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June 8, 2009
MFN 09-306

10 CFR Parts 21 and 52
Docket 52-001

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

**Subject: Response to NRC Request for Information and Supplemental
Information Regarding Two 2002 GEH 10 CFR Part 21 Notifications**

Introduction and Summary

GE Nuclear Energy, predecessor of GE Hitachi Nuclear Energy (hereinafter "GEH"), was the applicant for the Advanced Boiling Water Reactor ("ABWR") design certification, codified in U.S. Nuclear Regulatory Commission ("NRC") regulations 10 CFR Part 52, Appendix A. During preparations of the STP Units 3 and 4 Combined License Application ("COLA"), Rev. 0, GEH submitted NEDO-33372, "Advanced Boiling Water Reactor (ABWR) Containment Analysis," to the U.S. Nuclear Regulatory Commission ("NRC") in a letter dated September 4, 2007. NEDO-33372 proposed changes to the ABWR Design Control Document ("DCD") and provided the technical basis for certain departures identified in the COLA, Rev. 0, submitted September 20, 2007.

In a letter dated May 14, 2009 (Reference 1), the NRC requested information regarding NEDO-33372, specifically as to whether the proposed changes to the ABWR DCD contained therein have been evaluated under the provisions of 10 CFR Part 21. The NRC requested that GEH:

- 1) Evaluate, if GEH has not previously done so, whether each of the identified deficiencies to which the LTR refers is a defect in a facility, activity, or basic

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- component (with reference to the ABWR standard design) or a failure of a facility, activity, or basic component to comply, as defined in Part 21;
- 2) Inform the NRC staff of the results of the evaluations requested above and where the evaluations are documented and available for audit;
 - 3) Inform the NRC staff of any further action required pursuant to 10 CFR Part 21, if any, including reporting required under 10 CFR. § 21.21; and
 - 4) Whether the deficiencies are reportable under Part 21 or not, inform the NRC staff of any plans you might have to correct the identified deficiencies, other than through the vehicle of the LTR.

Responses to these items are provided below.

Responses to NRC Requests for Information

Evaluate, if GEH has not previously done so, whether each of the identified deficiencies to which the LTR refers is a defect in a facility, activity, or basic component (with reference to the ABWR standard design) or a failure of a facility, activity, or basic component to comply, as defined in Part 21.

As discussed above, GEH submitted NEDO-33372 to provide a revised containment analysis and to identify changes to the ABWR Design Control Document ("DCD") for three major types of modeling changes:

- Feedwater line break flow changes.
- Decay heat using 2-sigma uncertainty.
- Containment vent model.

GEH evaluated issues associated with these changes under 10 CFR Part 21 as described below.

Inform the NRC staff of the results of the evaluations requested above and where the evaluations are documented and available for audit.

The three types of changes were associated with one Potential Safety Concern ("PSC") and three Potentially Reportable Conditions ("PRC"). GEH evaluated each of these individually, as described below, and also reviewed these in a combined assessment in PRC 09-01, "Review of PSC 0240 with 2007 10CFR21 Reporting Requirements - ABWR."

PSC 0240, "Possible Non-Conservative Containment Analysis Assumptions (ABWR/Lungmen)." This PSC relates to the feedwater line break flow changes.

As part of its preparation for renewal of the ABWR design certification rule,¹ GEH identified a potential 10 CFR Part 21 issue, originally assessed in 2002 as PSC 0240, in which the conclusion for the ABWR Standard Plant stated:

Standard plant designs are covered by 10CFR52, and are not currently recognized by 10CFR21. Therefore, this deviation is not reportable under 10CFR21.

GEH initiated PRC 09-01 and completed the evaluation under Part 21. GEH determined that the issue of feedwater line break flow changes would not create a substantial safety hazard or the potential to violate a Technical Specification Safety Limit and is, therefore, not reportable, nor would it have been reportable, under 10 CFR Part 21, had it been evaluated in 2002. The issue was corrected for the Lungmen project and, as part of the closure of PSC 0240, Safety Communication SC 02-017 was issued to Toyko Electric for the Kashiwazaki Units 6 and 7 ABWRs.

PRC 00-26, "Non-Conservative Estimation of Decay Heat from Actinides." This PRC was evaluated in 2000 for containment analyses and Spent Fuel Pool Cooling analyses as not resulting in a substantial safety hazard or the possibility of exceeding a Technical Specification Safety Limit. PRC 05-42, "Worst Single Failure for Suppression Pool Temperature Analysis." This PRC also addressed the suppression pool temperature with different single failure assumptions, and was determined not to result in a substantial safety hazard or the possibility of exceeding a Technical Specification Safety Limit.

These two PRCs related to a small increase in the calculated suppression pool temperature. In LTR NEDO-33372, the marked-up ABWR DCD pages (Sections 6.2.1.1.2.2 and 6.2.1.1.3.3.1.4 and Table 6.2-1, pages B-7, B-12, and B-28) indicate a change in the suppression pool peak temperature from 97.2°C to 97.1°C. Because this value is lower than the previous value, it remains within the design limit for the ABWR, as certified.

PRC-03-69, "ABWR Main Steam Line Break Containment Response Analysis." This PRC related to a containment analysis issue and was addressed by the changes in NEDO-33372. The PRC-03-69 evaluation specifically concluded that the "issue does not produce a substantial safety hazard or Technical Specification Safety Limit violation for ABWR-SAR and is, therefore, not reportable."

¹ GEH informed the NRC in MFN-08-947 (December 5, 2008) that it plans to apply for renewal of the ABWR design certification.

Inform the NRC staff of any further action required pursuant to 10 CFR Part 21, if any, including reporting required under 10 CFR. § 21.21.

