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GE Hitachi Nuclear Energy

December 12, 2012
MFN 12-111 R1

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

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**Subject: Part 21 60-Day Interim Report Notification:
Error in Main Steam Line High Flow Computational Methodology**

This letter provides information concerning an evaluation being performed by GE Hitachi Nuclear Energy (GEH) regarding a potential non-conservatism in calculation of Main Steam Line (MSL) choked flow rates. A previous 60-Day Interim Report Notification regarding this issue was issued on September 27, 2012 as MFN 12-111 R0. As stated herein, GEH has not completed the evaluation to determine whether this is a reportable condition in accordance with the requirements of 10CFR 21.21(d), and continued evaluation is required to determine whether this question about calculation methods and inputs is a reportable condition and what impact and extent of this condition may exist.

The information required for a 60-Day Interim Report Notification per §21.21(a)(2) is provided in Attachment 3. The commitment for follow-on actions is provided in Attachment 3, 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

Attachments:

1. Description of Evaluation
2. US Plants Potentially Affected
3. 60-Day Interim Report Notification Information per §21.21(a)(2)

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References:

1. MFN 12-111 R0, Part 21 60-Day Interim Report Notification: Error in Main Steam Line High Flow Calculational Methodology, Dated September 27, 2012.

cc: S. S. Philpott, USNRC
S. J. Pannier, USNRC
O. Tabatabai-Yazdi, USNRC
D. C. Crawford, GEH
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PRC File
DRF Section No. 0000-0153-0033

Summary

GEH recently discovered that calculations of choked flow rate in the Main Steam Line (MSL) of GEH BWRs may not be conservative, with the potential impacts to be evaluated for existing MSL high-flow setpoints and Analytical Limits (ALs).

GEH continues to evaluate this condition to determine reportability under 10 CFR Part 21 and is therefore issuing this additional 60-Day Interim Report Notification and evaluation status update. GEH will close or issue an update on this matter on or before February 8, 2013. Based on results to date and work in process, GEH has no recommended actions and does not anticipate recommending any corrective actions to plant operations related to this issue in the future. This supplemental 60-day Interim Notification is issued in accordance with 10CFR Part 21.21(a)(2), and will be sent to all GE BWR/2-6 plants and ABWR plants.

Introduction

GEH recently discovered that some calculations of the choked flow rate in the Main Steam Line (MSL) of GEH BWRs were non-conservative, with potential impacts on margins between choked flow conditions and existing MSL high-flow setpoints and Analytical Limits (ALs).

A previous 60-Day Interim Report Notification regarding this issue was issued as MFN 12-111 R0 on September 27, 2012. Since that time, GEH has continued to evaluate the issue, and can report the following progress:

- Detailed investigation has revealed that calculations of MSL flow-instrument pressure drop, which are used to establish MSL high-flow instrument setpoints have been overly conservative, and this over-conservatism tends to offset the non-conservatism in choked flow rate calculations.
- Revised formulations for calculation of MSL choked flow rate and calculation of MSL flow-instrument pressure drop have been developed, and are nearly through an internal challenge review.
- A set of GE BWR/2-6 and ABWR plants was selected for an evaluation of MSL flow margins between the revised choked flow rates and the current (existing) MSL high-flow Analytical Limits. Evaluations to date provide no reason to believe the functionality or operability of the MSL high-flow trip at licensed conditions is compromised.

- A Nonconformance Assessment has been completed in accordance with GEH internal procedures with apparent causes identified and corrective and preventive actions underway.

Given the progress to date, GEH has no reason to recommend corrective or preventive actions at any plant at this time, and preliminary results suggest that no preventive actions will be required in the future, subject to final verification.

The evaluation has not been impacted by adverse results, but rather by the complexity in approaching the issue in a generic manner to incorporate all operating plants, and by the need to re-establish the bases for evaluating MSL high-flow trip function given the range of operating parameters across all plants. Evaluating specific aspects of plant design and operation for a large number of plants has proven time intensive.

ABWR and ESBWR Design Certification Documentation Applicability

As reported previously in MFN 12-111 R0, the discovered condition has no effect on the technical information contained in either the ABWR certified design or the ESBWR design in certification.

Recommendation

GEH has no recommendations.

Corrective/Preventive Actions

GEH intends to complete the ongoing evaluations by February 8, 2013.

Refer to Attachment 3, Item (vii) for corrective actions.

Attachment 2
US Plants Potentially Affected

US BWR Plants and Associated Facilities

| <u>Utility</u> | <u>Plant</u> |
|----------------|---------------------|
| <u>X</u> | Nine Mile Point 1-2 |
| <u>X</u> | Fermi 2 |
| <u>X</u> | Columbia |
| <u>X</u> | Grand Gulf |
| <u>X</u> | River Bend |
| <u>X</u> | FitzPatrick |
| <u>X</u> | Pilgrim |
| <u>X</u> | Vermont Yankee |
| <u>X</u> | Clinton |
| <u>X</u> | Dresden 2-3 |
| <u>X</u> | LaSalle 1-2 |
| <u>X</u> | Limerick 1-2 |
| <u>X</u> | Oyster Creek |
| <u>X</u> | Peach Bottom 2-3 |
| <u>X</u> | Quad Cities 1-2 |
| <u>X</u> | Perry 1 |
| <u>X</u> | Duane Arnold |
| <u>X</u> | Cooper |
| <u>X</u> | Susquehanna 1-2 |
| <u>X</u> | Brunswick 1-2 |
| <u>X</u> | Hope Creek |
| <u>X</u> | Hatch 1 - 2 |
| <u>X</u> | Browns Ferry 1-3 |
| <u>X</u> | Monticello |
| <u>X</u> | Millstone |

Attachment 3 – 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.

See Attachment 2 for a list of potentially affected plants

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

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- (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.

Calculations of Main Steam Line (MSL) choked flow rate may be non-conservative, with potential effects to be evaluated for existing MSL high-flow setpoints and Analytical Limits (ALs). Should margins between existing MSL high-flow setpoints and newly calculated values of choked flow rate be found non-conservative, then it is possible that affected plants might have MSL high-flow trips that would not activate main steam system isolation in the event of a postulated main steam line break downstream of each set of Main Steam Isolation Valves (MSIVs). GEH now believes this possibility is unlikely, although the relevant analyses have not completed verification.

- (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 August 3, 2012.

- (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.

Any defect resulting from this discovered condition would be found in calculations of MSL choked flow rate, and in subsequent analyses to establish MSL high-flow ALs and setpoints. The evaluation of extent of condition to identify which plants might have non-conservative margin between choked flow rate and MSL high-flow AL is incomplete but ongoing.

- (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.

Attachment 3 – 60-Day Interim Report Notification Information per §21.21(a)(2)

GEH has stopped approval of analysis tasks dependent upon values of choked flow rate or MSL high-flow ALs pending resolution of this issue.

GEH has completed a Nonconformance Assessment in accordance with GEH procedures, which identified apparent causes of the condition. Corrective and preventive actions were identified in that assessment and are underway.

- (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.

GEH has not found any reason to recommend corrective or preventive actions at plants.

- (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.