



GE Energy

James C. Kinsey
Project Manager, ESBWR Licensing

PO Box 780 M/C J-70
Wilmington, NC 28402-0780
USA

T 910 675 5057
F 910 362 5057
jim.kinsey@ge.com

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Subject: **Response to Portion of NRC Request for Additional Information
Letter No. 80 Related to ESBWR Design Certification Application –
Technical Specifications – RAI Number 16.0-5 S01**

Enclosure 1 contains GE's response to the subject replacement RAI transmitted via the Reference 1 letter. This RAI was originally transmitted via the Reference 2 letter and GE's original response is contained in the Reference 3 letter. This replacement RAI is being treated as a Supplement.

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,

A handwritten signature in cursive script that reads "James C. Kinsey for".

James C. Kinsey
Project Manager, ESBWR Licensing

D068

References:

1. MFN 06-419, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 80 Related to ESBWR Design Certification Application*, November 2, 2006
2. MFN 06-375, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 63 Related to ESBWR Design Certification Application*, October 4, 2006
3. MFN 06-431, Letter from David Hinds to U.S. Nuclear Regulatory Commission, *Response to Portion of NRC Request for Additional Information Letter No. 63 Related to ESBWR Design Certification Application – Technical Specifications – RAI Numbers 16.0-2 through 16.0-7, 16.2-10, 16.2-12 through 16.2-22, 16.2-25, 16.2-31 through 16.2-40, 16.2-43, 16.2-44, 16.2-46 through 16.2-49, 16.2-51, 16.2-53, 16.2-55 through 16.2-72, and 16.2-78 through 16.2-80*, November 13, 2006

Enclosure:

1. MFN 07-042 – Response to Portion of NRC Request for Additional Information Letter No. 80 Related to ESBWR Design Certification Application – Technical Specifications – RAI Number 16.0-5 S01

cc: AE Cabbage USNRC (with enclosures)
GB Stramback GE/San Jose (with enclosures)
eDRF 0000-0059-5596/1

Enclosure 1

MFN 07-042

Response to Portion of NRC Request for

Additional Information Letter No. 80

Related to ESBWR Design Certification Application

- Technical Specifications -

RAI Number 16.0-5 S01

NRC RAI 16.0-5 Supplement 1

Defense-in-Depth and the design basis require long term functional capability of the Containment, Control Room systems, and supporting systems. This is due to the long-term effects of radioactive decay and decay heat. The Containment, Control Room and supporting systems are required to mitigate the effects of design basis and severe accidents. Justify exclusion of the following STS from the ESBWR TS by demonstrating they do not satisfy the inclusion requirements of 10 CFR 50.36:

- A. *Section 3.7 (Service Water System and Ultimate Heat Sink (Cooling Towers), Control Room Fresh Air System, Control Room Heating Ventilation and Air Conditioning System);*
- B. *Section 3.9 (Reactor Water Cleanup/Shutdown Cooling System);*
- C. *Section 5.5 (Ventilation Filter Test Program, Diesel Generator Fuel Oil Testing Program).*

GE Response

This supplemental question expands upon RAI 16.0-5 by including the first three sentences. By way of background, the response in MFN 06-431, November 13, 2006, to RAI 16.0-5 is restated for convenience as follows:

NRC RAI 16.0-5

Justify exclusion of the following STS from the ESBWR TS by demonstrating they do not satisfy the inclusion requirements of 10 CFR 50.36:

- a. *Section 3.7 (Service Water System and Ultimate Heat Sink (Cooling Towers), Control Room Fresh Air System, Control Room Heating Ventilation and Air Conditioning System);*
- b. *Section 3.9 (Reactor Water Cleanup/Shutdown Cooling System);*
- c. *Section 5.5 (Ventilation Filter Test Program, Diesel Generator Fuel Oil Testing Program).*

GE Response

In response to NRC RAI 16.0-1, GE completed a systematic and comprehensive evaluation of Revision 1 of the ESBWR DCD to determine the ESBWR process variables, design features, operating restrictions, and structures, systems, or components (SSCs) that meet one or more of the four criteria in 10 CFR 50.36(c)(2)(ii). This evaluation was used to verify that Revision 1 of DCD Chapter 16 includes the Limiting Conditions for Operations (LCOs) required to maintain the validity of the safety analysis and risk analysis described in Revision 1 of the ESBWR DCD. The evaluation determined that the ESBWR systems discussed below did not meet the criteria for inclusion in the Technical Specifications. The results of this evaluation were provided in GE letter MFN 06-263, dated August 8, 2006.

