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MFN 08-729

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U.S. Nuclear Regulatory Commission
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Washington, D.C. 20555-0001

Subject: **Revised DCD Revision 5, Table 15.4-12 "Main Steam Line Break Analysis (MSLBA) Environmental Releases"**

During the course of the NRC Staff's confirmatory review of the environmental releases resulting from design base accidents, the NRC Staff and their contractor, Pacific Northwest National Laboratory (PNNL), discovered apparent anomalies in the subject DCD Table 15.4-12. NRC Staff notified GE Hitachi Nuclear Energy (GEH) on September 23, 2008 of the anomalies, and discussed the following specific comments from the NRC Staff and PNNL on September 24, 2008:

1. Typos in Table 15.4-12 on page 15.4-65. The isotopic environmental release of Sb and Tellurium Te differ in equilibrium iodine and pre-accident iodine spike while all other isotopes are the same for the equilibrium iodine and pre-accident iodine spike. Should they be the same?

2. It appears that Sb and Te were included in the MSLB radionuclide dose table, but not iodine? Why not iodine?

3. For MSLB, the following radionuclides do not appear to be included: Cs-136, 137, Ba-140, La-140, Se-141, 144 and Np-239.

4. When breaking down the radionuclide dose calculation, it appears that Iodine is not the main contributor to dose? Please explain.

5. Distribution of radionuclides for the MSLB dose does not appear to be consistent, especially for Sr-89 and Sr-90. Please explain.

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Prior to the discussion with NRC and PNNL Staff, GEH reviewed the MSLB model and analysis results from the quality record, concluding that the analysis model and results are correct. Confirmation of the model was achieved by re-running RADTRAD for the MSLB using iodine only, with the results indicating a difference of approximately 1 to 2% of what is shown in DCD Revision 5, Table 15.4-13.

The information extracted from the quality record appears in error and is confined to Table 15.4-12. The values in the table were taken from the time step 0.0015 hours in the MSLB RADTRAD output, and it appears the full inventory had not been released to the environment at that point in time in the model. Examination of the RADTRAD output for the later time steps shows the full isotopic inventory released to the environment, and is the correct section of the detailed RADTRAD results file to have been incorporated into DCD Revision 5, Table 15.4-12.

To facilitate NRC and PNNL Staff RADTRAD confirmation and safety evaluation development, GEH hereby submits the revised DCD Tier 2, Table 15.4-12 "MSLBA Environmental Results" with the corrected results files from the quality record, and requests that this letter and submittal be considered when the Staff develops the requisite Request for Additional Information (RAI).

If you have any questions or require additional information, please contact me.

Sincerely,

Richard E. Kingston

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Vice President, ESBWR Licensing

Reference:

1. GEH Telephone Conference with NRC and PNNL Staff dated September 24, 2008.

Enclosure:

1. Revised Table 15.4-12 DCD Tier 2 Markup

cc: AE Cubbage USNRC (with enclosure)
RE Brown GEH/Wilmington (with enclosure)
DH Hinds GEH/Wilmington (with enclosure)
eDRF 0000-0091-4897

Enclosure 1

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Revised Table 15.4-12 DCD Tier 2 Markup

Table 15.4-12

MSLBA Environment Releases

Isotope	Equilibrium Iodine		Pre-Incident Iodine Spike	
	Ci	MBq	Ci	MBq
Co-58	8.20E-03	3.03E+02	8.20E-03	3.03E+02
Co-60	1.60E-02	5.92E+02	1.60E-02	5.92E+02
Kr-85	9.50E-04	3.52E+01	9.50E-04	3.52E+01
Kr-85m	2.40E-01	8.88E+03	2.40E-01	8.88E+03
Kr-87	7.80E-01	2.88E+04	7.80E-01	2.88E+04
Kr-88	7.80E-01	2.88E+04	7.80E-01	2.88E+04
Rb-86	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sr-89	3.80E-02	1.41E+03	3.80E-02	1.41E+03
Sr-90	2.60E-03	9.62E+01	2.60E-03	9.62E+01
Sr-91	1.40E+00	5.18E+04	1.40E+00	5.18E+04
Sr-92	3.40E+00	1.26E+05	3.40E+00	1.26E+05
Y-90	2.60E-03	9.62E+01	2.60E-03	9.62E+01
Y-91	1.50E-02	5.55E+02	1.50E-02	5.55E+02
Y-92	2.10E+00	7.77E+04	2.10E+00	7.77E+04
Y-93	1.40E+00	5.18E+04	1.40E+00	5.18E+04
Zr-95	3.00E-03	1.11E+02	3.00E-03	1.11E+02
Zr-97	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-95	3.00E-03	1.11E+02	3.00E-03	1.11E+02

