

General Information (PAR)

Event # 46230

Rep Org: GE HITACHI NUCLEAR ENERGY	Notification Date / Time: 09/03/2010 15:23 (EDT)
Supplier: GE HITACHI NUCLEAR ENERGY	Event Date / Time: 09/03/2010 (EDT)
	Last Modification: 08/12/2011
Region: 1	Docket #:
City: WILMINGTON	Agreement State: Yes
County:	License #:
State: NC	
NRC Notified by: DALE E. PORTER	Notifications: RICHARD CONTE R1DO
HQ Ops Officer: ERIC SIMPSON	EUGENE GUTHRIE R2DO
Emergency Class: NON EMERGENCY	TAMARA BLOOMER R3DO
10 CFR Section:	RICK DEESE R4DO
21.21 UNSPECIFIED PARAGRAPH	MIKE CHEOK NRR EO
	PART 21 GP via email

PART 21 - FAILURE TO INCLUDE SEISMIC INPUT IN REACTOR CONTROL BLADE CUSTOMER GUIDANCE

The following is text of a facsimile submitted by the vendor:

"GE Hitachi Nuclear Energy (GEH) has identified that engineering evaluations that support the guidance provided in SC 08-05, Revision 1, do not address the potential impact of a seismic event on the ability to scram as it relates to the channel-control blade interference issue. Note that the seismic loads are not a consideration in the scram timing, but rather the ability to insert the control blades. In other words, the control blades must be capable of inserting during the seismic event, but not to the timing requirements of the Technical Specifications. GEH is 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 ability to scram for the BWR/6 plants is not adversely affected by the seismic events. Additional evaluation is required to determine to what extent the maximum allowable friction limits specified for the BWR/2-5 plants in SC 08-05 Revision 1 is affected by the addition of seismic loads.

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

Affected US plants previously notified by vendor and recommended for surveillance program include: Nine Mile Point, Units 1 and 2; Fermi 2; Columbia; FitzPatrick; Pilgrim; Vermont Yankee; Grand Gulf; River Bend; Clinton; Oyster Creek; Dresden, Units 2 and 3; LaSalle, Units 1 and 2; Limerick, Units 1 and 2; Peach Bottom, Units 2 and 3; Quad Cities, Units 1 and 2; Perry, Unit 1; Duane Arnold; Cooper; Monticello; Brunswick, Units 1 and 2; Hope Creek; Hatch, Units 1 and 2; and Browns Ferry, Units 1 and 2.

TEIG
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Affected US plants previously notified by vendor and provided information include: Susquehanna, Units 1 and 2 and Browns Ferry, Unit 3.

*** UPDATE FROM DALE PORTER TO ERIC SIMPSON AT 1556 ON 09/27/2010 ***

The following update was received via fax:

"This letter provides a revision to the information transmitted on September 2, 2010 in MFN 10-245 concerning an evaluation being performed by GE Hitachi Nuclear Energy (GEH) regarding the failure to include seismic input in channel-control blade interference customer guidance. Two changes have been made in Revision 1:

"1) A statement was added regarding the applicability of this issue to the ABWR and ESBWR design certification documentation.

"2) The original MFN 10-245 referenced the Safety Communication SC 08-05 R1 that was transmitted to the US NRC via MFN 08-420. The references to SC 08-05 were changed to MFN 08-420 to prevent possible confusion.

"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."

Notified the R1DO (Gray), R2DO (Hopper), R3DO (Orth), R4DO (Farnholtz), NRR EO (Lee) and Part 21 Group (via email).

*** UPDATE FROM DALE PORTER TO MARK ABRAMOVITZ AT 1723 ON 12/15/2010 ***

The following update was received via fax:

"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 10CFR21.21(d) and continued evaluation is required to determine the impact of a seismic event on the guidance contained in MFN 08-420.

"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."

GEH expects the task to be completed by August 15, 2011.

Notified the R1DO (Holody), R2DO (Henson), R3DO (Kozak), R4DO (Werner), NRR EO (Evans) and Part 21 Group (via email).

*** UPDATE AT 1808 EDT ON 08/11/11 FROM DALE PORTER TO JOE O'HARA ***

The following was received via fax:

"GE Hitachi Nuclear Energy (GEH) identified, in July 2010, that engineering evaluations 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 [December 2010]. GEH has not completed the evaluation of the impact of the seismic loads between the fuel channel and the control blade associated with a bounding 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 [less than 1000 psig] in the BWR/2-5 plants. Additional

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evaluations are required to determine to what extent the maximum allowable friction limits specified for the BWR/2-5 plants are affected by the addition of SSE 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."

The following sites are noted as having channel-control blade concerns:

Region 1: Nine Mile Point, Fitzpatrick, Pilgrim, Vermont Yankee, Oyster Creek, Limerick, Peach Bottom, Susquehanna, and Hope Creek

Region 2: Browns Ferry, Brunswick, Hatch,

Region 3: Fermi, Clinton, Dresden, LaSalle, Quad Cities, Perry, Duane Arnold, Monticello

Region 4: Columbia, Grand Gulf, River Bend, Cooper.

Notified R1DO (Powell), R2DO (Hopper), R3DO (Dickson), R4DO (Farnholtz) and NRR Part 21 Grp via email.

