January 11, 2006

Mr. David Hinds, Manager, ESBWR
General Electric Company
P.O. Box 780, M/C L60
Wilmington, NC 28402-0780

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 4 FOR THE ESBWR DESIGN CERTIFICATION APPLICATION

Dear Mr. Hinds:

By letter dated August 24, 2005, General Electric Company (GE) submitted an application for final design approval and standard design certification of the economic simplified boiling water reactor (ESBWR) standard plant design. The Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application. The NRC staff has determined that additional information is needed to continue portions of the review.

Enclosure 1 contains a request for additional information (RAI) regarding the ESBWR scaling analysis. This RAI was sent to you via electronic mail on December 8, 2005. On December 20, 2005, you agreed to provide a response to the requested information by May 26, 2006.

If you have any questions or comments concerning this matter, you may contact me at (301) 415-2863 or lwr@nrc.gov or you may contact Amy Cubbage at (301) 415-2875 or aec@nrc.gov.

Sincerely,

/RA/

Lawrence Rossbach, Project Manager
New Reactor Licensing Branch
Division of New Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 52-010

Enclosure: As stated

cc: See next page

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ACCESSION NO. ML060090465

OFFICE	NRBA/PM	NRBA/BC
NAME	LRossbach	LDudes
DATE	01/09/2006	01/11/2006

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Distribution for DCD RAI Letter No. 4 dated January 11, 2006

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Request for Additional Information (RAI) Regarding ESBWR Scaling Analysis

RAI Number	Reviewer	RAI Summary
6.3-1	Razzaque M. Landry R.	Update ESBWR scaling analysis for current ESBWR power level and design configuration.

Full Text of RAI:

As part of the pre-application review phase of ESBWR, GE performed a scaling analysis based on a model described in Reference 1, and presented a plot in Figure 1 of Reference 2 showing core collapsed water level (CCWL) as a function of reactor pressure. The ESBWR results were compared with GIST and GIRAFFE integral test data which agreed reasonably well. This demonstrated that the phenomena which impact the most important phase of the loss-of-coolant accident (LOCA) event, and in terms of the most critical variable CCWL, are in the same regime for the ESBWR and the test facilities. This comparison provided confirmation of system similarities because numerical proximity of the values of Pi-groups for the systems in question (ESBWR vs. test facilities) alone is not a sufficient basis to ensure similarity of the systems.

The staff understands that the ESBWR design presented in the design control document (DCD) has been modified from the pre-application reference design. The staff further believes that some of those modifications, as discussed below, can impact the phenomena that influence the CCWL.

- ESBWR core power increased from 4000 Mwt to 4500 Mwt (12.5 percent): According to Reference 1, core power is the only parameter that has a significant impact on the figure of merit (CCWL), and the CCWL subsequent to depressurization is inversely proportional to core power.

- Change of configuration: Changes in ESBWR design and operating parameters may revise the values of Pi-groups for inter-connected volumes and components (RPV, drywell, wetwell, GDCS, etc.). The most significant change of configuration is the GDCS gas space which is now connected to the drywell, instead of the wetwell.

- ESBWR limiting event: When the scaling analysis in Reference 2 was performed, the limiting accident for ESBWR was considered the GDCS line break. For the current ESBWR design, the limiting event is now considered the feedwater line break.

The ESBWR DCD does not provide an updated scaling analysis that demonstrates the adequacy of the test program, including PANDA/PANTHERS/GIRAFFE/GIST, when applied to the current ESBWR design. The staff, therefore, requests GE to provide the following additional information:

1. Provide an updated scaling analysis (similar to Reference 2) showing plots for CCWL vs. reactor pressure for modified ESBWR design and tests, including the revised Pi-values calculated using inter-connected volumes and components.

2. Provide a comparison of revised ESBWR Pi-values with that of the tests for other phases of LOCA.
3. Provide justification as to why confirmatory scaling analysis similar to the approach taken in Reference 2 for the blowdown and GDCS transition phases are not necessary for other phases of LOCA, such as long-term cooling phase.

REFERENCES

1. M. di Marzo, “A Simplified Model of the BWR Depressurization Transient,” Nuclear Engineering and Design, 205 (2001), pgs. 107-114, July 28, 2000.

2. Letter from S. A. Delvin (GE) to US NRC, “Response to Request for Additional Information (RAI) on Scaling Responses for ESBWR Pre-application Review - Additional Supplementary Information,” November 6, 2003.

cc:

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