3.791E+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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator: Fuel Cladding: BOL HM Constituents: BOL Enrichment %	From SFD	Used	
	HEAVY WATER	HEAVY WATER	
	ALUM	ALUM	
	U	U	
	93.17430199	40 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
	43.29	35,243.24	
Bounding:		66,463.11	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup calculated assuming all BOL heavy metal burned.

Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	1.12	814.05	
Bounding	2.11		1.02

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

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

Fuel Radionuclide Inventory Worksheet

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

¹Fuel decay start date: 1995
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367 2
 Template BOL Heavy Metal Mass (MT): 0 00116689
 Template Decay Time: 15 years

Estimated
 Canister usage:
 18"x10"
 0 67

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CvMWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg. MeV	
Ac-227	4.5861E-10	64 59	129 19	0 00E+00	2 96E-08	5 92E-08	0 0150	1 541E+13
Am-241	1 7832E-03	64 59	129 19	0 00E+00	1 15E-01	2 30E-01	0 0250	3 214E+12
Am-242m	4 3410E-07	64 59	129 19	0 00E+00	2 80E-05	5 61E-05	0 0375	2 806E+12
Am-243	1 4907E-06	64 59	129 19	0 00E+00	9 63E-05	1 93E-04	0 0575	2 993E+12
C-14	5 7162E-09	64 59	129 19	0 00E+00	3 69E-07	7 38E-07	0 0850	1 813E+12
Cl-36	1 3124E-32	64 59	129 19	0 00E+00	8 48E-31	1 70E-30	0 1250	1 243E+12
Cm-243	1 8568E-07	64 59	129 19	0 00E+00	1 20E-05	2 40E-05	0 2250	1 562E+12
Cm-244	3 5512E-05	64 59	129 19	0 00E+00	2 29E-03	4 59E-03	0 3750	6 841E+11
Co-60	1 0261E-05	64 59	129 19	0 00E+00	6 63E-04	1 33E-03	0 5750	1 110E+13
Cs-134	1 6931E-02	64 59	129 19	0 00E+00	1 09E+00	2 19E+00	0 8500	2 638E+11
Cs-135	3 4477E-06	64 59	129 19	0 00E+00	2 23E-04	4 45E-04	1 2500	1 332E+11
Cs-137	2 2800E+00	64 59	129 19	0 00E+00	1 47E+02	2 95E+02	1 7500	5 583E+09
Eu-154	3 6656E-02	64 59	129 19	0 00E+00	2 37E+00	4 74E+00	2 2500	6 985E+06
Eu-155	9 6841E-03	64 59	129 19	0 00E+00	6 26E-01	1 25E+00	2 7500	4 198E+05
Fe-55	4 6977E-04	64 59	129 19	0 00E+00	3 03E-02	6 07E-02	3 5000	2 668E+04
H-3	6 0485E-03	64 59	129 19	0 00E+00	3 91E-01	7 81E-01	5 0000	6 196E+01
I-129	7 5300E-07	64 59	129 19	0 00E+00	4 86E-05	9 73E-05	7 0000	6 862E+00
Kr-85	1 4989E-01	64 59	129 19	0 00E+00	9 68E+00	1 94E+01	11 0000	7 706E-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		
Th-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		

III. Template Selection Summary, Burnup Summary, and 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

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

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

¹Fuel decay start date 2035
 Estimates as of 2010
 Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT) 0.00116689
 Template Decay Time 5 years

Estimated
 Canister usage
 18"x10"
 125

II. Estimates							Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	495.31	990.62	0.00E+00	7.20E-08	1.44E-07	Avg MeV	
Am-241	1.1190E-03	495.31	990.62	0.00E+00	5.54E-01	1.11E+00	0.0150	1.911E+14
Am-242m	4.5425E-07	495.31	990.62	0.00E+00	2.25E-04	4.50E-04	0.0250	4.117E+13
Am-243	1.4921E-06	495.31	990.62	0.00E+00	7.39E-04	1.48E-03	0.0375	3.799E+13
C-14	5.7244E-09	495.31	990.62	0.00E+00	2.84E-06	5.67E-06	0.0575	3.736E+13
Ct-36	1.3124E-32	495.31	990.62	0.00E+00	6.50E-30	1.30E-29	0.0850	2.382E+13
Cm-243	2.3676E-07	495.31	990.62	0.00E+00	1.17E-04	2.35E-04	0.1250	2.063E+13
Cm-244	5.2042E-05	495.31	990.62	0.00E+00	2.58E-02	5.16E-02	0.2250	2.019E+13
Co-60	3.8208E-05	495.31	990.62	0.00E+00	1.89E-02	3.78E-02	0.3750	9.771E+12
Cs-134	4.8693E-01	495.31	990.62	0.00E+00	2.41E+02	4.82E+02	0.5750	1.342E+14
Cs-135	3.4477E-06	495.31	990.62	0.00E+00	1.71E-03	3.42E-03	0.8500	1.880E+13
Cs-137	2.8731E+00	495.31	990.62	0.00E+00	1.42E+03	2.85E+03	1.2500	3.497E+12
Eu-154	8.2053E-02	495.31	990.62	0.00E+00	4.06E+01	8.13E+01	1.7500	1.466E+11
Eu-155	3.9134E-02	495.31	990.62	0.00E+00	1.94E+01	3.88E+01	2.2500	3.076E+11
Fe-55	6.7429E-03	495.31	990.62	0.00E+00	3.34E+00	6.68E+00	2.7500	1.770E+09
H-3	1.0599E-02	495.31	990.62	0.00E+00	5.25E+00	1.05E+01	3.5000	1.963E+08
I-129	7.5300E-07	495.31	990.62	0.00E+00	3.73E-04	7.46E-04	5.0000	6.030E+02
Kr-85	2.8595E-01	495.31	990.62	0.00E+00	1.42E+02	2.83E+02	7.0000	6.728E+01
Np-237	9.5479E-06	495.31	990.62	0.00E+00	4.73E-03	9.46E-03	11.0000	7.588E+00
Pa-231	8.9297E-10	495.31	990.62	0.00E+00	4.42E-07	8.85E-07		
Pb-210	3.7609E-12	495.31	990.62	0.00E+00	1.86E-09	3.73E-09		
Pm-147	2.5452E+00	495.31	990.62	0.00E+00	1.26E+03	2.52E+03		
Pu-238	2.0550E-02	495.31	990.62	0.00E+00	1.02E+01	2.04E+01		
Pu-239	4.2838E-04	495.31	990.62	0.00E+00	2.12E-01	4.24E-01		
Pu-240	2.4401E-04	495.31	990.62	0.00E+00	1.21E-01	2.42E-01		
Pu-241	6.8764E-02	495.31	990.62	0.00E+00	3.41E+01	6.81E+01		
Pu-242	3.6329E-07	495.31	990.62	0.00E+00	1.80E-04	3.60E-04		
Ra-226	3.8045E-11	495.31	990.62	0.00E+00	1.88E-08	3.77E-08		
Ra-228	2.9902E-15	495.31	990.62	0.00E+00	1.48E-12	2.96E-12		
Ru-106	1.9055E-01	495.31	990.62	0.00E+00	9.44E+01	1.89E+02		
Se-79	1.2936E-05	495.31	990.62	0.00E+00	6.41E-03	1.28E-02		
Sn-126	1.1574E-05	495.31	990.62	0.00E+00	5.73E-03	1.15E-02		
Sr-90	2.7505E+00	495.31	990.62	0.00E+00	1.36E+03	2.72E+03		
Tc-99	4.2239E-04	495.31	990.62	0.00E+00	2.09E-01	4.18E-01		
Th-229	1.8848E-12	495.31	990.62	0.00E+00	9.34E-10	1.87E-09		
Th-230	1.7042E-08	495.31	990.62	0.00E+00	8.44E-06	1.69E-05		
Th-232	7.8132E-15	495.31	990.62	0.00E+00	3.87E-12	7.74E-12		
Th-208	4.4063E-08	495.31	990.62	0.00E+00	2.18E-05	4.36E-05		
U-232	1.3151E-07	495.31	990.62	0.00E+00	6.51E-05	1.30E-04		
U-233	1.9564E-09	495.31	990.62	0.00E+00	9.69E-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19.76578383	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup assumed to be 2% of BOL heavy metal mass Bounding burnup assumed to be twice nominal burnup
	From SFD	Estimated	
Nominal		495.31	
Bounding		990.62	

Checks			Estimated EOL HM/Given EOL HM 0.98
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.06		
Bounding	0.12		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 1992

Estimates as of: 2010

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

²Template Burnup(MWd): 367.2

Template BOL Heavy Metal Mass (MT): 0.00116689

Template Decay Time: 15 years

Estimated

Canister usage:

18"x10"

0.67

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-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		
Ti-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		

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 %:	93.1372549	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:	848.64	700.04	
Bounding:	1,021.63	1,400.07	

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

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.83	0.82	
Bounding	0.99	1.37	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

Fuel decay start date
Estimates as of

1992

2010

Template

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

*Template Burnup(MWd):

367.2

Template BOL Heavy Metal Mass (MT)

0.00116689

Template Decay Time

15 years

Estimated
Canister usage
18"x10"
1 83

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	4.5861E-10	3,665.55	4,475.50	0.00E+00	1.68E-06	2.05E-06	Avg MeV	
Am-241	1.7832E-03	3,665.55	4,475.50	0.00E+00	6.54E+00	7.98E+00	0.0150	5.339E+14
Am-242m	4.3410E-07	3,665.55	4,475.50	0.00E+00	1.59E-03	1.94E-03	0.0250	1.113E+14
Am-243	1.4907E-06	3,665.55	4,475.50	0.00E+00	5.46E-03	6.67E-03	0.0375	9.722E+13
C-14	5.7162E-09	3,665.55	4,475.50	0.00E+00	2.10E-05	2.56E-05	0.0575	1.037E+14
Cl-36	1.3124E-32	3,665.55	4,475.50	0.00E+00	4.81E-29	5.87E-29	0.0850	6.279E+13
Cm-243	1.8568E-07	3,665.55	4,475.50	0.00E+00	6.81E-04	8.31E-04	0.1250	4.305E+13
Cm-244	3.5512E-05	3,665.55	4,475.50	0.00E+00	1.30E-01	1.59E-01	0.2250	5.410E+13
Co-60	1.0261E-05	3,665.55	4,475.50	0.00E+00	3.76E-02	4.59E-02	0.3750	2.370E+13
Cs-134	1.6931E-02	3,665.55	4,475.50	0.00E+00	6.21E+01	7.58E+01	0.5750	3.847E+14
Cs-135	3.4477E-06	3,665.55	4,475.50	0.00E+00	1.26E-02	1.54E-02	0.8500	9.138E+12
Cs-137	2.2800E+00	3,665.55	4,475.50	0.00E+00	8.36E+03	1.02E+04	1.2500	4.616E+12
Eu-154	3.6656E-02	3,665.55	4,475.50	0.00E+00	1.34E+02	1.64E+02	1.7500	1.934E+11
Eu-155	9.6841E-03	3,665.55	4,475.50	0.00E+00	3.55E+01	4.33E+01	2.2500	2.420E+08
Fe-55	4.6977E-04	3,665.55	4,475.50	0.00E+00	1.72E+00	2.10E+00	2.7500	1.454E+07
H-3	6.0485E-03	3,665.55	4,475.50	0.00E+00	2.22E+01	2.71E+01	3.5000	9.243E+05
I-129	7.5300E-07	3,665.55	4,475.50	0.00E+00	2.76E-03	3.37E-03	5.0000	2.138E+03
Kr-85	1.4989E-01	3,665.55	4,475.50	0.00E+00	5.49E+02	6.71E+02	7.0000	2.368E+02
Np-237	9.5534E-06	3,665.55	4,475.50	0.00E+00	3.50E-02	4.28E-02	11.0000	2.659E+01
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	4.2638E-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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93.22033898	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate
	From SFD	Estimated	
Nominal	3,665.55	2,954.32	Nominal burnup taken directly from SFD (converted to MWd)
Bounding	4,475.50	5,908.64	Bounding burnup taken directly from SFD (converted to MWd)

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	1.12	0.81	0.93
Bounding	1.37	1.32	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 1992
 Estimates as of: 2010

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

²Template Burnup(MWd): 367.2

Template BOL Heavy Metal Mass (MT): 0.00116689

Template Decay Time: 15 years

Estimated
 Canister usage
 18"x10"
 113

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	1.559 25	2.949 75	0.00E+00	7.15E-07	1.35E-06	Avg MeV	
Am-241	1.7832E-03	1.559 25	2.949 75	0.00E+00	2.78E+00	5.26E+00	0.0150	3.519E+14
Am-242m	4.3410E-07	1.559 25	2.949 75	0.00E+00	6.77E-04	1.28E-03	0.0250	7.339E+13
Am-243	1.4907E-06	1.559 25	2.949 75	0.00E+00	2.32E-03	4.40E-03	0.0375	6.408E+13
C-14	5.7162E-09	1.559 25	2.949 75	0.00E+00	8.91E-06	1.69E-05	0.0575	6.833E+13
Cl-36	1.3124E-32	1.559 25	2.949 75	0.00E+00	2.05E-29	3.87E-29	0.0850	4.139E+13
Cm-243	1.8568E-07	1.559 25	2.949 75	0.00E+00	2.90E-04	5.48E-04	0.1250	2.838E+13
Cm-244	3.5512E-05	1.559 25	2.949 75	0.00E+00	5.54E-02	1.05E-01	0.2250	3.566E+13
Co-60	1.0261E-05	1.559 25	2.949 75	0.00E+00	1.60E-02	3.03E-02	0.3750	1.562E+13
Cs-134	1.6931E-02	1.559 25	2.949 75	0.00E+00	2.64E+01	4.99E+01	0.5750	2.535E+14
Cs-135	3.4477E-06	1.559 25	2.949 75	0.00E+00	5.38E-03	1.02E-02	0.8500	6.023E+12
Cs-137	2.2800E+00	1.559 25	2.949 75	0.00E+00	3.56E+03	6.73E+03	1.2500	3.042E+12
Eu-154	3.6656E-02	1.559 25	2.949 75	0.00E+00	5.72E+01	1.08E+02	1.7500	1.275E+11
Eu-155	9.6841E-03	1.559 25	2.949 75	0.00E+00	1.51E+01	2.86E+01	2.2500	1.595E+08
Fe-55	4.6977E-04	1.559 25	2.949 75	0.00E+00	7.32E-01	1.39E+00	2.7500	9.584E+06
H-3	6.0485E-03	1.559 25	2.949 75	0.00E+00	9.43E+00	1.78E+01	3.5000	6.092E+05
I-129	7.5300E-07	1.559 25	2.949 75	0.00E+00	1.17E-03	2.22E-03	5.0000	1.409E+03
Kr-85	1.4989E-01	1.559 25	2.949 75	0.00E+00	2.34E+02	4.42E+02	7.0000	1.561E+02
Np-237	9.5534E-06	1.559 25	2.949 75	0.00E+00	1.49E-02	2.82E-02	11.0000	1.752E+01
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	Basis for Parameter Differences:
	LIGHT WATER	LIGHT WATER	
	ALUM	ALUM	
	U	U	
	93.048	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
	1.559 25	1.467 69	
Nominal			Nominal burnup taken directly from SFD (converted to MWd).
Bounding	2.949 75	2.935 38	Bounding burnup taken directly from SFD (converted to MWd).

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
	0.73	0.94	
Nominal			1.00
Bounding	1.39	1.00	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name ORR (U308 HEU)
SNF ID # 903

Fuel Units & Descr: 97 - 19 CURVED PLATES

Heavy Metal Mass: BOL=29 643kg EOL=20 777kg

ROD Storage Site SRS

Fuel decay start date 1966

Estimates as of 2010

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

Template Burnup(MWd) 367.2

Template BOL Heavy Metal Mass (MT) 0 00116689

Template Decay Time 35 years

Estimated
Canister usage
18"x10"
2 69

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	2 0068E-09	8,396 08	16,792 17	0 00E+00	1 68E-05	3 37E-05	0 0150	1.237E+15
Am-241	2 5251E-03	8,396 08	16,792 17	0 00E+00	2 12E+01	4 24E+01	0 0250	2.568E+14
Am-242m	3 9624E-07	8,396 08	16,792 17	0 00E+00	3 33E-03	6 65E-03	0 0375	2.232E+14
Am-243	1 4880E-06	8,396 08	16,792 17	0 00E+00	1.25E-02	2.50E-02	0 0575	2.403E+14
C-14	5 7053E-09	8,396 08	16,792 17	0 00E+00	4 79E-05	9.58E-05	0 0850	1.448E+14
Cl-36	1.3124E-32	8,396 08	16,792 17	0 00E+00	1 10E-28	2.20E-28	0 1250	9.562E+13
Cm-243	1.1419E-07	8,396 08	16,792 17	0 00E+00	9 59E-04	1 92E-03	0.2250	1.250E+14
Cm-244	1 6522E-05	8,396 08	16,792 17	0 00E+00	1 39E-01	2 77E-01	0 3750	5.437E+13
Co-60	7 4047E-07	8,396 08	16,792 17	0 00E+00	6 22E-03	1 24E-02	0 5750	8.986E+14
Cs-134	2 0455E-05	8,396 08	16,792 17	0 00E+00	1 72E-01	3 43E-01	0 8500	1.098E+13
Cs-135	3 4477E-06	8,396 08	16,792 17	0 00E+00	2 89E-02	5 79E-02	1.2500	5.309E+12
Cs-137	1 4365E+00	8,396 08	16,792 17	0 00E+00	1.21E+04	2 41E+04	1.7500	2.988E+11
Eu-154	7.3230E-03	8,396 08	16,792 17	0 00E+00	6 15E+01	1.23E+02	2.2500	2.498E+07
Eu-155	5 9259E-04	8,396 08	16,792 17	0 00E+00	4 98E+00	9 95E+00	2.7500	2.384E+07
Fe-55	2.2791E-06	8,396 08	16,792 17	0 00E+00	1 91E-02	3 83E-02	3 5000	1.381E+04
H-3	1 9698E-03	8,396 08	16,792 17	0 00E+00	1 65E+01	3 31E+01	5 0000	5.645E+03
I-129	7.5300E-07	8,396 08	16,792 17	0 00E+00	6 32E-03	1 26E-02	7 0000	6.177E+02
Kr-85	4 1176E-02	8,396 08	16,792 17	0 00E+00	3 46E+02	6 91E+02	11 0000	6.897E+01
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		
Ti-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

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1.41E+02	2.61E+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 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
ROD Storage Site: SRS

¹Fuel decay start date: 1966
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated
Canister usage
18"x10"
0.11

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+06
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		
Ti-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		
U-233	3.6275E-09	386.76	678.07	0.00E+00	1.40E-06	2.46E-06		
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		
U-238	-4.2851E-09	386.76	0.00	1.61E-05	1.45E-05	1.61E-05		
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			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding:	LIGHT WATER	LIGHT WATER	
BOL HM Constituents:	ALUM	ALUM	
BOL Enrichment %:	U	U	
	93.29608939	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		386.76	
Bounding		678.07	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup calculated assuming all BOL heavy metal burned.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	1.72		
Bounding	3.01		1.06

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name 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

Fuel decay start date 1987
 Estimates as of 2010
 Template* ATR (Light Water Alum, 60 to 100%, U)
 *Template Burnup(MWd) 367.2
 Template BOL Heavy Metal Mass (MT) 0.00116689
 Template Decay Time 20 years

Estimated
 Canister usage
 18"x10"
 1.44

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	6.6313E-10	4,412.35	8,824.71	0.00E+00	2.93E-06	5.85E-06	Avg MeV	
Am-241	2.0060E-03	4,412.35	8,824.71	0.00E+00	8.85E+00	1.77E+01	0.0150	9.315E+14
Am-242m	4.2429E-07	4,412.35	8,824.71	0.00E+00	1.87E-03	3.74E-03	0.0250	1.937E+14
Am-243	1.4899E-06	4,412.35	8,824.71	0.00E+00	6.57E-03	1.31E-02	0.0375	1.690E+14
C-14	5.7135E-09	4,412.35	8,824.71	0.00E+00	2.52E-05	5.04E-05	0.0575	1.810E+14
Cf-252	1.3124E-32	4,412.35	8,824.71	0.00E+00	5.79E-29	1.16E-28	0.0850	1.094E+14
Cm-243	1.6443E-07	4,412.35	8,824.71	0.00E+00	7.26E-04	1.45E-03	0.1250	7.400E+13
Cm-244	2.9330E-05	4,412.35	8,824.71	0.00E+00	1.29E-01	2.59E-01	0.2250	9.436E+13
Co-60	5.3186E-06	4,412.35	8,824.71	0.00E+00	2.35E-02	4.69E-02	0.3750	4.107E+13
Cs-134	3.1563E-03	4,412.35	8,824.71	0.00E+00	1.39E+01	2.79E+01	0.5750	6.700E+14
Cs-135	3.4477E-06	4,412.35	8,824.71	0.00E+00	1.52E-02	3.04E-02	0.8500	1.133E+13
Cs-137	2.0313E+00	4,412.35	8,824.71	0.00E+00	8.96E+03	1.79E+04	1.2500	6.468E+12
Eu-154	2.4513E-02	4,412.35	8,824.71	0.00E+00	1.08E+02	2.16E+02	1.7500	2.969E+11
Eu-155	4.8175E-03	4,412.35	8,824.71	0.00E+00	2.13E+01	4.25E+01	2.2500	2.604E+07
Fe-55	1.2397E-04	4,412.35	8,824.71	0.00E+00	5.47E-01	1.09E+00	2.7500	1.472E+07
H-3	4.5697E-03	4,412.35	8,824.71	0.00E+00	2.02E+01	4.03E+01	3.5000	6.775E+04
I-129	7.5300E-07	4,412.35	8,824.71	0.00E+00	3.32E-03	6.64E-03	5.0000	3.877E+03
Kr-85	1.0850E-01	4,412.35	8,824.71	0.00E+00	4.79E+02	9.57E+02	7.0000	4.283E+02
Np-237	9.5561E-06	4,412.35	8,824.71	0.00E+00	4.22E-02	8.43E-02	11.0000	4.802E+01
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons
Fuel Cladding	ALUM	ALUM	This fuel matches on all parameters except enrichment.
BOL HM Constituents	U	U	
BOL Enrichment %	20.03831236	60 to 100	

Burnup Summary (MWd) ¹			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal		4,412.35	Nominal burnup calculated from the heavy metal mass destroyed
Bounding		8,824.71	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.16		1.00
Bounding	0.32		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ORR (U3Si2 LEU)
SNF ID #: 850
Fuel Units & Descr: 11 - ASSEMBLY
Heavy Metal Mass: BOL=11 076kg, EOL=9 908kg
ROD Storage Site: SRS

¹Fuel decay start date: 1966
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 35 years

