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SUBJECT: COMMENTS ON NUREG-1935 DRAFT

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COMMENTS ON NUREG-1935 (DRAFT) - January 2012

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Summary Assessment

The State-of-the-Art Reactor Consequence Analysis (SOARCA) presented in NUREG-1935 represents a major advance in the analysis of severe reactor accidents. The NRC staff and supporting contractors are to be commended for their excellent research and development work, and for preserving the continuity of severe accident research sponsored and initiated by the NRC Office of Research since the TMI-2 accident, over 30 years ago. My comments relate largely to MELCOR supporting research referenced in the Draft Report, and reported in NUREG/CR-6119, which describes MELCOR code demonstrations using various experiments. Although these comments are not expected to significantly impact the robustness and acceptance of the SOARCA methodology, they are offered for consideration and resolution, as appropriate.

The comments which follow are in three areas: MELCOR code aerosol demonstrations, MELCOR simulation of the TMI-2 accident, and the composition of the Expert Peer Review Committee.

MELCOR Code Aerosol Demonstration

The comparison of the MELCOR code with large-scale aerosol experiments in the LACE and VANAM facilities show large differences between MELCOR and the measured aerosol concentration data, after about 24 hours. This discrepancy should be explored and tested in an accident simulation calculation to determine if it could result in a significant difference in dose assessment.

MELCOR Code TMI-2 Accident Simulation

The TMI-2 lower vessel head examination data derived from the TMI-2 Vessel Investigation Project should be analyzed using the MELCOR code to test how well it predicts and simulates vessel head behavior gleaned from the VIP. The detailed analyses can be reported in supporting documentation, however the significance of the results should be summarized in the SOARCA report as a demonstration of the robustness of MELCOR for this potential critical juncture in the progression of a severe accident. This

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demonstration would also have important implications for communicating to the public, the credibility and confidence of NRC's understanding of severe accidents for safety evaluations, as well as for accident mitigation and emergency procedures for operating reactors. Further, this demonstration will also be important when the NRC proceeds with Level-3 PRA.

Regarding reactor accident demonstrations, when and if sufficient, quantitative information becomes available from the Fukushima Daiichi reactor accidents, MELCOR code demonstrations should be performed as this would provide a test for MARK I BWR applications, especially in comparison with the SOARCA Peach Bottom analyses.

Composition of the SOARCA Expert Peer Review Committee

The members of the committee are well qualified in their respective relevant fields of study, experience, and expertise. However, the diversity of the composition of the committee does not appear to be sufficiently balanced with respect to independence from the nuclear industry, and expertise in several specific areas of technology important to severe accident phenomena. Specifically, with only a few exceptions, committee members, are now, or recently had been contractors for nuclear industry-sponsored projects. Based upon information available in the literature and/or professional resumes, there did not appear to be anyone with expertise (experimental or theoretical) in aerosol dynamics. Also, only one member of the committee had expertise in core melt progression phenomenology.

I would be pleased to discuss or answer any questions you may have on these comments.