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MFN 07-533 Supplement 2

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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 134 Related to ESBWR Design Certification Application - Technical Specifications - RAI Number 16.2-138 S01**

Enclosures 1 and 2 contain the subject supplemental RAI response resulting from NRC RAI Letter No. 134. The GE Hitachi Nuclear Energy (GEH) response to the original RAI was provided in the Reference 1 letter.

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,

James C. Kinsey
Vice President, ESBWR Licensing

D068
NRO

Reference:

1. MFN 07-533, Letter from James C. Kinsey to U.S. Nuclear Regulatory Commission, *Response to Portion of NRC Request for Additional Information Letter No. 97 Related to ESBWR Design Certification Application - Technical Specifications - RAI Numbers 16.2-134, 16.2-136, 16.2-137, **16.2-138**, 16.2-139, and 16.2-142*, October 15, 2007

Enclosures:

1. MFN 07-533, Supplement 2 - Response to Portion of NRC Request for Additional Information Letter No. 134 Related to ESBWR Design Certification Application - Technical Specifications - RAI Number 16.2-138 S01
2. MFN 07-533, Supplement 2 - DCD Tier 2, Chapter 16 and Chapter 16B, Draft Revisions for RAI 16.2-138 S01

cc:

AE Cubbage	USNRC (with enclosures)
DH Hinds	GEH (with enclosures)
RE Brown	GEH (with enclosures)
eDRFs	81-2056

Enclosure 1

MFN 07-533, Supplement 2

Response to Portion of NRC Request for

Additional Information Letter No. 134

Related to ESBWR Design Certification Application

- Technical Specifications -

RAI Number 16.2-138 S01

NRC RAI 16.2-138

In ESBWR TS Section 3.3.1.3, "Reactor Protection System Manual Actuation," for the Actions Condition of "One or more channels inoperable," the reduced functional capability of the degraded condition described represents a loss one or both required channels of instrumentation for one or both manual actuation items. This condition would permit the plant to operate for up to 12 hours with a loss of all required safety system RPS manual actuation instrumentation. Additional information is needed to justify that the loss of function condition is a credible condition for which a temporary relaxation of the required design basis should be approved. Justify why operation should be permitted with more than one channel of each type of ESBWR manual actuation channels inoperable. Note that NUREG-1434 permits only one RPS manual actuation functions channel to be inoperable.

GEH Response

GEH revised the DCD, Chapter 16, Technical Specifications (TS) 3.3.1.3, "Reactor Protection System Manual Actuation," in Revision 4 to eliminate the 12 hour allowance to operate with all required safety system RPS manual actuation instrumentation inoperable. The DCD Chapter 16B TS Bases associated with TS 3.3.1.3 were also revised as described in Chapter 16B, Revision 4.

DCD Impact

DCD Chapter 16 and Chapter 16B were revised in Revision 4 in response to this RAI.

NRC RAI 16.2-138 S01

References:

- *Chapter 16 Rev. 3 to Rev 4. Change Item 24*
- *MFN 07-533, 10/15/2007, GEH response to RAI 16.2-138*

In RAI 16.2-138, the NRC staff stated:

> *In ESBWR TS Section 3.3.1.3, "Reactor Protection System Manual Actuation," for the Actions Condition of "One or more channels inoperable," the reduced functional capability of the degraded condition described represents a loss of one or both required channels of instrumentation for one or both manual actuation items. This condition would permit the plant to operate for up to 12 hours with a loss of all required safety system RPS manual actuation instrumentation. Additional information is needed to justify that the loss of function condition is a credible condition for which a temporary relaxation of the required design basis should be approved. Justify why operation should be permitted with more than one channel of each type of ESBWR manual actuation channels inoperable. Note that NUREG-1434 permits only one RPS manual actuation functions channel to be inoperable.*

In its response letter (MFN 07-533, October 15, 2007), GEH stated that it had revised the DCD, Chapter 16, Technical Specifications (TS) 3.3.1.3, "Reactor Protection System Manual Actuation," in Revision 4 to eliminate the 12-hour allowance to operate with all required safety system RPS manual actuation instrumentation inoperable. The DCD, Chapter 16B TS Bases

associated with TS 3.3.1.3 were also revised in Revision 4. In Revision 4 of the ESBWR DCD, Chapter 16, the generic technical specifications (GTS), GEH changed the Actions of GTS 3.3.1.3, "RPS Manual Actuation," as part of its response to RAI 16.2-138. The NRC staff find Actions A and B acceptable, but note that they could be combined in the same Action. Action C is not acceptable because it does not clearly state the expected action for the Condition of two inoperable channels in one manual actuation function. It seems that in all such cases, the choice (described in the Bases) would be to immediately enter Condition D or Condition E as appropriate, because placing both channels in trip would cause a scram. Please revise the GTS 3.3.1.3 Actions as indicated below, and make suitable changes to the GTS Bases.

