

Review Team Questions for March 13, 2013 Public Phone Call

Non-Proprietary Discussion

RAI response:

3.9-289, 3.9-290, and 3.9-291

The staff has the following clarifying questions and requests related to the final response to RAI-3.9-289, 3.9-290, and 3.9-291:

1. In its combined response to RAIs 3.9-289, 290, and 291 (MFN 12-066, Revision 2, January 30, 2013), GEH provides a summary of the regulatory positions in RG 1.20 in Table 1 of its RAI response. In its summary of Section 2.1 of RG 1.20, GEH does not address the following guidance on page 14 of RG 1.20:

After developing a steam dryer load definition, an applicant for the construction and operation of a BWR nuclear power plant (or a licensee using this regulatory guide in planning a power uprate for an operating BWR nuclear power plant) should apply the load definitions to vibration and stress models to determine the vibrations of the valves and stresses within the steam dryer, with justified damping assumptions and applicable weld factors and stress intensities. After including applicable bias errors and random uncertainties, the applicant/licensee should compare valve vibrations against applicable limits, and peak stresses at critical steam dryer locations to the fatigue limits in the ASME Boiler & Pressure Vessel Code.

To address Section 2.1 in RG 1.20, GEH states that the ESBWR prototype steam dryer will be analyzed based on the steam dryer design. GEH states that as part of the manufacturing process, there may be adjustments in the design in order to facilitate fabrication of the steam dryer. GEH indicates that following completion of fabrication, there will be an “as-built” predictive analysis that will be used for comparison to the final “as-built” steam dryer measured data during plant startup. GEH states that an ITAAC that will be added to the DCD Tier 1 to ensure that the predictive analysis of the “as-built” steam dryer will be fully documented.

Section C.III.4.3, “Combined License Information Items That Cannot Be Resolved Before the Issuance of a License,” in RG 1.206 states that for each COL action item that cannot be resolved before license issuance, the COL applicant should provide sufficient information to support the NRC licensing decision, and propose a method for ensuring the final closure of the item following COL issuance. One of the methods for final closure of a COL Information Item specified in RG 1.206 is development of a new ITAAC.

In that the “as-built” steam dryer will not be available for the COL applicant to perform a fatigue analysis prior to COL issuance, the COL applicant will need to follow the guidance in RG 1.206 to provide sufficient information to support the NRC licensing decision (such as successful implementation of the PBLE Method 1 on a sample steam dryer), and then rely on the new ITAAC to complete the resolution of the COL Information Item. The NRC staff requests that

GEH describe the application of the PBLE Method 1 for the fatigue analysis of the Grand Gulf steam dryer (including any lessons learned from issues identified during the analysis of steam dryer data) in the DCD as an example of the successful implementation of the methodology to allow the COL applicant to incorporate by reference this information in its FSAR to satisfy RG 1.20

2. In its combined response to RAIs 3.9-289, 290, and 291, GEH indicates that COL Information Item 3.9.9-1-A is as follows:

The Combined License (COL) Applicant will classify its reactor per the guidance in RG 1.20 and provide a milestone for submitting a description of the inspection and measurement programs to be performed (including measurement locations and analysis predictions) and the results of the vibration analysis, measurement and test program.

This COL Information Item only addresses classification of the reactor and activity milestones. The COL Information Item does not address the complete set of guidance in RG 1.20 for preventing potential adverse flow effects on the ESBWR steam dryer.

The NRC staff requests that GEH revise the COL Information Item to specify that the COL applicant will implement the recommendations in RG 1.20 for a comprehensive vibration assessment program for reactor internals. For example, the COL Information Item should specify that the COL applicant (a) describe Comprehensive Vibration Assessment Program for PBLE Method 1 consistent with RG 1.20; (b) provide steam dryer predicted analysis (for the plant-specific or a sample steam dryer) that concludes that steam dryer will not exceed stress limits with applicable bias and uncertainties and minimum alternating stress ratio (MASR); (c) describe startup program (with proposed startup license condition) that includes appropriate notification and hold points during power ascension, and submittal of completed analysis of steam dryer data within 90 days following startup; and (d) specify periodic steam dryer inspections during refueling outages. The COL applicant will be able to satisfy this COL Information Item by incorporating by reference the information in the ESBWR DCD with any supplemental information as necessary.

3. The GEH response to RAIs 3.9-289, 290, and 291 addresses COL Information Items and ITAAC to be completed by the COL applicant and later the COL licensee. The NRC staff requests that GEH provide recommended license conditions to be applied to the COL licensee to monitor the steam dryer performance during startup and during subsequent refueling outages. For example, the steam dryer license conditions should address the following: (a) monitor steam dryer data and main steam line vibration, and take appropriate action as necessary; (b) provide steam dryer data to NRC staff at prescribed power levels; (c) hold power for specific time period at prescribed power levels; (d) submit within 90 days following startup (1) the results of evaluation of the steam dryer and main steam line components for vibration and stress analysis, and (2) confirmation of PLBE Method 1 and the resulting bias and uncertainties; and (e) perform periodic steam dryer inspections during refueling outages. The license conditions developed to monitor the steam dryer performance for the power ascension at Grand Gulf might provide an appropriate starting point for the ESBWR COL steam dryer license conditions.

4. On page 3 of the GEH response to RAIs 3.9-289, 290, and 291, GEH refers to NRC Interim Staff Guidance ISG-024 in support of the ITAAC closure verification process. However, ISG-024 was not issued. The NRC staff requests that GEH revise its RAI response to remove the reference to ISG-024.