



Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

December 21, 2010

10 CFR 50.4(b)(6)
10 CFR 50.34(b)
10 CFR 2.390(d)(1)

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Watts Bar Nuclear Plant, Unit 2
NRC Docket No. 50-391

Subject: Watts Bar Nuclear Plant (WBN) Unit 2 – Final Safety Analysis Report (FSAR) – Response to Request for Additional Information

This letter responds to the following NRC staff request for additional information (RAI) provided verbally concerning the Unit 2 FSAR:

NRC RAI

Why are the Unit 2 core source terms different from the Unit 1 core source terms?

RESPONSE

The core source terms for Unit 1 and Unit 2 are different primarily because Unit 1 is producing Tritium and Unit 2 will not produce Tritium. Due to the specialized equipment required to produce Tritium, the Tritium production core contains different materials than the standard core. In addition, a different fuel cycle is required for Tritium production as compared to the standard core (i.e., fuel effective full power days [EFPDs] burnup is different for the two cores). Thus, the isotopic mix is different in the two cores.

Enclosure 1 provides a listing of the Tritium production core (Unit 1) isotopic inventory and Enclosure 2 provides a listing of the standard core (Unit 2) isotopic inventory.

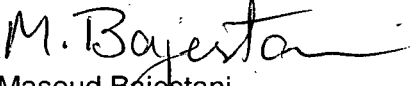
There are no new regulatory commitments contained in this letter. If you have any questions, please contact William Crouch at (423) 365-2004.

D030
NRC

U.S. Nuclear Regulatory Commission
Page 2
December 21, 2010

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 21st day of December, 2010.

Sincerely,


Masoud Bajestani
Watts Bar Unit 2 Vice President

Enclosure 1: Tritium Production Core (Unit 1) Inventory

Enclosure 2: Standard Core (Unit 2) Inventory

cc (Enclosures):

U. S. Nuclear Regulatory Commission
Region II
Marquis One Tower
245 Peachtree Center Ave., NE Suite 1200
Atlanta, Georgia 30303-1257

NRC Resident Inspector Unit 2
Watts Bar Nuclear Plant
1260 Nuclear Plant Road
Spring City, Tennessee 37381

ENCLOSURE 1

Tritium Production Core (Unit 1) Inventory

	Nuclide	Total Core Inventory (Ci)	1X Burned (Ci/Assy)	2X Burned (Ci/Assy)	3X Burned (Ci/Assy)
1	Kr-83m	1.23E+07	7.63E+04	5.15E+04	6.13E+04
2	Kr-85m	2.69E+07	1.69E+05	1.10E+05	1.25E+05
3	Kr-85	8.81E+05	3.56E+03	5.54E+03	6.84E+03
4	Kr-87	5.23E+07	3.31E+05	2.11E+05	2.36E+05
5	Kr-88	7.38E+07	4.68E+05	2.97E+05	3.31E+05
6	Kr-89	9.10E+07	5.81E+05	3.63E+05	3.97E+05
7	Kr-90	9.01E+07	5.76E+05	3.59E+05	3.92E+05
8	Xe-131m	9.54E+05	5.31E+03	4.56E+03	6.18E+03
9	Xe-133m	5.80E+06	3.41E+04	2.60E+04	3.45E+04
10	Xe-133	1.88E+08	1.11E+06	8.36E+05	1.09E+06
11	Xe-135m	3.59E+07	2.08E+05	1.63E+05	2.19E+05
12	Xe-135	4.96E+07	2.84E+05	2.30E+05	2.19E+05
13	Xe-137	1.65E+08	9.75E+05	7.30E+05	9.51E+05
14	Xe-138	1.59E+08	9.55E+05	6.93E+05	8.79E+05
15	Xe-139	1.26E+08	7.57E+05	5.43E+05	6.83E+05
16	Xe-140	8.32E+07	5.07E+05	3.54E+05	4.36E+05
17	I-130	2.34E+06	9.02E+03	1.51E+04	3.14E+04
18	I-131	9.01E+07	5.24E+05	4.09E+05	5.49E+05
19	I-132	1.31E+08	7.63E+05	5.89E+05	7.87E+05
20	I-133	1.88E+08	1.11E+06	8.35E+05	1.09E+06
21	I-134	2.08E+08	1.23E+06	9.18E+05	1.19E+06
22	I-135	1.76E+08	1.04E+06	7.81E+05	1.02E+06
23	I-136m	5.05E+07	3.02E+05	2.21E+05	2.83E+05
24	Br-83	1.23E+07	7.63E+04	5.14E+04	6.11E+04

