

GE-Hitachi Nuclear Energy Americas LLC

James C. Kinsey
Vice President, ESBWR Licensing

PO Box 780 M/C A-55
Wilmington, NC 28402-0780
USA

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

MFN 07-024
Supplement 3

Docket No. 52-010

October 15, 2007

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Subject: **Response to Portion of NRC Request for Additional Information
Letter No. 77 Related to ESBWR Design Certification Application -
Technical Specifications - RAI Numbers 16.2-75 S01 and 16.2-97 S01**

Enclosure 1 contains the subject supplemental RAI responses resulting from a June 6, 2007 e-mail from the NRC. GE-Hitachi Nuclear Energy's original responses were provided in the Reference 1 letter.

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

Sincerely,



James C. Kinsey
Vice President, ESBWR Licensing

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NRO

References:

1. MFN 07-024, Letter from James Kinsey to U.S. Nuclear Regulatory Commission, *Response to Portion of NRC Request for Additional Information Letter No. 77 Related to ESBWR Design Certification Application - Technical Specifications - RAI Numbers 16.2-33, 16.2-52, 16.2-75, 16.2-90 through 16.2-94, and 16.2- 97 through 16.2-109*, January 18, 2007

Enclosures:

1. MFN 07-024, Supplement 3 - Response to Portion of NRC Request for Additional Information Letter No. 77 Related to ESBWR Design Certification Application - Technical Specifications - RAI Numbers 16.2-75 S01 and 16.2-97 S01

cc: AE Cubbage USNRC (with enclosures)
DH Hinds GEH (with enclosures)
RE Brown GEH (w/o enclosures)
eDRFs 74-5246 and 72-7075

Enclosure 1

MFN 07-024, Supplement 3

Response to Portion of NRC Request for

Additional Information Letter No. 77

Related to ESBWR Design Certification Application

- Technical Specifications -

RAI Numbers 16.2-75 S01 and 16.2-97 S01

NRC RAI 16.2-75

Add DCD Sections 15.3.8 and 15.3.9 to the references for TS Bases 3.1.1.

GE Response

Revision 2 of the Design Control Document (DCD) Tier 2, Section 15.3.8 applies to a Control Rod Withdrawal Error During Startup, while Section 15.3.9 applies to a Control Rod Withdrawal Error During Power Operation.

For the Control Rod Withdrawal Error During Startup, the analysis described in DCD Tier 2, Section 15.3.8 demonstrates that the transient is terminated upon a reactor scram based on a high source range neutron monitor period. Therefore, SDM requirements would ensure for this event that the reactor will be made subcritical even if the highest worth control rod or control rod pair does not insert, similar to all other analyzed transients that assume reactor scram as a mitigative function. However, there are many other transients and accidents analyzed in the DCD Tier 2, Chapter 15 that result in reactor scram as a mitigative function, similar to that for the typical BWR/6. Specific references for all of these other events are not included in the NUREG-1434, Revision 3.1, Technical Specification 3.1.1 Bases. Therefore, not providing this reference is consistent with NUREG-1434, Revision 3.1, and the reference will not be added to the DCD Tier 2, Chapter 16B Bases.

For the Control Rod Withdrawal Error During Power Operation, DCD Tier 2, Section 15.3.9 specifically justifies not analyzing this event, because there is no postulated set of circumstances for which this event could occur. Therefore, not providing this reference is consistent with the DCD Tier 2, Chapter 15, and the reference will not be added to the DCD Tier 2, Chapter 16B Bases.

DCD Impact

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

NRC RAI 16.2-75, Supplement 1

The bases discussion regarding the applicable safety analyses for TS 3.1.1, Shutdown Margin, presents the Control Rod Withdrawal Error (RWE) during refueling as the event basis for the shutdown margin (SDM) LCO. Confirm whether RWE during refueling is more limiting than RWE at start up or low power. If RWE at start up or low power is more limiting, then the reference should be changed to RWE during start up; that is, change DCD reference from Section 15.3.7 to 15.3.8. (See staff RAI 15.3-33 regarding analysis of the RWE event during power operation.)

GEH Response

The core is designed to remain subcritical with one control rod pair (with the same HCU) or one rod of maximum worth withdrawn. This is a direct assumption in evaluating the Control Rod Withdrawal Error During Refueling (DCD Tier 2, Section 15.3.7). The definition of shutdown margin (SDM) provides subcriticality margin consistent with the worst-case assumptions for this event (i.e., xenon free, cold moderator temperature, and highest worth control rod or rod pair withdrawn).

