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MFN 06-308  
Supplement 15

Docket No. 52-010

March 17, 2008

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555-0001

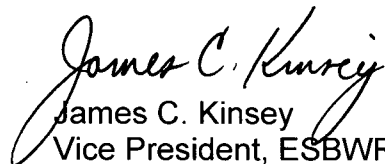
**Subject: Response to Portion of NRC Request for Additional Information  
Letter Number 148 Related to ESBWR Design Certification  
Application -- Classification of Structures, Systems and  
Components (Nuclear Boiler System) -- RAI Number 3.2-19 S03**

The purpose of this letter is to submit the GE Hitachi Nuclear Energy (GEH) response to a portion of the U.S. Nuclear Regulatory Commission (NRC) Requests for Additional Information (RAIs) received by GEH via Reference 1.

Enclosure 1 contains the GEH response to NRC RAI 3.2-19 S03 that was received from the NRC on February 19, 2008, via MFN 08-158 (NRC Letter 148) (Reference 1). Previously GEH received RAI 3.2-19 S02 on June 13, 2007, via an e-mail from the NRC (Chandu Patel) (Reference 3), to which GEH responded on January 23, 2008, via MFN 06-308, Supplement 12 (Reference 2). Previously, GEH received RAI 3.2-19 S01, on November 20, 2006, via an e-mail from the NRC (Jim Gaslevic) (Reference 5), to which GEH responded on March 22, 2007, via MFN 06-308, Supplement 1 (Reference 4). Originally RAI 3.2-19 was received by GEH, on August 8, 2006, via MFN 06-277 (NRC Letter 51) (Reference 7), to which GEH responded on September 8, 2006, via MFN 06-308 (Reference 6).

If you have any questions or require additional information, please contact me.

Sincerely,

  
James C. Kinsey  
Vice President, ESBWR Licensing

DO68  
LRO

References:

1. MFN 08-158 from Leslie Perkins, Project Manager, ESBWR/ABWR Projects Branch 2, Division of New Reactor Licensing, Office of New Reactors, to Robert E. Brown, *Request for Additional Information Letter No. 148 Related to ESBWR Design Certification Application*, dated February 19, 2008.
2. MFN 06-308, Supplement 12, from James C. Kinsey to the U.S. Nuclear Regulatory Commission, *Response to Portion of NRC Request for Additional Information to ESBWR Design Certification Application – Classification of structures, systems, and components*, RAI Number 3.2-19 S02, dated January 23, 2008.
3. E-mail from Chandu Patel, U.S. Nuclear Regulatory Commission to GEH, (RAI 3.2-19 S02), comment on response to RAI 3.2-19, Supplement 1 (MFN 06-308 Supplement 1), dated June 13, 2007.
4. MFN 06-308 Supplement 1 from James C. Kinsey to the U.S. Nuclear Regulatory Commission, *Response to Portion of NRC Request for Additional Information Letter No. 51 Related to ESBWR Design Certification Application – RWCU System – RAI Number 3.2-19 S01*, dated March 22, 2007.
5. E-mail from Jim Gaslevic, U.S. Nuclear Regulatory Commission to GEH, (RAI 3.2-19 S01), comment on response to RAI 3.2-19 main steam line valves and classifications, dated November 20, 2006.
6. MFN 06-308 from James C. Kinsey to the U.S. Nuclear Regulatory Commission, *Response to NRC Request for Additional Information Letter No. 51 Related to ESBWR Design Certification Application - Classification of Structures, Systems and Components - RAI Numbers 3.2-1 through 3.2-62*, dated September 8, 2006.
7. MFN 06-277 from Lawrence Rossbach, Project Manager, ESBWR/ABWR Projects Branch, Division of New Reactor Licensing, Office of Nuclear Reactor Regulation, to David H. Hinds, *Request for Additional Information Letter No. 51 Related to ESBWR Design Certification Application [RAI concerning the classification of structures, systems, and components as described in Section 3.2 of the ESBWR design control document]*, dated August 8, 2006.

Enclosure:

1. Response to Portion of NRC Request for Additional Information Letter Number 148 Related to ESBWR Design Certification Application Classification of Structures, Systems and Components (Nuclear Boiler System) RAI Number 3.2-19 S03

cc: AE Cabbage                      USNRC (with enclosure)  
RE Brown                            GEH/Wilmington (with enclosure)  
GB Stramback                      GEH/San Jose (with enclosure)  
DH Hinds                            GEH/Wilmington (with enclosure)  
eDRF                                 0000-0081-7231, Rev. 0

**Enclosure 1**

**MFN 06-308  
Supplement 15**

**Response to Portion of NRC Request for  
Additional Information Letter Number 148  
Related to ESBWR Design Certification Application  
Classification of Structures, Systems and Components  
(Nuclear Boiler System)  
RAI Number 3.2-19 S03**