Recommended ACTIONS for GTS 3.3.1.3, as referred to by RAI 16.2-138, Supplement 1

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Manual scram Function with one channel inoperable. OR Reactor Mode Switch – Shutdown Position Function with one channel inoperable	A.1 Verify affected channel in trip.	12 hours
B. Manual scram Function with one channel inoperable in MODE 1 or 2. AND Reactor Mode Switch – Shutdown Position Function with one channel inoperable in MODE 1 or 2.	B.1 Verify affected channels in trip. OR B.2 Enter Condition D.	Immediately Immediately
C. Manual scram Function with one channel inoperable in MODE 6. AND Reactor Mode Switch – Shutdown Position Function with one channel inoperable in MODE 6.	C.1 Verify affected channels in trip. OR C.2 Enter Condition E.	Immediately Immediately

D. Manual scram Function with two channels inoperable in MODE 1 or 2. OR Reactor Mode Switch – Shutdown Position Function with two channels inoperable in MODE 1 or 2. OR Required Action and associated Completion Time of Condition A or B not met in MODE 1 or 2. OR As required by Required Action B.2.	D.1 Be in MODE 3.	12 hours
E. Manual scram Function with two channels inoperable in MODE 6. OR Reactor Mode Switch – Shutdown Position Function with two channels inoperable in MODE 6. OR Required Action and associated Completion Time of Condition A or C not met in MODE 6. OR As required by Required Action C.2.	E.1 Initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies.	Immediately

GEH Response

The DCD Chapter 16, Technical Specification (TS) 3.3.1.3, "Reactor Protection System Manual Actuation," Actions Table will be revised to address the concerns expressed in the Request for Additional Information (RAI) as shown in the enclosed markup.

Conforming changes are also proposed in the associated Chapter 16B Bases.

DCD Impact

DCD Chapters 16 and 16B will be revised as described above and shown in the enclosed markup pages in Revision 5.

Enclosure 2

MFN 07-533, Supplement 2

DCD Tier 2, Chapter 16 and Chapter 16B, Draft Revisions for RAI 16.2-138 S01

3.3 INSTRUMENTATION

3.3.1.3 Reactor Protection System (RPS) Manual Actuation

LCO 3.3.1.3 The RPS manual actuation channels for each Function in Table 3.3.1.3-1 shall be OPERABLE.

APPLICABILITY According to Table 3.3.1.3-1

ACTIONS

- NOTE -

Separate Condition entry is allowed for each ~~RPS manual actuation channel~~ Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ~~Manual scram Function with one channel inoperable.~~One manual actuation channel inoperable in one Function.	A.1 Verify affected channel in trip.	12 hours
~~B. Reactor Mode Switch - Shutdown Position Function with one channel inoperable.~~	~~B.1 Verify affected channel in trip.~~	~~12 hours~~

~~CB.~~ ~~Manual scram Function with one or more channels inoperable~~ One manual actuation channel inoperable in both Functions. ~~AND~~ ~~Reactor Mode Switch Shutdown Position Function with one or more channels inoperable.~~	~~CB.1~~ Verify affected channels in trip.	Immediately
CONDITION	REQUIRED ACTION	COMPLETION TIME
~~DC.~~ Both manual actuation channels inoperable in one or both Functions in MODE 1 or 2. OR Required Action and associated Completion Time of Condition A~~,~~ or B~~, or C~~ not met in MODE 1 or 2.	~~DC.1~~ Be in MODE 3.	12 hours
~~ED.~~ Both manual actuation channels inoperable in one or both Functions in MODE 6. OR Required Action and associated Completion Time of Condition A~~,~~ or B~~, or C~~ not met in MODE 6.	~~ED.1~~ Initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies.	Immediately