Estimated
Canister usage
18"x10"
0.31

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	1,106.31	2,212.62	0.00E+00	2.22E-06	4.44E-06	Avg. MeV	
Am-241	2.5251E-03	1,106.31	2,212.62	0.00E+00	2.79E+00	5.59E+00	0.0150	1.630E+14
Am-242m	3.9624E-07	1,106.31	2,212.62	0.00E+00	4.38E-04	8.77E-04	0.0250	3.384E+13
Am-243	1.4880E-06	1,106.31	2,212.62	0.00E+00	1.65E-03	3.29E-03	0.0375	2.941E+13
C-14	5.7053E-09	1,106.31	2,212.62	0.00E+00	6.31E-06	1.26E-05	0.0575	3.166E+13
Cl-36	1.3124E-32	1,106.31	2,212.62	0.00E+00	1.45E-29	2.90E-29	0.0850	1.908E+13
Cm-243	1.1419E-07	1,106.31	2,212.62	0.00E+00	1.26E-04	2.53E-04	0.1250	1.260E+13
Cm-244	1.6522E-05	1,106.31	2,212.62	0.00E+00	1.83E-02	3.66E-02	0.2250	1.647E+13
Co-60	7.4047E-07	1,106.31	2,212.62	0.00E+00	8.19E-04	1.64E-03	0.3750	7.164E+12
Cs-134	2.0455E-05	1,106.31	2,212.62	0.00E+00	2.26E-02	4.53E-02	0.5750	1.184E+14
Cs-135	3.4477E-06	1,106.31	2,212.62	0.00E+00	3.81E-03	7.63E-03	0.8500	1.446E+12
Cs-137	1.4365E+00	1,106.31	2,212.62	0.00E+00	1.59E+03	3.18E+03	1.2500	6.995E+11
Eu-154	7.3230E-03	1,106.31	2,212.62	0.00E+00	8.10E+00	1.62E+01	1.7500	3.937E+10
Eu-155	5.9259E-04	1,106.31	2,212.62	0.00E+00	6.56E-01	1.31E+00	2.2500	3.292E+06
Fe-55	2.2791E-06	1,106.31	2,212.62	0.00E+00	2.52E-03	5.04E-03	2.7500	3.142E+06
H-3	1.9698E-03	1,106.31	2,212.62	0.00E+00	2.18E+00	4.36E+00	3.5000	1.836E+03
I-129	7.5300E-07	1,106.31	2,212.62	0.00E+00	8.33E-04	1.67E-03	5.0000	7.504E+02
Kr-85	4.1756E-02	1,106.31	2,212.62	0.00E+00	4.56E+01	9.11E+01	7.0000	8.216E+01
Np-237	9.5752E-06	1,106.31	2,212.62	0.00E+00	1.06E-02	2.12E-02	11.0000	9.163E+00
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		
Th-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons. This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ALUM	ALUM	
	U	U	
	19.81328831	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Nominal Bounding	From SFD	Estimated	
		1.106.31 2.212.62	

Checks			Estimated EOL HM/Given EOL HM 1.01
Nominal Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0.32 0.63		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

Fuel decay start date: 1987
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100% U)
 *Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 20 years

Estimated
 Canister usage
 18"x10"
 1.38

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	6.6313E-10	2,731.39	5,462.79	0.00E+00	1.81E-06	3.62E-06	Avg MeV	
Am-241	2.0060E-03	2,731.39	5,462.79	0.00E+00	5.48E+00	1.10E+01	0.0150	5.76E+14
Am-242m	4.2429E-07	2,731.39	5,462.79	0.00E+00	1.16E-03	2.32E-03	0.0250	1.199E+14
Am-243	1.4899E-06	2,731.39	5,462.79	0.00E+00	4.07E-03	8.14E-03	0.0375	1.046E+14
C-14	5.7135E-09	2,731.39	5,462.79	0.00E+00	1.56E-05	3.12E-05	0.0575	1.120E+14
Cf-252	1.3124E-32	2,731.39	5,462.79	0.00E+00	3.58E-29	7.17E-29	0.0850	6.769E+13
Cm-243	1.6443E-07	2,731.39	5,462.79	0.00E+00	4.49E-04	8.98E-04	0.1250	4.581E+13
Cm-244	2.9330E-05	2,731.39	5,462.79	0.00E+00	8.01E-02	1.60E-01	0.2250	5.841E+13
Co-60	5.3186E-06	2,731.39	5,462.79	0.00E+00	1.45E-02	2.91E-02	0.3750	2.543E+13
Cs-134	3.1563E-03	2,731.39	5,462.79	0.00E+00	8.62E+00	1.72E+01	0.5750	4.147E+14
Cs-135	3.4477E-06	2,731.39	5,462.79	0.00E+00	9.42E-03	1.88E-02	0.8500	7.012E+12
Cs-137	2.0313E+00	2,731.39	5,462.79	0.00E+00	5.55E+03	1.11E+04	1.2500	4.004E+12
Eu-154	2.4513E-02	2,731.39	5,462.79	0.00E+00	6.70E+01	1.34E+02	1.7500	1.838E+11
Eu-155	4.8175E-03	2,731.39	5,462.79	0.00E+00	1.32E+01	2.63E+01	2.2500	1.612E+07
Fe-55	1.2397E-04	2,731.39	5,462.79	0.00E+00	3.39E-01	6.77E-01	2.7500	9.113E+06
H-3	4.5697E-03	2,731.39	5,462.79	0.00E+00	1.25E+01	2.50E+01	3.5000	4.195E+04
I-129	7.5300E-07	2,731.39	5,462.79	0.00E+00	2.06E-03	4.11E-03	5.0000	2.401E+03
Kr-85	1.0850E-01	2,731.39	5,462.79	0.00E+00	2.96E+02	5.93E+02	7.0000	2.653E+02
Np-237	9.5561E-06	2,731.39	5,462.79	0.00E+00	2.61E-02	5.22E-02	11.0000	2.974E+01
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		
Th-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
	From SFD	Used	
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19.818	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate*
	From SFD	Estimated	
Nominal		2,731.39	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding		5,462.79	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.15		1.00
Bounding	0.31		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ORR SPECIAL

SNF ID #: 163

Fuel Units & Descr: 11 - 19 CURVED PLATES

Heavy Metal Mass: BOL=22.045kg; EOL=18.48kg

ROD Storage Site: SRS

¹Fuel decay start date: 1966

Estimates as of: 2010

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

²Template Burnup(MWd): 367.2

Template BOL Heavy Metal Mass (MT): 0.00116689

Template Decay Time: 35 years

Estimated

Canister usage

18"x10"

0.31

II. Estimates

	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.0068E-09	3,376.22	6,752.44	0.00E+00	6.78E-06	1.36E-05	Avg MeV	
Am-241	2.5251E-03	3,376.22	6,752.44	0.00E+00	8.53E+00	1.71E+01	0.0150	4.973E+14
Am-242m	3.9624E-07	3,376.22	6,752.44	0.00E+00	1.34E-03	2.68E-03	0.0250	1.033E+14
Am-243	1.4880E-06	3,376.22	6,752.44	0.00E+00	5.02E-03	1.00E-02	0.0375	8.976E+13
C-14	5.7053E-09	3,376.22	6,752.44	0.00E+00	1.93E-05	3.85E-05	0.0575	9.662E+13
Cl-36	1.3124E-32	3,376.22	6,752.44	0.00E+00	4.43E-29	8.86E-29	0.0850	5.821E+13
Cm-243	1.1419E-07	3,376.22	6,752.44	0.00E+00	3.86E-04	7.71E-04	0.1250	3.845E+13
Cm-244	1.6522E-05	3,376.22	6,752.44	0.00E+00	5.58E-02	1.12E-01	0.2250	5.026E+13
Co-60	7.4047E-07	3,376.22	6,752.44	0.00E+00	2.50E-03	5.00E-03	0.3750	2.186E+13
Cs-134	2.0455E-05	3,376.22	6,752.44	0.00E+00	6.91E-02	1.38E-01	0.5750	3.613E+14
Cs-135	3.4477E-06	3,376.22	6,752.44	0.00E+00	1.16E-02	2.33E-02	0.8500	4.414E+12
Cs-137	1.4365E+00	3,376.22	6,752.44	0.00E+00	4.85E+03	9.70E+03	1.2500	2.135E+12
Eu-154	7.3230E-03	3,376.22	6,752.44	0.00E+00	2.47E+01	4.94E+01	1.7500	1.202E+11
Eu-155	5.9259E-04	3,376.22	6,752.44	0.00E+00	2.00E+00	4.00E+00	2.2500	1.005E+07
Fe-55	2.2791E-06	3,376.22	6,752.44	0.00E+00	7.69E-03	1.54E-02	2.7500	9.589E+06
H-3	1.9698E-03	3,376.22	6,752.44	0.00E+00	6.65E+00	1.33E+01	3.5000	5.583E+03
I-129	7.5300E-07	3,376.22	6,752.44	0.00E+00	2.54E-03	5.08E-03	5.0000	2.282E+03
Kr-85	4.1176E-02	3,376.22	6,752.44	0.00E+00	1.39E+02	2.78E+02	7.0000	2.498E+02
Np-237	9.5752E-06	3,376.22	6,752.44	0.00E+00	3.23E-02	6.47E-02	11.0000	2.786E+01
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		
Ti-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		

Thermal Power

Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
5.65E+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

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

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

¹Fuel decay start date 1966
 Estimates as of 2010
 Template (Worst Case)
²Template Burnup(MWd) 62.5
 Template BOL Heavy Metal Mass (MT) 0.00186865
 Template Decay Time 35 years

Estimated
 Canister usage:
 18"x10"
 0.03

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	2.3072E-06	66.52	66.52	0.00E+00	1.53E-04	1.53E-04	0.0150	8.152E+13
Am-241	8.4448E+00	66.52	66.52	0.00E+00	5.62E+02	5.62E+02	0.0250	1.622E+13
Am-242m	1.6848E-02	66.52	66.52	0.00E+00	1.12E+00	1.12E+00	0.0375	1.417E+13
Am-243	1.6320E-02	66.52	66.52	0.00E+00	1.09E+00	1.09E+00	0.0575	2.230E+13
C-14	1.2090E-01	66.52	66.52	0.00E+00	8.04E+00	8.04E+00	0.0850	8.703E+12
Cl-36	2.2849E-03	66.52	66.52	0.00E+00	1.52E-01	1.52E-01	0.1250	6.821E+12
Cm-243	8.6624E-04	66.52	66.52	0.00E+00	5.76E-02	5.76E-02	0.2250	7.539E+12
Cm-244	1.6848E+01	66.52	66.52	0.00E+00	1.12E+01	1.12E+01	0.3750	3.225E+12
Co-60	2.8086E+01	66.52	66.52	0.00E+00	1.87E+03	1.87E+03	0.5750	5.244E+13
Cs-134	3.4148E-04	66.52	66.52	0.00E+00	2.27E-02	2.27E-02	0.8500	2.004E+12
Cs-135	4.3976E-04	66.52	66.52	0.00E+00	2.93E-02	2.93E-02	1.2500	1.401E+14
Cs-137	2.1049E+01	66.52	66.52	0.00E+00	1.40E+03	1.40E+03	1.7500	6.196E+10
Eu-154	1.2500E+00	66.52	66.52	0.00E+00	8.32E+01	8.32E+01	2.2500	7.346E+08
Eu-155	6.8986E-02	66.52	66.52	0.00E+00	4.59E+00	4.59E+00	2.7500	2.070E+08
Fe-55	2.9308E-01	66.52	66.52	0.00E+00	1.95E+01	1.95E+01	3.5000	1.657E+05
H-3	2.4311E-01	66.52	66.52	0.00E+00	1.62E+01	1.62E+01	5.0000	7.036E+04
I-129	1.0618E-05	66.52	66.52	0.00E+00	7.06E-04	7.06E-04	7.0000	8.057E+03
Kr-85	5.9882E-01	66.52	66.52	0.00E+00	3.98E+01	3.98E+01	11.0000	9.219E+02
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-08	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		
Ti-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		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

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

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate
Nominal		66.52	
Bounding		66.52	Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: PRR-1 (UALX-HEU) PHILIPPINES
 SNF ID #: 638
 Fuel Units & Descr: 21 - 18 FLAT PLATES
 Heavy Metal Mass: BOL=3.286kg, EOL=3.286kg
 ROD Storage Site: SRS

Fuel decay start date: 1998
 Estimates as of: 2010
 Template: TRIGA-AI (LW/U-Zr, Alum, 10 to 20%, U)
 Template Burnup(MWd): 6.65
 Template BOL Heavy Metal Mass (MT): 0.00018
 Template Decay Time: 10 years

Estimated
 Canister usage:
 18"x10"
 0.88

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.2892E-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	8.096E+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		
Th-208	1.9459E-08	62.74	125.48	0.00E+00	1.22E-06	2.44E-06		
U-232	5.3850E-08	62.74	125.48	0.00E+00	3.38E-06	6.76E-06		
U-233	1.3135E-07	62.74	125.48	0.00E+00	8.24E-06	1.65E-05		
U-234	1.9143E-07	62.74	125.48	0.00E+00	1.20E-05	2.40E-05		
U-235	-2.6159E-06	62.74	0.00	6.62E-03	6.45E-03	6.62E-03		
U-236	1.2719E-05	62.74	125.48	0.00E+00	7.98E-04	1.60E-03		
U-238	-3.8857E-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	Basis for Parameter Differences
Reactor Moderator:	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	This Template was used for the following reasons:
Fuel Cladding	ALUM	ALUM	This fuel matches on all parameters except enrichment.
BOL HM Constituents	U	U	
BOL Enrichment %:	93.14680552	10 to 20.1	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		62.74	Nominal burnup assumed to be 2% of BOL heavy metal mass.
Bounding		125.48	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.52		0.98
Bounding	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 PRR-1 (UALX-LEU) PHILIPPINES
 SNF ID # 558
 Fuel Units & Descr 30 - 17 FLAT PLATES
 Heavy Metal Mass BOL=20.328kg EOL=19.713kg
 ROD Storage Site SRS
 Fuel decay start date 1998
 Estimates as of 2010
 Template TRIGA-AI (LW/U-Zr, Alum, 10 to 20%, U)
 Template Burnup(MWd) 6.65
 Template BOL Heavy Metal Mass (MT) 0.00018
 Template Decay Time 10 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	1.2892E-09	587.03	1,174.06	0.00E+00	7.57E-07	1.51E-06	Avg MeV	
Am-241	2.9429E-03	587.03	1,174.06	0.00E+00	1.73E+00	3.46E+00	0.0150	1.578E+14
Am-242m	1.9489E-06	587.03	1,174.06	0.00E+00	1.14E-03	2.29E-03	0.0250	3.301E+13
Am-243	2.3308E-07	587.03	1,174.06	0.00E+00	1.37E-04	2.74E-04	0.0375	3.898E+13
C-14	4.3278E-05	587.03	1,174.06	0.00E+00	2.54E-02	5.08E-02	0.0575	3.224E+13
Cl-36	4.3023E-08	587.03	1,174.06	0.00E+00	2.53E-05	5.05E-05	0.0850	2.095E+13
Cm-243	2.4286E-07	587.03	1,174.06	0.00E+00	1.43E-04	2.85E-04	0.1250	2.900E+13
Cm-244	2.6015E-06	587.03	1,174.06	0.00E+00	1.53E-03	3.05E-03	0.2250	1.839E+13
Co-60	1.6075E-02	587.03	1,174.06	0.00E+00	9.44E+00	1.89E+01	0.3750	7.570E+12
Cs-134	1.9323E-02	587.03	1,174.06	0.00E+00	1.13E+01	2.27E+01	0.5750	1.128E+14
Cs-135	3.1549E-05	587.03	1,174.06	0.00E+00	1.85E-02	3.70E-02	0.8500	2.055E+13
Cs-137	2.4556E+00	587.03	1,174.06	0.00E+00	1.44E+03	2.88E+03	1.2500	2.259E+13
Eu-154	9.0180E-01	587.03	1,174.06	0.00E+00	5.29E+02	1.06E+03	1.7500	6.477E+11
Eu-155	2.1820E-01	587.03	1,174.06	0.00E+00	1.28E+02	2.56E+02	2.2500	1.541E+09
Fe-55	2.2902E-03	587.03	1,174.06	0.00E+00	1.34E+00	2.69E+00	2.7500	3.021E+07
H-3	8.1609E-03	587.03	1,174.06	0.00E+00	4.79E+00	9.58E+00	3.5000	3.686E+06
I-129	7.3805E-07	587.03	1,174.06	0.00E+00	4.33E-04	8.67E-04	5.0000	6.778E+02
Kr-85	1.8256E-01	587.03	1,174.06	0.00E+00	1.07E+02	2.14E+02	7.0000	7.665E+01
Np-237	1.4505E-06	587.03	1,174.06	0.00E+00	8.52E-04	1.70E-03	11.0000	8.725E+00
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
Fuel Cladding	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	19.87821382	10 to 20.1	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		587.03	
Bounding		1,174.06	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.78		
Bounding	1.56		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 2035
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd), 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 5 years

Estimated
 Canister usage:
 18"x10"
 3.44

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	42.04	84.08	0.00E+00	6.11E-09	1.22E-08	Avg MeV	
Am-241	1.1190E-03	42.04	84.08	0.00E+00	4.70E-02	9.41E-02	0.0150	1.622E+13
Am-242m	4.5425E-07	42.04	84.08	0.00E+00	1.91E-05	3.82E-05	0.0250	3.495E+12
Am-243	1.4921E-06	42.04	84.08	0.00E+00	6.27E-05	1.25E-04	0.0375	3.225E+12
C-14	5.7244E-09	42.04	84.08	0.00E+00	2.41E-07	4.81E-07	0.0575	3.171E+12
Cl-36	1.3124E-32	42.04	84.08	0.00E+00	5.52E-31	1.10E-30	0.0850	2.022E+12
Cm-243	2.3676E-07	42.04	84.08	0.00E+00	9.95E-06	1.99E-05	0.1250	1.751E+12
Cm-244	5.2042E-05	42.04	84.08	0.00E+00	2.19E-03	4.38E-03	0.2250	1.713E+12
Co-60	3.8208E-05	42.04	84.08	0.00E+00	1.61E-03	3.21E-03	0.3750	8.293E+11
Cs-134	4.8693E-01	42.04	84.08	0.00E+00	2.05E+01	4.09E+01	0.5750	1.139E+13
Cs-135	3.4477E-06	42.04	84.08	0.00E+00	1.45E-04	2.90E-04	0.8500	1.595E+12
Cs-137	2.8731E+00	42.04	84.08	0.00E+00	1.21E+02	2.42E+02	1.2500	2.968E+11
Eu-154	8.2053E-02	42.04	84.08	0.00E+00	3.45E+00	6.90E+00	1.7500	1.245E+10
Eu-155	3.9134E-02	42.04	84.08	0.00E+00	1.65E+00	3.29E+00	2.2500	2.611E+10
Fe-55	6.7429E-03	42.04	84.08	0.00E+00	2.83E-01	5.67E-01	2.7500	1.502E+08
H-3	1.0599E-02	42.04	84.08	0.00E+00	4.46E-01	8.91E-01	3.5000	1.666E+07
I-129	7.5300E-07	42.04	84.08	0.00E+00	3.17E-05	6.33E-05	5.0000	4.999E+01
Kr-85	2.8595E-01	42.04	84.08	0.00E+00	1.20E+01	2.40E+01	7.0000	5.573E+00
Np-237	9.5479E-06	42.04	84.08	0.00E+00	4.01E-04	8.03E-04	11.0000	6.282E-01
Pa-231	8.9297E-10	42.04	84.08	0.00E+00	3.75E-08	7.51E-08		
Pb-210	3.7609E-12	42.04	84.08	0.00E+00	1.58E-10	3.16E-10		
Pm-147	2.5452E+00	42.04	84.08	0.00E+00	1.07E+02	2.14E+02		
Pu-238	2.0550E-02	42.04	84.08	0.00E+00	8.64E-01	1.73E+00		
Pu-239	4.2838E-04	42.04	84.08	0.00E+00	1.80E-02	3.60E-02		
Pu-240	2.4401E-04	42.04	84.08	0.00E+00	1.03E-02	2.05E-02		
Pu-241	6.8764E-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		
Ti-208	4.4063E-08	42.04	84.08	0.00E+00	1.85E-06	3.70E-06		
U-232	1.3151E-07	42.04	84.08	0.00E+00	5.53E-06	1.11E-05		
U-233	1.9564E-09	42.04	84.08	0.00E+00	8.22E-08	1.64E-07		
U-234	1.8371E-04	42.04	84.08	0.00E+00	7.72E-03	1.54E-02		
U-235	-2.7235E-06	42.04	0.00	4.41E-03	4.30E-03	4.41E-03		
U-236	1.5493E-05	42.04	84.08	0.00E+00	6.51E-04	1.30E-03		
U-238	-4.2851E-09	42.04	0.00	5.97E-05	5.95E-05	5.97E-05		
Y-90	2.7505E+00	42.04	84.08	0.00E+00	1.16E+02	2.31E+02		
Other Radionuclides					2.16E+02	4.32E+02		
							Thermal Power	
							Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
							2.13E+00	4.26E+00
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	92.00045093	60 to 100	

Burnup Summary (MWd)³

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		42.04	
Bounding		84.08	

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/ Given EOL HM
Nominal	0.06		
Bounding	0.12		

Estimated EOL HM/ Given EOL HM: 0.98

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name 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

¹Fuel decay start date. 2035
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0.44

II. Estimates							Gamma Sources	
	m	X _n	X _b	b	Y _n	Y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	1.4545E-10	344.38	688.76	0.00E+00	5.01E-08	1.00E-07	Avg MeV	
Am-241	1.1190E-03	344.38	688.76	0.00E+00	3.85E-01	7.71E-01	0.0150	1.329E+14
Am-242m	4.5425E-07	344.38	688.76	0.00E+00	1.56E-04	3.13E-04	0.0250	2.863E+13
Am-243	1.4921E-06	344.38	688.76	0.00E+00	5.14E-04	1.03E-03	0.0375	2.642E+13
C-14	5.7244E-09	344.38	688.76	0.00E+00	1.97E-06	3.94E-06	0.0575	2.598E+13
Cf-252	1.3124E-32	344.38	688.76	0.00E+00	4.52E-30	9.04E-30	0.0850	1.656E+13
Cm-243	2.3676E-07	344.38	688.76	0.00E+00	8.15E-05	1.63E-04	0.1250	1.434E+13
Cm-244	5.2042E-05	344.38	688.76	0.00E+00	1.79E-02	3.58E-02	0.2250	1.404E+13
Co-60	3.8208E-05	344.38	688.76	0.00E+00	1.32E-02	2.63E-02	0.3750	6.794E+12
Cs-134	4.8693E-01	344.38	688.76	0.00E+00	1.68E+02	3.35E+02	0.5750	9.332E+13
Cs-135	3.4477E-06	344.38	688.76	0.00E+00	1.19E-03	2.37E-03	0.8500	1.307E+13
Cs-137	2.8731E+00	344.38	688.76	0.00E+00	9.89E+02	1.98E+03	1.2500	2.431E+12
Eu-154	8.2063E-02	344.38	688.76	0.00E+00	2.83E+01	5.65E+01	1.7500	1.020E+11
Eu-155	3.9134E-02	344.38	688.76	0.00E+00	1.35E+01	2.70E+01	2.2500	2.139E+11
Fe-55	6.7429E-03	344.38	688.76	0.00E+00	2.32E+00	4.64E+00	2.7500	1.230E+09
H-3	1.0599E-02	344.38	688.76	0.00E+00	3.65E+00	7.30E+00	3.5000	1.365E+08
I-129	7.5300E-07	344.38	688.76	0.00E+00	2.59E-04	5.19E-04	5.0000	4.193E+02
Kr-85	2.8595E-01	344.38	688.76	0.00E+00	9.85E+01	1.97E+02	7.0000	4.679E+01
Np-237	9.5479E-06	344.38	688.76	0.00E+00	3.29E-03	6.58E-03	11.0000	5.277E+00
Pa-231	8.9297E-10	344.38	688.76	0.00E+00	3.08E-07	6.15E-07		
Pb-210	3.7609E-12	344.38	688.76	0.00E+00	1.30E-09	2.59E-09		
Pm-147	2.5452E+00	344.38	688.76	0.00E+00	8.77E+02	1.75E+03		
Pu-238	2.0550E-02	344.38	688.76	0.00E+00	7.08E+00	1.42E+01		
Pu-239	4.2838E-04	344.38	688.76	0.00E+00	1.48E-01	2.95E-01		
Pu-240	2.4401E-04	344.38	688.76	0.00E+00	8.40E-02	1.68E-01		
Pu-241	6.8764E-02	344.38	688.76	0.00E+00	2.37E+01	4.74E+01		
Pu-242	3.6329E-07	344.38	688.76	0.00E+00	1.25E-04	2.50E-04		
Ra-226	3.8045E-11	344.38	688.76	0.00E+00	1.31E-08	2.62E-08		
Ra-228	2.9902E-15	344.38	688.76	0.00E+00	1.03E-12	2.06E-12		
Ru-106	1.9055E-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		
Ti-208	4.4063E-08	344.38	688.76	0.00E+00	1.52E-05	3.03E-05		
U-232	1.3151E-07	344.38	688.76	0.00E+00	4.53E-05	9.06E-05		
U-233	1.9564E-09	344.38	688.76	0.00E+00	6.74E-07	1.35E-06		
U-234	1.8371E-04	344.38	688.76	0.00E+00	6.33E-02	1.27E-01		
U-235	-2.7235E-06	344.38	0.00	7.47E-03	6.53E-03	7.47E-03		
U-236	1.5493E-05	344.38	688.76	0.00E+00	5.34E-03	1.07E-02		
U-238	-4.2851E-09	344.38	0.00	4.95E-03	4.95E-03	4.95E-03		
Y-90	2.7505E+00	344.38	688.76	0.00E+00	9.47E+02	1.89E+03		
Other Radionuclides					1.77E+03	3.54E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %:	19.0001402	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup assumed to be 2% of BOL heavy metal mass Bounding burnup assumed to be twice nominal burnup
	From SFD	Estimated	
Nominal		344.38	
Bounding		688.76	