ENCLOSURE 1

Tritium Production Core (Unit 1) Inventory

	Nuclide	Total Core Inventory (Ci)	1X Burned (Ci/Assy)	2X Burned (Ci/Assy)	3X Burned (Ci/Assy)
25	Br-84m	6.68E+05	3.86E+03	3.06E+03	4.13E+03
26	Br-84	2.18E+07	1.37E+05	8.95E+04	1.03E+05
27	Br-85	2.65E+07	1.67E+05	1.08E+05	1.23E+05
28	Br-87	4.40E+07	2.79E+05	1.77E+05	1.98E+05
29	Cs-134	1.12E+07	3.13E+04	8.41E+04	1.48E+05
30	Cs-135	3.60E+01	1.30E-01	2.42E-01	3.48E-01
31	Cs-136	3.67E+06	1.53E+04	2.24E+04	4.57E+04
32	Cs-137	8.81E+06	3.34E+04	5.76E+04	7.66E+04
33	Cs-138	1.75E+08	1.05E+06	7.67E+05	9.80E+05
34	Cs-139	1.66E+08	9.95E+05	7.27E+05	9.28E+05
35	Cs-140	1.49E+08	8.95E+05	6.53E+05	8.32E+05
36	Cs-141	1.12E+08	6.75E+05	4.86E+05	6.14E+05
37	Rb-88	7.48E+07	4.74E+05	3.02E+05	3.37E+05
38	Rb-89	9.64E+07	6.13E+05	3.87E+05	4.29E+05
39	Rb-90m	2.13E+07	1.33E+05	8.74E+04	1.01E+05
40	Rb-90	9.41E+07	6.00E+05	3.76E+05	4.13E+05
41	Rb-91	1.15E+08	7.28E+05	4.66E+05	5.24E+05
42	Se-84	2.12E+07	1.33E+05	8.66E+04	9.93E+04
43	Sr-89	1.02E+08	6.47E+05	4.06E+05	4.54E+05
44	Sr-90	6.94E+06	2.78E+04	4.40E+04	5.45E+04
45	Sr-91	1.23E+08	7.72E+05	4.99E+05	5.68E+05
46	Sr-92	1.31E+08	8.14E+05	5.39E+05	6.27E+05
47	Sr-93	1.45E+08	8.97E+05	6.08E+05	7.26E+05
48	Sr-94	1.36E+08	8.39E+05	5.75E+05	6.92E+05