BASES

APPLICABLE SAFETY ANALYSES	RPS Manual Actuation does not satisfy any criteria of 10 CFR 50.36(d)(2)(ii), but is retained for the overall redundancy and diversity of the RPS as required by the NRC approved licensing basis.
LCO	Two manual actuation channels and two Reactor Mode Switch - Shutdown actuation channels as specified in Table 3.3.1.3-1 are required to be OPERABLE to retain the overall redundancy and diversity of the RPS.
APPLICABILITY	The manual actuation Functions are required to be OPERABLE whenever the RPS automatic instrumentation is required to be OPERABLE in LCO 3.3.1.1, "Reactor Protection System (RPS) Instrumentation"). RPS is required to be OPERABLE in MODES 1 and 2, and MODE 6 with any control rod withdrawn from a core cell containing one or more fuel assemblies. During normal operation in MODES 3, 4, and 5, all control rods are fully inserted and the Reactor Mode Switch - Shutdown Position control rod withdrawal block (LCO 3.3.2.1, "Control Rod Block Instrumentation") does not allow any control rod to be withdrawn. In MODE 6, control rods withdrawn from a core cell containing no fuel assemblies do not affect the reactivity of the core and therefore are not required to have the capability to scram. Provided all control rods otherwise remain inserted, the RPS function is not required. In this condition the required SDM (LCO 3.1.1,"SHUTDOWN MARGIN") and refuel position one-rod-out/rod- pair-out interlock (LCO 3.9.2, "Refuel Position One-Rod/Rod-Pair-Out Interlock") ensures no event requiring RPS will occur. Under these conditions, the RPS function is not required to be OPERABLE.
ACTIONS	A Note has be provided to modify the ACTIONS related to RPS manual actuation ~~channels~~Functions. Section 1.3, Completion Times, specifies once a Condition has been entered, subsequent divisions, subsystems, components or variables expressed in the Condition discovered to be inoperable or not within limits, will not result in separate entry into the Condition. Section 1.3 also specifies Required Actions of the Condition continue to apply for each additional failure, with Completion Times based on initial entry into the condition. However, the Required Actions for inoperable RPS manual actuation ~~channels~~ Functions provide appropriate compensatory measures for separate inoperable ~~channels~~Functions. As such, a Note has been provided which allows separate Condition entry for each inoperable RPS manual actuation ~~channel~~Function.

BASES

ACTIONS (continued)

A.1

If one manual actuation channel ~~of the manual scram Function~~ is inoperable the capability to shutdown the unit with the ~~manual scram channels~~ associated Function is lost. However, manual shutdown capability is retained by the OPERABLE ~~Reactor Mode Switch -Shutdown position~~ Function. The 12 hour Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. The 12 hour Completion Time is acceptable because the automatic functions and alternative manual trip methods are still available and has been found to be acceptable by Reference 1. The four RPS automatic divisions also have manual trip capability provided by four divisional trip switches that are located in positions easily accessible for optional use by the plant operator.

Alternatively, if it is not desired to place the inoperable channel in trip (e.g., as in the case where placing the inoperable channel in trip would result in a scram, Condition ~~D~~ C or ~~E~~D, as appropriate, must be entered and its Required Action taken.

B.1

~~If one channel of the Reactor Mode Switch -Shutdown position Function is inoperable the manual trip capability with the Reactor Mode Switch - Shutdown position channels is lost. However, manual shutdown capability is retained by the OPERABLE manual scram Function. The 12 hour Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. The 12 hour Completion Time is acceptable because the automatic functions and alternative manual trip methods are still available and has been found to be acceptable by Reference 1. The four RPS automatic divisions also have manual trip capability provided by four divisional trip switches that are located in positions easily accessible for optional use by the plant operator.~~

~~Alternatively, if it is not desired to place the inoperable channel in trip (e.g., as in the case where placing the inoperable channel in trip would result in a scram, Condition D or E, as appropriate, must be entered and its Required Action taken.~~

~~C.1~~

With one ~~or more~~ channels of the manual scram Function inoperable and one ~~or more~~ channels of the Reactor Mode Switch -Shutdown position Function inoperable, the affected channels must be verified in trip

BASES

ACTIONS (continued)

immediately. In this Condition, both required manual actuation Functions are inoperable.

Alternatively, if it is not desired to place the inoperable channels in trip (e.g., as in the case where placing the inoperable channels in trip would result in a scram, Condition ~~D~~C or ~~E~~D, as appropriate, must be entered and its Required Action taken.

~~D~~C.1

With both manual actuation channels inoperable in one or both Functions in MODE 1 or 2 or ~~I~~if any Required Action and associated Completion Time of Condition A~~,~~ or B~~, or C~~ is not met in MODE 1 or 2, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 12 hours. The allowed Completion Time are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant safety systems.

~~E~~D.1

With both manual actuation channels inoperable in one or both Functions in MODE 6 or ~~I~~if any Required Action and associated Completion Time of Condition A~~,~~ or B~~, or C~~ is not met in MODE 6, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must immediately initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies. Action must continue until all such control rods are fully inserted. Control rods in core cells containing no fuel assemblies do not affect the reactivity of the core and, therefore, do not have to be inserted.

SURVEILLANCE REQUIREMENTS

SR 3.3.1.3.1

A CHANNEL FUNCTIONAL TEST is performed on the manual scram channels to ensure that the channels will perform the intended Function. The Frequency of 92 days is based on the reliability of the RPS actuation logic and controls and has been found to be acceptable by Reference 1.