Checks			Estimated EOL HM/Given EOL HM 0.98
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.06		
Bounding	0.12		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: R-2 SVTR (U3S2 LEU) SWEDEN
 SNF ID #: 942
 Fuel Units & Descr: 183 - MTR TYPE
 Heavy Metal Mass: BOL=351 47kg, EOL=308 977kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1996
 Estimates as of: 2010
 Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 10 years

Estimated
 Canister usage
 18"x10"
 508

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	40,241.32	80,482.63	0.00E+00	1.14E-05	2.29E-05	Avg MeV	
Am-241	1.4935E-03	40,241.32	80,482.63	0.00E+00	6.01E+01	1.20E+02	0.0150	1.095E+16
Am-242m	4.4390E-07	40,241.32	80,482.63	0.00E+00	1.79E-02	3.57E-02	0.0250	2.304E+15
Am-243	1.4913E-06	40,241.32	80,482.63	0.00E+00	6.00E-02	1.20E-01	0.0375	2.008E+15
C-14	5.7217E-09	40,241.32	80,482.63	0.00E+00	2.30E-04	4.60E-04	0.0575	2.122E+15
Cl-36	1.3124E-32	40,241.32	80,482.63	0.00E+00	5.28E-28	1.06E-27	0.0850	1.291E+15
Cr-243	2.0967E-07	40,241.32	80,482.63	0.00E+00	8.44E-03	1.69E-02	0.1250	9.030E+14
Cr-244	4.3001E-05	40,241.32	80,482.63	0.00E+00	1.73E+00	3.46E+00	0.2250	1.108E+15
Co-60	1.9798E-05	40,241.32	80,482.63	0.00E+00	7.97E-01	1.59E+00	0.3750	4.968E+14
Cs-134	9.0795E-02	40,241.32	80,482.63	0.00E+00	3.65E+03	7.31E+03	0.5750	8.066E+15
Cs-135	3.4477E-06	40,241.32	80,482.63	0.00E+00	1.39E-01	2.77E-01	0.8500	3.934E+14
Cs-137	2.5588E+00	40,241.32	80,482.63	0.00E+00	1.03E+05	2.06E+05	1.2500	1.280E+14
Eu-154	5.4847E-02	40,241.32	80,482.63	0.00E+00	2.21E+03	4.41E+03	1.7500	4.675E+12
Eu-155	1.9469E-02	40,241.32	80,482.63	0.00E+00	7.83E-02	1.57E+03	2.2500	3.091E+11
Fe-55	1.7797E-03	40,241.32	80,482.63	0.00E+00	7.16E+01	1.43E+02	2.7500	4.313E+09
H-3	8.0065E-03	40,241.32	80,482.63	0.00E+00	3.22E+02	6.44E+02	3.5000	5.135E+08
I-129	7.5300E-07	40,241.32	80,482.63	0.00E+00	3.03E-02	6.06E-02	5.0000	4.287E+04
Kr-85	2.0705E-01	40,241.32	80,482.63	0.00E+00	8.33E+03	1.67E+04	7.0000	4.764E+03
Np-237	9.5507E-06	40,241.32	80,482.63	0.00E+00	3.84E-01	7.69E-01	11.0000	5.360E+02
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-08	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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents	U	U	
BOL Enrichment %	19.84262055	60 to 100	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		40,241.32	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		80,482.63	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.36		1.01
Bounding	0.73		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name 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

Fuel decay start date 1996
Estimates as of 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0 00116689
Template Decay Time 10 years

Estimated
Canister usage:
18"x10"
12 50

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	2 8404E-10	48,454.25	96,908 50	0 00E+00	1.38E-05	2 75E-05	0 0150	1.318E+16
Am-241	1 4935E-03	48,454.25	96,908 50	0.00E+00	7.24E+01	1 45E+02	0 0250	2.774E+15
Am-242m	4 4390E-07	48,454.25	96,908 50	0 00E+00	2.15E-02	4 30E-02	0 0375	2.418E+15
Am-243	1 4913E-06	48,454.25	96,908 50	0 00E+00	7.23E-02	1 45E-01	0 0575	2.555E+15
C-14	5 7217E-09	48,454.25	96,908 50	0 00E+00	2 77E-04	5 54E-04	0 0850	1.554E+15
Cl-36	1 3124E-32	48,454.25	96,908 50	0 00E+00	6 36E-28	1 27E-27	0 1250	1.087E+15
Cm-243	2 0967E-07	48,454.25	96,908 50	0 00E+00	1 02E-02	2 03E-02	0 2250	1.335E+15
Cm-244	4 3001E-05	48,454.25	96,908 50	0 00E+00	2 08E+00	4 17E+00	0 3750	5.982E+14
Co-60	1 9798E-05	48,454.25	96,908 50	0 00E+00	9 59E-01	1 92E+00	0 5750	9.712E+15
Cs-134	9 0795E-02	48,454.25	96,908 50	0 00E+00	4 40E+03	8 80E+03	0 8500	4.737E+14
Cs-135	3.4477E-06	48,454.25	96,908 50	0 00E+00	1 67E-01	3 34E-01	1.2500	1.542E+14
Cs-137	2.5588E+00	48,454.25	96,908 50	0 00E+00	1 24E+05	2 48E+05	1 7500	5.630E+12
Eu-154	5 4847E-02	48,454.25	96,908 50	0 00E+00	2 66E+03	5 32E+03	2 2500	3.722E+11
Eu-155	1 9469E-02	48,454.25	96,908 50	0 00E+00	9 43E+02	1 89E+03	2 7500	5.193E+09
Fe-55	1 7797E-03	48,454.25	96,908 50	0 00E+00	8 62E+01	1.72E+02	3.5000	6.183E+08
H-3	8 0065E-03	48,454.25	96,908 50	0 00E+00	3 88E+02	7.76E+02	5.0000	5.137E+04
I-129	7 5300E-07	48,454.25	96,908 50	0.00E+00	1 00E+04	2 01E+04	7.0000	5.707E+03
Kr-85	2 0705E-01	48,454.25	96,908 50	0.00E+00	4 63E-01	9.26E-01	11 0000	6.421E+02
Np-237	9 5507E-06	48,454.25	96,908 50	0 00E+00	6 17E-05	1.23E-04		
Pa-231	1 2740E-09	48,454.25	96,908 50	0 00E+00	5 74E-07	1 15E-06		
Pb-210	1 1838E-11	48,454.25	96,908 50	0 00E+00	3.29E+04	6 59E+04		
Pm-147	6 7974E-01	48,454.25	96,908 50	0 00E+00	9 57E+02	1 91E+03		
Pu-238	1 9755E-02	48,454.25	96,908 50	0 00E+00	2 08E+01	4 15E+01		
Pu-239	4.2838E-04	48,454.25	96,908 50	0 00E+00	1 18E+01	2 36E+01		
Pu-240	2 4390E-04	48,454.25	96,908 50	0 00E+00	2 62E+03	5 24E+03		
Pu-241	5 4058E-02	48,454.25	96,908 50	0 00E+00	1 76E-02	3 52E-02		
Pu-242	3 6329E-07	48,454.25	96,908 50	0 00E+00	4 06E-06	8 12E-06		
Ra-226	8.3742E-11	48,454.25	96,908 50	0 00E+00	2 80E-10	5.59E-10		
Ra-228	5 7734E-15	48,454.25	96,908 50	0 00E+00	2 97E+02	5 95E+02		
Ru-106	6 1356E-03	48,454.25	96,908 50	0 00E+00	6 27E-01	1.25E+00		
Se-79	1 2936E-05	48,454.25	96,908 50	0 00E+00	5 61E-01	1.12E+00		
Sn-126	1 1574E-05	48,454.25	96,908 50	0 00E+00	1 18E+05	2.37E+05		
Sr-90	2 4417E+00	48,454.25	96,908 50	0 00E+00	2 05E+01	4 09E+01		
Tc-99	4 2239E-04	48,454.25	96,908 50	0 00E+00	1.38E-07	2 77E-07		
Th-229	2 8568E-12	48,454.25	96,908 50	0.00E+00	1.23E-03	2 45E-03		
Th-230	2 5310E-08	48,454.25	96,908 50	0 00E+00	5 64E-10	1 13E-09		
Th-232	1 1631E-14	48,454.25	96,908 50	0 00E+00	2.26E-03	4 53E-03		
Ti-208	4 6705E-08	48,454.25	96,908 50	0 00E+00	6 37E-03	1 27E-02		
U-232	1.3151E-07	48,454.25	96,908 50	0 00E+00	1 05E-04	2 10E-04		
U-233	2 1650E-09	48,454.25	96,908 50	0 00E+00	8 91E+00	1 78E+01		
U-234	1 8399E-04	48,454.25	96,908 50	0 00E+00	9 00E-02	2.22E-01		
U-235	-2 7235E-06	48,454.25	0 00	2 22E-01	7 51E-01	1.50E+00		
U-236	1.5493E-05	48,454.25	96,908 50	0 00E+00	2 58E-03	2.79E-03		
U-238	-4 2851E-09	48,454.25	0 00	2 79E-03	1 18E+05	2.37E+05		
Y-90	2 4423E+00	48,454.25	96,908 50	0 00E+00	1 20E+05	2 41E+05		
Other Radionuclides								

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
	From SFD	Used	
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	92.5168132	60 to 100	

Burnup Summary (MWd) ²		Basis for burnup used in estimate:
	From SFD	
Nominal	48 454.25	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding	96 908.50	

Checks		
	Burnup Multiplier	Estimated Burnup/ Given Burnup
Nominal	1.39	Estimated EOL HM/Given EOL HM 1.05
Bounding	2.77	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 1987
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0 00116689
 Template Decay Time: 20 years

Estimated
 Canister usage
 18"x10"
 1.33

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	6 6313E-10	1,066 72	2,133 45	0 00E+00	7,07E-07	1 41E-06	Avg MeV	
Am-241	2 0060E-03	1,066 72	2,133 45	0 00E+00	2 14E+00	4,28E+00	0 0150	2,252E+14
Am-242m	4,2429E-07	1,066 72	2,133 45	0 00E+00	4,53E-04	9 05E-04	0 0250	4 683E+13
Am-243	1 4899E-06	1,066 72	2,133 45	0 00E+00	1,59E-03	3 18E-03	0 0375	4 085E+13
C-14	5 7135E-09	1,066 72	2,133 45	0 00E+00	6,09E-06	1 22E-05	0 0575	4,375E+13
Cl-36	1 3124E-32	1,066 72	2,133 45	0 00E+00	1,40E-29	2 80E-29	0 0850	2 644E+13
Cm-243	1 6443E-07	1,066 72	2,133 45	0 00E+00	1,75E-04	3 51E-04	0 1250	1 789E+13
Cm-244	2 9330E-05	1,066 72	2,133 45	0 00E+00	3,13E-02	6 26E-02	0 2250	2,281E+13
Co-60	5 3186E-06	1,066 72	2,133 45	0 00E+00	5 67E-03	1 13E-02	0 3750	9 930E+12
Cs-134	3 1563E-03	1,066 72	2,133 45	0 00E+00	3,37E+00	6 73E+00	0 5750	1 620E+14
Cs-135	3 4477E-06	1 066 72	2,133 45	0 00E+00	3 68E-03	7 36E-03	0 8500	2 738E+12
Cs-137	2 0313E+00	1,066 72	2,133 45	0 00E+00	2,17E+03	4 33E+03	1 2500	1 564E+12
Eu-154	2 4513E-02	1,066 72	2,133 45	0 00E+00	2 61E+01	5 23E+01	1 7500	7 177E+10
Eu-155	4 8175E-03	1,066 72	2,133 45	0 00E+00	5,14E+00	1 03E+01	2 2500	6,296E+06
Fe-55	1 2397E-04	1,066 72	2,133 45	0 00E+00	1 32E-01	2 64E-01	2 7500	3 559E+06
H-3	4 5697E-03	1,066 72	2,133 45	0 00E+00	4 87E+00	9 75E+00	3 5000	1 635E+04
I-129	7 5300E-07	1,066 72	2,133 45	0 00E+00	8 03E-04	1 61E-03	5 0000	9,247E+02
Kr-85	1 0850E-01	1,066 72	2,133 45	0 00E+00	1,16E+02	2 31E+02	7 0000	1 021E+02
Np-237	9 5561E-06	1,066 72	2,133 45	0 00E+00	1 02E-02	2 04E-02	11.0000	1 144E+01
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		
Ti-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	Thermal Power	
U-233	2 5825E-09	1,066 72	2,133 45	0 00E+00	2 75E-06	5,51E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1 8450E-04	1,066 72	2,133 45	0 00E+00	1 97E-01	3 94E-01	2,54E+01	5,09E+01
U-235	-2 7235E-06	1,066 72	0 00	1 11E-02	8 22E-03	1,11E-02	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	89 96321383	60 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		1,066 72	
Bounding		2,133 45	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 59		
Bounding	1 18		1 01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name RA-3 (UALX-HEU) (ARGENTINA)
SNF ID # 636
Fuel Units & Descr: 207 - 19 CURVED PLATES
Heavy Metal Mass BOL=37.84kg; EOL=30 139kg
ROD Storage Site: SRS

Fuel decay start date 1987
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 20 years

Estimated
Canister usage
18"x10"
8 63

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)		
Ac-227	6.6313E-10	7,292.43	14,584.86	0.00E+00	4.84E-06	9.67E-06	Avg MeV	
Am-241	2.0060E-03	7,292.43	14,584.86	0.00E+00	1.46E+01	2.93E+01	0.0150	1.540E+15
Am-242m	4.2429E-07	7,292.43	14,584.86	0.00E+00	3.09E-03	6.19E-03	0.0250	3.201E+14
Am-243	1.4899E-06	7,292.43	14,584.86	0.00E+00	1.09E-02	2.17E-02	0.0375	2.792E+14
C-14	5.7135E-09	7,292.43	14,584.86	0.00E+00	4.17E-05	8.33E-05	0.0575	2.991E+14
Cl-36	1.3124E-32	7,292.43	14,584.86	0.00E+00	9.57E-29	1.91E-28	0.0850	1.807E+14
Cm-243	1.6443E-07	7,292.43	14,584.86	0.00E+00	1.20E-03	2.40E-03	0.1250	1.223E+14
Cm-244	2.9330E-05	7,292.43	14,584.86	0.00E+00	2.14E-01	4.28E-01	0.2250	1.559E+14
Co-60	5.3186E-06	7,292.43	14,584.86	0.00E+00	3.88E-02	7.76E-02	0.3750	6.788E+13
Cs-134	3.1563E-03	7,292.43	14,584.86	0.00E+00	2.30E+01	4.60E+01	0.5750	1.107E+15
Cs-135	3.4477E-06	7,292.43	14,584.86	0.00E+00	2.51E-02	5.03E-02	0.8500	1.872E+13
Cs-137	2.0313E+00	7,292.43	14,584.86	0.00E+00	1.48E+04	2.96E+04	1.2500	1.069E+13
Eu-154	2.4513E-02	7,292.43	14,584.86	0.00E+00	1.79E+02	3.58E+02	1.7500	4.906E+11
Eu-155	4.8175E-03	7,292.43	14,584.86	0.00E+00	3.51E+01	7.03E+01	2.2500	4.304E+07
Fe-55	1.2397E-04	7,292.43	14,584.86	0.00E+00	9.04E-01	1.81E+00	2.7500	2.433E+07
H-3	4.5697E-03	7,292.43	14,584.86	0.00E+00	3.33E+01	6.66E+01	3.5000	1.118E+05
I-129	7.5300E-07	7,292.43	14,584.86	0.00E+00	5.49E-03	1.10E-02	5.0000	6.321E+03
Kr-85	1.0850E-01	7,292.43	14,584.86	0.00E+00	7.91E+02	1.58E+03	7.0000	6.979E+02
Np-237	9.5561E-06	7,292.43	14,584.86	0.00E+00	6.97E-02	1.39E-01	11.0000	7.821E+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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and 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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RECH-1 (CHILE)

SNF ID #: 708

Fuel Units & Descr: 58 - MTR TYPE

Heavy Metal Mass: BOL=11 873kg, EOL=7 998kg

ROD Storage Site: SRS

¹Fuel decay start date: 1999

Estimates as of: 2010

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

²Template Burnup(MWd): 367.2

Template BOL Heavy Metal Mass (MT): 0.00116689

Template Decay Time: 10 years

Estimated
Canister usage
18"x10"
2.42

II. Estimates	m	X _a	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.8404E-10	3.669 13	7.338 26	0.00E+00	1.04E-06	2.08E-06	Avg. MeV	
Am-241	1.4935E-03	3.669 13	7.338 26	0.00E+00	5.48E+00	1.10E+01	0.0150	9.980E+14
Am-242m	4.4390E-07	3.669 13	7.338 26	0.00E+00	1.63E-03	3.26E-03	0.0250	2.100E+14
Am-243	1.4913E-06	3.669 13	7.338 26	0.00E+00	5.47E-03	1.09E-02	0.0375	1.831E+14
C-14	5.7217E-09	3.669 13	7.338 26	0.00E+00	2.10E-05	4.20E-05	0.0575	1.934E+14
Cl-36	1.3124E-32	3.669 13	7.338 26	0.00E+00	4.82E-29	9.63E-29	0.0850	1.177E+14
Cm-243	2.0967E-07	3.669 13	7.338 26	0.00E+00	7.69E-04	1.54E-03	0.1250	8.233E+13
Cm-244	4.3001E-05	3.669 13	7.338 26	0.00E+00	1.58E-01	3.16E-01	0.2250	1.011E+14
Co-60	1.9798E-05	3.669 13	7.338 26	0.00E+00	7.26E-02	1.45E-01	0.3750	4.530E+13
Cs-134	9.0795E-02	3.669 13	7.338 26	0.00E+00	3.33E+02	6.66E+02	0.5750	7.354E+14
Cs-135	3.4477E-06	3.669 13	7.338 26	0.00E+00	1.27E-02	2.53E-02	0.8500	3.587E+13
Cs-137	2.5588E+00	3.669 13	7.338 26	0.00E+00	9.39E+03	1.88E+04	1.2500	1.168E+13
Eu-154	5.4847E-02	3.669 13	7.338 26	0.00E+00	2.01E+02	4.02E+02	1.7500	4.263E+11
Eu-155	1.9469E-02	3.669 13	7.338 26	0.00E+00	7.14E+01	1.43E+02	2.2500	2.818E+10
Fe-55	1.7797E-03	3.669 13	7.338 26	0.00E+00	6.53E+00	1.31E+01	2.7500	3.933E+08
H-3	8.0065E-03	3.669 13	7.338 26	0.00E+00	2.94E+01	5.88E+01	3.5000	4.682E+07
I-129	7.5300E-07	3.669 13	7.338 26	0.00E+00	2.76E-03	5.53E-03	5.0000	3.891E+03
Kr-85	2.0705E-01	3.669 13	7.338 26	0.00E+00	7.60E+02	1.52E+03	7.0000	4.323E+02
Np-237	9.5507E-06	3.669 13	7.338 26	0.00E+00	3.50E-02	7.01E-02	11.0000	4.864E+01
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator: Fuel Cladding: BOL HM Constituents: BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ALUM	ALUM	
	U	U	
	79.9939132	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
		3.669 13	
Nominal			Nominal burnup calculated from the heavy metal mass destroyed
Bounding		7.338.26	Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0.98		
Nominal			1.03
Bounding	1.96		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name RHF (FRANCE)
SNF ID # 179
Fuel Units & Descr: 4 - 2 CONCENTRIC TUBES
Heavy Metal Mass: BOL=36 kg, EOL=25.51kg
ROD Storage Site SRS

¹Fuel decay start date: 1989
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 20 years

Estimated
Canister usage
18"x10"
0.67

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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		
Th-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)
2.57E+02	5.14E+02
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
	From SFD	Used	
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	92.97	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate
	From SFD	Estimated	
Nominal		10,786.55	Nominal burnup calculated from the heavy metal mass destroyed
Bounding		21,573.10	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.93		1.03
Bounding	1.86		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RINSC
SNF ID #: 181
Fuel Units & Descr: 44 - 18 FLAT PLATES
Heavy Metal Mass: BOL=61 12kg; EOL=60 465kg
ROD Storage Site: SRS

¹Fuel decay start date: 2035
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 5 years

Estimated
Canister usage*
18"x10"
1.83

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19.7728395	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal:		620.87	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding:		1,241.73	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal:	0.03		1.00
Bounding:	0.06		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RINSC
 SNF ID #: 180
 Fuel Units & Descr: 70 - 18 FLAT PLATES
 Heavy Metal Mass BOL=9 366kg EOL=8 498kg
 ROD Storage Site: SRS
 Fuel decay start date: 1992
 Estimates as of: 2010
 Template: ATR (Light Water Alum, 60 to 100%, U)
 Template Burnup (MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 15 years

Estimated
 Canister usage
 18"x10"
 1.94

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	4.5861E-10	822.01	1,644.03	0.00E+00	3.77E-07	7.54E-07	Avg MeV	
Am-241	1.7832E-03	822.01	1,644.03	0.00E+00	1.47E+00	2.93E+00	0.0150	1.961E+14
Am-242m	4.3410E-07	822.01	1,644.03	0.00E+00	3.57E-04	7.14E-04	0.0250	4.090E+13
Am-243	1.4907E-06	822.01	1,644.03	0.00E+00	1.23E-03	2.45E-03	0.0375	3.571E+13
C-14	5.7162E-09	822.01	1,644.03	0.00E+00	4.70E-06	9.40E-06	0.0575	3.808E+13
Cl-36	1.3124E-32	822.01	1,644.03	0.00E+00	1.08E-29	2.16E-29	0.0850	2.307E+13
Cm-243	1.8568E-07	822.01	1,644.03	0.00E+00	1.53E-04	3.05E-04	0.1250	1.581E+13
Cm-244	3.5512E-05	822.01	1,644.03	0.00E+00	2.92E-02	5.84E-02	0.2250	1.987E+13
Co-60	1.0261E-05	822.01	1,644.03	0.00E+00	8.44E-03	1.69E-02	0.3750	8.706E+12
Cs-134	1.6931E-02	822.01	1,644.03	0.00E+00	1.39E+01	2.78E+01	0.5750	1.413E+14
Cs-135	3.4477E-06	822.01	1,644.03	0.00E+00	2.83E-03	5.67E-03	0.8500	3.357E+12
Cs-137	2.2800E+00	822.01	1,644.03	0.00E+00	1.87E+03	3.75E+03	1.2500	1.696E+12
Eu-154	3.6656E-02	822.01	1,644.03	0.00E+00	3.01E+01	6.03E+01	1.7500	7.105E+10
Eu-155	9.6841E-03	822.01	1,644.03	0.00E+00	7.96E+00	1.59E+01	2.2500	8.888E+07
Fe-55	4.6977E-04	822.01	1,644.03	0.00E+00	3.86E-01	7.72E-01	2.7500	5.342E+06
H-3	6.0485E-04	822.01	1,644.03	0.00E+00	4.97E+00	9.94E+00	3.5000	3.395E+05
I-129	7.5300E-07	822.01	1,644.03	0.00E+00	6.19E-04	1.24E-03	5.0000	7.858E+02
Kr-85	1.4989E-01	822.01	1,644.03	0.00E+00	1.23E+02	2.46E+02	7.0000	8.703E+01
Np-237	9.5534E-06	822.01	1,644.03	0.00E+00	7.85E-03	1.57E-02	11.0000	9.772E+00
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		
Th-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		

