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GE Hitachi Nuclear Energy

Dale E. Porter

GE-Hitachi Nuclear Energy Americas LLC
Safety Evaluation Program Manager

3901 Castle Hayne Rd.,
Wilmington, NC 28401
USA

T 910 819-4491
Dale.Porter@GE.Com

December 15, 2010
MFN 10-245 R2

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

Subject: **Part 21 60-Day Interim Report Notification: Failure to Include Seismic Input in Channel-Control Blade Interference Customer Guidance**

Reference: **GEH Letter to NRC, Part 21 60-Day Interim Report Notification: Failure to Include Seismic Input in Channel-Control Blade Interference Customer Guidance, September 24, 2010, MFN 10-245 R1**

GEH Letter to NRC, Update to GEH Surveillance Program for Channel-Control Blade Interference Monitoring, December 19, 2008, MFN 08-420

This letter provides information concerning an on-going evaluation being performed by GE Hitachi Nuclear Energy (GEH) regarding the failure to include seismic loads in the guidance provided in MFN 08-420. As stated herein, GEH has not concluded that this is a reportable condition in accordance with the requirements of 10CFR 21.21(d) and continued evaluation is required to determine the impact of a seismic event on the guidance contained in MFN 08-420.

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 Previously Notified of Channel-Control Blade Interference Concerns
3. 60-Day Interim Report Notification Information per §21.21(a)(2)

cc: S. S. Philpott, USNRC
S. J. Pannier, USNRC
O. Tabatabai-Yazdi, USNRC
J. F. Harrison, GEH
J. G. Head, GEH
P. L. Campbell, GEH Washington
A. A. Lingenfelter, GNF
PRC File
DRF Section No. 0000-0126-8998

Attachment 1 – Description of Evaluation

Summary

GE Hitachi Nuclear Energy (GEH) identified, in July 2010, that engineering evaluations supporting the guidance provided in MFN 08-420, did not address the potential impact of a seismic event on the ability to scram as it relates to the channel-control blade interference issue. GEH provided status of the on-going evaluation in MFN 10-245 R1. GEH has not completed the evaluation of the impact of the seismic loads between the fuel channel and the control blade associated with an Operating Basis Earthquake (OBE), and a Safe Shutdown Earthquake (SSE) on BWR/2-5 plants. The scram capability is expected to be affected due to the added seismic loads at low reactor pressures in the BWR/2-5 plants. Additional evaluations are required to determine to what extent the maximum allowable friction limits specified for the BWR/2-5 plants in MFN 08-420 are affected by the addition of seismic loads at low reactor pressures.

GEH issues this 60-Day Interim Report in accordance with the requirements set forth in 10CFR 21.21(a)(2) to allow additional time for this evaluation to be completed.

Background

In 2008, GEH issued Safety Communication MFN 08-420, that provided guidance for monitoring plants for channel – control blade interference while maintaining acceptable scram performance under normal, transient, and low pressure conditions for BWR/2-6 plants. It was subsequently discovered that the basis for that Safety Communication did not address the effects of a seismic event on the ability to insert the control blades and effect a shutdown when a scram is demanded. GEH continues to evaluate the impact of the seismic events on the guidance provided in MFN 08-420.

In September 2010 GEH issued MFN 10-245 R1, to communicate the following results from the evaluation completed as of that date:

1. The required scram performance for the BWR/6 plant is not adversely impacted by the seismic events. The guidance specified in MFN 08-420 continues to ensure that the BWR/6 control rods will fully insert during a seismic event (OBE or SSE).
2. For the BWR/2-5 plants, at reactor pressures of 1000 psig and above, the required scram capability is not adversely impacted by the seismic events (OBE or SSE). The guidance specified in MFN 08-420 will continue to ensure that the BWR/2-5 control blades will fully insert during a seismic event (OBE or SSE).
3. For the BWR/2-5 plants, the potential exists that during a seismic event, control blades with scram friction near the limits specified in MFN 08-420, may not fully insert at the

main steam isolation valve (MSIV) isolation pressure condition, or at a 550 psig pressure condition as defined in the Safety Communication.