Table 15.4-12

MSLBA Environment Releases

Isotope	Equilibrium Iodine		Pre-Incident Iodine Spike	
	Ci	MBq	Ci	MBq
Mo-99	7.50E-01 7.38E-03	2.77E+04 2.73E+02	7.50E-01 7.38E-03	2.77E+04 2.73E+02
Tc-99m	7.50E-01 1.08E-03	2.77E+04 4.01E+01	7.50E-01 1.08E-03	2.77E+04 4.01E+01
Ru-103	7.50E-03 4.73E-06	2.77E+02 1.75E-01	7.50E-03 4.73E-06	2.77E+02 1.75E-01
Ru-105	0.00E+00 1.48E-02	0.00E+00 5.46E+02	0.00E+00 1.48E-02	0.00E+00 5.46E+02
Ru-106	1.10E-03 3.64E-02	4.07E+01 1.35E+03	1.10E-03 3.64E-02	4.07E+01 1.35E+03
Rh-105	0.00E+00 3.74E-03	0.00E+00 1.38E+02	0.00E+00 3.74E-03	0.00E+00 1.38E+02
Sb-127	0.00E+00 1.57E+00	0.00E+00 5.83E+04	0.00E+00 3.05E+01	0.00E+00 1.13E+06
Sb-129	0.00E+00 1.38E+01	0.00E+00 5.10E+05	0.00E+00 2.76E+02	0.00E+00 1.02E+07
Te-127	0.00E+00 9.84E+00	0.00E+00 3.64E+05	0.00E+00 1.97E+02	0.00E+00 7.28E+06
Te-127m	0.00E+00 2.46E+01	0.00E+00 9.10E+05	0.00E+00 5.02E+02	0.00E+00 1.86E+07
Te-129	4.87E-06 1.38E+01	1.80E-01 5.10E+05	4.87E-06 2.76E+02	1.80E-01 1.02E+07
Te-129m	1.50E-02 3.25E-01	5.55E+02 1.20E+04	1.50E-02 3.26E-01	5.55E+02 1.21E+04
Te-131m	3.70E-02 8.96E-01	1.37E+03 3.32E+04	3.70E-02 9.10E-01	1.37E+03 3.37E+04
Te-132	3.80E-03 9.84E-03	1.41E+02 3.64E+02	3.80E-03 9.84E-03	1.41E+02 3.64E+02
I-131	1.60E+00 6.59E-03	5.92E+04 2.44E+02	3.10E+01 6.59E-03	1.15E+06 2.44E+02
I-132	1.40E+01 2.66E-02	5.18E+05 9.83E+02	2.80E+02 2.66E-02	1.04E+07 9.83E+02
I-133	1.00E+01 1.48E-01	3.70E+05 5.46E+03	2.00E+02 1.48E-01	7.40E+06 5.46E+03
I-134	2.50E+01 1.48E-01	9.24E+05 5.46E+03	5.10E+02 1.48E-01	1.89E+07 5.46E+03
I-135	1.40E+01 1.08E-02	5.18E+05 4.01E+02	2.80E+02 1.08E-02	1.04E+07 4.01E+02

Table 15.4-12

MSLBA Environment Releases

Isotope	Equilibrium Iodine		Pre-Incident Iodine Spike	
	Ci	MBq	Ci	MBq
Xe-133	3.30E-01	1.22E+04	3.31E-01	1.22E+04
Xe-135	9.11E-01	3.37E+04	9.25E-01	3.42E+04
Cs-134	1.00E-02	3.70E+02	1.00E-02	3.70E+02
Cs-136	6.70E-03	2.48E+02	6.70E-03	2.48E+02
Cs-137	2.70E-02	9.99E+02	2.70E-02	9.99E+02
Ba-139	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ba-140	1.50E-01	5.55E+03	1.50E-01	5.55E+03
La-140	1.50E-01	5.55E+03	1.50E-01	5.55E+03
La-141	0.00E+00	0.00E+00	0.00E+00	0.00E+00
La-142	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ce-141	1.10E-02	4.07E+02	1.10E-02	4.07E+02
Ce-143	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ce-144	1.10E-03	4.07E+01	1.10E-03	4.07E+01
Pr-143	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nd-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-239	3.00E+00	1.11E+05	3.00E+00	1.11E+05
Pu-238	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu-239	8.25E-12	3.05E-07	8.25E-12	3.05E-07
Pu-240	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 15.4-12

MSLBA Environment Releases

Isotope	Equilibrium Iodine		Pre-Incident Iodine Spike	
	Ci	MBq	Ci	MBq
Pu-241	0.00E+000.00E+00	0.00E+000.00E+00	0.00E+000.00E+00	0.00E+000.00E+00
Am-241	0.00E+000.00E+00	0.00E+000.00E+00	0.00E+000.00E+00	0.00E+000.00E+00
Cm-242	0.00E+000.00E+00	0.00E+000.00E+00	0.00E+000.00E+00	0.00E+000.00E+00
Cm-244	0.00E+000.00E+00	0.00E+000.00E+00	0.00E+000.00E+00	0.00E+000.00E+00