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## GE Hitachi Nuclear Energy

### Proprietary Notice

This letter transmits proprietary information in accordance with 10CFR2.390. Upon removal of Enclosure 1, the balance of this letter may be considered non-proprietary.

**Dale E. Porter**

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September 26, 2011

MFN 10-245 R4

U.S. Nuclear Regulatory Commission

Attn: Document Control Desk

Washington, DC 20555-0001

**Subject: Part 21 Reportable Condition Notification:  
Failure to Include Seismic Input in Channel-Control Blade Interference Customer  
Guidance**

GE Hitachi Nuclear Energy (GEH) has completed its evaluation of the engineering evaluations that support the guidance provided in MFN 08-420, with consideration of the impact of a seismic event on the ability of a control rod to fully insert during a scram under conditions with substantial channel-control blade (rod) interference. This issue was initially reported on September 2, 2010 as GEH letter MFN 10-245 (Reference 1); revised on September 27, 2010 as MFN 10-245 R1 (Reference 2). Additional information was provided on December 15, 2010 as GEH letter MFN 10-245 R2 (Reference 3) and again on August 11, 2011 as GEH letter MFN 10-245 R3 (Reference 4).

GEH has determined that when channel-control blade interference is present at reduced reactor pressure and at friction levels considered acceptable in MFN 08-420 (Reference 5), a simultaneously occurring Safe Shutdown Earthquake (SSE) may result in control rod friction that inhibits the full insertion of the affected control rods during a reactor scram from these conditions. This scenario was not explicitly considered in MFN 08-420 (Reference 5).

GEH has also quantified maximum allowable control rod friction for channel-control blade interference during the SSE with reactor system pressure  $\geq 900$  psig. The previous conclusion regarding the scram capability for the BWR/2-5 plants, last communicated in MFN 10-245 R2 (Reference 3), was based upon a reactor system pressure of 1000 psig. The updated evaluation at 900 psig has resulted in modifications to the guidance specified in MFN 08-420 (Reference 5).

The enclosure provides a description of the evaluation, with surveillance recommendations for BWR/2-5 plants. The recommended surveillance is intended to augment the surveillance requirements in the plant Technical Specifications and define populations of control rods to be tested, and the method for testing, until other actions that mitigate or limit the potential for channel-control blade interference can be identified and implemented.

Please note that Enclosure 1 contains proprietary information of the type that GEH maintains in confidence and withholds from public disclosure. The information has been handled and classified as proprietary to GEH as indicated in its affidavit. The affidavit contained in Enclosure 3 identifies that the information contained in Enclosure 1 has been handled and classified as proprietary to GEH. GEH hereby requests that the information in Enclosure 1 be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 9.17. Enclosure 2 is a non-proprietary version.

## Conclusion

Based upon the evaluation, GEH has concluded that a Reportable Condition under 10CFR Part 21 exists for BWR/2-5 plants. This determination does not apply to BWR/6 or ABWR plants or the ABWR/ESBWR Design Control Document's (DCD). The information contained in this document informs the NRC of the conclusions and recommendations derived from GEH's evaluation of this issue.

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

Sincerely,

A handwritten signature in black ink, appearing to read 'Dale E. Porter', with a stylized flourish at the end.

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

## References:

1. Letter from Dale E. Porter (GEH) to Document Control Desk (US NRC), Subject: Part 21 60-Day Interim Report Notification: Failure to Include Seismic Input in Channel-Control Blade Interference Customer Guidance, September 2, 2010, MFN 10-245.
2. Letter from Dale E. Porter (GEH) to Document Control Desk (US NRC), Subject: Part 21 60-Day Interim Report Notification: Failure to Include Seismic Input in Channel-Control Blade Interference Customer Guidance, September 27, 2010, MFN 10-245 R1.

3. Letter from Dale E. Porter (GEH) to Document Control Desk (US NRC), Subject: Part 21 60-Day Interim Report Notification: Failure to Include Seismic Input in Channel-Control Blade Interference Customer Guidance, December 15, 2010, MFN 10-245 R2.
4. Letter from Dale E. Porter (GEH) to Document Control Desk (US NRC), Subject: Part 21 60-Day Interim Report Notification: Failure to Include Seismic Input in Channel-Control Blade Interference Customer Guidance, August 11, 2011, MFN 10-245 R3.
5. Letter from Dale E. Porter (GEH) to Document Control Desk (US NRC), Subject: Update to GEH Surveillance Program for Channel-Control Blade Interference Monitoring, December 19, 2008, MFN 08-420.

Attachments:

1. Notification Information Required by 21.21(d)(4)
2. US Plants Potentially Affected

Enclosures:

1. Description of the Evaluation and Surveillance Recommendations for BWR/2-5 Plants, GEH Proprietary Information – Class III (Confidential)
2. Description of the Evaluation and Surveillance Recommendations for BWR/2-5 Plants, Non-Proprietary Information – Class I (Public)
3. Affidavit

cc: S. S. Philpott, USNRC  
S. J. Pannier, USNRC  
O. Tabatabai-Yazdi, USNRC  
J. F. Harrison, GEH  
J. G. Head, GEH  
H. Madronero, GEH  
P. L. Campbell, GEH Washington  
A. A. Lingenfelter, GNF  
PRC File  
DRF Section No. 0000-0136-9907