ENCLOSURE 1

Tritium Production Core (Unit 1) Inventory

	Nuclide	Total Core Inventory (Ci)	1X Burned (Ci/Assy)	2X Burned (Ci/Assy)	3X Burned (Ci/Assy)
49	Y-90	7.21E+06	2.89E+04	4.57E+04	5.78E+04
50	Y-91m	7.11E+07	4.48E+05	2.90E+05	3.30E+05
51	Y-91	1.29E+08	8.12E+05	5.23E+05	5.99E+05
52	Y-92	1.31E+08	8.17E+05	5.41E+05	6.30E+05
53	Y-93	1.49E+08	9.16E+05	6.23E+05	7.46E+05
54	Y-94	1.48E+08	9.07E+05	6.28E+05	7.63E+05
55	Y-95	1.57E+08	9.54E+05	6.72E+05	8.31E+05
56	Y-96	1.48E+08	8.99E+05	6.38E+05	7.93E+05
57	Zr-95	1.64E+08	9.97E+05	7.05E+05	8.71E+05
58	Zr-97	1.57E+08	9.38E+05	6.89E+05	8.83E+05
59	Nb-95	1.66E+08	1.00E+06	7.13E+05	8.78E+05
60	Nb-97m	1.49E+08	8.89E+05	6.53E+05	8.38E+05
61	Nb-97	1.58E+08	9.45E+05	6.95E+05	8.92E+05
62	Mo-99	1.68E+08	9.93E+05	7.48E+05	9.80E+05
63	Tc-99m	1.47E+08	8.70E+05	6.55E+05	8.58E+05
64	Tc-99	1.12E+03	4.36E+00	7.23E+00	9.15E+00
65	Tc-101	1.54E+08	8.96E+05	6.94E+05	9.29E+05
66	Ru-103	1.31E+08	7.25E+05	6.28E+05	8.97E+05
67	Ru-105	8.13E+07	4.21E+05	4.19E+05	6.55E+05
68	Ru-106	3.56E+07	1.37E+05	2.30E+05	3.49E+05
69	Ru-107	4.33E+07	2.08E+05	2.38E+05	3.96E+05
70	Rh-103m	118000000	653000	566000	808000
71	Rh-105m	22800000	118000	117000	183000
72	Rh-105	7.59E+07	3.92E+05	3.92E+05	5.92E+05

ENCLOSURE 1

Tritium Production Core (Unit 1) Inventory

	Nuclide	Total Core Inventory (Ci)	1X Burned (Ci/Assy)	2X Burned (Ci/Assy)	3X Burned (Ci/Assy)
73	Rh-106	3.94E+07	1.58E+05	2.49E+05	3.93E+05
74	Rh-107	4.35E+07	2.09E+05	2.39E+05	3.98E+05
75	Sn-130	3.14E+07	1.81E+05	1.43E+05	1.95E+05
76	Sb-127	8.87E+06	4.88E+04	4.30E+04	6.26E+04
77	Sb-129	2.77E+07	1.56E+05	1.30E+05	1.82E+05
78	Sb-130m	41600000	240000	190000	259000
79	Sb-130	8.97E+06	5.04E+04	4.23E+04	5.96E+04
80	Sb-133	5.52E+07	3.34E+05	2.38E+05	2.99E+05
81	Te-125m	2.17E+05	7.83E+02	1.45E+03	1.95E+03
82	Te-127m	1.15E+06	6.11E+03	5.81E+03	8.21E+03
83	Te-127	8.77E+06	4.80E+04	4.27E+04	6.20E+04
84	Te-129m	4.10E+06	2.32E+04	1.93E+04	2.68E+04
85	Te-129	2.73E+07	1.54E+05	1.28E+05	1.79E+05
86	Te-131m	1.27E+07	7.32E+04	5.87E+04	8.04E+04
87	Te-131	8.00E+07	4.66E+05	3.62E+05	4.85E+05
88	Te-132	1.29E+08	7.54E+05	5.80E+05	7.73E+05
89	Te-133m	7.15E+07	4.34E+05	3.08E+05	3.82E+05
90	Te-133	1.10E+08	6.48E+05	4.90E+05	6.43E+05
91	Te-134	1.62E+08	9.81E+05	6.97E+05	8.70E+05
92	Ba-137m	8.35E+06	3.17E+04	5.45E+04	7.26E+04
93	Ba-139	1.71E+08	1.02E+06	7.49E+05	9.61E+05
94	Ba-140	1.65E+08	9.88E+05	7.24E+05	9.30E+05
95	Ba-141	1.55E+08	9.29E+05	6.79E+05	8.67E+05
96	Ba-142	1.48E+08	8.92E+05	6.45E+05	8.17E+05

