August 14, 2008

Mr. W. E. Cummins, Vice President
Regulatory Affairs and Standardization
Westinghouse Electric Company
P.O. Box 355
Pittsburgh, PA 15230-0355

SUBJECT: Westinghouse Technical Report 122, "Offsite and Control Room Dose Changes"

Dear Mr. Cummins:

By letter dated July 27, 2007, Westinghouse Electric Company (Westinghouse) submitted Technical Report (TR) 122, APP-GW-GLN-122, "Offsite and Control Room Dose Changes." This TR was submitted in support of the AP1000 Design Certification Amendment Application (Docket No 52-006). By letter dated October 26, 2007, Westinghouse provided supporting information for the review of TR 122, APP-SSAR-GSC-642, "Assessment of Basis for Aerosol Plugging in AP1000 Containment Leak Paths for Radiological Design Basis Accidents." By letter dated June 30, 2008, Westinghouse responded to the United States Nuclear Regulatory Commission (NRC) staff's questions regarding TR 122 which were designated as RAI-SRP15.3-RSAC-01 through 17. In TR 122, as supplemented by the October 26, 2007, and June 30, 2008 submittals, Westinghouse presented a justification for fission product penetration into narrow containment cracks resulting in the attenuation of the release of fission products to the environment. The resulting Decontamination Factor (DF) of 5 (equivalent to an attenuation of 80%) is claimed by Westinghouse using the methodology of TR 122.

Based on the NRC staff's review the following issues were identified:

- In the submittal of TR 122, Oyster Creek was referenced as a case when NRC granted credit for aerosol impaction. The NRC staff notes initially that in the April 2007 NRC staff evaluation of the Oyster Creek dose assessment, the effective aerosol removal rates were associated with the leakage through the main steam lines to the environment and was acceptable based only on the aerosol removal mechanism of sedimentation. Aerosol impaction was not found acceptable in that license amendment review, nor has the NRC staff previously found aerosol impaction generally acceptable.

- With regard to the methodology of TR 122, this methodology makes extensive use of the Morewitz Correlation which was developed to describe the tube-plugging effects associated with sodium fires. There are several important differences between the data cited by Morewitz and the application proposed by Westinghouse to describe the plugging of small containment cracks by aerosol containing fission products:

- The Morewitz correlation is applicable for particle Stokes numbers and settling velocities substantially different than those hypothesized for leaks in the AP1000 containment. On the other hand, aerosol sampling devices known to sample aerosols accurately operate in regimes closer to those expected for the AP1000 leaks indicating little if any aerosol deposition under those conditions.

- There is a good reason to believe that aerosol particles would not simply impact and remain on the surface of the containment leak paths. Particles will bounce off the leak path surfaces and be re-entrained in the leak flow. A variety of mechanisms are available to deagglomerate resuspended particles so they do not promptly redeposit.

- It has been observed that surfaces that are exposed to turbulent flow tend to be periodically scrubbed such that material which has been retained on the surface is resuspended and is available for leakage.

In addition to the problematic nature of the proposed application of the Morewitz Correlation, leakage tests conducted in Japan involving low and high-voltage containment penetrations found that leakage evolved over time and was very sensitive to temperature which suggests that any effect resulting in material being retained on the leak path surfaces need not be permanent.

In conclusion, following a careful review of TR 122 and the October 26, 2007 and June 30, 2008 supplements, by the NRC staff and its consultant, Dr. D. A. Powers, the NRC staff finds that TR 122 does not support a DF of 5. Moreover, it is unlikely that any DF greater than 1.0 can be justified using the methodology presented in TR 122. Accordingly, the proposed changes to the AP1000 DCD, addressed in TR 122, are unacceptable. If you have any questions please contact Phyllis Clark at 301-415-6447or by E-mail at phyllis.clark@nrc.gov.

Sincerely,

/RA/

Thomas A. Bergman, Deputy Director
for Licensing Operations
Division of New Reactor Licensing
Office of New Reactors

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