**NRC RAI 3.2-19**

*In Table 3.2-1, Component B21, Item 13, the piping and valves (including supports) for main steam drains beyond the outermost MSIV and downstream of the second isolation valve is designated Quality Group D. However, consistent with SRP 3.2.2 and RG 1.26 guidance, this second drain isolation valve must also be a normally closed valve to define an acceptable transition from the upstream Quality Group B piping to the downstream Quality Group D piping. Please verify that the described second valve is a normally closed valve. Also, this item is designated Seismic Category II, which requires seismic analysis methods which are described in Section 3.7 of the DCD. However, Section 15.4.4.5.2.3 of the DCD refers to earthquake experience data as a basis for seismic structural capability of the main steam lines and drains. Please verify that this item will be analyzed according to methods described in Section 3.7, and revise Section 15.4.4.5.2.3 accordingly.*

**GE Response**

The second isolation valve in the main steam drains beyond the outermost MSIV is a normally closed valve. GE confirms that B21 Item 13 in Table 3.2-1 will be analyzed according to the methods that are described in DCD Section 3.7. The statement in Section 15.4.4.5.2.3 that refers to earthquake experience data is not intended to be the only basis for seismic structural capability of main steam lines and drains. Please refer to the following statement in Section 15.4.4.5.2.3 that confirms that in the case of the ESBWR a dynamic analysis is performed to provide the basis for seismic structural capability of these lines:

“In the case of the ESBWR, further margin for survival can be expected, because the ESBWR lines are designed through dynamic analysis to survive such events, whereas in the case of the actual experience database, the lines shown to survive were designed to lesser standards to meet only normally expected loads.”

**DCD Impact**

No DCD changes will be made in response to this RAI.

**NRC RAI 3.2-19 S01**

*Email from Jim Gaslevic on 11/20/06*

*Table 3.2-1 shows that the MSIV drains beyond the outermost MSIV is designated as Quality Group D. The response to RAI 3.2-19 indicates that the second isolation valve in the main steam drains beyond the MSIV is a normally closed valve and GE confirms that B21 item 13 in Table 3.2-1 will be analyzed according to the methods that are described in DCD Section 3.7. Since Figure 3.2-1 shows there is an open orifice in this line that bypasses the closed valve, please confirm that the offsite radiation dose caused by a failure in this Safety Class D piping will not exceed the acceptance criteria of .5 rem identified in RG 1.26. Otherwise this line should be classified as Quality group C to be consistent with RG 1.26.*

**GE Response**

There is a second normally closed valve that is in series with and upstream of the orifice in the bypass line. This valve is not reflected in the simplified schematic in DCD Figure 3.2-1, but does appear on the detailed Nuclear Boiler System P&ID. This second normally closed valve has the same classification as the normally closed valve referenced in the RAI. Therefore, no re-classification of the bypass line with the orifice is needed.

**DCD Impact**

No DCD changes will be made in response to this RAI.

**NRC RAI 3.2-19 S02**

*Comment on response to RAI 3.2-19 S01 (MFN 06-308, Supplement 1):*

*GE's response to RAI 3.2-19 S01 identified that there is a second normally closed valve that is in series with and upstream of the orifice in the bypass line that is not reflected in the simplified schematic in DCD Figure 3.2-1, but does appear on the detailed Nuclear Boiler System P&ID. This normally closed valve is important to the classification and should be shown on the simplified diagram. The applicant is requested to submit a revised DCD Figure 3.2-1 to show this normally closed valve in the main steam drains.*

**GEH Response**

This RAI was received by GEH prior to the submittal of DCD Tier 2, Revision 4. Therefore, the response to this RAI is based upon the current DCD, Revision 4.

Figure 3.2-1, which is a schematic diagram of the Power Conversion System, was revised, in DCD Tier 2, Rev. 4, to accurately depict the correct valve and piping relationships.

In addition, Items 12, 13 and 18 for System B21 in Table 3.2-1 were revised in DCD Tier 2, Rev. 4; to define the correct classifications for the steam drains.

**DCD Impact**

No changes will be made to the DCD in response to this RAI.

**NRC RAI 3.2-19 S03**

*DCD Tier 2, Revision 4, submitted a revised Figure 3.2-1 to depict the correct valve and piping relationships. Although this figure does not show the second normally closed valve in the main steam (MS) drains stated in the response to RAI 3.2-19 S01, two normally open isolation valves in the MS drains are shown that could be used for isolating a downstream MS drain break. The boundary from safety-related to non-safety related is normally a closed valve, second automatically closed valve or second remotely operated valve. Provided the normally open isolation valves are remotely operated, this classification boundary is acceptable. Please confirm that the isolation valves are remotely operated or otherwise explain the basis for the classification boundary.*