**Document Components:**

001 MFN 10-245 R4 Cover Letter.pdf  
002 MFN 10-245 R4 Enclosure 1 Proprietary.pdf  
003 MFN 10-245 R4 Enclosure 2 Non-Proprietary.pdf  
004 MFN 10-245 R4 Enclosure 3 Affidavit.pdf

**Attachment 1**

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

Dale E. Porter  
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3901 Castle Hayne Road, Wilmington, NC 28401

- (ii) **Identification of the facility, the activity, or the basic component supplied for such facility or such activity within the United States 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.**

GEH has determined that the scram capability of the control rod drive mechanism in BWR/2-5 plants may not be sufficient to ensure the control rod will fully insert in a cell with channel-control rod friction at or below the friction limits specified in MFN 08-420 with a concurrent Safe Shutdown Earthquake (SSE). The plant condition for which incomplete control rod insertion might occur is when the reactor is below normal operating pressure (<900 psig) and a scram occurs concurrent with the SSE, for Mark I containment plants, and for the SSE with concurrent Loss-of-Coolant Accident (LOCA) and Safety Relief Valve (SRV) events for Mark II containment plants. In this scenario a Substantial Safety Hazard results because the affected control rods might not fully insert to perform the required safety function.

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

A Potential Reportable Condition Evaluation, in accordance with 10CFR Part 21, was initiated on July 7, 2010. A 60-Day Interim Notification was issued on September 2, 2010 via MFN 10-245. A revision to the 60-Day Interim Notification was issued on September 27, 2010 via MFN 10-245 R1. A subsequent 60-Day Interim Notification was issued on December 15, 2010 via MFN 10-245 R2 to extend the evaluation period. A third 60-Day

Interim Notification was issued on August 11, 2011 via MFN 10-245 R3 to extend the evaluation period to September 26, 2011.

- (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.**

See Attachment 2 for a list of potentially affected plants.

- (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.**

The recommended testing with new allowable friction limits described in Enclosure 1 will ensure control rods fully insert at low reactor pressure concurrent with an SSE (for Mark I containment plants) and SSE with concurrent LOCA (for Mark II containment plants).

- (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.**

See Enclosure 1 for the recommended actions.

- (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.

**Attachment 2**

**US Plants Previously Notified of Channel-Control Blade Concerns**

(1) = Surveillance program recommended

(2) = Provided for information

<b><u>(1)</u></b>	<b><u>(2)</u></b>	<b>Utility</b>	<b>Plant</b>
<u>X</u>	<u>      </u>	Constellation Nuclear	Nine Mile Point 1
<u>X</u>	<u>      </u>	Constellation Nuclear.	Nine Mile Point 2
<u>X</u>	<u>      </u>	Detroit Edison Co.	Fermi 2
<u>X</u>	<u>      </u>	Energy Northwest	Columbia
<u>X</u>	<u>      </u>	Entergy Nuclear Northeast	FitzPatrick
<u>X</u>	<u>      </u>	Entergy Nuclear Northeast	Pilgrim
<u>X</u>	<u>      </u>	Entergy Nuclear Northeast	Vermont Yankee
<u>      </u>	<u>X</u>	Entergy Operations, Inc.	Grand Gulf
<u>      </u>	<u>X</u>	Entergy Operations, Inc.	River Bend
<u>      </u>	<u>X</u>	Exelon Generation Co.	Clinton
<u>X</u>	<u>      </u>	Exelon Generation Co.	Oyster Creek
<u>X</u>	<u>      </u>	Exelon Generation Co.	Dresden 2
<u>X</u>	<u>      </u>	Exelon Generation Co.	Dresden 3
<u>X</u>	<u>      </u>	Exelon Generation Co.	LaSalle 1
<u>X</u>	<u>      </u>	Exelon Generation Co.	LaSalle 2
<u>X</u>	<u>      </u>	Exelon Generation Co.	Limerick 1
<u>X</u>	<u>      </u>	Exelon Generation Co.	Limerick 2
<u>X</u>	<u>      </u>	Exelon Generation Co.	Peach Bottom 2
<u>X</u>	<u>      </u>	Exelon Generation Co.	Peach Bottom 3
<u>X</u>	<u>      </u>	Exelon Generation Co.	Quad Cities 1
<u>X</u>	<u>      </u>	Exelon Generation Co.	Quad Cities 2
<u>      </u>	<u>X</u>	First Energy Nuclear Operating Co.	Perry 1
<u>X</u>	<u>      </u>	FPL Energy	Duane Arnold
<u>X</u>	<u>      </u>	Nebraska Public Power District	Cooper
<u>X</u>	<u>      </u>	Xcel Energy	Monticello
<u>X</u>	<u>      </u>	PPL Susquehanna LLC.	Susquehanna 1
<u>X</u>	<u>      </u>	PPL Susquehanna LLC	Susquehanna 2
<u>X</u>	<u>      </u>	Progress Energy	Brunswick 1
<u>X</u>	<u>      </u>	Progress Energy	Brunswick 2
<u>X</u>	<u>      </u>	PSEG Nuclear.	Hope Creek
<u>X</u>	<u>      </u>	Southern Nuclear Operating Co.	Hatch 1
<u>X</u>	<u>      </u>	Southern Nuclear Operating Co.	Hatch 2
<u>X</u>	<u>      </u>	Tennessee Valley Authority	Browns Ferry 1
<u>X</u>	<u>      </u>	Tennessee Valley Authority	Browns Ferry 2
<u>X</u>	<u>      </u>	Tennessee Valley Authority	Browns Ferry 3