Other Radionuclides

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences*
Reactor Moderator	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93.13598185	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate*
Nominal		822.01	Nominal burnup calculated from the heavy metal mass destroyed
Bounding	37.46	1.644.03	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.28		1.01
Bounding	0.56	43.88	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 1998
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0 0016689
 Template Decay Time: 10 years

Estimated
 Canister usage
 18"x10"
 1 63

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2 8404E-10	1,089 55	2,179 09	0 00E+00	3 09E-07	6 19E-07	Avg. MeV	
Am-241	1 4935E-03	1,089 55	2,179 09	0 00E+00	1 63E+00	3 25E+00	0 0150	2 964E+14
Am-242m	4 4390E-07	1,089 55	2,179 09	0 00E+00	4 84E-04	9 67E-04	0 0250	6 237E+13
Am-243	1 4913E-06	1,089 55	2,179 09	0 00E+00	1 62E-03	3 25E-03	0 0375	5 438E+13
C-14	5 7217E-09	1,089 55	2,179 09	0 00E+00	6 23E-06	1 25E-05	0 0575	5 744E+13
Cl-36	1 3124E-32	1,089 55	2,179 09	0 00E+00	1 43E-29	2 86E-29	0 0850	3 495E+13
Co-243	2 0967E-07	1,089 55	2,179 09	0 00E+00	2 28E-04	4 57E-04	0 1250	2 445E+13
Co-244	4 3001E-05	1,089 55	2,179 09	0 00E+00	4 69E-02	9 37E-02	0 2250	3 001E+13
Co-60	1 9798E-05	1,089 55	2,179 09	0 00E+00	2 16E-02	4 31E-02	0 3750	1 345E+13
Cs-134	9 0795E-02	1,089 55	2,179 09	0 00E+00	9 89E+01	1 98E+02	0 5750	2 184E+14
Cs-135	3 4477E-06	1,089 55	2,179 09	0 00E+00	3 76E-03	7 51E-03	0 8500	1 065E+13
Cs-137	2 5588E+00	1,089 55	2,179 09	0 00E+00	2 79E+03	5 58E+03	1 2500	3 467E+12
Eu-154	5 4847E-02	1,089 55	2,179 09	0 00E+00	5 98E+01	1 20E+02	1 7500	1 266E+11
Eu-155	1 9469E-02	1,089 55	2,179 09	0 00E+00	2 12E+01	4 24E+01	2 2500	8 369E+09
Fe-55	1 7797E-03	1,089 55	2,179 09	0 00E+00	1 94E+00	3 88E+00	2 7500	1 168E+08
H-3	8 0065E-03	1,089 55	2,179 09	0 00E+00	8 72E+00	1 74E+01	3 5000	1 390E+07
I-129	7 5300E-07	1,089 55	2,179 09	0 00E+00	8 20E-04	1 64E-03	5 0000	1 174E+03
Kr-85	2 0705E-01	1,089 55	2,179 09	0 00E+00	2 26E+02	4 51E+02	7 0000	1 305E+02
Np-237	9 5507E-06	1,089 55	2,179 09	0 00E+00	1 04E-02	2 08E-02	11 0000	1 469E+01
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		
Ti-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-06	1,089 55	0 00	1 30E-02	1 01E-02	1 30E-02		
U-236	1 5493E-05	1,089 55	2,179 09	0 00E+00	1 69E-02	3 38E-02		
U-238	-4 2851E-09	1,089 55	0 00	8 19E-03	8 18E-03	8 19E-03		
Y-90	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons:
Fuel Cladding	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents	U	U	
BOL Enrichment %	19 83094182	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		1 089 55	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		2 179 09	Bounding burnup assumed to be twice nominal burnup.

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0 11		1 00
Bounding	0 23		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name 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

¹Fuel decay start date 1999
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 10 years

Estimated
Canister usage
18"x10"
1 96

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	2.8404E-10	4,459.89	8,919.79	0.00E+00	1.27E-06	2.53E-06	0.0150	1.213E+15
Am-241	1.4935E-03	4,459.89	8,919.79	0.00E+00	6.66E+00	1.33E+01	0.0250	2.553E+14
Am-242m	4.4390E-07	4,459.89	8,919.79	0.00E+00	1.98E-03	3.96E-03	0.0375	2.226E+14
Am-243	1.4913E-06	4,459.89	8,919.79	0.00E+00	6.65E-03	1.33E-02	0.0575	2.351E+14
C-14	5.7217E-09	4,459.89	8,919.79	0.00E+00	2.55E-05	5.10E-05	0.0850	1.431E+14
Cl-36	1.3124E-32	4,459.89	8,919.79	0.00E+00	5.85E-29	1.17E-28	0.1250	1.001E+14
Cm-243	2.0967E-07	4,459.89	8,919.79	0.00E+00	9.35E-04	1.87E-03	0.2250	1.229E+14
Cm-244	4.3001E-05	4,459.89	8,919.79	0.00E+00	1.92E-01	3.84E-01	0.3750	5.506E+13
Co-60	1.9798E-05	4,459.89	8,919.79	0.00E+00	8.83E-02	1.77E-01	0.5750	8.939E+14
Cs-134	9.0795E-02	4,459.89	8,919.79	0.00E+00	4.05E+02	8.10E+02	0.8500	4.360E+13
Cs-135	3.4477E-06	4,459.89	8,919.79	0.00E+00	1.54E-02	3.08E-02	1.2500	1.419E+13
Cs-137	2.5588E+00	4,459.89	8,919.79	0.00E+00	1.14E+04	2.28E+04	1.7500	5.182E+11
Eu-154	5.4847E-02	4,459.89	8,919.79	0.00E+00	2.45E+02	4.89E+02	2.2500	3.426E+10
Eu-155	1.9469E-02	4,459.89	8,919.79	0.00E+00	8.68E+01	1.74E+02	2.7500	4.780E+08
Fe-55	1.7797E-03	4,459.89	8,919.79	0.00E+00	7.94E+00	1.59E+01	3.5000	5.691E+07
H-3	8.0065E-03	4,459.89	8,919.79	0.00E+00	3.57E+01	7.14E+01	5.0000	4.762E+03
I-129	7.5300E-07	4,459.89	8,919.79	0.00E+00	3.36E-03	6.72E-03	7.0000	5.293E+02
Kr-85	2.0705E-01	4,459.89	8,919.79	0.00E+00	9.23E+02	1.85E+03	11.0000	5.955E+01
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19.6829334	60 to 100	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		4,459.89	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
Bounding		8,919.79	
Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.25		1.01
Bounding	0.50		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RU-1 (UALX LEU) URAGUAY
SNF ID #: 557
Fuel Units & Descr: 4 - ASSEMBLY
Heavy Metal Mass: BOL=2112kg, EOL=2.11kg
ROD Storage Site: SRS

¹Fuel decay start date: 1998
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 10 years

Estimated
Canister usage:
18"x10"
0.11

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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)
8.00E-02	1.20E-01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

Reactor Moderator	From SFD	Used	Basis for Parameter Differences: This Template was used for the following reasons. This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	19.81060606	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Nominal	0.00	1.89	
Bounding		3.79	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.00	448.40	
Bounding	0.01		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name 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

¹Fuel decay start date 1998
Estimates as of: 2010
Template ATR (Light Water, Alum., 60 to 100% U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0 00116689
Template Decay Time 10 years

Estimated
Canister usage
18"x10"
0 42

II. Estimates							Gamma Sources	
Radionuclide	m	x _n	x _b	b	y _n	y _b	Photon Energy Group	Total Photons/sec (bounding)
	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	2 8404E-10	7 10	14 21	0 00E+00	2 02E-09	4 03E-09	0 0150	1 932E+12
Am-241	1 4935E-03	7 10	14 21	0 00E+00	1 06E-02	2 12E-02	0 0250	4 066E+11
Am-242m	4 4390E-07	7 10	14 21	0 00E+00	3 15E-06	6 31E-06	0 0375	3 545E+11
Am-243	1 4913E-06	7 10	14 21	0 00E+00	1 06E-05	2 12E-05	0 0575	3 745E+11
C-14	5 7217E-09	7 10	14 21	0 00E+00	4 06E-08	8 13E-08	0 0850	2 278E+11
Cl-36	1 3124E-32	7 10	14 21	0 00E+00	9 32E-32	1 86E-31	0 1250	1 594E+11
Cm-243	2 0967E-07	7 10	14 21	0 00E+00	1 49E-06	2 98E-06	0 2250	1 957E+11
Cm-244	4 3001E-05	7 10	14 21	0 00E+00	3 05E-04	6 11E-04	0 3750	8 769E+10
Co-60	1 9798E-05	7 10	14 21	0 00E+00	1 41E-04	2 81E-04	0 5750	1 424E+12
Cs-134	9 0795E-02	7 10	14 21	0 00E+00	6 45E-01	1 29E+00	0 8500	6 944E+10
Cs-135	3 4477E-06	7 10	14 21	0 00E+00	2 45E-05	4 90E-05	1 2500	2 260E+10
Cs-137	2 5588E+00	7 10	14 21	0 00E+00	1 82E+01	3 63E+01	1 7500	8 252E+08
Eu-154	5 4847E-02	7 10	14 21	0 00E+00	3 90E-01	7 79E-01	2 2500	5 456E+07
Eu-155	1 9469E-02	7 10	14 21	0 00E+00	1 38E-01	2 77E-01	2 7500	7 613E+05
Fe-55	1 7797E-03	7 10	14 21	0 00E+00	1 26E-02	2 53E-02	3 5000	9 065E+04
H-3	8 0065E-03	7 10	14 21	0 00E+00	5 69E-02	1 14E-01	5 0000	1 246E+01
I-129	7 5300E-07	7 10	14 21	0 00E+00	5 35E-06	1 07E-05	7 0000	1 405E+00
Kr-85	2 0705E-01	7 10	14 21	0 00E+00	1 47E+00	2 94E+00	11 0000	1 594E-01
Np-237	9 5507E-06	7 10	14 21	0 00E+00	6 78E-05	1 36E-04		
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
	LIGHT WATER	LIGHT WATER	
Reactor Moderator			This Template was used for the following reasons This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19 81060606	60 to 100	

Burnup Summary (MWd)⁴

	From SFD	Estimated	Basis for burnup used in estimate
Nominal	0 02	7 10	
Bounding		14 21	

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0 00	448 40	1 00
Bounding	0 01		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: RV-1 (UALX LEU) VENEZUELA
 SNF ID #: 816
 Fuel Units & Descr: 56 - MTR TYPE
 Heavy Metal Mass: BOL=39 698kg; EOL=38 713kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1997
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 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		
Ti-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		
U-233	2.1650E-09	933.38	1,866.76	0.00E+00	2.02E-06	4.04E-06		
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		
U-238	-4.2851E-09	933.38	0.00	1.08E-02	1.08E-02	1.08E-02		
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		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
2.95E+01	5.91E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator Fuel Cladding BOL HM Constituents BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ALUM	ALUM	
	U	U	
	19.1126847	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Nominal Bounding	From SFD	Estimated	
		933.38 1,866.76	

Checks			Estimated EOL HM/Given EOL HM 1.00
Nominal Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0.07 0.15		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name SAPHIR U3Si2-LEU (SWITZERLAND)

SNF ID # 443

Fuel Units & Descr 39 - MTR TYPE

Heavy Metal Mass BOL=79 732kg EOL=71 191kg

ROD Storage Site SRS

Fuel decay start date 1993

Estimates as of 2010

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

Template Burnup(MWd) 367.2

Template BOL Heavy Metal Mass (MT) 0 00116689

Template Decay Time 15 years

Estimated
Canister usage
18"x10"
1 63

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4 5861E-10	8,088 49	16,176 99	0 00E+00	3 71E-06	7 42E-06	Avg MeV	
Am-241	1 7832E-03	8,088 49	16,176 99	0 00E+00	1 44E+01	2 88E+01	0 0150	1 930E+15
Am-242m	4 3410E-07	8,088 49	16,176 99	0 00E+00	3 51E-03	7 02E-03	0 0250	4 025E+14
Am-243	1 4907E-06	8,088 49	16,176 99	0 00E+00	1 21E-02	2 41E-02	0 0375	3 514E+14
C-14	5 7162E-09	8,088 49	16,176 99	0 00E+00	4 62E-05	9 25E-05	0 0575	3 747E+14
Cl-36	1 3124E-32	8,088 49	16,176 99	0 00E+00	1 06E-28	2 12E-28	0 0850	2 270E+14
Cm-243	1 8568E-07	8,088 49	16,176 99	0 00E+00	1 50E-03	3 00E-03	0 1250	1 558E+14
Cm-244	3 5512E-05	8,088 49	16,176 99	0 00E+00	2 87E-01	5 74E-01	0 2250	1 955E+14
Co-60	1 0261E-05	8,088 49	16,176 99	0 00E+00	8 30E-02	1 66E-01	0 3750	8 567E+13
Cs-134	1 6931E-02	8,088 49	16,176 99	0 00E+00	1 37E+02	2 74E+02	0 5750	1 391E+15
Cs-135	3 4477E-06	8,088 49	16,176 99	0 00E+00	2 79E-02	5 58E-02	0 8500	3 303E+13
Cs-137	2 2800E+00	8,088 49	16,176 99	0 00E+00	1 84E+04	3 69E+04	1 2500	1 668E+13
Eu-154	3 6656E-02	8,088 49	16,176 99	0 00E+00	2 96E+02	5 93E+02	1 7500	6 991E+11
Eu-155	9 6841E-03	8,088 49	16,176 99	0 00E+00	7 83E+01	1 57E+02	2 2500	8 746E+08
Fe-55	4 0697E-04	8,088 49	16,176 99	0 00E+00	3 80E+00	7 60E+00	2 7500	5 256E+07
H-3	6 0485E-03	8,088 49	16,176 99	0 00E+00	4 89E+01	9 78E+01	3 5000	3 341E+06
I-129	7 5300E-07	8,088 49	16,176 99	0 00E+00	6 09E-03	1 22E-02	5 0000	7 775E+03
Kr-85	1 4989E-01	8,088 49	16,176 99	0 00E+00	1 21E+03	2 42E+03	7 0000	8 612E+02
Np-237	9 5534E-06	8,088 49	16,176 99	0 00E+00	7 73E-02	1 55E-01	11.0000	9 672E+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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons
Fuel Cladding	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match
BOL HM Constituents	U	U	
BOL Enrichment %	19 83740991	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		8 088 49	Nominal burnup calculated from the heavy metal mass destroyed.
Bounding		16,176 99	Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.32		1.01
Bounding	0.64		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAPHIR UALX-HEU (SWITZERLAND)
 SNF ID #: 444
 Fuel Units & Descr: 76 - MTR TYPE
 Heavy Metal Mass: BOL=21 447kg, EOL=12kg
 ROD Storage Site: SRS

¹Fuel decay start date: 1993
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time: 15 years

Estimated
 Canister usage
 18"x10"
 317

II. Estimates	m	X _a	X _b	b	Y _a	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	8,946.30	17,892.61	0.00E+00	4.10E-06	8.21E-06	Avg MeV	
Am-241	1.7832E-03	8,946.30	17,892.61	0.00E+00	1.60E+01	3.19E+01	0.0150	2.134E+15
Am-242m	4.3410E-07	8,946.30	17,892.61	0.00E+00	3.88E-03	7.77E-03	0.0250	4.451E+14
Am-243	1.4907E-06	8,946.30	17,892.61	0.00E+00	1.33E-02	2.67E-02	0.0375	3.887E+14
C-14	5.7162E-09	8,946.30	17,892.61	0.00E+00	5.11E-05	1.02E-04	0.0575	4.145E+14
Cl-36	1.3124E-32	8,946.30	17,892.61	0.00E+00	1.17E-28	2.35E-28	0.0850	2.510E+14
Cm-243	1.8568E-07	8,946.30	17,892.61	0.00E+00	1.66E-03	3.32E-03	0.1250	1.721E+14
Cm-244	3.5512E-05	8,946.30	17,892.61	0.00E+00	3.18E-01	6.35E-01	0.2250	2.163E+14
Co-60	1.0261E-05	8,946.30	17,892.61	0.00E+00	9.18E-02	1.84E-01	0.3750	9.475E+13
Cs-134	1.6931E-02	8,946.30	17,892.61	0.00E+00	1.51E+02	3.03E+02	0.5750	1.538E+15
Cs-135	3.4477E-06	8,946.30	17,892.61	0.00E+00	3.08E-02	6.17E-02	0.8500	3.653E+13
Cs-137	2.2800E+00	8,946.30	17,892.61	0.00E+00	2.04E+04	4.08E+04	1.2500	1.845E+13
Eu-154	3.6656E-02	8,946.30	17,892.61	0.00E+00	3.28E+02	6.56E+02	1.7500	7.733E+11
Eu-155	9.6841E-03	8,946.30	17,892.61	0.00E+00	8.66E+01	1.73E+02	2.2500	9.674E+08
Fe-55	4.6977E-04	8,946.30	17,892.61	0.00E+00	4.20E+00	8.41E+00	2.7500	5.814E+07
H-3	6.0485E-03	8,946.30	17,892.61	0.00E+00	5.41E+01	1.08E+02	3.5000	3.695E+06
I-129	7.5300E-07	8,946.30	17,892.61	0.00E+00	6.74E-03	1.35E-02	5.0000	8.546E+03
Kr-85	1.4989E-01	8,946.30	17,892.61	0.00E+00	1.34E+03	2.68E+03	7.0000	9.465E+02
Np-237	9.5534E-06	8,946.30	17,892.61	0.00E+00	8.55E-02	1.71E-01	11.0000	1.063E+02
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-236	1.5493E-05	8,946.30	17,892.61	0.00E+00	1.39E-01	2.77E-01		
U-238	4.2851E-09	8,946.30	0.00	6.76E-04	6.38E-04	6.76E-04		
Y-90	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	90.62318257	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		8,946.30	
Bounding		17,892.61	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	1.33		
Bounding	2.65		1.05

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name 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

Fuel decay start date: 1993
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
*Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 15 years

Estimated
Canister usage
18"x10"
2.17

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Cv/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	4.5861E-10	6,795.81	13,591.62	0.00E+00	3.12E-06	6.23E-06	Avg MeV	
Am-241	1.7832E-03	6,795.81	13,591.62	0.00E+00	1.21E+01	2.42E+01	0.0150	1.621E+15
Am-242m	4.3410E-07	6,795.81	13,591.62	0.00E+00	2.95E-03	5.90E-03	0.0250	3.381E+14
Am-243	1.4907E-06	6,795.81	13,591.62	0.00E+00	1.01E-02	2.03E-02	0.0375	2.953E+14
C-14	5.7162E-09	6,795.81	13,591.62	0.00E+00	3.88E-05	7.77E-05	0.0575	3.148E+14
Cl-36	1.3124E-32	6,795.81	13,591.62	0.00E+00	8.92E-29	1.78E-28	0.0850	1.907E+14
Cm-243	1.8568E-07	6,795.81	13,591.62	0.00E+00	1.26E-03	2.52E-03	0.1250	1.307E+14
Cm-244	3.5512E-05	6,795.81	13,591.62	0.00E+00	2.41E-01	4.83E-01	0.2250	1.643E+14
Co-60	1.0261E-05	6,795.81	13,591.62	0.00E+00	6.97E-02	1.39E-01	0.3750	7.198E+13
Cs-134	1.6931E-02	6,795.81	13,591.62	0.00E+00	1.15E+02	2.30E+02	0.5750	1.168E+15
Cs-135	3.4477E-06	6,795.81	13,591.62	0.00E+00	2.34E-02	4.69E-02	0.8500	2.775E+13
Cs-137	2.2800E+00	6,795.81	13,591.62	0.00E+00	1.55E+04	3.10E+04	1.2500	1.402E+13
Eu-154	3.6656E-02	6,795.81	13,591.62	0.00E+00	2.49E+02	4.98E+02	1.7500	5.874E+11
Eu-155	9.6841E-03	6,795.81	13,591.62	0.00E+00	6.58E+01	1.32E+02	2.2500	7.348E+08
Fe-55	4.6977E-04	6,795.81	13,591.62	0.00E+00	3.19E+00	6.38E+00	2.7500	4.416E+07
H-3	6.0485E-03	6,795.81	13,591.62	0.00E+00	4.11E+01	8.22E+01	3.5000	2.807E+06
I-129	7.5300E-07	6,795.81	13,591.62	0.00E+00	5.12E-03	1.02E-02	5.0000	6.506E+03
Kr-85	1.4989E-01	6,795.81	13,591.62	0.00E+00	1.02E+03	2.04E+03	7.0000	7.206E+02
Np-237	9.5534E-06	6,795.81	13,591.62	0.00E+00	6.49E-02	1.30E-01	11.0000	8.092E+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-08	5.34E-08		
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		
Th-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator	From SFD LIGHT WATER	Used LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	45.07146122	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
	From SFD	Estimated	
Nominal		6.795.81	
Bounding		13,591.62	

Checks			Estimated EOL HM/Given EOL HM 1.01
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.60		
Bounding	1.20		

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

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

¹Fuel decay start date 1972
Estimates as of 2010
Template (Worst Case)
²Template Burnup(MWd), 62.5
Template BOL Heavy Metal Mass (MT) 0.00186865
Template Decay Time 35 years

Estimated
Canister usage:
18"x10"
0.78

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-06	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	1.060E+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+06
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-06	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		
Ti-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	Thermal Power	
U-233	3.6128E-04	95.69	95.69	0.00E+00	3.46E-02	3.46E-02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.2788E-02	95.69	95.69	0.00E+00	1.22E+00	1.22E+00	5.18E+02	6.22E+02
U-235	5.7486E-04	95.69	95.69	4.12E-02	9.62E-02	9.62E-02	Total	Total
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		
U-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

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

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		95.69	Nominal burnup set equal to bounding burnup
Bounding		95.69	Bounding burnup taken from SFD and converted to MWd using BOL=95.588kg

Checks

	Burnup Multiplier	Estimated Burnup/Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.03		1.40
Bounding	0.03		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAXTON (MOX ZR)
SNF ID #: 787
Fuel Units & Descr: 43 - ELEMENT
Heavy Metal Mass BOL= , EOL=239 88kg
ROD Storage Site INEEL

¹Fuel decay start date 1972
Estimates as of 2010

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

Estimated
Canister usage
18"x10"
1.34

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.3072E-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
Cf-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		
Sm-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		
Ti-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	1.55E+03	1.56E+03
U-235	5.7486E-04	240.13	240.13	1.03E-01	2.41E-01	2.41E-01	Total	Total
U-236	2.3485E-04	240.13	240.13	0.00E+00	5.64E-02	5.64E-02		
U-238	1.1581E-04	240.13	240.13	1.29E-02	4.07E-02	4.07E-02		
Y-90	1.9804E+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			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	(Worst Case)	This fuel didn't closely match any existing templates, therefore the worst case template was used
BOL HM Constituents	ZIRC	SST/Inconel	
BOL Enrichment %	Pu and U	U, Th, & Pu	
		0 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		240.13	Nominal burnup set equal to bounding burnup
Bounding		240.13	Bounding burnup taken from SFD and converted to MWd using BOL=240.132kg

