



HITACHI

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MFN 14-013 R1

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

**Subject: 10 CFR Part 21.21(a)(2) 60-Day Interim Report Notification:
Containment Loads Potentially Exceed Limits with High Suppression Pool
Water Level in the ABWR Design**

This letter provides supplemental information concerning an evaluation being performed by GE Hitachi Nuclear Energy (GEH) regarding the potential increase in hydrodynamic loads that may be experienced by containment structures during a postulated Loss of Coolant Accident (LOCA) associated with Reference 1, and requests additional time to complete the evaluation for the determination of reportability of this condition.

A potential analysis error has been identified that is associated with the ABWR hydrodynamic loads determined by using the Technical Specification Suppression Pool High Water Level (HWL) as an analysis input condition. Vessel coolant inventory is transferred into the containment Suppression Pool during a postulated LOCA blowdown, thereby increasing the Suppression Pool water level. The correction in the analysis may lead to a Suppression Pool water level greater than what is currently assumed in structural analyses which apply the containment hydrodynamic loads generated during a postulated LOCA event. For example, a postulated Feedwater Line Break (FWLB) may transfer a large quantity of FW liquid into the Suppression Pool with a notable increase in pool water level, even assuming a portion of the discharged fluid spills over into the lower drywell region of the ABWR containment. A higher Suppression Pool water level may result in increased hydrodynamic loads acting on the submerged walls and structures in the containment. The higher Suppression Pool water level can extend the wetted regions of the Suppression Pool walls and the ABWR access tunnel, as well as result in wetted submerged structure segments that were not previously considered wetted. This potential analysis error affects the LOCA containment hydrodynamic loads including condensation oscillation (CO) and chugging, as well as Safety Relief Valve (SRV) actuation loads.

Assessing the overall impact of increased hydrodynamic loads calculated with higher Suppression Pool water level requires an evaluation of the containment structural components' design bases. GEH is in the process of examining revised containment loads, and determining available margin in the ABWR containment component design specifications to accommodate potentially increased load source forcing functions. ABWR plants may then compare affected plant-specific containment structural design bases to these specifications for relative margin. An extended time period is needed in order to complete the revised containment load determination and evaluate the impact on containment structures.

GEH is requesting additional time to complete the analysis previously noted in Reference 1. The information required for this GEH 60-Day Interim Report Notification per §21.21(a)(2) is provided in Attachment 1. The commitment for follow-on actions is provided in Attachment 1, item (vii).

If you have any questions, please call me at (910) 819-4491.

Sincerely,



Dale E. Porter
Safety Evaluation Program Manager
GE-Hitachi Nuclear Energy Americas LLC

Reference:

1. 60-Day Interim Report Notification, Titled: Containment Loads Potentially Exceed Limits with High Suppression Pool Water Level in the ABWR Design, Numbered: MFN 14-013 R0, Dated: March 31, 2014

Attachments:

1. 60-Day Interim Report Notification Information per §21.21(a)(2)

cc: J. Golla, USNRC
A. N. Issa, USNRC
A. Muniz, USNRC
S. J. Pannier, USNRC
S. S. Philpott, USNRC
J. Burke, GEH
S. Bowman, GEH
J. F. Harrison, GEH
J. G. Head, GEH
R. Jacobs, GEH
J. Leong, GEH
A. Meyers, GEH
P. Sharpe, GEH
P. L. Campbell, GEH Washington
J. Wileman, GEH
PRC File
S. Sheth, GEH
PLM Spec 000N7289 R1

Attachment 1 – 60-Day Interim Report Notification Information per §21.21(a)(2)

- (i) Name and address of the individual or individuals informing the Commission.

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- (ii) Identification of the facility, the activity, or the basic component supplied for such facility which fails to comply or contains a defect.

There are currently no US ABWR plants in operation or under construction that would be potentially affected by this evaluation. While no US plants in operation or under construction are potentially affected by the potential analysis error, the NRC certified design of the ABWR and the GEH ABWR design certification renewal application currently under review may be affected.

The Combined License Applications (COLA) for the South Texas Project (STP) Units 3 and 4 references the ABWR design certification (10 CFR Part 52, Appendix A). However, GEH is not the entity providing the design for the STP Units 3 and 4 COLAs. In accordance with NRC guidance in RIS 2010-05, GEH is currently evaluating the issue and will determine if it impacts the ABWR design certification and will report it as a defect to the NRC, if required.

Applications for the issued Early Site Permits for the Clinton ESP Site, the Grand Gulf ESP Site, and the North Anna ESP Site, reference the ABWR certified design. However, the issue identified in this interim report relates to structural loads, which are not addressed in the ESPs and, thus, these ESPs are not impacted. In addition, the ESP application for the PSEG Site, currently under review, references the ABWR certified design, but is similarly not impacted by the issue. Likewise, the Victoria County Station ESP application (withdrawn 10/03/2012) also referenced the ABWR certified design and is not impacted by this issue.

- (iii) Identification of the firm constructing the facility or supplying the basic component which fails to comply or contains a defect.