**HITACHI****GE Hitachi Nuclear Energy****Dale E. Porter**GE-Hitachi Nuclear Energy Americas LLC
Safety Evaluation Program Manager3901 Castle Hayne Rd.,
Wilmington, NC 28401
USAT 910 819-4491
Dale.Porter@GE.ComAugust 11, 2011
MFN 10-245 R3U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001**Subject: Part 21 60-Day Interim Report Notification:
Failure to Include Seismic Input in
Channel-Control Blade Interference Customer Guidance**

This letter provides information concerning the 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 (Reference 1). This issue was initially reported on September 2, 2010 as GEH letter MFN 10-245 R0 (Reference 2); revised on September 27, 2010 as MFN 10-245 R1 (Reference 3). Additional information was provided on December 15, 2010 as GEH letter MFN 10-245 R2 (Reference 4).

GEH has not concluded that this is a reportable condition in accordance with the requirements of 10 CFR 21.21(d) and continued evaluation is required to determine the impact of a seismic event on the guidance contained in MFN 08-420.

To provide perspective to the continuing evaluation, it is important to note the limited range of conditions that remain under study. For normal operating pressure conditions, the guidance provided in MFN 08-420 remains adequate. The conditions that remain under study involve only startup and shutdown low pressure conditions. GEH has studied 17 US BWR plants from a probabilistic risk standpoint to predict the likelihood that a plant would experience a Safe Shutdown Earthquake (SSE) during a startup or shutdown. That study determined the median frequency of 1E-6/year and a highest frequency of 3E-6/year for this occurrence for the 17 plant study group. The overall probability that conditions exist where a blade would not insert is further reduced when considering the likelihood of the simultaneous occurrence of channel-control blade interference.

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).

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If you have any questions on this information, 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)

References:

1. 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.
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 2, 2010, MFN 10-245.
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, September 27, 2010, MFN 10-245 R1.
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, December 15, 2010, MFN 10-245 R2.

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. 0000-0137-3868

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Attachment 1
Page 1 of 3**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 (Reference 1), 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 R2 (Reference 4). GEH has not completed the evaluation of the impact of the seismic loads between the fuel channel and the control blade associated with a bounding 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 SSE 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 2010, GEH identified that the engineering evaluations supporting the guidance provided in MFN 08-420, did not address the potential impact of a seismic event on the ability of control rods to fully insert during a scram for locations with substantial channel – control blade interference. GEH issued three 60-Day Interim Reports in accordance with the requirements set forth in 10CFR 21.21(a)(2) to allow additional time for the evaluation to be completed.

In September 2010, GEH issued MFN 10-245 and MFN 10-245 R1 (References 2 and 3, respectively) 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) at all normal operating conditions.
2. For BWR/2-5 plants, at reactor pressures of 1000 psig and above, the required scram capability is not adversely impacted by the inclusion of 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).

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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.

In December 2010, GEH issued MFN 10-245 R2 to communicate the status of the on-going evaluation. Additional time was needed to modify and verify the model used for establishing the maximum allowable friction limits in MFN 08-420; adding the capability to evaluate the effects of friction caused by a seismic event. The scope of the modification also included other changes needed to account for the depletion of the Hydraulic Control Unit (HCU) scram accumulator and pressurization of the Scram Discharge Volume (SDV).

Evaluation Status

As of this date, the modification of the model is complete. GEH has performed preliminary evaluations using the model to determine the impact of the seismic event on the ability of the control rod to scram when channel-control blade interference is present. Once the evaluations are complete, GEH will be providing an update to MFN 08-420 – specifically providing guidance for startup and shutdown. This communication provides updated recommendations for BWR/2-5 plants until the evaluations are complete.

ABWR and ESBWR Design Certification Documentation Applicability

The issues described above have been reviewed for applicability to documentation associated with 10 CFR 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, control rods that have exhibited signs of channel-control blade interference (i.e. either no-settle (>30 seconds) or slow-to-settle (>7 seconds)) should be fully inserted prior to operating at a reactor pressure less than 950 psig. Because of this increased sensitivity to channel-control blade interference, settle time testing or other appropriate alternate testing to identify control rods affected by interference should be performed prior to operating at a reactor pressure less than 950 psig. Additionally, during startup or shutdown with reactor pressure <950 psig, all control rods should have the associated accumulator pressure charged to ≥ 1100 psig until reactor pressure is ≥ 950 psig.

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Corrective/Preventive Actions

GEH will complete the ongoing evaluations by September 26, 2011.

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

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Attachment 2
Page 1 of 1**Attachment 2****US Plants 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

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Attachment 3
Page 1 of 2**Attachment 3 – 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.

GE Hitachi Nuclear Energy

- (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 a bounding 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 a concurrent seismic event. 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 10 CFR 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 September 26, 2011.

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- (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, control rods that have exhibited signs of channel-control blade interference (i.e. either no-settle (>30 seconds) or slow-to-settle (>7 seconds)) should be fully inserted prior to operating at a reactor pressure less than 950 psig. Because of this increased sensitivity to channel-control blade interference, settle time testing or other appropriate alternate testing to identify control rods affected by interference should be performed prior to operating at a reactor pressure less than 950 psig. Additionally, during startup or shutdown with reactor pressure <950 psig, all control rods should have the associated accumulator pressure charged to ≥ 1100 psig until reactor pressure is ≥ 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.