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.03		1.40
Bounding	0.03		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SAXTON (UO2 SST)
SNF ID #: 882
Fuel Units & Descr: 20 - ELEMENT
Heavy Metal Mass: BOL= , EOL=10 402kg
ROD Storage Site: INEEL

¹Fuel decay start date: 1972
Estimates as of: 2010
Template: Pathfinder (Light Water, SST, 60 to 100%, U)
²Template Burnup(MWd): 6.01
Template BOL Heavy Metal Mass (MT): 0.00012882
Template Decay Time: 35 years

Estimated
Canister usage
18"x10"
0.69

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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		
Th-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		
U-233	3.1847E-09	16.67	16.67	0.00E+00	5.31E-08	5.31E-08		
U-234	3.8769E-07	16.67	16.67	0.00E+00	6.46E-06	6.46E-06		
U-235	-2.7761E-06	16.67	0.00	2.10E-02	2.10E-02	2.10E-02		
U-236	1.6190E-05	16.67	16.67	0.00E+00	2.70E-04	2.70E-04		
U-238	-2.8547E-09	16.67	0.00	2.28E-04	2.27E-04	2.28E-04		
Y-90	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			Basis for Parameter Differences*
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	SST	SST	
	U	U	
BOL HM Constituents		60 to 100	This fuel matches on all parameters except enrichment (unknown)
BOL Enrichment %			

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
		16.67	
Bounding		16.67	Nominal burnup set equal to bounding burnup Bounding burnup taken from SFD and converted to MWd using BOL=10 42kg

Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/Given Burnup	
	0.03		
Bounding	0.03		1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name SAXTON (UO2 ZR)
 SNF ID # 788
 Fuel Units & Descr 9 - ELEMENT
 Heavy Metal Mass BOL= , EOL=41.482kg
 ROD Storage Site INEEL

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

Estimated
 Canister usage
 18"x10"
 0.31

II. Estimates		m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	
Ac-227	8.7758E-10	66.48	66.48	0.00E+00	5.83E-08	5.83E-08	Avg MeV		
Am-241	1.4352E-01	66.48	66.48	0.00E+00	9.54E+00	9.54E+00	0.0150	3.577E+12	
Am-242m	2.8698E-04	66.48	66.48	0.00E+00	1.91E-02	1.91E-02	0.0250	7.213E+11	
Am-243	6.2565E-04	66.48	66.48	0.00E+00	4.16E-02	4.16E-02	0.0375	6.880E+11	
C-14	4.7901E-05	66.48	66.48	0.00E+00	3.18E-03	3.18E-03	0.0675	7.949E+11	
Cl-36	8.0297E-07	66.48	66.48	0.00E+00	5.34E-05	5.34E-05	0.0850	4.003E+11	
Cm-243	2.5081E-04	66.48	66.48	0.00E+00	1.67E-02	1.67E-02	0.1250	2.778E+11	
Cm-244	4.9015E-02	66.48	66.48	0.00E+00	3.26E+00	3.26E+00	0.2250	3.433E+11	
Co-60	2.5581E-03	66.48	66.48	0.00E+00	1.70E-01	1.70E-01	0.3750	1.476E+11	
Cs-134	4.0536E-05	66.48	66.48	0.00E+00	2.69E-03	2.69E-03	0.5750	3.433E+12	
Cs-135	1.4433E-05	66.48	66.48	0.00E+00	9.60E-04	9.60E-04	0.8500	4.749E+10	
Cs-137	1.3979E+00	66.48	66.48	0.00E+00	9.29E+01	9.29E+01	1.2500	4.665E+10	
Eu-154	2.0203E-02	66.48	66.48	0.00E+00	1.34E+00	1.34E+00	1.7500	1.397E+09	
Eu-155	1.7684E-03	66.48	66.48	0.00E+00	1.18E-01	1.18E-01	2.2500	2.251E+05	
Fe-55	4.3136E-05	66.48	66.48	0.00E+00	2.87E-03	2.87E-03	2.7500	4.609E+05	
H-3	2.0769E-02	66.48	66.48	0.00E+00	1.38E+00	1.38E+00	3.5000	4.752E+04	
I-129	9.8288E-07	66.48	66.48	0.00E+00	6.53E-05	6.53E-05	5.0000	2.032E+04	
Kr-85	2.8214E-02	66.48	66.48	0.00E+00	1.88E+00	1.88E+00	7.0000	2.342E+03	
Np-237	1.1218E-05	66.48	66.48	0.00E+00	7.46E-04	7.46E-04	11.0000	2.690E+02	
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			
Th-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			

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences ¹
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons
Fuel Cladding	ZIRC	ZIRC	This fuel matches on all parameters except enrichment (unknown)
BOL HM Constituents	U	U	
BOL Enrichment %		0 to 5	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal		66.48	Nominal burnup set equal to bounding burnup
Bounding		66.48	Bounding burnup taken from SFD and converted to MWd using BOL=41.552kg

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name SHIPPINGPORT PWR C1 BLKT (RODS)
 SNF ID # 189
 Fuel Units & Descr 2 - ROD
 Heavy Metal Mass BOL=16 891kg; EOL=16 108kg
 ROD Storage Site. INEEL

¹Fuel decay start date: 1959
 Estimates as of 2010
 Template PWR (Light Water, Zirc, 0 to 5%, U)
²Template Burnup(MWd): 61 92
 Template BOL Heavy Metal Mass (MT) 0 00176911
 Template Decay Time 50 years

Estimated
 Canister usage
 18"x15"
 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 0733E-09	744 60	1,489 19	0 00E+00	7.99E-07	1 60E-06	Avg MeV	
Am-241	1 4751E-01	744 60	1,489 19	0 00E+00	1 10E+02	2 20E+02	0 0150	5 666E+13
Am-242m	2 6809E-04	744 60	1,489 19	0 00E+00	2 00E-01	3 99E-01	0 0250	1 136E+13
Am-243	6 2484E-04	744 60	1,489 19	0 00E+00	4 65E-01	9 31E-01	0 0375	1.070E+13
C-14	4.7820E-05	744 60	1,489 19	0 00E+00	3 56E-02	7 12E-02	0 0575	1.339E+13
Cl-36	8 0297E-07	744 60	1,489 19	0 00E+00	5 98E-04	1 20E-03	0 0850	6.256E+12
Cm-243	1.7426E-04	744 60	1 489 19	0 00E+00	1.30E-01	2 60E-01	0 1250	4 162E+12
Cm-244	2.7616E-02	744 60	1,489 19	0 00E+00	2 06E+01	4 11E+01	0.2250	5.341E+12
Co-60	3 5610E-04	744 60	1,489 19	0 00E+00	2 65E-01	5 30E-01	0.3750	2.307E+12
Cs-134	2.6260E-07	744 60	1,489 19	0 00E+00	1 96E-04	3 91E-04	0.5750	5 432E+13
Cs-135	1 4433E-05	744 60	1,489 19	0 00E+00	1.07E-02	2 15E-02	0 8500	5.304E+11
Cs-137	9 8870E-01	744 60	1,489 19	0 00E+00	7 36E+02	1 47E+03	1.2500	3.375E+11
Eu-154	6 0320E-03	744 60	1,489 19	0 00E+00	4 49E+00	8 98E+00	1 7500	1 484E+10
Eu-155	2 1770E-04	744 60	1,489 19	0 00E+00	1 62E-01	3 24E-01	2.2500	2.439E+06
Fe-55	7 9296E-07	744 60	1,489 19	0 00E+00	5 90E-04	1 18E-03	2 7500	8.597E+06
H-3	8 9486E-03	744 60	1,489 19	0 00E+00	6 66E+00	1 33E+01	3.5000	6.133E+05
I-129	9 8288E-07	744 60	1,489 19	0 00E+00	7.32E-04	1 46E-03	5 0000	2 621E+05
Kr-85	1 0707E-02	744 60	1,489 19	0 00E+00	7 97E+00	1 59E+01	7 0000	3.020E+04
Np-237	1.1927E-05	744 60	1,489 19	0.00E+00	8 88E-03	1 78E-02	11 0000	3 467E+03
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		
Th-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	Thermal Power	
U-233	2 5856E-08	744 60	1,489 19	0 00E+00	1 93E-05	3 85E-05	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	5 2665E-05	744 60	1,489 19	0 00E+00	3 92E-02	7 84E-02	1.35E+01	2 69E+01
U-235	-1 4487E-06	744 60	0 00	2 60E-04	0 00E+00	2 60E-04	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences ¹
Reactor Moderator	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding		ZIRC	
BOL HM Constituents		U	
BOL Enrichment %	0 710999907	0 to 5	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		744 60	
Bounding	304 04	1 489 19	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	1.26		
Bounding	2.52	4 90	1 02

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name SLOWPOKE (HEU) CANADA
 SNF ID # 296
 Fuel Units & Descr 1 - 297 ROD ARRAY
 Heavy Metal Mass BOL=0.875kg EOL=0.87kg
 ROD Storage Site SRS
 Fuel decay start date 2010
 Estimates as of 2010
 Template ATR (Light Water, Alum., 60 to 100%, U)
 Template Burnup(MWd) 367.2
 Template BOL Heavy Metal Mass (MT) 0.00116689
 Template Decay Time 5 years

Estimated
 Canister usage
 18"x10"
 0.04

III. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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+06
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		
Ti-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	Thermal Power	
U-233	1.9564E-09	12.53	25.06	0.00E+00	2.45E-08	4.90E-08	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8371E-04	12.53	25.06	0.00E+00	2.30E-03	4.60E-03	6.35E-01	1.27E+00
U-235	-2.7235E-06	12.53	0.00	1.78E-03	1.75E-03	1.78E-03	Total	Total
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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	94.28571429	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal	12.53	4.74	Nominal burnup taken directly from SFD (converted to MWd)
Bounding		25.06	Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.05	0.38	0.99
Bounding	0.09		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: SLOWPOKE (HEU) CANADA
SNF ID #: 1065
Fuel Units & Descr: 1 - 297 ROD ARRAY
Heavy Metal Mass: BOL=0.875kg; EOL=0.87kg
ROD Storage Site: SRS

¹Fuel decay start date: 2010
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
²Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.0016689
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0.04

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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
Cr-243	2.3676E-07	12.53	25.06	0.00E+00	2.97E-06	5.93E-06	0.1250	5.217E+11
Cr-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+06
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		
Ti-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		

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 %	94.28571429	60 to 100	

Burnup Summary (MWd)¹

	From SFD	Estimated	Basis for burnup used in estimate*
Nominal	12.53	4.74	
Bounding		25.06	Nominal burnup taken directly from SFD (converted to MWd) Bounding burnup assumed to be twice nominal burnup

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.05	0.38	
Bounding	0.09		0.99

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name SPERT-III
 SNF ID # 209
 Fuel Units & Descr 3 - CANISTER OF SCRAP
 Heavy Metal Mass BOL= ; EOL=974kg
 ROD Storage Site INEEL
 Fuel decay start date 1966
 Estimates as of 2010
 Template: PWR (Light Water, Zirc, 0 to 5%, U)
 *Template Burnup(MWd) 61.92
 Template BOL Heavy Metal Mass (MT)* 0.00176911
 Template Decay Time* 35 years

Estimated
 Canister usage
 HIC
 1.00

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding 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	9,262.37	9,262.37	0.00E+00	8.13E-06	8.13E-06	Avg MeV	
Am-241	1.4352E-01	9,262.37	9,262.37	0.00E+00	1.33E+03	1.33E+03	0.0150	4.984E+14
Am-242m	2.8698E-04	9,262.37	9,262.37	0.00E+00	2.66E+00	2.66E+00	0.0250	1.005E+14
Am-243	6.2565E-04	9,262.37	9,262.37	0.00E+00	5.79E+00	5.79E+00	0.0375	9.585E+13
C-14	4.7901E-05	9,262.37	9,262.37	0.00E+00	4.44E-01	4.44E-01	0.0575	1.107E+14
Cl-36	8.0297E-07	9,262.37	9,262.37	0.00E+00	7.44E-03	7.44E-03	0.0850	5.576E+13
Cm-243	2.5081E-04	9,262.37	9,262.37	0.00E+00	2.32E+00	2.32E+00	0.1250	3.870E+13
Cm-244	4.9015E-02	9,262.37	9,262.37	0.00E+00	4.54E+02	4.54E+02	0.2250	4.782E+13
Co-60	2.5581E-03	9,262.37	9,262.37	0.00E+00	2.37E+01	2.37E+01	0.3750	2.056E+13
Cs-134	4.0536E-05	9,262.37	9,262.37	0.00E+00	3.75E-01	3.75E-01	0.5750	4.782E+14
Cs-135	1.4433E-05	9,262.37	9,262.37	0.00E+00	1.34E-01	1.34E-01	0.8500	6.616E+12
Cs-137	1.3979E+00	9,262.37	9,262.37	0.00E+00	1.29E+04	1.29E+04	1.2500	6.499E+12
Eu-154	2.0203E-02	9,262.37	9,262.37	0.00E+00	1.87E+02	1.87E+02	1.7500	1.946E+11
Eu-155	1.7684E-03	9,262.37	9,262.37	0.00E+00	1.64E+01	1.64E+01	2.2500	3.134E+07
Fe-55	4.3136E-05	9,262.37	9,262.37	0.00E+00	4.00E-01	4.00E-01	2.7500	6.420E+07
H-3	2.0769E-02	9,262.37	9,262.37	0.00E+00	1.92E+02	1.92E+02	3.5000	6.611E+06
I-129	9.8288E-07	9,262.37	9,262.37	0.00E+00	9.10E-03	9.10E-03	5.0000	2.826E+06
Kr-85	2.8214E-02	9,262.37	9,262.37	0.00E+00	2.61E+02	2.61E+02	7.0000	3.258E+05
Np-237	1.1218E-05	9,262.37	9,262.37	0.00E+00	1.04E-01	1.04E-01	11.0000	3.742E+04
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	1.1823E-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		
Th-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		

III. Template Selection Summary, Burnup Summary, and Checks

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

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup set equal to bounding burnup Bounding burnup estimated by assuming BOL heavy metal mass was twice EOL.
	From SFD	Estimated	
Nominal		9,262.37	
Bounding		9,262.37	

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: THOR (UALX-HEU) TAIWAN
SNF ID #: 629
Fuel Units & Descr: 35 - MTR TYPE
Heavy Metal Mass: BOL=5.061kg; EOL=4.098kg
ROD Storage Site: SRS

Fuel decay start date: 1997
Estimates as of: 2010
Template: TRIGA-AI (LW/U-Zrx, Alum, 10 to 20% U)
Template Burnup (MWd): 6.65
Template BOL Heavy Metal Mass (MT): 0.00018
Template Decay Time: 10 years

Estimated
Canister usage:
18"x10"
1.46

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.2892E-09	918.72	1,837.45	0.00E+00	1.18E-06	2.37E-06	Avg MeV	
Am-241	2.9429E-03	918.72	1,837.45	0.00E+00	2.70E+00	5.41E+00	0.0150	2.470E+14
Am-242m	1.9489E-06	918.72	1,837.45	0.00E+00	1.79E-03	3.58E-03	0.0250	5.166E+13
Am-243	2.3308E-07	918.72	1,837.45	0.00E+00	2.14E-04	4.28E-04	0.0375	6.101E+13
C-14	4.3278E-05	918.72	1,837.45	0.00E+00	3.98E-02	7.95E-02	0.0575	5.045E+13
Cl-36	4.3023E-08	918.72	1,837.45	0.00E+00	3.95E-05	7.91E-05	0.0850	3.279E+13
Cm-243	2.4286E-07	918.72	1,837.45	0.00E+00	2.23E-04	4.46E-04	0.1250	4.538E+13
Cm-244	2.6015E-06	918.72	1,837.45	0.00E+00	2.39E-03	4.78E-03	0.2250	2.879E+13
Co-60	1.6075E-02	918.72	1,837.45	0.00E+00	1.48E+01	2.95E+01	0.3750	1.185E+13
Cs-134	1.9323E-02	918.72	1,837.45	0.00E+00	1.78E+01	3.55E+01	0.5750	1.765E+14
Cs-135	3.1549E-05	918.72	1,837.45	0.00E+00	2.90E-02	5.80E-02	0.8500	3.215E+13
Cs-137	2.4556E+00	918.72	1,837.45	0.00E+00	2.26E+03	4.51E+03	1.2500	3.535E+13
Eu-154	9.0180E-01	918.72	1,837.45	0.00E+00	8.29E+02	1.66E+03	1.7500	1.014E+12
Eu-155	2.1810E-01	918.72	1,837.45	0.00E+00	2.00E+02	4.01E+02	2.2500	2.411E+09
Fe-55	2.2902E-03	918.72	1,837.45	0.00E+00	2.10E+00	4.21E+00	2.7500	4.728E+07
H-3	8.1609E-03	918.72	1,837.45	0.00E+00	7.50E+00	1.50E+01	3.5000	5.768E+06
I-129	7.3805E-07	918.72	1,837.45	0.00E+00	6.78E-04	1.36E-03	5.0000	1.041E+03
Kr-85	1.8256E-01	918.72	1,837.45	0.00E+00	1.68E+02	3.35E+02	7.0000	1.177E+02
Np-237	1.4505E-06	918.72	1,837.45	0.00E+00	1.33E-03	2.67E-03	11.0000	1.340E+01
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		
Th-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		
							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			Basis for Parameter Differences:
Reactor Moderator	From SFD LW AND U ZIRC HYDRIDE	Used LW AND U ZIRC HYDRIDE	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	93.16330608	10 to 20.1	This fuel matches on all parameters except enrichment.

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
Bounding		918.72 1,837.45	
			Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Bounding	4.91 9.83		
			1.01

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name TRR-1 (JALX-HEU) THAILAND
SNF ID # 633
Fuel Units & Descr 31 - MTR TYPE
Heavy Metal Mass BOL=5.295kg EOL=4 771kg
ROD Storage Site SRS

Fuel decay start date: 1998
Estimates as of 2010
Template TRIGA-AI (LW/U-Zrx, Alum, 10 to 20%, U)
Template Burnup(MWd): 6 65
Template BOL Heavy Metal Mass (MT) 0.00018
Template Decay Time 10 years

Estimated
Canister usage
18"x10"
1 29

II. Estimates							Gamma Sources	
	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	1.2892E-09	500 07	1,000 14	0 00E+00	6 45E-07	1.29E-06	0 0150	1.345E+14
Am-241	2 9429E-03	500 07	1,000 14	0 00E+00	1 47E+00	2 94E+00	0 0250	2.812E+13
Am-242m	1 9489E-06	500 07	1,000 14	0 00E+00	9 75E-04	1.95E-03	0 0375	3.321E+13
Am-243	2 3308E-07	500 07	1,000 14	0 00E+00	1.17E-04	2.33E-04	0 0575	2.746E+13
C-14	4.3278E-05	500 07	1,000 14	0 00E+00	2.16E-02	4.33E-02	0 0850	1.785E+13
Cl-36	4 3023E-08	500 07	1,000 14	0 00E+00	2.15E-05	4.30E-05	0 1250	2.470E+13
Cm-243	2 4266E-07	500 07	1,000 14	0 00E+00	1.21E-04	2 43E-04	0 2250	1.567E+13
Cm-244	2 6015E-06	500 07	1,000 14	0 00E+00	1.30E-03	2 60E-03	0 3750	6 448E+12
Co-60	1 6075E-02	500 07	1,000 14	0 00E+00	8 04E+00	1 61E+01	0 5750	9 606E+13
Cs-134	1 9323E-02	500 07	1,000 14	0 00E+00	9 66E+00	1.93E+01	0 8500	1.750E+13
Cs-135	3 1549E-05	500 07	1,000 14	0 00E+00	1.58E-02	3 16E-02	1.2500	1 924E+13
Cs-137	2 4556E+00	500 07	1,000 14	0 00E+00	1.23E+03	2 46E+03	1 7500	5 517E+11
Eu-154	9 0180E-01	500 07	1,000 14	0 00E+00	4.51E+02	9 02E+02	2.2500	1.313E+09
Eu-155	2 1820E-01	500 07	1,000 14	0 00E+00	1.09E+02	2.18E+02	2 7500	2.574E+07
Fe-55	2.2902E-03	500 07	1,000 14	0 00E+00	1.15E+00	2.29E+00	3 5000	3 140E+06
H-3	8 1609E-03	500 07	1,000 14	0 00E+00	4 08E+00	8 16E+00	5 0000	5 672E+02
I-129	7.3805E-07	500 07	1,000 14	0 00E+00	3 69E-04	7.38E-04	7 0000	6 411E+01
Kr-85	1 8256E-01	500 07	1,000 14	0 00E+00	9 13E+01	1 83E+02	11 0000	7.297E+00
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		
Th-208	1 9459E-08	500 07	1,000 14	0 00E+00	9 73E-06	1.95E-05		
U-232	5 3850E-08	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	8.98E-03	1 03E-02		
U-236	1.2719E-05	500 07	1,000 14	0 00E+00	6.36E-03	1.27E-02		
U-238	-3 8857E-08	500 07	0 00	1 80E-04	1.60E-04	1 80E-04		
Y-90	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences
	From SFD	Used	
Reactor Moderator	LW AND U ZIRC HYDRIDE	LW AND U ZIRC HYDRIDE	This Template was used for the following reasons: This fuel matches on all parameters except enrichment.
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	89 90758798	10 to 20 1	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		500 07	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding		1,000 14	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	2.56		1 00
Bounding	5 11		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 1996
Estimates as of: 2010

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

²Template Burnup(MWd): 367.2

Template BOL Heavy Metal Mass (MT): 0 00116689

Template Decay Time: 10 years

Estimated
Canister usage:
18"x10"
1 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	2 8404E-10	307 59	615 18	0 00E+00	8.74E-08	1 75E-07	Avg MeV	
Am-241	1 4935E-03	307 59	615 18	0 00E+00	4 59E-01	9 19E-01	0 0150	8.367E+13
Am-242m	4 4390E-07	307 59	615 18	0 00E+00	1.37E-04	2 73E-04	0 0250	1 761E+13
Am-243	1 4913E-06	307 59	615 18	0 00E+00	4.59E-04	9 17E-04	0 0375	1 535E+13
C-14	5 7217E-09	307 59	615 18	0 00E+00	1.76E-06	3 52E-06	0 0575	1 622E+13
Cl-36	1 3124E-32	307 59	615 18	0 00E+00	4 04E-30	8 07E-30	0 0850	9 867E+12
Cm-243	2 0967E-07	307 59	615 18	0 00E+00	6 45E-05	1 29E-04	0 1250	6 902E+12
Cm-244	4 3001E-05	307 59	615 18	0 00E+00	1.32E-02	2 65E-02	0 2250	8 473E+12
Co-60	1 9798E-05	307 59	615 18	0 00E+00	6.09E-03	1 22E-02	0 3750	3.798E+12
Cs-134	9 0795E-02	307 59	615 18	0 00E+00	2 79E+01	5 59E+01	0 5750	6 165E+13
Cs-135	3 4477E-06	307 59	615 18	0 00E+00	1 06E-03	2 12E-03	0 8500	3 007E+12
Cs-137	2 5588E+00	307 59	615 18	0 00E+00	7 87E+02	1 57E+03	1 2500	9 788E+11
Eu-154	5 4847E-02	307 59	615 18	0 00E+00	1 69E+01	3 37E+01	1 7500	3.574E+10
Eu-155	1 9469E-02	307 59	615 18	0 00E+00	5 99E+00	1 20E+01	2 2500	2.363E+09
Fe-55	1 7797E-03	307 59	615 18	0 00E+00	5 47E-01	1 09E+00	2 7500	3.297E+07
H-3	8 0065E-03	307 59	615 18	0 00E+00	2 46E+00	4 93E+00	3 5000	3 925E+06
I-129	7 5300E-07	307 59	615 18	0 00E+00	2 32E-04	4 63E-04	5 0000	3.264E+02
Kr-85	2 0705E-01	307 59	615 18	0 00E+00	6 37E+01	1 27E+02	7 0000	3 627E+01
Np-237	9 5507E-06	307 59	615 18	0 00E+00	2 94E-03	5 88E-03	11 0000	4 080E+00
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		
Ti-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		