GE Hitachi Nuclear Energy supplied the design analysis basis for ABWR containment hydrodynamic loads for the ABWR certified design and the GEH ABWR design certification renewal application currently under review.

- (iv) Nature of the defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply.

ABWR hydrodynamic loads have been calculated with the Suppression Pool water level defined at the Technical Specification Suppression Pool High Water Level (HWL). The Suppression Pool level during the postulated LOCA vessel blowdown may be greater than the Suppression Pool HWL during the pertinent timeframe for hydrodynamic loads because vessel coolant inventory is transferred into the suppression pool during blowdown. Additionally, certain containment structures previously thought uncovered may be submerged with the higher Suppression Pool water level. Increased hydrodynamic loads

Attachment 1 – 60-Day Interim Report Notification Information per §21.21(a)(2)

may correspondingly increase the totals in the design load combinations for which containment structures are designed to withstand.

- (v) The date on which the information of such defect or failure to comply was obtained.

A Potential Reportable Condition Evaluation in accordance with 10 CFR Part 21 was initiated on February 7, 2014. On March 31, 2014 a submittal (MFN 14-013-R0) per the requirements of §21.21(a)(2) was provided to the commission documenting the request for an extension of the evaluation period.

- (vi) In the case of a basic component which contains a defect or fails to comply, the number and location of these components in use at, supplied for, being supplied for, or may be supplied for, manufactured, or being manufactured for one or more facilities or activities subject to the regulations in this part.

There are no current operating US ABWR plants affected by this evaluation. While no US plants are affected by the potential analysis error, the NRC certified design of the ABWR and the GEH ABWR design certification renewal application currently under review may be affected.

The potential analysis error reported in this document affects systems, structures, and components in the ABWR containment subjected to hydrodynamic loads during a postulated LOCA, including but not limited to containment submerged structures, the ABWR access tunnel, and SRV discharge lines.

- (vii) The corrective action, which has been, is being, or will be taken; the name of the individual or organization responsible for the action; and the length of time that has been or will be taken to complete the action.

Corrective actions may be required should structural design specifications of containment components (e.g. ABWR access tunnel and previously un-wetted structural components) or any potentially affected systems indicate reduced design margin with load combinations approaching component design limits.

The GEH assessment has progressed in identifying affected structures and components, characterizing conservatism in design basis analysis methods as well as alternate methods, and evaluating the potential hydrodynamic loads multiplication factors for the affected structures and components. Affected structures and components include the pool boundary (basemat, containment wall, and pedestal wall), the access tunnel, Safety Relief Valve Discharge Line piping and quenchers, and Emergency Core Cooling System suction strainers. Load multiplication factors are determined by comparing the existing design basis loads to the loads calculated with corrected suppression pool water level input and using the design basis methods or alternate methods for characterizing analysis conservatism. Evaluation for each structure and component considers the hydrodynamic loads associated with pool swell, condensation oscillation, chugging, and Safety Relief Valve actuation. The GEH assessment of load multiplication factors indicates the access tunnel to be the most impacted structure.

Attachment 1 – 60-Day Interim Report Notification Information per §21.21(a)(2)

Upon completion of the containment hydrodynamic loads assessment, their contribution to the overall containment loads combinations is required for assessing margin to component design limits. Evaluation of the containment loads combinations for the affected structures and components is continuing, with additional time required in order to complete the design margin assessment. The updated completion date of the GEH evaluation is August 29, 2014.

Once completed, GEH will provide to the affected plants an assessment summary for affected containment structural components or system design specifications requiring mitigative action. Such actions may include a margin re-characterization from the design specifications to the existing plant design bases. A more extreme outcome of this evaluation could include compensatory structural augmentations, which is not likely.

- (viii) Any advice related to the defect or failure to comply about the facility, activity, or basic component that has been, is being, or will be given to purchasers or licensees.

There are currently no operating US ABWR plants potentially affected by this evaluation for which advice would be communicated. While no US plants are potentially affected by the potential analysis error, the NRC certified design of the ABWR and the GEH ABWR design certification renewal application currently under review may be affected. The Combined License Applications for the South Texas Project (STP) Units 3 and 4 references the ABWR design certification (10 CFR Part 52, Appendix A). However, GEH is not the entity providing the design for the STP Units 3 and 4 COLAs and, thus, the structural design basis for the containment hydrodynamic loads may be different than that in the ABWR certified design.

GEH suggests that the staff at potentially affected plants review the containment structure and affected system design bases for potentially affected components. The ABWR access tunnel is anticipated as being the structural component most affected by any increased hydrodynamic loads resulting from higher suppression pool water level. Therefore, the loads combinations of the ABWR access tunnel should be a primary focus of reviews, with particular review of the condensation oscillation and chugging load components. Additionally, GEH recommends a review of submerged structures to identify not only structures and components with additional submergence, but also any structures and components near the current maximum suppression pool water level that were previously not identified as submerged but that would be submerged following the suppression pool level increase.

- (ix) In the case of an early site permit, the entities to whom an early site permit was transferred.

This is not an early site permit concern, as explained above in Item (ii).