To ensure that any other PSC/PRC issues relating to the ABWR were properly evaluated, GEH undertook actions to assess the extent of condition and determined that two previous notifications should be supplemented: PRC 02-44 and PRC 02-54. These conditions were reported to the NRC in 2002 (see References 2 and 3), but the notifications did not indicate that they are applicable to the ABWR design. GEH provides the supplemental information in the enclosures herein so that the NRC is informed of these two issues in advance of construction and operation of future ABWR plants in the U.S. There were no errors in the ABWR DCD associated with these two PRCs.

Whether the deficiencies are reportable under Part 21 or not, inform the NRC staff of any plans you might have to correct the identified deficiencies, other than through the vehicle of the LTR.

GEH is currently in the process of determining the scope of a renewal application and will be discussing with the NRC potential amendments to the ABWR DCD. GEH will consider including changes in LTR NEDO-33372, as well as changes associated with PRC 02-44 and PRC 02-54 described in the enclosures herein (as appropriate). In addition, it is expected that Combined License Applications submitted prior to ABWR design certification rule amendments would address necessary changes as departures.

GEH will initiate internal actions to address the issues as part of initial fuel load and detailed design for the two items discussed in the enclosures. Please contact me if you have any questions.

Sincerely,



Jerald G. Head

- References:
- 1) NRC letter to GEH, Impact of GE-Hitachi Nuclear Energy Licensing Topical Report on Advanced Boiling Water Reactor Certified Design, May 14, 2009
 - 2) GE Nuclear Energy Letter to NRC, Fuel Support Side Entry Orifice Loss Coefficient in Core Monitoring System Databank, October 4, 2002, MFN 02-067
 - 3) GE Nuclear Energy Letter to NRC, Reportable Condition Stability Solution Option III, Period Based Algorithm T_{min} Specification, November 22, 2002, MFN 02-091

- Enclosures
- 1) Possible Over-Prediction of Side Entry Orifice Loss Coefficient Affecting CPR Calculations for BWR/6 and ABWR
 - 2) Option III OPRM T_{min}/T_{max} Tuning

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**Possible Over-Prediction of Side Entry Orifice Loss Coefficient
Affecting CPR Calculations for BWR/6 and ABWR**

GE Nuclear Energy letter to NRC, Fuel Support Side Entry Orifice Loss Coefficient in Core Monitoring System Databank, October 4, 2002, MFN 02-067, notified the NRC of a 10 CFR Part 21 reportable condition for PRC 02-44, "Possible Over-Prediction of Side Entry Orifice Loss Coefficient Affecting CPR Calculations for BWR/6 and ABWR." However, the notification did not indicate that it was applicable to the ABWR design because no ABWR plants were being licensed, constructed, or operated in the U.S. As part of the closure of PRC 02-44, GE Nuclear Energy issued Safety Information Communication (SC 02-15) to inform foreign companies operating affected BWRs and ABWRs of the issue.

Related to PRC 02-44, the STP Units 3 and 4 COLA did not discuss the issue because neither the ABWR DCD nor the COLA include the level of design detail (orifice loss coefficient data for core monitoring system input) that would describe actions to address the loss coefficient issue. Therefore, there were no errors in the ABWR DCD and no related departures in the COLA. Actions described in MFN 02-067 will be addressed for future ABWRs that may be constructed in the U.S. for the selected fuel type. No amendment to the ABWR DCD is necessary.

Option III OPRM T_{min}/T_{max} Tuning

GE letter to NRC, Reportable Condition Stability Solution Option III, Period Based Algorithm T_{min} Specification, November 22, 2002, MFN 02-091, notified the NRC of a 10 CFR Part 21 evaluation for PRC 02-54, "Option III OPRM T_{min}/T_{max} Tuning."

For PRC 02-54, as related to STP Units 3 and 4, GEH submitted Licensing Topical Report NEDO-33336, "Advanced Boiling Water Reactor (ABWR) Stability Evaluation," to the NRC in MFN 07-296 (June 15, 2007). NEDO-33336, Reference 7.5, is the associated Safety Communication notification SC 02-21 (November 22, 2002) for the Option III period based algorithm (which was issued to Taiwan Power Company for the Lungmen ABWR project). The LTR states the following in regard to Reference 7.5:

- T_{min} and T_{max} are conservatively set at 1.0 and 3.5 seconds, respectively (Reference 7.5).

The values in the ABWR DCD and references, as certified, are given as T_{min} = 1s and T_{max} = 3.5 seconds, with a $\pm t_{\text{error}} = 0.15$ s (Table 7.6-2, "APRM Trip Function Summary," footnote). Also, see Chapter 16 of the ABWR DCD, as certified, for Technical Specification Table 3.3.1.1-1, page 3.3-16, which gives the values in brackets for the neutron flux oscillations within any OPRM cell with a period between [1.15] seconds and [3.35] seconds. For these bracketed values, NEDO-33336 (June 2007) would change the values to [1.0] and [3.0] seconds, respectively. However, the values in the ABWR DCD, as certified, are already within the values given in the PRC-02-54 notification to the NRC (MFN 02-91), which are a T_{min} of 1.2 seconds or lower, and a T_{max} of 3.0 seconds or higher.

From this, it is shown that the ABWR DCD values were within acceptable ranges, even with the error adjustments. The change recommended by NEDO-33336 is more conservative for the additional margin recommended in PRC-02-54. Thus, there is no *error* in the ABWR design certification. GEH has developed a range of values that would allow for additional margin. However, the notification (MFN 02-091) states that a tighter range may be justified based on plant-specific analysis, and more conservative final actual values for future ABWRs could be implemented through detailed design prior to initial plant startup.