May 20, 2003

Mr. Atambir S. Rao, ESBWR Project Manager
Nuclear Plant Projects
General Electric Company
175 Curtner Avenue, M/C 365
San Jose, CA 95125-1014

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 2 RELATED TO ESBWR PRE-APPLICATION REVIEW (TAC NOS. MB6279, MB6280, MB6281, AND MB7255)

Dear Mr. Rao:

By letters dated August 30 and November 19, 2002, and January 9, 2003, General Electric Company (GE) submitted eight topical reports in support of the ESBWR pre-application review. The Nuclear Regulatory Commission (NRC) staff is performing a detailed review of these topical reports to ensure that the information is sufficiently complete to enable the NRC staff to reach a conclusion on the acceptability of these reports.

The NRC staff has determined that additional information is necessary to continue the review. Enclosure 1 contains requests for additional information (RAIs) regarding the NEDC-33082P, "ESBWR Scaling Report," NEDC-33079P and Supplement 1, "ESBWR Test and Analysis Program Description (TAPD)," NEDC-33081P, "ESBWR Test Report," and NEDC-32606P, "SBWR Testing Summary Report." These RAIs were sent to you via electronic mail on April 9 and 10, 2003, and were discussed with you on April 23, 2003. Please provide the requested information by July 31, 2003, so that the review can be completed in a timely manner. Partial submittals would be welcomed to minimize delays.

If you have any questions or comments concerning this matter, you may contact me at (301) 415-2875 or aec@nrc.gov.

Sincerely,

/RA/

Amy E. Cubbage, ESBWR Project Manager
New Reactor Licensing Project Office
Office of Nuclear Reactor Regulation

Project No. 717

Enclosure: As stated

cc: See next page

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Request for Additional Information (RAI)
ESBWR Scaling, Testing, and TAPD
ESBWR Pre-Application Review
General Electric Company

RAIs ON: (1) NEDC-33082P, "ESBWR SCALING REPORT" (2) NEDC-33079P AND SUPPLEMENT 1, "ESBWR TEST AND ANALYSIS PROGRAM DESCRIPTION (TAPD)," (3) NEDC-33081P, "ESBWR TEST REPORT," AND (4) NEDC-32606P, "SBWR TESTING SUMMARY REPORT"

13. Test facility insulation / Heat Losses :

Tests were performed at prototypical temperature and pressure; whereas, test pressure vessel walls were thinner than the actual vessel wall thickness. As a result, heat losses through the vessel wall in the tests are expected to be higher than the prototype, and can result in systematic distortions of test data. The impact and safety significance of distortions needs to be related to the degree of importance of the distorted phenomena. In the Scaling report, there was no discussion presented on the distortions due to heat losses, especially in the GIRAFFE facility testings, where the primary variable of interest is the water level in the reactor pressure vessel (RPV). The staff, therefore, requests that General Electric (GE) assess the impact of heat loss on test data obtained from the facilities, such as GIRAFFE, and explain what was done to offset this potential source of distortion when qualifying the TRACG code.

14. Surface-to-Volume ratio of PCC headers :

In the 2nd paragraph, page 8-5 of the Scaling report (NEDC-33082P), it was stated that because the surface area to volume ratio is increased for the reduced length headers of the passive containment cooling system (PCCS) in the testing facilities (PANDA, PANTHERS), the heat removal through the header walls was increased. The staff realizes that the heat loss in the headers is much less compared to that through the tube walls. However, a higher heat loss through the headers results in increased total heat removal capacity for the PCCS in the tests (non-conservative effect), and this may have an impact on the containment pressure. The staff, therefore, requests that GE provide an estimate as to how a distortion in PCCS heat removal capacity will impact the peak containment pressure.

15. Absence of a quantitative bottom-up scaling analysis :

In page 10-2 of the ESBWR Scaling report (NEDC-33082P), the last sentence of 4th paragraph states that, "Much of the bottom-up results are borrowed from the SBWR scaling report rather than repeating them in this report." The staff, however, notes that in letter dated May 14, 1996, from NRC to GE, "Staff Review of GE Scaling Report NEDC-32288P, Rev. 1, Scaling of SBWR Related Tests, Related to Reactor Systems Area," it was stated in Items 3 and 4 that, "....while the H2TM approach uses both top-down scaling for systems or components, and bottom-up scaling that focuses on phenomenology, GE's approach provides a quantitative evaluation only on the basis of top-down scaling parameters. The bottom-up approach is discussed in a qualitative fashion in the scaling report, but a quantitative analysis is not presented. The lack of a bottom-up scaling analysis means that there is no explicit link between significant SBWR phenomena, as identified in GE's Phenomena Identification and Ranking Tables (PIRTs) for the

SBWR, and the test facility scaling. This failure to link the PIRT and scaling is the major shortcoming of GE's report." In light of the fact that a quantitative bottom-up scaling analysis was not presented in the ESBWR Scaling report, the staff requests GE to submit such an analysis as part of the H2TM approach, clearly demonstrating explicit link between significant ESBWR phenomena, as identified in the PIRT and the test facility scaling.

16. Abbreviation error :

In page 1-1 of the ESBWR Scaling report (NEDC-33082P), 2nd line of last paragraph should be "SBWR," not "ESBWR."

Follow-up questions related to RAI Question 9, ESBWR RAI letter 1:

17. Please add the PCCS vent submergence to "ESBWR Horizontal Vent System" figure. Is the top elevation of the suppression pool gas volume (i.e., lower surface of diaphragm floor between DW and WW) at 16900 mm? And, please provide a figure showing the top view (including azimuthal and radial locations of the 10 vertical vent pipes) of the horizontal vent system with radial dimensions.

18. Please provide a table listing the height (in reference to the inner surface of pool bottom) of Isolation Condenser (IC)/PCCS pools, the normal water level in these pool, the elevation of the top of the condenser tubes (or the bottom elevation of the top header), the normal "total water volume" in the IC/PCCS pools (with the presence of IC and PCC condensers), and the maximum water volume filling to the top of the pools with the presence of IC and PCCS condensers.

19. Does Volume 0 communicate freely with Volume 1 in the "Location of Key Volumes in Table 1," figure? What is the rationale or advantage to separate these two volumes? Will the loss-of-coolant accident (LOCA) break flow and the condensed steam on the drywell wall fill up Volume 0 first and then Volume 2 next?

20. Please provide a sketch showing how a fuel assembly is supported on the core plate and the various leakage paths between fuel assemblies and the bypass region of the ESBWR.

Design Related Questions

21. Provide instrumentation diagrams for the RPV that show all the safety-related instrument locations for measuring pressures, temperatures, water levels (or differental pressure), and gas concentrations in the RPV (for initiating reactor scram and containment isolation). Show Levels 0.5, 1, 2, 3, 8, and 9, normal water level, top of active fuel (TAF), and bottom of active fuel (BAF).

22. Will Level 9, Level 3, Level 2, Level 1, or Level 0.5 initiate a reactor scram if reactor is not yet scrammed? Please explain the logic for the Level 2 initiation of a joint automatic depressurization system (ADS) inhibit plus standby liquid control system (SLCS) initiation with a concurrent "APRM Not Downscale" signal.

23. After Level 1 is confirmed, describe the actuation sequence and time delay of 12 safety relief valves (SRVs), 8 depressurization valves (DPVs), 8 gravity driven cooling system (GDCS) injection valves, and 4 PCCS drain tank valves.

24. How many nozzles does the RPV have? What are the inside diameters of each nozzle?

ESBWR

cc:

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