- a. In Section 3.7 of NUREG-1434 ["Standard Technical Specifications General Electric Plants, BWR/6"], Revision 3.1:

- The system equivalent in intent to the Standby Service Water System and Ultimate Heat Sink (UHS) are the ESBWR Isolation Condenser/Passive Containment Cooling (IC/PCC) pools, which reject all of the heat necessary to the atmosphere to meet the safety analyses acceptance criteria for the first 72 hours following a design basis event. The IC/PCC pools are included in ESBWR Technical Specification 3.7.5. The ESBWR non-safety Plant Service Water System and Main Cooling Tower do not provide required cooling to any safety-related system.
 - Refer to the response to RAI 16.2-52 [actually, RAI 16.2-54] for a discussion of the Technical Specification requirements for the ESBWR systems equivalent in intent to the Control Room Fresh Air System and Control Room Air Conditioning System contained in Section 3.7 of NUREG-1434, Revision 3.1.
- b. The results of the evaluation discussed in response to NRC RAI 16.0-1 determined that the cleanup function and the decay heat removal function of the nonsafety-related RWCU/SDC System do not meet any of the four criteria in 10 CFR 50.36(c)(2)(ii). Instead, refer to the response to RAI 16.2-74 for a discussion of the safety-related systems for decay heat removal included in the ESBWR Technical Specification requirements equivalent in intent to the Residual Heat Removal (RHR) System contained in Section 3.9 of NUREG-1434, Revision 3.1.
- c. In Section 5.5 of NUREG-1434 ["Standard Technical Specifications General Electric Plants, BWR/6"], Revision 3.1:
- The Ventilation Filter Test Program is not needed in the ESBWR Technical Specifications because there are no ventilation filtration systems credited with meeting the safety analyses acceptance criteria for the first 72 hours following a design basis event. All ventilation filtration systems are non-safety in the ESBWR.
 - The Diesel Generator Fuel Oil Testing Program is not needed in the ESBWR Technical Specifications because there are no diesel generators needed to operate in order to meet the safety analyses acceptance criteria for the first 72 hours following a design basis event. All diesel generators are non-safety in the ESBWR.

DCD Impact

No changes will be made to DCD Tier 2, Chapter 16 or Chapter 16B as a result of this RAI.

The above quoted response explains why selected non-safety systems are not included in the Technical Specifications as directly meeting one of the four criteria of 10 CFR 50.36(c)(2)(ii). These non-safety, active, defense-in-depth systems are not assumed to function during the first 72 hours of any analyzed accident or transient. It is GE's position that the intent of the application of the 10 CFR 50.36 Criterion is limited to the protective and mitigative features that are credited in the primary success path during the first 72 hours.

However, for these active, defense-in-depth non-safety systems, GE has not completed its evaluation of the appropriate regulatory treatment of non-safety systems (RTNSS).

The RTNSS evaluation and the relationship of the results of such an evaluation are explained in MFN 06-263, August 8, 2006, in response to NRC RAI 16.0-1. As stated in that response:

Consistent with [NRC guidance on RTNSS in SECY 94-084 and SECY 95-132, and DCD Appendix 1D and Section 19.6], in a subsequent revision to the DCD, GE will provide appropriate "short-term availability controls" in the form of "simple Technical Specifications" for the RTNSS SSCs identified in DCD Appendix 1D.

Based on the NRC guidance and the ESBWR RTNSS evaluation, the systems that are the subject of RAI 16.0-5 and its supplement may, at a later time, be subject to short-term availability controls, which will be presented in DCD Chapter 19 as an appendix "in the form of simple Technical Specifications." At this time, for the reasons discussed herein, it would be inappropriate to address the RTNSS treatment in detail. GE met with the NRC Staff on November 28, 2006, to discuss RTNSS for the ESBWR. The discussions at that meeting were consistent with the positions discussed herein.

Recent NRC guidance further supports that the post-72 hours active systems should be evaluated as RTNSS. Specifically, NRC guidance in DG-1145, Section C.IV.10, "Regulatory Treatment of Non-Safety Systems," compares passive systems required during the first 72 hours following an initiating event, and active systems relied upon for defense-in-depth and necessary to meet passive ALWR plant safety and investment protection goals. The referenced section of the NRC guidance notes that the information contained therein is based on NUREG-1793, Volume 3, "Final Safety Evaluation report related to Certification of the AP1000 Standard Plant Design" (September 2004). The guidance states the following:

Defense-in-depth systems provide long-term, post-accident plant capabilities. Passive systems should be able to perform their safety functions, independent of operator action or offsite support, for 72 hours after an initiating event. After 72 hours, non-safety or active systems may be required to replenish the passive systems or to perform core and containment heat removal duties directly. These active systems are the first line of defense in reducing challenges to the passive systems in the event of transients or plant upsets.