For the 15.3.8 Control Rod Withdrawal Error During Startup (DCD Tier 2, Section 15.3.8), the event is terminated by reactor scram (i.e., reactor core achieving subcriticality) with peak fuel pin enthalpy acceptance criterion met. There is no credit for any additional subcriticality margin in evaluating this event.

For the Control Rod Withdrawal Error During Power Operation (DCD Tier 2, Section 15.3.9), the Automated Thermal Limit Monitor (ATLM) subsystem performs two rod block monitoring functions. One function monitors Minimum Critical Power Ratio (MCPR) limit and protects the operating limit MCPR, another function monitors the Maximum Linear Heat Generation Rate (MLHGR) limit. The event is terminated prior to reaching any operating fuel thermal limit while the reactor remains critical at power operating conditions. There is no credit for any additional subcriticality margin in evaluating this event.

For SDM considerations, the Control Rod Withdrawal Error During Refueling event is the only rod withdrawal error event that credits any subcriticality margin, and is therefore, more limiting than either the Control Rod Withdrawal Error During Startup or the Control Rod Withdrawal Error During Power Operation. Section 15.3.7 is therefore the appropriate reference for TS Bases 3.1.1.

DCD Impact

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

NRC RAI 16.2-97

Confirm that all Automatic Depressurization System (ADS) and Depressurization Valve (DPV) timers are included in the TS.

GE Response

The ESBWR Design Control Document (DCD), Tier 2, Revision 1, Chapter 16B, Technical Specification (TS) 3.3.5.2, "Emergency Core Cooling System (ECCS) Actuation," Bases indicates that TS 3.3.5.2 does include the timers associated with the Automatic Depressurization System (ADS) and the Depressurization Valves (DPVs). However, in the Revision 1 Bases, this was shown as a bracketed item as a result of a lack of detail contained in DCD Chapter 7, "Instrumentation." The TS 3.3.5.2 Bases also state that a detailed description of the ECCS instrumentation and ECCS actuation logic is provided in the Bases for Limiting Condition for Operation (LCO) 3.3.5.1, "Emergency Core Cooling System (ECCS) Instrumentation." A review of the Bases associated with LCO 3.3.5.1 shows that the ADS and DPV timers are implicitly included in the TS. Surveillance Requirement (SR) 3.3.5.1.4 requires a periodic verification that the response time of the ECCS instrument channels is within limits. To provide assurance that the ADS and DPV timers are operable, GE revised TS 3.3.5.2 and the associated Bases, in Revision 2, to include a response time test of the actuation logic.

DCD Impact

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

NRC RAI 16.2-97, Supplement 1

In its letter response to RAI 16.2-97, MFN 07-024, the applicant stated it had added response time testing of the ECCS actuation logic with SR 3.3.5.2.2, "Verify the ECCS RESPONSE TIME of each required division is within limits." The associated TS bases for this SR does not explicitly describe the ADV and DPV "timers" as being included in the surveillance. The bases for TS 3.3.5.2, "ECCS Actuation," mention "timers" once in the third paragraph of the background discussion and once in the third paragraph of the LCO discussion. The staff does not concur with the applicant's contention that ADS and DPV timers are implicitly included in the TS because it does not find that testing the timers is clearly included in SR 3.3.5.2.2. Since the timers are very critical for the function of ECCS, timers should be included in the TS explicitly.

GEH Response

GEH revised the DCD, Chapter 16B description of response time testing provided in Technical Specification (TS) 3.3.5.2, "Emergency Core Cooling System (ECCS) Actuation," Bases for Surveillance Requirement (SR) 3.3.5.2.2 to clarify that timers are included in the scope of the surveillance.

DCD Impact

DCD Chapter 16B, TS 3.3.5.2, SR 3.3.5.2.2 Bases were revised in Revision 4 to include the following statement: "This test encompasses the ECCS actuation circuitry from the outputs of the DTMs through the LDs that consists of VLUs, the timers, and the LDs associated with the ADS SRVs, the ADS DPVs, the GDCS injection valves, the GDCS equalizing line valves, and the SLC squib-actuated valves."