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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 95 – Steam and Power Conversion System – RAI Numbers 10.3-11 and 10.4-12**

Enclosure 1 contains GE's response to the subject NRC RAIs transmitted via Reference 1.

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

Sincerely,

Kathy Sedney for

James C. Kinsey
Project Manager, ESBWR Licensing

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NRO

Reference:

1. MFN 07-204, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 95 Related to the ESBWR Design Certification Application*, March 27, 2007.

Enclosure:

1. MFN 07-287 – Response to Portion of NRC Request for Additional Information Letter No. 95 – RAI Numbers 10.3-11 and 10.4-12

cc: AE Cubbage USNRC (with enclosure)
BE Brown GE/Wilmington (with enclosure)
LE Fennern GE/San Jose (with enclosure)
GB Stramback GE/San Jose (with enclosure)
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Enclosure 1

MFN 07-287

Response to Portion of NRC Request for Additional Information Letter No. 95 Related to ESBWR Design Certification

Steam and Power Conversion System

RAI Numbers 10.3-11 and 10.4-12

NRC RAI 10.3-11

DCD Tier 2, Revision 3, Section 10.3.1, states that "the MSIV fission product leakage path to the main condenser is analyzed to demonstrate structural integrity under SSE loading conditions. The drain valve(s), that are required to change position to provide the MSIV leakage path to the main condenser are equipped with reliable power sources or designed to fail to the required position on loss of power or air.

Please revise DCD Section 10.3 to include a COL Action Item requiring a COL Holder to provide operating procedures and staff training to perform the manual operations required to isolate the main condenser path to provide a volume for holdup and plate-out of fission products potentially leaking from MSIVs.

GE Response

The text in the above RAI contains two elements of the same subject. The RAI text first addresses the drain valves that are required to change position to establish the MSIV leakage path to the condenser. Secondly, the RAI requests information on the operations required to isolate the main condenser path and is apparently referring to the steam auxiliary isolation valves that are required to close to isolate auxiliary connections and loads from the Turbine Main Steam System (TMSS). The response below addresses operations associated with closing the steam auxiliary isolation valves. However, the response and reasoning also apply to operations associated with opening the drain valves that are required to establish the MSIV leakage path to the condenser.

The TMSS is not required to perform or support any safety-related function. However, the TMSS is designed to close the steam auxiliary isolation valve(s) on branch lines between the MSIVs and Main Turbine Stop Valves (excluding the fission product leakage path to the condenser) on an MSIV isolation signal. As stated in DCD Tier 2, Subsection 10.3.1.1, the subject valves fail closed on loss of electrical power to the valve actuating solenoid or on loss of pneumatic pressure.

Closing the TMSS auxiliary isolation valves to branch lines isolates TMSS branch connections and auxiliary loads from the MSIV fission product leakage path. This action is consistent with the isolated condenser method described in NEDC-31858P, Revision 2, "BWROG Report for Increasing MSIV Leakage Rate Limits and Elimination of Leakage Control Systems." The isolated condenser method was chosen over equally effective alternative methods specifically due to the reduced number of operator actions that are required.

The RAI requests that GE provide a COL Action Item to specify that the COL holder provide procedures and training to perform the manual operations required to close the steam auxiliary isolation valves on branch lines between the MSIVs and Main Turbine Stop Valves. However, the design does not utilize manual operator actions to achieve this isolation. Operator actions associated with this automatic function are normally limited to verification that the required valves have closed. Any subsequent manual actions would only be required to compensate for postulated equipment failures.

This operator function, similar to nearly all operator functions, is performed in accordance with plant procedures. Individual operator actions and associated functions are typically not listed or described in the DCD. In addition, commitments to develop procedures and operator training are generally not contained in DCD Tier 2 chapters such as Chapter 10. This chapter content is also not required in applicable regulatory guidance, e.g. NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," Section 10.3. DCD Tier 2, Chapter 13, "Conduct of Operations," contains a plant-level description of requirements and commitments to develop operating procedures. Subsection 13.5.3.4 states that, "procedures shall be provided to guide operations in emergencies and other significant events." Further, DCD Tier 2 provides commitments and general requirements with regards to operator training in Sections 13.2 and 18.10.

A procedure is needed to provide the operator actions required to ensure that the MSIV fission product leakage path is isolated from TMSS auxiliaries. This procedure is to be developed along with other emergency response procedures as stated in DCD Tier 2, Chapter 13. Operator training on this function and procedure is provided as stated in DCD Tier 2, Sections 13.2 and 18.10. Based on the above evaluation and applicable regulatory guidance, it is not considered necessary that the DCD include specific requirements regarding the contents of plant procedures. Specifically, as it pertains to this RAI, commitments to provide specific procedures and staff training for the purpose of verifying that appropriate automatic actions have occurred is not deemed necessary. Accordingly, no COL Holder items will be added to the DCD as a result of this request.

DCD Impact

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

NRC RAI 10.4-12

DCD Tier 2, Revision 3, Section 3.9.3.2, states that the feedwater nozzle design incorporates the requirements found in NUREG-0619 and Generic Letters 80-95 and 81-11. However, in addition to the design considerations, the staff requests that GE verify that the ESBWR complies with all NUREG-0619 provisions, including a feedwater nozzle pre-service and in-service inspection program.

Specifically, the staff requests that the applicant verify that the ESBWR feedwater nozzles are designed to provide access for the examinations described in NUREG-0619. The staff also requests that GE included a COL Action Item to ensure that a COL applicant will include the provisions of NUREG-0619 into its pre-service and in-service inspection programs.

GE Response

The ESBWR feedwater nozzles are designed for inspections in accordance with the requirements of ASME Section XI and inspected under the COL holders Preservice/Inservice inspection (PSI/ISI) program. DCD Subsection 5.2.4, Preservice and Inservice Inspections, has a COL holder action item to prepare an inspection program meeting ASME XI requirements as outlined in DCD Table 1.9-22. The COL action item is listed in DCD Subsection 5.2.6.

NRC regulatory guidance from NUREG-0619-REV-1, "BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking: Resolution of Generic Technical Activity A-10 (Technical Report)," has been reviewed and is addressed by the nozzle design and current inspection practices. NUREG-0619-REV-1 is listed in DCD Subsection 3.9.3.2 and DCD Table 1.9-23.

The ESBWR feedwater nozzle is specifically designed to mitigate the feedwater nozzle technical issues detailed in NUREG-0619-REV-1, Part I. The ESBWR feedwater nozzle design is similar to the Monticello feedwater nozzle design and is addressed in Table 2 of NUREG-0619-REV-1, and conforms to "other configurations" including note 8. Note 8 states that "*Other configurations, such as the proposed double-sleeve welded design for Monticello, will be reviewed on a plant-specific basis and inspection intervals determined from these reviews.*" Therefore, the Ultrasonic Testing (UT) examination, visual examination and surface examination are not specifically identified by NUREG-0619 for the ESBWR design. However, NUREG-0619 examination criteria are not necessary since the ASME Section XI Code now includes requirements for UT inspection of the nozzle inner blend radius and bore region that satisfy the NUREG-0619 requirements. Additionally, the surface examination of the nozzle inner blend radius and bore region is no longer necessary since the sensitivity of the UT examination methods have been demonstrated and qualified to detect small surface flaws. This likewise eliminates the need for the design to provide physical access to the inside of the nozzle surface.

The specific inspections and their intervals are to be identified in the COL Holder's PSI/ISI plan. Since the PSI/ISI plan is to include the feedwater nozzle inspections as now required by the ASME Code, no additional COL action items are necessary

DCD Impact

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