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			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %:	93.40659341	60 to 100	

Burnup Summary (MWd) ³			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		307 59	
Bounding		615 18	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0 19		
Bounding	0 38		1 00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name UMRR (LEU) ROLLA
 SNF ID # 146
 Fuel Units & Descr 28 - 24 CURVED PLATES
 Heavy Metal Mass BOL=31 898kg, EOL=26 46kg
 ROD Storage Site SRS
 Fuel decay start date 2035
 Estimates as of 2010
 Template ATR (Light Water, Alum., 60 to 100%, U)
 Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT) 0 00116689
 Template Decay Time 5 years

Estimated
 Canister usage
 18"x10"
 0.78

II. Estimates	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	5,149 51	10,299 02	0 00E+00	7 49E-07	1 50E-06	Avg MeV	
Am-241	1 1190E-03	5,149 51	10,299 02	0 00E+00	5 76E+00	1 15E+01	0.0150	1.987E+15
Am-242m	4 5425E-07	5,149 51	10,299 02	0 00E+00	2.34E-03	4 68E-03	0.0250	4.281E+14
Am-243	1 4921E-06	5,149 51	10,299 02	0 00E+00	7.68E-03	1 54E-02	0.0375	3.950E+14
C-14	5 7244E-09	5,149 51	10,299 02	0 00E+00	2.95E-05	5 90E-05	0.0575	3.884E+14
Ct-36	1 3124E-32	5,149 51	10,299 02	0 00E+00	6.76E-29	1 35E-28	0.0850	2.476E+14
Cm-243	2 3676E-07	5,149 51	10,299 02	0 00E+00	1.22E-03	2 44E-03	0.1250	2.144E+14
Cm-244	5 2042E-05	5,149 51	10,299 02	0 00E+00	2 68E-01	5 36E-01	0.2250	2.099E+14
Co-60	3 8208E-05	5,149 51	10,299 02	0 00E+00	1 97E-01	3 94E-01	0.3750	1.016E+14
Cs-134	4 8693E-01	5,149 51	10,299 02	0 00E+00	2.51E+03	5 01E+03	0.5750	1.395E+15
Cs-135	3 4477E-06	5,149 51	10,299 02	0 00E+00	1 78E-02	3 55E-02	0.8500	1.954E+14
Cs-137	2 8731E+00	5,149 51	10,299 02	0 00E+00	1.48E+04	2 96E+04	1.2500	3.636E+13
Eu-154	8.2053E-02	5,149 51	10,299 02	0 00E+00	4.23E+02	8 45E+02	1.7500	1.525E+12
Eu-155	3 9134E-02	5,149 51	10,299 02	0 00E+00	2 02E+02	4 03E+02	2.2500	3.198E+12
Fe-55	6.7429E-03	5,149 51	10,299 02	0 00E+00	3 47E+01	6 94E+01	2.7500	1.840E+10
H-3	1 0599E-02	5,149 51	10,299 02	0 00E+00	5 46E+01	1 09E+02	3.5000	2.040E+09
I-129	7.5300E-07	5,149 51	10,299 02	0 00E+00	3 88E-03	7.76E-03	5.0000	6.119E+03
Kr-85	2 8595E-01	5,149 51	10,299 02	0 00E+00	1 47E+03	2 94E+03	7.0000	6.822E+02
Np-237	9 5479E-06	5,149 51	10,299 02	0 00E+00	4 92E-02	9 83E-02	11.0000	7.690E+01
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 0650E-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	Thermal Power	
U-233	1.9564E-09	5,149 51	10,299 02	0 00E+00	1 01E-05	2 01E-05	Nominal Heat	Bounding
U-234	1.8371E-04	5,149 51	10,299 02	0 00E+00	9 46E-01	1.89E+00	Output	Heat Output
U-235	-2 7235E-06	5,149 51	0 00	1.36E-02	0 00E+00	1.36E-02	(Watts)	(Watts)
U-236	1.5493E-05	5,149 51	10,299 02	0 00E+00	7 98E-02	1 60E-01	2 61E+02	5.22E+02
U-238	-4 2851E-09	5,149 51	0 00	8 60E-03	8.58E-03	8 60E-03	Total	Total
Y-90	2 7505E+00	5,149 51	10,299 02	0 00E+00	1 42E+04	2 83E+04		
Other Radionuclides					2 65E+04	5 30E+04		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD LIGHT WATER	Used LIGHT WATER	
Fuel Cladding:	ALUM	ALUM	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
BOL HM Constituents	U	U	
BOL Enrichment %	19 7500078	60 to 100	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
Bounding		5 149 51	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
		10,299 02	
Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Bounding	0.51		-1.02
	1.03		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name 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

Fuel decay start date: 2035
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
*Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
7.19

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	49.06	98.11	0.00E+00	7.14E-09	1.43E-08	Avg MeV	
Am-241	1.1190E-03	49.06	98.11	0.00E+00	5.49E-02	1.10E-01	0.0150	1.893E+13
Am-242m	4.5425E-07	49.06	98.11	0.00E+00	2.23E-05	4.46E-05	0.0250	4.078E+12
Am-243	1.4921E-06	49.06	98.11	0.00E+00	7.32E-05	1.46E-04	0.0375	3.763E+12
C-14	5.7244E-09	49.06	98.11	0.00E+00	2.81E-07	5.62E-07	0.0575	3.700E+12
Cl-36	1.3124E-32	49.06	98.11	0.00E+00	6.44E-31	1.29E-30	0.0850	2.359E+12
Cm-243	2.3676E-07	49.06	98.11	0.00E+00	1.16E-05	2.32E-05	0.1250	2.043E+12
Cm-244	5.2042E-05	49.06	98.11	0.00E+00	2.55E-03	5.11E-03	0.2250	1.999E+12
Co-60	3.8208E-05	49.06	98.11	0.00E+00	1.87E-03	3.75E-03	0.3750	9.677E+11
Cs-134	4.8693E-01	49.06	98.11	0.00E+00	2.39E+01	4.78E+01	0.5750	1.329E+13
Cs-135	3.4477E-06	49.06	98.11	0.00E+00	1.69E-04	3.38E-04	0.8500	1.862E+12
Cs-137	2.8731E+00	49.06	98.11	0.00E+00	1.41E+02	2.82E+02	1.2500	3.463E+11
Eu-154	8.2053E-02	49.06	98.11	0.00E+00	4.03E+00	8.05E+00	1.7500	1.452E+10
Eu-155	3.9134E-02	49.06	98.11	0.00E+00	1.92E+00	3.84E+00	2.2500	3.046E+10
Fe-55	6.7429E-03	49.06	98.11	0.00E+00	3.31E-01	6.62E-01	2.7500	1.753E+08
H-3	1.0599E-02	49.06	98.11	0.00E+00	5.20E-01	1.04E+00	3.5000	1.944E+07
I-129	7.5300E-07	49.06	98.11	0.00E+00	3.69E-05	7.39E-05	5.0000	5.844E+01
Kr-85	2.8595E-01	49.06	98.11	0.00E+00	1.40E+01	2.81E+01	7.0000	6.515E+00
Np-237	9.5479E-06	49.06	98.11	0.00E+00	4.68E-04	9.37E-04	11.0000	7.344E-01
Pa-231	8.9297E-10	49.06	98.11	0.00E+00	4.38E-08	8.76E-08		
Pb-210	3.7609E-12	49.06	98.11	0.00E+00	1.84E-10	3.69E-10		
Pm-147	2.5452E+00	49.06	98.11	0.00E+00	1.25E+02	2.50E+02		
Pu-238	2.0550E-02	49.06	98.11	0.00E+00	1.01E+00	2.02E+00		
Pu-239	4.2838E-04	49.06	98.11	0.00E+00	2.10E-02	4.20E-02		
Pu-240	2.4401E-04	49.06	98.11	0.00E+00	1.20E-02	2.39E-02		
Pu-241	6.8764E-02	49.06	98.11	0.00E+00	3.37E+00	6.75E+00		
Pu-242	3.6329E-07	49.06	98.11	0.00E+00	1.78E-05	3.56E-05		
Ra-226	3.8045E-11	49.06	98.11	0.00E+00	1.87E-09	3.73E-09		
Ra-228	2.9902E-15	49.06	98.11	0.00E+00	1.47E-13	2.93E-13		
Ru-106	1.9055E-01	49.06	98.11	0.00E+00	9.35E+00	1.87E+01		
Se-79	1.2936E-05	49.06	98.11	0.00E+00	6.35E-04	1.27E-03		
Sn-126	1.1574E-05	49.06	98.11	0.00E+00	5.68E-04	1.14E-03		
Sr-90	2.7505E+00	49.06	98.11	0.00E+00	1.35E+02	2.70E+02		
Tc-99	4.2239E-04	49.06	98.11	0.00E+00	2.07E-02	4.14E-02		
Th-229	1.8848E-12	49.06	98.11	0.00E+00	9.25E-11	1.85E-10		
Th-230	1.7042E-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		
Ti-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		

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 %	93.15	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	28.18	49.06	
Bounding		98.11	

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

Checks

	Burnup Multiplier	Estimated Burnup/ Given Burnup	Estimated EOL HM/Given EOL HM
Nominal	0.04	1.74	
Bounding	0.08		

1.00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name UNIV OF FLORIDA (ARGONAUT) LEU
SNF ID # 273
Fuel Units & Descr 14 - ELEMENT
Heavy Metal Mass BOL=0.995kg EOL=0.995kg
ROD Storage Site SRS

Fuel decay start date 2035
Estimates as of 2010
Template ATR (Light Water Alum, 60 to 100% U)
Template Burnup(MWd): 367.2
Template BOL Heavy Metal Mass (MT) 0.00116689
Template Decay Time 5 years

Estimated
Canister usage
18"x10"
0.58

II. Estimates	m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	0.60	1.19	0.00E+00	8.69E-11	1.74E-10	Avg MeV	
Am-241	1.1190E-03	0.60	1.19	0.00E+00	6.68E-04	1.34E-03	0.0150	2.305E+11
Am-242m	4.5425E-07	0.60	1.19	0.00E+00	2.71E-07	5.43E-07	0.0250	4.965E+10
Am-243	1.4921E-06	0.60	1.19	0.00E+00	8.91E-07	1.78E-06	0.0375	4.581E+10
C-14	5.7244E-09	0.60	1.19	0.00E+00	3.42E-09	6.84E-09	0.0575	4.505E+10
Cl-36	1.3124E-32	0.60	1.19	0.00E+00	7.84E-33	1.57E-32	0.0850	2.872E+10
Cm-243	2.3676E-07	0.60	1.19	0.00E+00	1.41E-07	2.83E-07	0.1250	2.487E+10
Cm-244	5.2042E-05	0.60	1.19	0.00E+00	3.11E-05	6.22E-05	0.2250	2.435E+10
Co-60	3.8208E-05	0.60	1.19	0.00E+00	2.28E-05	4.56E-05	0.3750	1.178E+10
Cs-134	4.8693E-01	0.60	1.19	0.00E+00	2.91E-01	5.82E-01	0.5750	1.618E+11
Cs-135	3.4477E-06	0.60	1.19	0.00E+00	2.06E-06	4.12E-06	0.8500	2.266E+10
Cs-137	2.8731E+00	0.60	1.19	0.00E+00	1.72E+00	3.43E+00	1.2500	4.217E+09
Eu-154	8.2053E-02	0.60	1.19	0.00E+00	4.90E-02	9.80E-02	1.7500	1.768E+08
Eu-155	3.9134E-02	0.60	1.19	0.00E+00	2.34E-02	4.67E-02	2.2500	3.709E+08
Fe-55	6.7429E-03	0.60	1.19	0.00E+00	4.03E-03	8.05E-03	2.7500	2.134E+06
H-3	1.0599E-02	0.60	1.19	0.00E+00	6.33E-03	1.27E-02	3.5000	2.366E+05
I-129	7.5300E-07	0.60	1.19	0.00E+00	4.50E-07	8.99E-07	5.0000	1.327E+00
Kr-85	2.8595E-01	0.60	1.19	0.00E+00	1.71E-01	3.42E-01	7.0000	1.502E-01
Np-237	9.5479E-06	0.60	1.19	0.00E+00	5.70E-06	1.14E-05	11.0000	1.710E-02
Pa-231	8.9297E-10	0.60	1.19	0.00E+00	5.33E-10	1.07E-09		
Pb-210	3.7609E-12	0.60	1.19	0.00E+00	2.25E-12	4.49E-12		
Pm-147	2.5452E+00	0.60	1.19	0.00E+00	1.52E+00	3.04E+00		
Pu-238	2.0550E-02	0.60	1.19	0.00E+00	1.23E-02	2.45E-02		
Pu-239	4.2838E-04	0.60	1.19	0.00E+00	2.56E-04	5.12E-04		
Pu-240	2.4401E-04	0.60	1.19	0.00E+00	1.46E-04	2.91E-04		
Pu-241	6.8764E-02	0.60	1.19	0.00E+00	4.11E-02	8.21E-02		
Pu-242	3.6329E-07	0.60	1.19	0.00E+00	2.17E-07	4.34E-07		
Ra-226	3.8045E-11	0.60	1.19	0.00E+00	2.27E-11	4.54E-11		
Ra-228	2.9902E-15	0.60	1.19	0.00E+00	1.79E-15	3.57E-15		
Ru-106	1.9055E-01	0.60	1.19	0.00E+00	1.14E-01	2.28E-01		
Se-79	1.2936E-05	0.60	1.19	0.00E+00	7.73E-06	1.55E-05		
Sn-126	1.1574E-05	0.60	1.19	0.00E+00	6.91E-06	1.38E-05		
Sr-90	2.7505E+00	0.60	1.19	0.00E+00	1.64E+00	3.29E+00		
Tc-99	4.2239E-04	0.60	1.19	0.00E+00	2.52E-04	5.05E-04		
Th-229	1.8848E-12	0.60	1.19	0.00E+00	1.13E-12	2.25E-12		
Th-230	1.7042E-08	0.60	1.19	0.00E+00	1.02E-08	2.04E-08		
Th-232	7.8132E-15	0.60	1.19	0.00E+00	4.67E-15	9.33E-15		
Ti-208	4.4063E-08	0.60	1.19	0.00E+00	2.63E-08	5.26E-08		
U-232	1.3151E-07	0.60	1.19	0.00E+00	7.85E-08	1.57E-07		
U-233	1.9564E-09	0.60	1.19	0.00E+00	1.17E-09	2.34E-09		
U-234	1.8371E-04	0.60	1.19	0.00E+00	1.10E-04	2.19E-04		
U-235	-2.7235E-06	0.60	0.00	4.27E-04	4.25E-04	4.27E-04		
U-236	-1.5493E-05	0.60	1.19	0.00E+00	9.25E-06	1.85E-05		
U-238	-4.2851E-09	0.60	0.00	2.68E-04	2.68E-04	2.68E-04		
Y-90	2.7505E+00	0.60	1.19	0.00E+00	1.64E+00	3.29E+00		
Other Radionuclides					3.07E+00	6.14E+00		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary

	From SFD	Used	Basis for Parameter Differences:
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons
Fuel Cladding	ALUM	ALUM	This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match
BOL HM Constituents	U	U	
BOL Enrichment %	19.8359342	60 to 100	

Burnup Summary (MWd)²

	From SFD	Estimated	Basis for burnup used in estimate:
Nominal	0.60		Nominal burnup taken directly from SFD (converted to MWd)
Bounding		1.19	Bounding burnup assumed to be twice nominal burnup

Checks

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

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 2035
Estimates as of: 2010

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

²Template Burnup(MWd): 367.2

Template BOL Heavy Metal Mass (MT) 0 00116689

Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
0 94

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1 4545E-10	270 47	540 94	0 00E+00	3 93E-08	7 87E-08	Avg. MeV	
Am-241	1 1190E-03	270 47	540 94	0 00E+00	3 03E-01	6 05E-01	0 0150	1 044E+14
Am-242m	4 5425E-07	270 47	540 94	0 00E+00	1 23E-04	2 46E-04	0 0250	2 248E+13
Am-243	1 4921E-06	270 47	540 94	0 00E+00	4 04E-04	8 07E-04	0 0375	2 075E+13
C-14	5 7244E-09	270 47	540 94	0 00E+00	1 55E-06	3 10E-06	0 0575	2 040E+13
Cl-36	1 3124E-32	270 47	540 94	0 00E+00	3 55E-30	7 10E-30	0 0850	1 301E+13
Cm-243	2 3676E-07	270 47	540 94	0 00E+00	6 40E-05	1 28E-04	0 1250	1 126E+13
Cm-244	5 2042E-05	270 47	540 94	0 00E+00	1 41E-02	2 82E-02	0 2250	1 102E+13
Co-60	3 8208E-05	270 47	540 94	0 00E+00	1 03E-02	2 07E-02	0 3750	5 336E+12
Cs-134	4 8693E-01	270 47	540 94	0 00E+00	1 32E+02	2 63E+02	0 5750	7 329E+13
Cs-135	3 4477E-06	270 47	540 94	0 00E+00	9 32E-04	1 86E-03	0 8500	1 026E+13
Cs-137	2 8731E+00	270 47	540 94	0 00E+00	7 77E+02	1 55E+03	1 2500	1 910E+12
Eu-154	8 2053E-02	270 47	540 94	0 00E+00	2 22E+01	4 44E+01	1 7500	8 008E+10
Eu-155	3 9134E-02	270 47	540 94	0 00E+00	1 06E+01	2 12E+01	2 2500	1 680E+11
Fe-55	6 7429E-03	270 47	540 94	0 00E+00	1 82E+00	3 65E+00	2 7500	9 663E+08
H-3	1 0599E-02	270 47	540 94	0 00E+00	2 87E+00	5 73E+00	3 5000	1 072E+08
I-129	7 5300E-07	270 47	540 94	0 00E+00	2 04E-04	4 07E-04	5 0000	3 207E+02
Kr-85	2 8595E-01	270 47	540 94	0 00E+00	7 73E+01	1 55E+02	7 0000	3 576E+01
Np-237	9 5479E-06	270 47	540 94	0 00E+00	2 58E-03	5 16E-03	11 0000	4 030E+00
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-08	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		
Ti-208	4 4063E-08	270 47	540 94	0 00E+00	1 19E-05	2 38E-05		
U-232	1 3151E-07	270 47	540 94	0 00E+00	3 56E-05	7 11E-05		
U-233	1 9564E-09	270 47	540 94	0 00E+00	5 29E-07	1 06E-06		
U-234	1 8371E-04	270 47	540 94	0 00E+00	4 97E-02	9 94E-02		
U-235	-2 7235E-06	270 47	0 00	9 63E-03	8 89E-03	9 63E-03		
U-236	1 5493E-05	270 47	540 94	0 00E+00	4 19E-03	8 38E-03		
U-238	-4 2851E-09	270 47	0 00	1 10E-04	1 09E-04	1 10E-04		
Y-90	2 7505E+00	270 47	540 94	0 00E+00	7 44E+02	1 49E+03		
Other Radionuclides					1 39E+03	2 78E+03		

Thermal Power	
Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
1 37E+01	2 74E+01
Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator:	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	93 16325044	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		270 47	
Bounding		540 94	Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0 18		
Bounding	0 36		1 00

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name UNIV OF MASS-LOWELL (LEU)
 SNF ID # 275
 Fuel Units & Descr 41 - 18 FLAT PLATES
 Heavy Metal Mass BOL=14.321kg EOL=14.321kg
 ROD Storage Site SRS

¹Fuel decay start date 2035
 Estimates as of 2010
 Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
 Template BOL Heavy Metal Mass (MT): 0.00116689
 Template Decay Time 5 years

Estimated
 Canister usage
 18"x10"
 1.14

II. Estimates	m	x _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	271.25	542.50	0.00E+00	3.95E-08	7.89E-08	Avg MeV	
Am-241	1.1190E-03	271.25	542.50	0.00E+00	3.04E-01	6.07E-01	0.0150	1.047E+14
Am-242m	4.5425E-07	271.25	542.50	0.00E+00	1.23E-04	2.46E-04	0.0250	2.255E+13
Am-243	1.4921E-06	271.25	542.50	0.00E+00	4.05E-04	8.09E-04	0.0375	2.081E+13
C-14	5.7244E-09	271.25	542.50	0.00E+00	1.55E-06	3.11E-06	0.0575	2.046E+13
Cl-36	1.3124E-32	271.25	542.50	0.00E+00	3.56E-30	7.12E-30	0.0850	1.304E+13
Cm-243	2.3676E-07	271.25	542.50	0.00E+00	6.42E-05	1.28E-04	0.1250	1.130E+13
Cm-244	5.2042E-05	271.25	542.50	0.00E+00	1.41E-02	2.82E-02	0.2250	1.105E+13
Co-60	3.8208E-05	271.25	542.50	0.00E+00	1.04E-02	2.07E-02	0.3750	5.351E+12
Cs-134	4.8693E-01	271.25	542.50	0.00E+00	1.32E+02	2.64E+02	0.5750	7.350E+13
Cs-135	3.4477E-06	271.25	542.50	0.00E+00	9.35E-04	1.87E-03	0.8500	1.029E+13
Cs-137	2.8731E+00	271.25	542.50	0.00E+00	7.79E+02	1.56E+03	1.2500	1.915E+12
Eu-154	8.2053E-02	271.25	542.50	0.00E+00	2.23E+01	4.45E+01	1.7500	8.031E+10
Eu-155	3.9134E-02	271.25	542.50	0.00E+00	1.06E+01	2.12E+01	2.2500	1.684E+11
Fe-55	6.7429E-03	271.25	542.50	0.00E+00	1.83E+00	3.66E+00	2.7500	9.691E+08
H-3	1.0599E-02	271.25	542.50	0.00E+00	2.88E+00	5.75E+00	3.5000	1.075E+08
I-129	7.5300E-07	271.25	542.50	0.00E+00	2.04E-04	4.09E-04	5.0000	3.302E+02
Kr-85	2.8595E-01	271.25	542.50	0.00E+00	7.76E+01	1.55E+02	7.0000	3.684E+01
Np-237	9.5479E-06	271.25	542.50	0.00E+00	2.59E-03	5.18E-03	11.0000	4.155E+00
Pa-231	8.9297E-10	271.25	542.50	0.00E+00	2.42E-07	4.84E-07		
Pb-210	3.7609E-12	271.25	542.50	0.00E+00	1.02E-09	2.04E-09		
Pm-147	2.5452E+00	271.25	542.50	0.00E+00	6.90E+02	1.38E+03		
Pu-238	2.0550E-02	271.25	542.50	0.00E+00	5.57E+00	1.11E+01		
Pu-239	4.2838E-04	271.25	542.50	0.00E+00	1.16E-01	2.32E-01		
Pu-240	2.4401E-04	271.25	542.50	0.00E+00	6.62E-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		
Ti-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	Thermal Power	
U-233	1.9564E-09	271.25	542.50	0.00E+00	5.31E-07	1.06E-06	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-234	1.8371E-04	271.25	542.50	0.00E+00	4.98E-02	9.97E-02	1.38E+01	2.75E+01
U-235	-2.7235E-06	271.25	0.00	6.10E-03	5.36E-03	6.10E-03	Total	Total
U-236	1.5493E-05	271.25	542.50	0.00E+00	4.20E-03	8.40E-03		
U-238	-4.2851E-09	271.25	0.00	3.86E-03	3.86E-03	3.86E-03		
Y-90	2.7505E+00	271.25	542.50	0.00E+00	7.46E+02	1.49E+03		
Other Radionuclides					1.40E+03	2.79E+03		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	
BOL HM Constituents	ALUM	ALUM	
BOL Enrichment %	U	U	
	19.71401492	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup assumed to be 2% of BOL heavy metal mass Bounding burnup assumed to be twice nominal burnup
	From SFD	Estimated	
Nominal		271.25	
Bounding		542.50	