The DG-1145 guidance references NRC guidance first established in SECY 94-084 and SECY 95-132, which describe the scope, criteria, and process used to determine regulatory treatment of non-safety systems in passive plant designs. In SECY 94-084, "Policy and Technical Issues Associated with the Regulatory Treatment of Non-Safety Systems in Passive Plant Designs" (March 28, 1994), the NRC Staff discussed RTNSS. The Commission approved the staff's position regarding RTNSS as discussed in SECY 94-084 in a Staff Requirements Memorandum (SRM) dated June 30, 1994. The NRC Staff subsequently issued SECY 95-132, "Policy and Technical Issues Associated with the Regulatory Treatment of Non-Safety Systems in Passive Plant Designs (SECY 94-084)" (May 22, 1995), which revised SECY 94-084, but retained the position on RTNSS with essentially no changes. The Commission approved the Staff recommendations contained in SECY 95-132 in a SRM dated June 28, 1995, with direction to the Staff to clarify a recommendation concerning inservice testing of pumps and valves (See NRC Memorandum, D. Crutchfield to Docket File, "Consolidation of SECY 94-084 and SECY 95-132," July 24, 1995).

In SECY 95-132, the NRC supported many of the EPRI Advanced Light Water Reactor (ALWR) Utilities Requirement Document design requirements. By way of example, the NRC explained:

The passive ALWR designs also include active systems that provide defense-in-depth capabilities for reactor coolant makeup and decay heat removal. Active systems are the first line of defense to reduce challenges to the passive systems in the event of transients or plant upsets. As stated above, all active systems in passive plants are designated as non-safety systems. In addition, one of the principal design requirements of EPRI's ALWR utility requirements document (URD) is that passive systems should be able to perform their safety functions, independent of operator action or offsite support, for 72 hours after an initiating event. After 72 hours, non-safety, or active systems may be required to replenish the passive systems or perform core and containment heat removal duties directly . . .

[A]ctive systems are not classified as safety-related in passive ALWR designs, and credit is not taken for these active systems in the Chapter 15 licensing design-basis accident (DBA) analyses. In SECY 90-406, "Quarterly Report on Emerging Technical Concerns," December 17, 1990, the staff listed the role of these active systems in the passive design as an emerging technical issue. In SECY 93-087, "Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor (ALWR) Designs," April 2, 1993, the staff discussed the issue of regulatory treatment of active non-safety systems (the "RTNSS Issue") and stated that it would propose a resolution of this issue in a separate Commission paper.

The NRC Staff also acknowledged:

The exclusive reliance on passive systems in meeting current licensing criteria is a departure from current design philosophy and licensing practice and must be evaluated. Therefore the staff will need new guidance for reviewing [passive design] submittals and in developing regulatory treatment of non-safety systems (RTNSS).

On July 19, 1995, the Commission issued an amendment to 10 CFR 50.36 to codify the criteria for determining the content of Technical Specifications (60FR36953, July 19, 1995). In the Statement of Considerations Supplementary Information, the Commission summarized the basis for Technical Specification content, explaining the four criteria:

By applying the four criteria contained in this rule, a licensee should capture the conditions for operation of its facility that are required to meet the principal operative standard in Section 182a. of the Atomic Energy Act, that is, that adequate protection is provided to the health and safety of the public.

The Commission recognizes that the four criteria carry a theme of focusing on the technical requirements for features of controlling importance to safety. Since many of the requirements are of significance to the health and safety of the public, this rule reflects the subjective statement of the purpose of technical specifications expressed by the Atomic Safety and Licensing Appeal Board in Portland General Electric Company (Trojan Nuclear Plant), ALAB-531, 9 NRC 263 (1979). There, the Appeal Board interpreted technical specifications as being reserved for those conditions or limitations upon reactor operation necessary to obviate the possibility of an abnormal situation or

event giving rise to *an immediate threat* to the public health and safety (re: 60FR36954-5, with *emphasis* added).

One primary purpose of SECY 95-132 was to address how non-safety, active, defense-in-depth systems would be evaluated for regulatory treatment appropriate to the function of these systems. This discussion of the regulatory treatment was new and separate from discussion of how credited protective systems were regulated by 10 CFR 50.36, which is intended to apply to "an immediate threat to public health and safety." Specifically, of the five RTNSS evaluation criteria described in SECY 95-132, Criterion B identifies the scope as including system functions relied upon for "long term safety (beyond 72 hours)."

Based on the above considerations, it is GE's position that the RTNSS evaluation is the appropriate regulatory treatment for non-safety, active, post-72 hour recovery/defense-in-depth systems, which do not fall within the scope of the criteria delineated in 10 CFR 50.36. Each of the systems, subsystems, and components listed in the subject of this RAI were addressed within the response to RAI 16.0-1 to determine if they fall under the scope of the criteria delineated in 10 CFR 50.36, consistent with the position and NRC guidance described above. To the extent that any of these systems are determined to require additional regulatory treatment per the RTNSS evaluation, the systems will be included in a future revision to Chapter 19 in a short-term availability controls appendix, as appropriate. Any additional information regarding the subject systems should be addressed through the NRC review of RTNSS.

DCD Impact

No DCD changes will be made in response to this RAI.