**GEH Response**

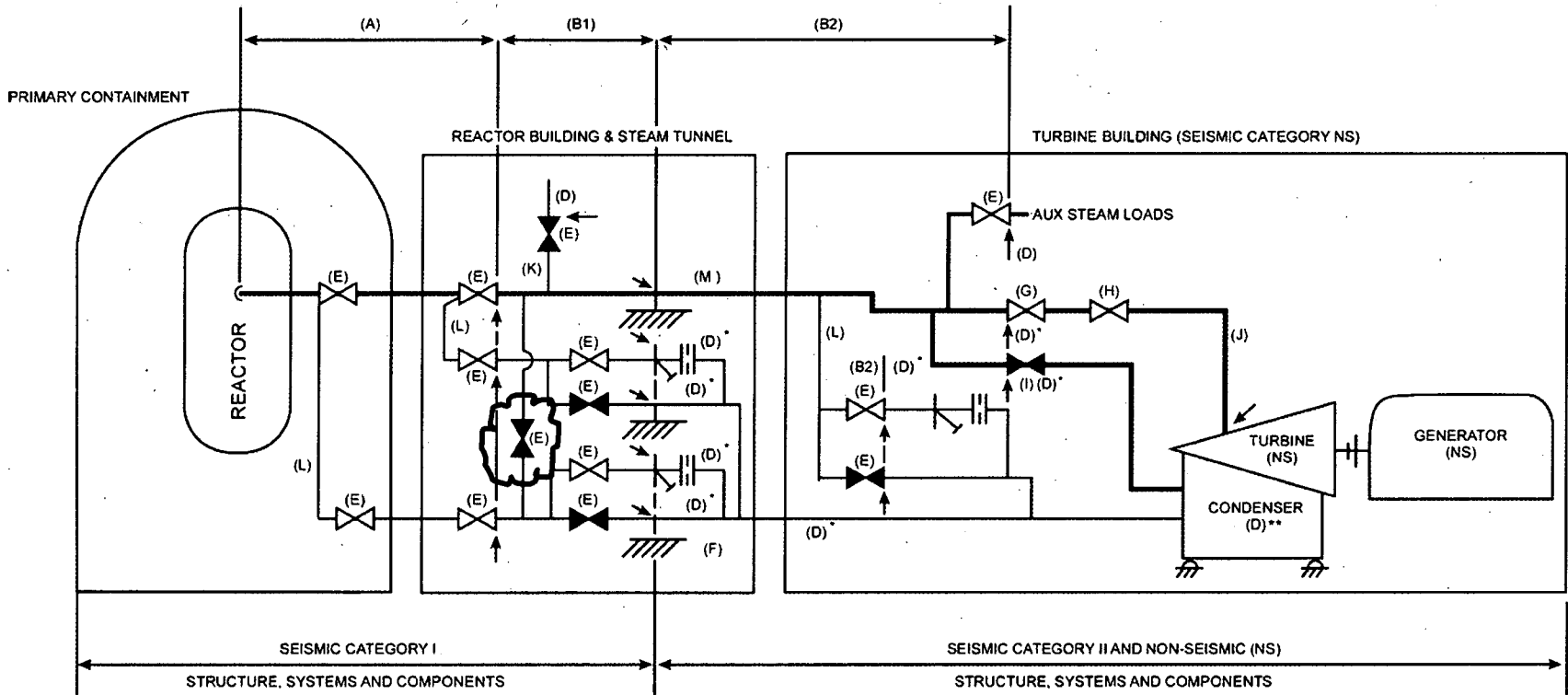
All valves shown on DCD Tier 2 Figure 3.2-1 that are part of Quality Group A have automatic isolation. The isolation signals for these valves are indicated, respectively, in DCD Tier 2 Tables 6.2-16 through 6.2-20. Valves located immediately upstream of steam line drains orifices shown on Figure 3.2-1 in Quality Groups B1 and B2 are normally open and designed to fail open in order to maintain a drainage path in the event of a loss of power to any of the three valves.

There is a line (drawn vertically) on Figure 3.2-1 under Quality Group B1, which directly cross-connects the main steam lines (all four) to the main steam lines drain line with an isolation valve shown as normally open. An open valve in this location would result in an abnormal bypass of main steam to the condenser. GEH has determined that this valve should be represented properly as normally closed, consistent with the design, and will make this correction in the next DCD revision.

**DCD Impact**

DCD Tier 2, Figure 3.2-1 will be revised as noted in the attached markup.





LEGEND:		
A.	QUALITY GROUP A	
B 1.	QUALITY GROUP B	
B 2.	QUALITY GROUP B, SEISMIC CATEGORY II	
D.	QUALITY GROUP D	
E.	ISOLATION VALVE	
F.	SEISMIC INTERFACE RESTRAINT	
G.	TURBINE STOP VALVE	
H.	TURBINE CONTROL VALVE	
I.	TURBINE BYPASS VALVE	
J.	MAIN STEAM LEAD	
K.	INSTRUMENT BRANCH LINE	
L.	DRAIN LINE	
M.	STEAM LINE	
NS	NON-SEISMIC	
↙	CLASSIFICATION CHANGE	
		* ANALYZED TO DEMONSTRATE STRUCTURAL INTEGRITY UNDER SSE-LOADING CONDITIONS FOR MSIV LEAKAGE PATH
		** CONDENSER SUPPORTS AND ANCHORS ARE DESIGNED TO MAINTAIN CONDENSER INTEGRITY FOLLOWING SSE FOR MSIV LEAKAGE HOLDUP VOLUME.

Figure 3.2-1. Quality Group and Seismic Category Classification Applicable to Power Conversion System