Checks			Estimated EOL HM/Given EOL HM 0.98
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.06		
Bounding	0.12		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: UNIV OF MICHIGAN
SNF ID #: 276
Fuel Units & Descr: 130 - 18 CURVED PLATES
Heavy Metal Mass: BOL=100 854kg; EOL=89 882kg
ROD Storage Site: SRS

¹Fuel decay start date: 1992
Estimates as of: 2010
Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 15 years

Estimated
Canister usage:
18"x10"
5.42

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	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+06
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		
Th-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator: Fuel Cladding: BOL HM Constituents: BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ALUM	ALUM	
	U	U	
	19 7909823	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Nominal Bounding	From SFD	Estimated	
		10,390 70 20 781 39	

Checks			Estimated EOL HM/Given EOL HM 1 01
Nominal Bounding	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0 33 0 65		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name 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

¹Fuel decay start date 2035
 Estimates as of 2010
 Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
 Template BOL Heavy Metal Mass (MT) 0.00116689
 Template Decay Time 5 years

Estimated
 Canister usage
 18"x10"
 3 42

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	CI/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-10	1,708.42	3,416.85	0.00E+00	2.48E-07	4.97E-07	Avg MeV	
Am-241	1.1190E-03	1,708.42	3,416.85	0.00E+00	1.91E+00	3.82E+00	0.0150	6.592E+14
Am-242m	4.5425E-07	1,708.42	3,416.85	0.00E+00	7.76E-04	1.55E-03	0.0250	1.420E+14
Am-243	1.4921E-06	1,708.42	3,416.85	0.00E+00	2.55E-03	5.10E-03	0.0375	1.311E+14
C-14	5.7244E-09	1,708.42	3,416.85	0.00E+00	9.78E-06	1.96E-05	0.0575	1.289E+14
Cl-36	1.3124E-32	1,708.42	3,416.85	0.00E+00	2.24E-29	4.48E-29	0.0850	8.215E+13
Cm-243	2.3676E-07	1,708.42	3,416.85	0.00E+00	4.04E-04	8.09E-04	0.1250	7.114E+13
Cm-244	5.2042E-05	1,708.42	3,416.85	0.00E+00	8.89E-02	1.78E-01	0.2250	6.963E+13
Co-60	3.8208E-05	1,708.42	3,416.85	0.00E+00	6.53E-02	1.31E-01	0.3750	3.370E+13
Cs-134	4.8693E-01	1,708.42	3,416.85	0.00E+00	8.32E+02	1.66E+03	0.5750	4.629E+14
Cs-135	3.4477E-06	1,708.42	3,416.85	0.00E+00	5.89E-03	1.18E-02	0.8500	6.483E+13
Cs-137	2.8731E+00	1,708.42	3,416.85	0.00E+00	4.91E+03	9.82E+03	1.2500	1.206E+13
Eu-154	8.2053E-02	1,708.42	3,416.85	0.00E+00	1.40E+02	2.80E+02	1.7500	5.058E+11
Eu-155	3.9134E-02	1,708.42	3,416.85	0.00E+00	6.69E+01	1.34E+02	2.2500	1.061E+12
Fe-55	6.7429E-03	1,708.42	3,416.85	0.00E+00	1.15E+01	2.30E+01	2.7500	6.104E+09
H-3	1.0599E-02	1,708.42	3,416.85	0.00E+00	1.81E+01	3.62E+01	3.5000	6.769E+08
I-129	7.5300E-07	1,708.42	3,416.85	0.00E+00	1.29E-03	2.57E-03	5.0000	2.045E+03
Kr-85	2.8595E-01	1,708.42	3,416.85	0.00E+00	4.89E+02	9.77E+02	7.0000	2.281E+02
Np-237	9.5479E-06	1,708.42	3,416.85	0.00E+00	1.63E-02	3.26E-02	11.0000	2.571E+01
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		
Ti-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences: This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Reactor Moderator	From SFD LIGHT WATER	Used LIGHT WATER	
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19.74999113	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate: Nominal burnup calculated from the heavy metal mass destroyed Bounding burnup assumed to be twice nominal burnup
	From SFD	Estimated	
Nominal		1,708.42	
Bounding		3,416.85	

Checks			Estimated EOL HM/Given EOL HM 1.00
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.16		
Bounding	0.31		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

Fuel decay start date: 2035
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 5 years

Estimated
Canister usage:
18"x10"
9.38

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Cu/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.4545E-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-137	3.4477E-06	15,320.41	30,640.81	0.00E+00	5.28E-02	1.06E-01	0.8500	5.814E+14
Cs-137	2.8731E+00	15,320.41	30,640.81	0.00E+00	4.40E+04	8.80E+04	1.2500	1.082E+14
Eu-154	8.2053E-02	15,320.41	30,640.81	0.00E+00	1.26E+03	2.51E+03	1.7500	4.536E+12
Eu-155	3.9134E-02	15,320.41	30,640.81	0.00E+00	6.00E+02	1.20E+03	2.2500	9.514E+12
Fe-55	6.7429E-03	15,320.41	30,640.81	0.00E+00	1.03E+02	2.07E+02	2.7500	5.474E+10
H-3	1.0599E-02	15,320.41	30,640.81	0.00E+00	1.62E+02	3.25E+02	3.5000	6.070E+09
I-129	7.5300E-07	15,320.41	30,640.81	0.00E+00	1.15E-02	2.31E-02	5.0000	1.826E+04
Kr-85	2.8595E-01	15,320.41	30,640.81	0.00E+00	4.38E+03	8.76E+03	7.0000	2.037E+03
Np-237	9.5479E-06	15,320.41	30,640.81	0.00E+00	1.46E-01	2.93E-01	11.0000	2.296E+02
Pa-231	8.9297E-10	15,320.41	30,640.81	0.00E+00	1.37E-05	2.74E-05		
Pb-210	3.7609E-12	15,320.41	30,640.81	0.00E+00	5.76E-08	1.15E-07		
Pm-147	2.5452E+00	15,320.41	30,640.81	0.00E+00	3.90E+04	7.80E+04		
Pu-238	2.0550E-02	15,320.41	30,640.81	0.00E+00	3.15E+02	6.30E+02		
Pu-239	4.2838E-04	15,320.41	30,640.81	0.00E+00	6.56E+00	1.31E+01		
Pu-240	2.4401E-04	15,320.41	30,640.81	0.00E+00	3.74E+00	7.48E+00		
Pu-241	6.8764E-02	15,320.41	30,640.81	0.00E+00	1.05E+03	2.11E+03		
Pu-242	3.6329E-07	15,320.41	30,640.81	0.00E+00	5.57E-03	1.11E-02		
Ra-226	3.8045E-11	15,320.41	30,640.81	0.00E+00	5.83E-07	1.17E-06		
Ra-228	2.9902E-15	15,320.41	30,640.81	0.00E+00	4.58E-11	9.16E-11		
Ru-106	1.9055E-01	15,320.41	30,640.81	0.00E+00	2.92E+03	5.84E+03		
Se-79	1.2936E-05	15,320.41	30,640.81	0.00E+00	1.98E-01	3.96E-01		
Sn-126	1.1574E-05	15,320.41	30,640.81	0.00E+00	1.77E-01	3.55E-01		
Sr-90	2.7505E+00	15,320.41	30,640.81	0.00E+00	4.21E+04	8.43E+04		
Tc-99	4.2239E-04	15,320.41	30,640.81	0.00E+00	6.47E+00	1.29E+01		
Th-229	1.8848E-12	15,320.41	30,640.81	0.00E+00	2.89E-08	5.78E-08		
Th-230	1.7042E-08	15,320.41	30,640.81	0.00E+00	2.61E-04	5.22E-04		
Th-232	7.8132E-15	15,320.41	30,640.81	0.00E+00	1.20E-10	2.39E-10		
Ti-208	4.4063E-08	15,320.41	30,640.81	0.00E+00	6.75E-04	1.35E-03		
U-232	1.3151E-07	15,320.41	30,640.81	0.00E+00	2.01E-03	4.03E-03		
U-233	1.9564E-09	15,320.41	30,640.81	0.00E+00	3.00E-05	5.99E-05		
U-234	1.8371E-04	15,320.41	30,640.81	0.00E+00	2.81E+00	5.63E+00		
U-235	-2.7235E-06	15,320.41	0.00	8.12E-02	3.95E-02	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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents:	U	U	
BOL Enrichment %:	19.74999113	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		15,320.41	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding		30,640.81	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.26		1.01
Bounding	0.51		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name UNIV OF VIRGINIA (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

¹Fuel decay start date 1993
Estimates as of 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd) 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 15 years

Estimated
Canister usage
18"x10"
0.83

II. Estimates							Gamma Sources	
Radionuclide	m	x _a	x _b	b	y _a	y _b	Photon Energy Group	Total Photons/sec (bounding)
	C/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Avg MeV	
Ac-227	4.5861E-10	327.67	655.34	0.00E+00	1.50E-07	3.01E-07	0.0150	7.818E+13
Am-241	1.7832E-03	327.67	655.34	0.00E+00	5.84E-01	1.17E+00	0.0250	1.630E+13
Am-242m	4.3410E-07	327.67	655.34	0.00E+00	1.42E-04	2.84E-04	0.0375	1.424E+13
Am-243	1.4907E-06	327.67	655.34	0.00E+00	4.88E-04	9.77E-04	0.0575	1.518E+13
C-14	5.7162E-09	327.67	655.34	0.00E+00	1.87E-06	3.75E-06	0.0850	9.195E+12
Cl-36	1.3124E-32	327.67	655.34	0.00E+00	4.30E-30	8.60E-30	0.1250	6.304E+12
Cm-243	1.8568E-07	327.67	655.34	0.00E+00	6.08E-05	1.22E-04	0.2250	7.922E+12
Cm-244	3.5512E-05	327.67	655.34	0.00E+00	1.16E-02	2.33E-02	0.3750	3.470E+12
Co-60	1.0261E-05	327.67	655.34	0.00E+00	3.36E-03	6.72E-03	0.5750	5.633E+13
Cs-134	1.6931E-02	327.67	655.34	0.00E+00	5.55E+00	1.11E+01	0.8500	1.338E+12
Cs-135	3.4477E-06	327.67	655.34	0.00E+00	1.13E-03	2.26E-03	1.2500	6.759E+11
Cs-137	2.2800E+00	327.67	655.34	0.00E+00	7.47E+02	1.49E+03	1.7500	2.832E+10
Eu-154	3.6656E-02	327.67	655.34	0.00E+00	1.20E+01	2.40E+01	2.2500	3.543E+07
Eu-155	9.6841E-03	327.67	655.34	0.00E+00	3.17E+00	6.35E+00	2.7500	2.129E+06
Fe-55	4.6977E-04	327.67	655.34	0.00E+00	1.54E-01	3.08E-01	3.5000	1.354E+05
H-3	6.0485E-03	327.67	655.34	0.00E+00	1.98E+00	3.96E+00	5.0000	3.281E+02
I-129	7.5300E-07	327.67	655.34	0.00E+00	2.47E-04	4.93E-04	7.0000	3.640E+01
Kr-85	1.4989E-01	327.67	655.34	0.00E+00	4.91E+01	9.82E+01	11.0000	4.092E+00
Np-237	9.5534E-06	327.67	655.34	0.00E+00	3.13E-03	6.26E-03		
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		
Ti-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		
U-233	2.3739E-09	327.67	655.34	0.00E+00	7.78E-07	1.56E-06		
U-234	1.8423E-04	327.67	655.34	0.00E+00	6.04E-02	1.21E-01		
U-235	2.7235E-06	327.67	0.00	1.04E-02	9.50E-03	1.04E-02		
U-236	1.5493E-05	327.67	655.34	0.00E+00	5.08E-03	1.02E-02		
U-238	4.2851E-09	327.67	0.00	6.55E-03	6.55E-03	6.55E-03		
Y-90	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			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19.77478682	60 to 100	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		327.67	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup
Bounding		655.34	
Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	0.04		1.00
Bounding	0.09		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date 1966
 Estimates as of: 2010
 Template: ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup(MWd): 367.2
 Template BOL Heavy Metal Mass (MT): 0 0016689
 Template Decay Time: 35 years

Estimated
 Canister usage:
 18"x10"
 1.83

II. Estimates	m	x _a	x _b	b	y _a	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ³	Bounding Fuel Burnup (MWd) ³	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2 0068E-09	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 084E+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+06
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		
Th-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		

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences*
Reactor Moderator: Fuel Cladding: BOL HM Constituents: BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ALUM	ALUM	
	U	U	
	92 93756073	60 to 100	

Burnup Summary (MWd) ⁴			Basis for burnup used in estimate:
Nominal: Bounding:	From SFD	Estimated	
	230.24 280.84	1,012.55 2,025.11	

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

Checks			Estimated EOL HM/Given EOL HM
Nominal: Bounding:	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0.41 0.81	4.40 7.21	

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name VBWR (UO2)
SNF ID # 855
Fuel Units & Descr. 7 - ROD
Heavy Metal Mass BOL=6 578kg EOL=4.04kg
ROD Storage Site INEL

¹Fuel decay start date- 1962
Estimates as of 2010
Template PWR (Light Water, Zirc, 0 to 5%, U)
²Template Burnup(MWd): 61.92
Template BOL Heavy Metal Mass (MT) 0 00176911
Template Decay Time 35 years

Estimated
Canister usage
18"x10"
0 19

II. Estimates		m	x _n	x _b	b	y _n	y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Photon Energy Group	Total Photons/sec (bounding)	
Ac-227	8 7758E-10	2,413 71	4,827 42	0 00E+00	2 12E-06	4 24E-06	Avg MeV		
Am-241	1 4352E-01	2,413 71	4,827 42	0 00E+00	3 46E+02	6 93E+02	0 0150	2 597E+14	
Am-242m	2 8698E-04	2,413 71	4,827 42	0 00E+00	6 93E-01	1 39E+00	0 0250	5 238E+13	
Am-243	6 2565E-04	2,413 71	4,827 42	0 00E+00	1 51E+00	3 02E+00	0 0375	4 996E+13	
C-14	4 7901E-05	2,413 71	4,827 42	0 00E+00	1 16E-01	2 31E-01	0 0575	5 772E+13	
Cl-36	8 0297E-07	2,413 71	4,827 42	0 00E+00	1 94E-03	3 88E-03	0 0850	2 906E+13	
Cm-243	2 5081E-04	2,413 71	4,827 42	0 00E+00	6 05E-01	1 21E+00	0 1250	2 017E+13	
Cm-244	4 9015E-02	2,413 71	4,827 42	0 00E+00	1 18E+02	2 37E+02	0 2250	2 492E+13	
Co-60	2 5581E-03	2,413 71	4,827 42	0 00E+00	6 17E+00	1 23E+01	0 3750	1 072E+13	
Cs-134	4 0536E-05	2,413 71	4,827 42	0 00E+00	9 78E-02	1 96E-01	0 5750	2 493E+14	
Cs-135	1 4433E-05	2,413 71	4,827 42	0 00E+00	3 48E-02	6 97E-02	0 8500	3 448E+12	
Cs-137	1 3979E+00	2,413 71	4,827 42	0 00E+00	3 37E+03	6 75E+03	1 2500	3 387E+12	
Eu-154	2 0203E-02	2,413 71	4,827 42	0 00E+00	4 88E+01	9 75E+01	1 7500	1 014E+11	
Eu-155	1 7684E-03	2,413 71	4,827 42	0 00E+00	4 27E+00	8 54E+00	2 2500	1 633E+07	
Fe-55	4 3136E-05	2,413 71	4,827 42	0 00E+00	1 04E-01	2 08E-01	2 7500	3 346E+07	
H-3	2 0769E-02	2,413 71	4,827 42	0 00E+00	5 01E+01	1 00E+02	3 5000	3 445E+06	
I-129	9 8288E-07	2,413 71	4,827 42	0 00E+00	2 37E-03	4 74E-03	5 0000	1 473E+06	
Kr-85	2 8214E-02	2,413 71	4,827 42	0 00E+00	6 81E+01	1 36E+02	7 0000	1 698E+05	
Np-237	1 1218E-05	2,413 71	4,827 42	0 00E+00	2 71E-02	5 42E-02	11 0000	1 950E+04	
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			
Ti-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			

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator	From SFD	Used	
Fuel Cladding	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons
BOL HM Constituents	ZIRC	ZIRC	This fuel matches on all parameters except enrichment.
BOL Enrichment %	U	U	
	23 16820093	0 to 5	
Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		2 413 71	Nominal burnup calculated from the heavy metal mass destroyed
Bounding		4 827 42	Bounding burnup assumed to be twice nominal burnup
Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/ Given Burnup	
Nominal	10 48		1 03
Bounding	20 97		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: 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

¹Fuel decay start date: 2035
Estimates as of: 2010
Template ATR (Light Water, Alum, 60 to 100%, U)
²Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0 00116689
Template Decay Time: 5 years

Estimated
Canister usage
18"x10"
0 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	0.0008E-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+06
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		
Th-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+00	2.25E+00
							Total	Total

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
	From SFD	Used	
Reactor Moderator:	LIGHT WATER	LIGHT WATER	This Template was used for the following reasons: This fuel matches ATR Template on all but one parameter (enrichment) making ATR a reasonable match.
Fuel Cladding:	ALUM	ALUM	
BOL HM Constituents	U	U	
BOL Enrichment %	19 8630137	60 to 100	

Burnup Summary (MWd) ²			Basis for burnup used in estimate:
	From SFD	Estimated	
Nominal		22.16	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.
Bounding		44.32	

Checks			Estimated EOL HM/Given EOL HM
	Burnup Multiplier	Estimated Burnup/Given Burnup	
Nominal	0.00		1.00
Bounding	0.01		

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

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

Fuel Radionuclide Inventory Worksheet

I. Fuel and Template Information

Fuel Name: ZPRL (UALX-LEU) TAIWAN
SNF ID #: 554
Fuel Units & Descr: 35 - ASSEMBLY
Heavy Metal Mass: BOL=23.748kg EOL=23.348kg
ROD Storage Site: SRS
Fuel decay start date: 1997
Estimates as of: 2010
Template: ATR (Light Water, Alum., 60 to 100%, U)
Template Burnup (MWd): 367.2
Template BOL Heavy Metal Mass (MT): 0.00116689
Template Decay Time: 10 years

Estimated
Canister usage:
18"x10"
0.97

II. Estimates		m	X _n	X _b	b	Y _n	Y _b	Gamma Sources	
Radionuclide	Ci/MWd From Template	Nominal Fuel Burnup (MWd) ²	Bounding Fuel Burnup (MWd) ²	Initial Activity (Ci)	Nominal Fuel Inventories (Ci)	Bounding Fuel Inventories (Ci)	Photon Energy Group	Total Photons/sec (bounding) ²	
Ac-227	2.8404E-10	377.86	755.72	0.00E+00	1.07E-07	2.15E-07	Avg. MeV		
Am-241	1.4935E-03	377.86	755.72	0.00E+00	5.64E-01	1.13E+00	0.0150	1.028E+14	
Am-242m	4.4390E-07	377.86	755.72	0.00E+00	1.68E-04	3.35E-04	0.0250	2.163E+13	
Am-243	1.4913E-06	377.86	755.72	0.00E+00	5.63E-04	1.13E-03	0.0375	1.886E+13	
C-14	5.7217E-09	377.86	755.72	0.00E+00	2.16E-06	4.32E-06	0.0575	1.992E+13	
Cl-36	1.3124E-32	377.86	755.72	0.00E+00	4.96E-30	9.92E-30	0.0850	1.212E+13	
Cm-243	2.0967E-07	377.86	755.72	0.00E+00	7.92E-05	1.58E-04	0.1250	8.479E+12	
Cm-244	4.3001E-05	377.86	755.72	0.00E+00	1.62E-02	3.25E-02	0.2250	1.041E+13	
Co-60	1.9798E-05	377.86	755.72	0.00E+00	7.48E-03	1.50E-02	0.3750	4.665E+12	
Cs-134	9.0795E-02	377.86	755.72	0.00E+00	3.43E+01	6.86E+01	0.5750	7.573E+13	
Cs-135	3.4477E-06	377.86	755.72	0.00E+00	1.30E-03	2.61E-03	0.8500	3.694E+12	
Cs-137	2.5588E+00	377.86	755.72	0.00E+00	9.67E+02	1.93E+03	1.2500	1.202E+12	
Eu-154	5.4847E-02	377.86	755.72	0.00E+00	2.07E+01	4.14E+01	1.7500	4.390E+10	
Eu-155	1.9469E-02	377.86	755.72	0.00E+00	7.36E+00	1.47E+01	2.2500	2.903E+09	
Fe-55	1.7797E-03	377.86	755.72	0.00E+00	6.72E-01	1.34E+00	2.7500	4.050E+07	
H-3	8.0065E-03	377.86	755.72	0.00E+00	3.03E+00	6.05E+00	3.5000	4.822E+06	
I-129	7.5300E-07	377.86	755.72	0.00E+00	2.85E-04	5.69E-04	5.0000	4.153E+02	
Kr-85	2.0705E-01	377.86	755.72	0.00E+00	7.82E+01	1.56E+02	7.0000	4.620E+01	
Np-237	9.5507E-06	377.86	755.72	0.00E+00	3.61E-03	7.22E-03	11.0000	5.202E+00	
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-08	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			
Ti-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			

III. Template Selection Summary, Burnup Summary, and Checks

Template Selection Summary			Basis for Parameter Differences:
Reactor Moderator: Fuel Cladding: BOL HM Constituents: BOL Enrichment %	From SFD	Used	
	LIGHT WATER	LIGHT WATER	
	ALUM	ALUM	
	U	U	
	19.74998117	60 to 100	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			Basis for burnup used in estimate:
Nominal	From SFD	Estimated	
		377.86	
Bounding		755.72	Nominal burnup calculated from the heavy metal mass destroyed. Bounding burnup assumed to be twice nominal burnup.