The Safety Communication also stated that it was unlikely that a Substantial Safety Hazard exists for BWR/2-5 plants currently operating under the guidance provided in MFN 08-420 based upon the following:

a. The evaluation completed to date indicates that this issue applies only to the BWR/2-5 plants, and only for low-pressure scram conditions.
b. For control blades exhibiting channel–control blade interference as described in MFN 08-420, it is expected that these control blades will completely or partially insert upon scram during a seismic event, even at lower pressure conditions.
c. Any control blade that did not fully insert during the seismic event can be inserted manually, either by normal control blade insertion or by resetting the scram and re-scramming the particular control blade.
d. The time spent at low reactor pressure is limited.

Evaluation Status

The maximum allowable friction limits in MFN 08-420 were developed using a computer code/model of the generic control rod drive (CRD), control rod blade, hydraulic control unit (HCU) and the associated piping to the HCU. GEH had to modify the computer code to have the capability of modeling the time/position dependent friction force from the dynamic loads predicted for a seismic event. Since the previous Interim Notification, it was discovered that, due to the longer scram times expected (>20 seconds) during a seismic event at low reactor pressure, two additional modifications to the computer program were found to be necessary to account for original system behaviors that had significant margin by the original analyses but now appeared to have much less margin. Those additional modifications concerned the following issues:

1) The model had to account for the depletion of the HCU accumulator due to leakage past the seals internal to the CRDM.
2) Also, the model had to account for the pressurization of the SDV that opposes control rod insertion during the scram that could delay or prevent the scram.

Although there are no regulatory time requirements for achieving a scram during a seismic event, confirmation that all control rods will fully insert during a scram while at lower reactor pressures such as during plant start-up and shutdown will be verified.

As of this date, the computer code modifications described above are complete and functional, though unverified. GEH is proceeding with completion of the required

documentation and design verification for the modified model. In addition, GEH will be performing a comprehensive design review to ensure that all original seismic requirements are considered.

The preliminary analysis continues to support that it is unlikely that a Substantial Safety Hazard exists for BWR/2-5 plants currently operating under the guidance provided in MFN 08-420 for the reasons stated above.

ABWR and ESBWR Design Certification Documentation Applicability

The issues described above have been reviewed for applicability to documentation associated with 10CFR 52 and it has been determined that there is no effect on the technical information contained in either the ABWR certified design or the ESBWR design in certification.

Recommendation

To assist in a control blade insertion under the low-pressure condition, the accumulator pressure for no-settle control blades may be increased as described in MFN 08-420 Table 2-3 or the control blade inserted manually prior to operating at a reactor pressure less than 950 psig.

Corrective/Preventive Actions

GEH will complete the following evaluations on the dates specified herein. This task will be completed by August 15, 2011.

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

Attachment 2 –
US Plants Previously Notified of Channel-Control Blade Concerns

(1) = Surveillance program recommended
(2) = Provided for information

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

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

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

Dale E. Porter
GE Hitachi Nuclear Energy
Safety Evaluation Program Manager
3901 Castle Hayne Road, Wilmington, NC 28401

(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.

GE Hitachi Nuclear Energy (GEH) has identified that engineering evaluations that support the guidance provided in MFN 08-420, do not address the potential impact of a seismic event on scram performance as it relates to the channel-control blade interference issue. GEH continues evaluating the impact of the seismic loads between the fuel channel and the control blade associated with an Operating Basis Earthquake (OBE), and a Safe Shutdown Earthquake (SSE) on BWR/2-5 plants. The scram capability is expected to be affected due to the added seismic loads at low reactor pressures in the BWR/2-5 plants. The scram capability for the BWR/6 plants is not adversely affected by the concurrent seismic events. Additional evaluations are required to determine to what extent the maximum allowable friction limits specified for the BWR/2-5 plants in MFN 08-420 are affected by the addition of seismic loads at low reactor pressures.

(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.

(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.

GEH will complete the evaluation by August 15, 2011.

(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.

To assist in a control blade insertion under the low-pressure condition, the accumulator pressure for no-settle control blades may be increased as described in MFN 08-420 Table 2-3 or the control blade inserted manually prior to operating at a reactor pressure less than 950 psig.

(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.