ENCLOSURE 1

Tritium Production Core (Unit 1) Inventory

	Nuclide	Total Core Inventory (Ci)	1X Burned (Ci/Assy)	2X Burned (Ci/Assy)	3X Burned (Ci/Assy)
97	La-140	1.69E+08	1.00E+06	7.48E+05	9.78E+05
98	La-141	1.56E+08	9.33E+05	6.83E+05	8.71E+05
99	La-142	1.52E+08	9.11E+05	6.61E+05	8.37E+05
100	La-143	1.46E+08	8.85E+05	6.31E+05	7.89E+05
101	Ce-141	1.59E+08	9.51E+05	6.94E+05	8.85E+05
102	Ce-143	1.47E+08	8.90E+05	6.36E+05	7.96E+05
103	Ce-144	1.17E+08	6.10E+05	6.00E+05	6.79E+05
104	Ce-145	9.96E+07	6.00E+05	4.32E+05	5.45E+05
105	Pr-143	1.46E+08	8.82E+05	6.30E+05	7.84E+05
106	Pr-144	1.18E+08	6.15E+05	6.04E+05	6.85E+05
107	Pr-145	9.97E+07	6.00E+05	4.32E+05	5.45E+05
108	Np-239	1.53E+09	8.24E+06	7.61E+06	1.16E+07
109	H-3	2.68E+07			

ENCLOSURE 2

Standard Core (Unit 2) Inventory

	Nuclide	Ci / Assembly	Total Core Inventory (Ci)
1	Kr-83m	5.96E+04	1.15E+07
2	Kr-85m	1.24E+05	2.39E+07
3	Kr-85	5.35E+03	1.03E+06
4	Kr-87	2.49E+05	4.81E+07
5	Kr-88	3.45E+05	6.66E+07
6	Kr-89	4.29E+05	8.28E+07
7	Kr-90	4.59E+05	8.86E+07
8	Xe-131m	5.43E+03	1.05E+06
9	Xe-133m	3.19E+04	6.16E+06
10	Xe-133	9.92E+05	1.91E+08
11	Xe-135m	2.10E+05	4.05E+07
12	Xe-135	3.33E+05	6.43E+07
13	Xe-137	9.23E+05	1.78E+08
14	Xe-138	8.64E+05	1.67E+08
15	Xe-139	6.41E+05	1.24E+08
16	Xe-140	4.46E+05	8.61E+07
17	I-130	9.99E+03	1.93E+06
18	I-131	4.90E+05	9.46E+07
19	I-132	7.18E+05	1.39E+08
20	I-133	1.01E+06	1.95E+08
21	I-134	1.12E+06	2.16E+08
22	I-135	9.65E+05	1.86E+08
23	I-136m	2.16E+05	4.17E+07
24	Br-83	5.96E+04	1.15E+07

ENCLOSURE 2

Standard Core (Unit 2) Inventory

	Nuclide	Ci / Assembly	Total Core Inventory (Ci)
25	Br-84m	2.95E+03	5.69E+05
26	Br-84	1.11E+05	2.14E+07
27	Br-85	1.23E+05	2.37E+07
28	Br-87	1.96E+05	3.78E+07
29	Cs-134	8.61E+04	1.66E+07
30	Cs-135	0.00E+00	0.00E+00
31	Cs-136	3.05E+04	5.89E+06
32	Cs-137	6.04E+04	1.17E+07
33	Cs-138	9.36E+05	1.81E+08
34	Cs-139	8.72E+05	1.68E+08
35	Cs-140	7.83E+05	1.51E+08
36	Cs-141	5.97E+05	1.15E+08
37	Rb-88	3.54E+05	6.83E+07
38	Rb-89	4.62E+05	8.92E+07
39	Rb-90m	1.34E+05	2.59E+07
40	Rb-90	4.25E+05	8.20E+07
41	Rb-91	5.62E+05	1.08E+08
42	Se-84	1.08E+05	2.08E+07
43	Sr-89	4.84E+05	9.34E+07
44	Sr-90	4.63E+04	8.94E+06
45	Sr-91	6.03E+05	1.16E+08
46	Sr-92	6.41E+05	1.24E+08
47	Sr-93	7.24E+05	1.40E+08
48	Sr-94	7.22E+05	1.39E+08