Checks			Estimated EOL HM/Given EOL HM
Nominal	Burnup Multiplier	Estimated Burnup/ Given Burnup	
	0.05		
Bounding	0.10		1.00

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

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

2010 Summary, Totals for all Spent Fuels

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
				Avg. MeV
Ac-227	2.69E+02	3.17E+02		
Am-241	2.61E+06	3.74E+06	0.0150	3.390E+18
Am-242m	6.62E+03	1.04E+04	0.0250	7.048E+17
Am-243	5.45E+03	8.48E+03	0.0375	6.421E+17
C-14	2.93E+04	3.86E+04	0.0575	6.967E+17
Cl-36	5.09E+02	6.83E+02	0.0850	3.991E+17
Cm-243	1.80E+03	3.18E+03	0.1250	3.026E+17
Cm-244	2.55E+05	4.40E+05	0.2250	3.409E+17
Co-60	2.02E+07	2.60E+07	0.3750	1.527E+17
Cs-134	1.82E+06	3.26E+06	0.5750	2.613E+18
Cs-135	4.00E+02	5.77E+02	0.8500	1.631E+17
Cs-137	4.16E+07	6.52E+07	1.2500	1.975E+18
Eu-154	1.12E+06	1.76E+06	1.7500	2.158E+15
Eu-155	3.27E+05	5.65E+05	2.2500	1.595E+15
Fe-55	3.13E+06	5.33E+06	2.7500	1.728E+15
H-3	2.87E+05	4.40E+05	3.5000	1.220E+12
I-129	2.23E+01	3.28E+01	5.0000	2.831E+09
Kr-85	2.05E+06	3.44E+06	7.0000	3.258E+08
Np-237	1.99E+02	3.10E+02	11.0000	3.739E+07
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		
Ti-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		

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)	Gamma Sources	
			Photon	Total
			Energy Group	Photons/sec (bounding)
Ac-227	2.99E+00	6.87E+00	Avg MeV	
Am-241	1.29E+06	1.78E+06	0.0150	1.483E+18
Am-242m	2.77E+03	3.82E+03	0.0250	3.101E+17
Am-243	2.61E+03	3.61E+03	0.0375	2.806E+17
C-14	2.26E+04	2.92E+04	0.0575	3.072E+17
Cl-36	4.18E+02	5.42E+02	0.0850	1.751E+17
Cm-243	2.33E+02	3.51E+02	0.1250	1.417E+17
Cm-244	4.70E+04	6.71E+04	0.2250	1.491E+17
Co-60	1.51E+07	1.70E+07	0.3750	6.826E+16
Cs-134	9.86E+05	1.95E+06	0.5750	1.040E+18
Cs-135	9.74E+01	1.47E+02	0.8500	9.240E+16
Cs-137	1.43E+07	2.49E+07	1.2500	1.289E+18
Eu-154	6.53E+05	9.96E+05	1.7500	1.080E+15
Eu-155	1.55E+05	2.73E+05	2.2500	1.092E+15
Fe-55	1.00E+06	1.15E+06	2.7500	3.961E+13
H-3	1.09E+05	1.56E+05	3.5000	7.412E+11
I-129	5.20E+00	8.83E+00	5.0000	4.408E+08
Kr-85	9.32E+05	1.71E+06	7.0000	5.059E+07
Np-237	7.46E+01	1.26E+02	11.0000	5.796E+06
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		
Ti-208	3.98E+02	9.40E+02		
U-232	1.08E+03	2.54E+03		
U-233	1.85E+03	1.96E+03	Thermal Power	
U-234	3.89E+03	5.18E+03	Nominal Heat	
U-235	1.09E+02	1.51E+02	Output (Watts)	Bounding Heat Output (Watts)
U-236	1.11E+02	1.82E+02	4.95E+05	7.03E+05
U-238	2.69E+01	3.34E+01	Total	Total
Y-90	1.33E+07	2.32E+07		
Other Radionuclides	2.58E+07	4.24E+07		

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)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
			Avg. MeV	
Ac-227	2.42E+02	2.53E+02		
Am-241	4.51E+05	6.92E+05	0.0150	1.119E+18
Am-242m	2.49E+03	4.52E+03	0.0250	2.333E+17
Am-243	1.32E+03	2.21E+03	0.0375	2.145E+17
C-14	3.98E+03	4.45E+03	0.0575	2.230E+17
Cl-36	5.00E+01	5.77E+01	0.0850	1.335E+17
Cm-243	1.02E+03	1.91E+03	0.1250	9.930E+16
Cm-244	1.11E+05	1.98E+05	0.2250	1.138E+17
Co-60	4.60E+06	7.96E+06	0.3750	5.080E+16
Cs-134	8.22E+05	1.29E+06	0.5750	9.122E+17
Cs-135	1.96E+02	2.76E+02	0.8500	6.058E+16
Cs-137	1.54E+07	2.26E+07	1.2500	6.055E+17
Eu-154	3.31E+05	5.30E+05	1.7500	7.656E+14
Eu-155	1.48E+05	2.56E+05	2.2500	5.023E+14
Fe-55	2.12E+06	4.16E+06	2.7500	1.322E+15
H-3	1.13E+05	1.73E+05	3.5000	4.742E+11
I-129	9.51E+00	1.30E+01	5.0000	1.263E+09
Kr-85	7.52E+05	1.13E+06	7.0000	1.454E+08
Np-237	5.14E+01	7.84E+01	11.0000	1.670E+07
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	Thermal Power	
U-234	5.16E+03	5.49E+03	Nominal Heat	
U-235	2.20E+01	3.15E+01	Output (Watts)	Bounding Heat Output (Watts)
U-236	7.84E+01	1.06E+02	3.26E+05	4.89E+05
U-238	4.20E+01	4.30E+01	Total	Total
Y-90	1.31E+07	1.83E+07		
Other Radionuclides	1.88E+07	2.76E+07		

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	0.0	1446.1	0.0	0.0	0.0	0.0
Bare Fuel Transfers						
	0	Assemblies				

2010 Summary, Totals for 24" x 10' Canister

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
			Avg MeV	
Ac-227	6.43E-04	1.29E-03		
Am-241	1.94E+03	3.89E+03	0.0150	2.047E+17
Am-242m	4.11E-01	8.23E-01	0.0250	4.256E+16
Am-243	1.44E+00	2.89E+00	0.0375	3.712E+16
C-14	5.54E-03	1.11E-02	0.0575	3.976E+16
Cl-36	1.27E-26	2.54E-26	0.0850	2.402E+16
Cm-243	1.59E-01	3.19E-01	0.1250	1.626E+16
Cm-244	2.84E+01	5.69E+01	0.2250	2.073E+16
Co-60	5.16E+00	1.03E+01	0.3750	9.024E+15
Cs-134	3.06E+03	6.12E+03	0.5750	1.472E+17
Cs-135	3.34E+00	6.68E+00	0.8500	2.489E+15
Cs-137	1.97E+06	3.94E+06	1.2500	1.421E+15
Eu-154	2.38E+04	4.75E+04	1.7500	6.522E+13
Eu-155	4.67E+03	9.34E+03	2.2500	5.721E+09
Fe-55	1.20E+02	2.40E+02	2.7500	3.234E+09
H-3	4.43E+03	8.86E+03	3.5000	1.486E+07
I-129	7.30E-01	1.46E+00	5.0000	8.401E+05
Kr-85	1.05E+05	2.10E+05	7.0000	9.274E+04
Np-237	9.26E+00	1.85E+01	11.0000	1.039E+04
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		
Ti-208	4.46E-02	8.92E-02		
U-232	1.22E-01	2.44E-01		
U-233	2.50E-03	5.01E-03	Thermal Power	
U-234	1.79E+02	3.58E+02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	4.64E+00	7.28E+00	2.31E+04	4.62E+04
U-236	1.50E+01	3.00E+01	Total	Total
U-238	8.14E-02	8.55E-02		
Y-90	1.87E+06	3.73E+06		
Other Radionuclides	1.87E+06	3.75E+06		

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	00	00	1653	00	00	00

Bare Fuel Transfers	
0	Assemblies

2010 Summary, Totals for 24" x 15' Canister

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
			Avg. MeV	
Ac-227	2.35E+01	4.15E+01		
Am-241	6.30E+01	1.11E+02	0.0150	5.208E+16
Am-242m	4.37E-01	7.72E-01	0.0250	1.075E+16
Am-243	8.78E-02	1.55E-01	0.0375	9.202E+15
C-14	2.61E+01	4.60E+01	0.0575	1.004E+16
Cl-36	5.10E-01	9.01E-01	0.0850	6.368E+15
Cm-243	1.10E-01	1.94E-01	0.1250	4.078E+15
Cm-244	5.84E+00	1.03E+01	0.2250	5.685E+15
Co-60	9.17E+02	1.62E+03	0.3750	2.307E+15
Cs-134	2.08E+02	3.67E+02	0.5750	3.494E+16
Cs-135	8.06E+00	1.42E+01	0.8500	6.914E+14
Cs-137	5.24E+05	9.26E+05	1.2500	4.374E+14
Eu-154	5.42E+03	9.58E+03	1.7500	4.170E+13
Eu-155	7.52E+02	1.33E+03	2.2500	1.679E+09
Fe-55	9.32E+00	1.65E+01	2.7500	2.688E+14
H-3	1.05E+03	1.86E+03	3.5000	1.091E+06
I-129	4.46E-01	7.89E-01	5.0000	3.394E+05
Kr-85	3.37E+04	5.95E+04	7.0000	2.540E+04
Np-237	3.52E-02	6.23E-02	11.0000	2.006E+03
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		
Ti-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		

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HKC	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)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	1.00E+00	1.50E+01	Avg MeV	
Am-241	2.81E+04	3.20E+04	0.0150	4.614E+16
Am-242m	3.41E+02	3.50E+02	0.0250	9.605E+15
Am-243	8.99E+01	1.08E+02	0.0375	8.867E+15
C-14	2.40E+01	4.11E+01	0.0575	9.243E+15
Cl-36	3.43E-01	6.73E-01	0.0850	5.516E+15
Cm-243	1.20E+02	1.29E+02	0.1250	3.708E+15
Cm-244	7.27E+03	9.24E+03	0.2250	4.723E+15
Co-60	8.70E+03	1.05E+04	0.3750	2.054E+15
Cs-134	5.23E+03	5.46E+03	0.5750	4.077E+16
Cs-135	1.42E+01	1.95E+01	0.8500	8.119E+14
Cs-137	7.21E+05	1.09E+06	1.2500	1.189E+15
Eu-154	1.04E+04	1.49E+04	1.7500	2.680E+13
Eu-155	1.08E+04	1.14E+04	2.2500	2.990E+11
Fe-55	1.58E+03	2.18E+03	2.7500	9.729E+13
H-3	5.66E+03	7.28E+03	3.5000	1.918E+09
I-129	4.44E-01	7.40E-01	5.0000	5.858E+07
Kr-85	2.92E+04	5.10E+04	7.0000	6.746E+06
Np-237	1.91E+00	2.27E+00	11.0000	7.744E+05
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		
Ti-208	1.84E+02	2.77E+03		
U-232	4.99E+02	7.50E+03		
U-233	1.16E+03	1.20E+03	Thermal Power	
U-234	1.64E+01	1.55E+02	Nominal Heat	
U-235	1.77E-01	3.83E-01	Output (Watts)	Bounding Heat Output (Watts)
U-236	2.39E+00	2.66E+00	8.99E+03	1.54E+04
U-238	4.32E-01	4.95E-01	Total	Total
Y-90	4.54E+05	8.08E+05		
Other Radionuclides	7.26E+05	1.12E+06		

Total Canister Usage Summary						
	18" x 10'	18" x 15'	24" x 10'	24" x 15'	HIC	MCO
Number of Canisters	00	00	00	00	162.4	00

Bare Fuel Transfers	
0	Assemblies

2010 Summary, Totals for MCO

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
			Avg. MeV	
Ac-227	2.52E-03	3.18E-03	0.0150	3.251E+17
Am-241	5.51E+05	6.77E+05	0.0250	6.632E+16
Am-242m	4.21E+02	5.84E+02	0.0375	6.163E+16
Am-243	5.06E+02	8.08E+02	0.0575	7.046E+16
C-14	4.87E+02	5.69E+02	0.0850	3.682E+16
Cl-36	3.48E-01	6.96E-01	0.1250	2.461E+16
Cm-243	1.09E+02	2.18E+02	0.2250	3.159E+16
Cm-244	2.36E+04	4.51E+04	0.3750	1.366E+16
Co-60	1.43E+03	2.58E+03	0.5750	2.979E+17
Cs-134	8.87E+01	1.16E+02	0.8500	3.191E+15
Cs-135	5.73E+01	7.02E+01	1.2500	2.011E+15
Cs-137	6.66E+06	8.06E+06	1.7500	8.934E+13
Eu-154	4.24E+04	5.56E+04	2.2500	8.684E+09
Eu-155	2.24E+03	3.20E+03	2.7500	6.150E+09
Fe-55	3.33E+01	5.39E+01	3.5000	7.413E+08
H-3	1.97E+04	3.01E+04	5.0000	3.163E+08
I-129	4.78E+00	5.78E+00	7.0000	3.636E+07
Kr-85	1.48E+05	1.78E+05	11.0000	4.171E+06
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		

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)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
			Avg MeV	
Ac-227	4.09E-02	8.16E-02		
Am-241	2.88E+05	5.50E+05	0.0150	1.601E+17
Am-242m	5.95E+02	1.13E+03	0.0250	3.218E+16
Am-243	9.30E+02	1.74E+03	0.0375	3.017E+16
C-14	2.14E+03	4.26E+03	0.0575	3.705E+16
Cl-36	4.02E+01	8.03E+01	0.0850	1.777E+16
Cm-243	3.12E+02	5.71E+02	0.1250	1.301E+16
Cm-244	6.58E+04	1.21E+05	0.2250	1.528E+16
Co-60	4.91E+05	9.82E+05	0.3750	6.558E+15
Cs-134	6.44E+02	1.21E+03	0.5750	1.395E+17
Cs-135	2.29E+01	4.32E+01	0.8500	2.970E+15
Cs-137	2.02E+06	3.76E+06	1.2500	7.509E+16
Eu-154	5.57E+04	1.06E+05	1.7500	8.912E+13
Eu-155	5.88E+03	1.11E+04	2.2500	3.915E+11
Fe-55	5.42E+03	1.08E+04	2.7500	1.213E+11
H-3	3.40E+04	6.32E+04	3.5000	1.758E+09
I-129	1.21E+00	2.24E+00	5.0000	7.513E+08
Kr-85	5.37E+04	1.00E+05	7.0000	8.657E+07
Np-237	1.40E+01	2.59E+01	11.0000	9.941E+06
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		
Ti-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		

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	00	00	00	00	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)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
			Avg. MeV	
Ac-227	2.98E-03	5.93E-03	0.0150	1.587E+18
Am-241	2.32E+04	4.51E+04	0.0250	3.374E+17
Am-242m	1.46E+01	2.88E+01	0.0375	3.067E+17
Am-243	4.31E+01	7.70E+01	0.0575	3.099E+17
C-14	3.46E+01	6.92E+01	0.0850	1.940E+17
Cl-36	6.27E-01	1.25E+00	0.1250	1.562E+17
Cm-243	8.86E+00	1.57E+01	0.2250	1.652E+17
Cm-244	5.57E+03	9.19E+03	0.3750	7.699E+16
Co-60	9.04E+03	1.80E+04	0.5750	1.158E+18
Cs-134	1.73E+06	3.09E+06	0.8500	1.263E+17
Cs-135	2.18E+01	4.23E+01	1.2500	2.825E+16
Cs-137	1.36E+07	2.64E+07	1.7500	1.062E+15
Eu-154	3.86E+05	7.26E+05	2.2500	1.545E+15
Eu-155	1.72E+05	3.17E+05	2.7500	1.016E+13
Fe-55	9.85E+04	1.81E+05	3.5000	1.152E+12
H-3	4.29E+04	8.26E+04	5.0000	6.245E+07
I-129	4.07E+00	7.94E+00	7.0000	7.158E+06
Kr-85	1.10E+06	2.11E+06	11.0000	8.195E+05
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		
Ti-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		

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)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	0.00E+00	0.00E+00	Avg. MeV	
Am-241	0.00E+00	0.00E+00	0.0150	0.000E+00
Am-242m	0.00E+00	0.00E+00	0.0250	0.000E+00
Am-243	0.00E+00	0.00E+00	0.0375	0.000E+00
C-14	0.00E+00	0.00E+00	0.0575	0.000E+00
Cl-36	0.00E+00	0.00E+00	0.0850	0.000E+00
Cm-243	0.00E+00	0.00E+00	0.1250	0.000E+00
Cm-244	0.00E+00	0.00E+00	0.2250	0.000E+00
Co-60	0.00E+00	0.00E+00	0.3750	0.000E+00
Cs-134	0.00E+00	0.00E+00	0.5750	0.000E+00
Cs-135	0.00E+00	0.00E+00	0.8500	0.000E+00
Cs-137	0.00E+00	0.00E+00	1.2500	0.000E+00
Eu-154	0.00E+00	0.00E+00	1.7500	0.000E+00
Eu-155	0.00E+00	0.00E+00	2.2500	0.000E+00
Fe-55	0.00E+00	0.00E+00	2.7500	0.000E+00
H-3	0.00E+00	0.00E+00	3.5000	0.000E+00
I-129	0.00E+00	0.00E+00	5.0000	0.000E+00
Kr-85	0.00E+00	0.00E+00	7.0000	0.000E+00
Np-237	0.00E+00	0.00E+00	11.0000	0.000E+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		
Ti-208	0.00E+00	0.00E+00		
Ti-232	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		

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	00	00	00	00	00	00
Bare Fuel Transfers						
	0	Assemblies				

2010 Summary, DBE category: Non-Metals, Intact

Radionuclide	Nominal Fuel Inventories(Ci)	Bounding Fuel Inventories(Ci)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
Ac-227	2.68E+02	3.01E+02	Avg. MeV	
Am-241	1.07E+06	2.02E+06	0.0150	1.068E+18
Am-242m	3.73E+03	7.21E+03	0.0250	2.186E+17
Am-243	2.94E+03	5.58E+03	0.0375	2.003E+17
C-14	1.12E+04	1.97E+04	0.0575	2.284E+17
Cl-36	2.01E+02	3.60E+02	0.0850	1.239E+17
Cm-243	1.42E+03	2.66E+03	0.1250	8.677E+16
Cm-244	1.87E+05	3.42E+05	0.2250	1.068E+17
Co-60	2.57E+06	4.61E+06	0.3750	4.590E+16
Cs-134	6.01E+04	1.14E+05	0.5750	8.870E+17
Cs-135	2.30E+02	3.62E+02	0.8500	2.135E+16
Cs-137	1.50E+07	2.36E+07	1.2500	3.545E+17
Eu-154	3.01E+05	5.35E+05	1.7500	6.662E+14
Eu-155	8.96E+04	1.67E+05	2.2500	1.773E+13
Fe-55	8.47E+04	1.63E+05	2.7500	1.620E+15
H-3	1.32E+05	2.26E+05	3.5000	4.350E+10
I-129	1.06E+01	1.58E+01	5.0000	2.164E+09
Kr-85	5.49E+05	8.45E+05	7.0000	2.492E+08
Np-237	5.90E+01	1.03E+02	11.0000	2.861E+07
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		
Ti-208	4.01E+04	4.61E+04		
U-232	1.09E+05	1.25E+05	Thermal Power	
U-233	1.61E+04	2.02E+04	Nominal Heat	
U-234	4.81E+03	6.22E+03	Output (Watts)	Bounding Heat Output (Watts)
U-235	4.94E+01	9.45E+01	2.98E+05	4.75E+05
U-236	6.72E+01	1.10E+02	Total	Total
U-238	4.18E+01	5.07E+01		
Y-90	1.21E+07	1.84E+07		
Other Radionuclides	1.88E+07	3.03E+07		

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)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
			Avg MeV	
Ac-227	1.06E+00	1.51E+01	0 0150	1 954E+17
Am-241	2.79E+05	3.55E+05	0 0250	3 939E+16
Am-242m	9 53E+02	1.15E+03	0 0375	3 568E+16
Am-243	7.34E+02	1 01E+03	0 0575	4 015E+16
C-14	3 68E+03	4 40E+03	0 0850	2 124E+16
Cl-36	6 82E+01	8 18E+01	0.1250	1 665E+16
Cm-243	2 45E+02	3 49E+02	0.2250	1 762E+16
Cm-244	3 53E+04	5 85E+04	0.3750	7 646E+15
Co-60	7 86E+06	1 16E+07	0 5750	1.379E+17
Cs-134	2 72E+04	4 69E+04	0 8500	6.524E+15
Cs-135	3 88E+01	5 15E+01	1.2500	8 596E+17
Cs-137	2.53E+06	3.62E+06	1 7500	1 639E+14
Eu-154	1.44E+05	2.02E+05	2 2500	2 830E+13
Eu-155	3 50E+04	4 94E+04	2 7500	9 764E+13
Fe-55	2 57E+06	4 60E+06	3 5000	2 327E+10
H-3	3 18E+04	4 77E+04	5 0000	3 667E+08
I-129	1.21E+00	1.85E+00	7.0000	4 223E+07
Kr-85	1 06E+05	1 59E+05	11 0000	4 849E+06
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		
Ti-208	1.88E+02	2 77E+03		
U-232	5 08E+02	7.51E+03		
U-233	1.25E+03	1 30E+03	Thermal Power	
U-234	4 05E+02	6 29E+02	Nominal Heat Output (Watts)	Bounding Heat Output (Watts)
U-235	2 29E+01	2 77E+01	1.69E+05	2.48E+05
U-236	1 64E+01	2 05E+01	Total	Total
U-238	3 07E+01	3 15E+01		
Y-90	2 04E+06	2.94E+06		
Other Radionuclides	3 98E+06	5.45E+06		

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)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
			Avg. MeV	
Ac-227	1.22E-02	1.89E-02		
Am-241	6.13E+04	7.15E+04	0.0150	9.739E+16
Am-242m	5.96E+01	1.13E+02	0.0250	2.000E+16
Am-243	4.89E+01	8.92E+01	0.0375	1.777E+16
C-14	3.15E+03	3.15E+03	0.0575	1.949E+16
Cl-36	3.72E+01	3.72E+01	0.0850	1.117E+16
Cm-243	2.71E+01	5.39E+01	0.1250	7.390E+15
Cm-244	3.30E+03	6.37E+03	0.2250	9.562E+15
Co-60	5.24E+05	5.25E+05	0.3750	4.166E+15
Cs-134	6.32E+02	1.43E+03	0.5750	7.658E+16
Cs-135	1.33E+01	1.82E+01	0.8500	9.342E+14
Cs-137	1.84E+06	2.06E+06	1.2500	3.928E+16
Eu-154	9.88E+03	1.20E+04	1.7500	2.436E+13
Eu-155	1.86E+03	3.24E+03	2.2500	2.472E+11
Fe-55	4.90E+03	5.01E+03	2.7500	7.867E+09
H-3	3.06E+04	3.22E+04	3.5000	5.816E+08
I-129	1.03E+00	1.19E+00	5.0000	5.065E+07
Kr-85	4.83E+04	5.40E+04	7.0000	5.816E+06
Np-237	8.57E+00	9.54E+00	11.0000	6.669E+05
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		
Ti-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		

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)	Gamma Sources	
			Photon Energy Group	Total Photons/sec (bounding)
			Avg MeV	
Ac-227	1 80E-01	1 82E-01		
Am-241	1 18E+06	1 24E+06	0 0150	4 417E+17
Am-242m	1 86E+03	1 90E+03	0 0250	8 945E+16
Am-243	1 69E+03	1 72E+03	0 0375	8 161E+16
C-14	1 12E+04	1 12E+04	0 0575	9 876E+16
Cl-36	2 02E+02	2 02E+02	0 0850	4 884E+16
Cm-243	9 78E+01	9 78E+01	0 1250	3 559E+16
Cm-244	2 42E+04	2 45E+04	0 2250	4 176E+16
Co-60	9 28E+06	9 28E+06	0 3750	1 795E+16
Cs-134	1 06E+03	1 07E+03	0 5750	3 528E+17
Cs-135	9 57E+01	1 03E+02	0 8500	8 009E+15
Cs-137	8 68E+06	9 50E+06	1 2500	6 930E+17
Eu-154	2 82E+05	2 86E+05	1 7500	2 414E+14
Eu-155	2 85E+04	2 87E+04	2 2500	3 652E+12
Fe-55	3 75E+05	3 75E+05	2 7500	3 119E+11
H-3	4 96E+04	5 11E+04	3 5000	4 714E+08
I-129	5 44E+00	6 03E+00	5 0000	1 871E+08
Kr-85	2 54E+05	2 72E+05	7 0000	2 141E+07
Np-237	5 76E+01	6 34E+01	11 0000	2 450E+06
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		
Ti-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		

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