ENCLOSURE 2

Standard Core (Unit 2) Inventory

	Nuclide	Ci / Assembly	Total Core Inventory (Ci)
49	Y-90	4.91E+04	9.48E+06
50	Y-91m	3.50E+05	6.76E+07
51	Y-91	6.27E+05	1.21E+08
52	Y-92	6.46E+05	1.25E+08
53	Y-93	4.91E+05	9.48E+07
54	Y-94	7.80E+05	1.51E+08
55	Y-95	8.11E+05	1.57E+08
56	Y-96	7.83E+05	1.51E+08
57	Zr-95	8.66E+05	1.67E+08
58	Zr-97	8.35E+05	1.61E+08
59	Nb-95	8.74E+05	1.69E+08
60	Nb-97m	7.92E+05	1.53E+08
61	Nb-97	8.40E+05	1.62E+08
62	Mo-99	9.22E+05	1.78E+08
63	Tc-99m	8.11E+05	1.57E+08
64	Tc-99	0.00E+00	0.00E+00
65	Tc-101	8.36E+05	1.61E+08
66	Ru-103	7.66E+05	1.48E+08
67	Ru-105	5.20E+05	1.00E+08
68	Ru-106	2.59E+05	5.00E+07
69	Ru-107	2.99E+05	5.77E+07
70	Rh-103m	765000	147645000
71	Rh-105m	148000	28564000
72	Rh-105	4.95E+05	9.55E+07

ENCLOSURE 2

Standard Core (Unit 2) Inventory

	Nuclide	Ci / Assembly	Total Core Inventory (Ci)
73	Rh-106	2.76E+05	5.33E+07
74	Rh-107	2.99E+05	5.77E+07
75	Sn-130	1.65E+05	3.18E+07
76	Sb-127	4.17E+04	8.05E+06
77	Sb-129	1.57E+05	3.03E+07
78	Sb-130m	221000	42653000
79	Sb-130	5.20E+04	1.00E+07
80	Sb-133	3.20E+05	6.18E+07
81	Te-125m	1.00E+02	1.93E+04
82	Te-127m	6.87E+03	1.33E+06
83	Te-127	4.11E+04	7.93E+06
84	Te-129m	3.01E+04	5.81E+06
85	Te-129	1.49E+05	2.88E+07
86	Te-131m	9.62E+04	1.86E+07
87	Te-131	4.14E+05	7.99E+07
88	Te-132	7.05E+05	1.36E+08
89	Te-133m	4.52E+05	8.72E+07
90	Te-133	5.49E+05	1.06E+08
91	Te-134	8.95E+05	1.73E+08
92	Ba-137m	5.40E+04	1.11E+07
93	Ba-139	8.94E+05	1.73E+08
94	Ba-140	8.98E+05	1.73E+08
95	Ba-141	8.10E+05	1.56E+08
96	Ba-142	7.71E+05	1.49E+08

ENCLOSURE 2

Standard Core (Unit 2) Inventory

	Nuclide	Ci / Assembly	Total Core Inventory (Ci)
97	La-140	9.29E+05	1.79E+08
98	La-141	8.17E+05	1.58E+08
99	La-142	7.99E+05	1.54E+08
100	La-143	7.59E+05	1.46E+08
101	Ce-141	8.25E+05	1.59E+08
102	Ce-143	7.65E+05	1.48E+08
103	Ce-144	6.69E+05	1.29E+08
104	Ce-145	5.20E+05	1.00E+08
105	Pr-143	7.46E+05	1.44E+08
106	Pr-144	6.73E+05	1.30E+08
107	Pr-145	5.21E+05	1.01E+08
108	Np-239	9.69E+06	1.87E+09