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Subject: **Response to Portion of NRC Request for Additional Information
Letter No. 231 - Related To ESBWR Design Certification
Application – RAI Number 14.2-97**

The purpose of this letter is to submit the GE Hitachi Nuclear Energy (GEH) response to the U.S. Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) sent by the Reference 1 NRC letter. GEH response to RAI Number 14.2-97 is addressed in Enclosure 1. DCD markups associated with this response are provided in Enclosure 2.

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

Sincerely,

Richard E. Kingston
Vice President, ESBWR Licensing

DOB
NRC

Reference:

1. MFN 08-628, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request For Additional Information Letter No. 231 Related To ESBWR Design Certification Application*, dated August 5, 2008.

Enclosures:

1. MFN 08-819 – Response to Portion of NRC Request for Additional Information Letter No. 231 - Related To ESBWR Design Certification Application – RAI Number 14.2-97
2. MFN 08-819 – Response to Portion of NRC Request for Additional Information Letter No. 231 - Related To ESBWR Design Certification Application – RAI Number 14.2-97 – DCD Markup

cc: AE Cubbage USNRC (with enclosures)
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eDRF 0000-0092-2218

Enclosure 1

MFN 08-819

Response to Portion of NRC Request for

Additional Information Letter No. 231

Related to ESBWR Design Certification Application

RAI Number 14.2-97

NRC RAI 14.2-97

The test description in ESBWR DCD Subsection 14.2.8.2.11 should be revised to include a discussion demonstrating conformance with applicable topical reports, since it is too broad and general in its present form.

The discussions related to the test description and acceptance criteria for the reactor internals vibration test program (Initial Startup Flow Induced Vibration Testing) in ESBWR Revision 5 Subsection 14.2.8.2.11 are too broad and general. There is no reference to the GE Licensing Topical Report NEDE-33259P Revision 1- "Reactor Internals Flow Induced Vibration Program," which contains an item by item discussion of the components requiring testing during the startup test program of the first ESBWR as well as the types and locations of the sensors for monitoring flow induced vibration (FIV) behavior. The test description in ESBWR Subsection 14.2.8.2.11 should be revised to include a discussion demonstrating conformance with this topical and other applicable references in the ESBWR DCD. The DC applicant's current approach to steam dryer load definition is defined as the Plant Based Load Evaluation (PBLE) method, which is discussed in Licensing Topical Report NEDC-33408P. The development of the FIV loads described in this report are in accordance with RG 1.20, Revision 3. The FIV loads will be used in combination with other design loads in qualifying the steam dryer as described in Licensing Topical Report NEDE-33313P. The test description in ESBWR Subsection 14.2.8.2.11 should discuss conformance with these Licensing Topical Reports.

GEH Response

A description of the Flow Induced Vibration program and associated startup testing is provided in DCD Tier 2, Section 3L. Section 3L includes references to topical reports NEDE-33259P Revision 1, NEDC-33408P, and NEDE-33313P.

A reference to DCD Tier 2, Section 3L will be added to Subsection 14.2.8.2.11.

DCD Impact

DCD Tier 2, Subsection 14.2.8.2.11 will be revised as shown in the Enclosure 2 markup.

Enclosure 2

MFN 08-819

Response to Portion of NRC Request for

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DCD Markup

14.2.8.2.11 Reactor Internals Vibration Test (Initial Startup Flow-Induced Vibration Testing)***Purpose***

The objective of this test is to collect information needed to verify the adequacy of the design, manufacture, and assembly of reactor vessel internals with respect to the potential affects of flow-induced vibration. Instrumentation of major components and the flow tests and remote inspections provide assurance that excessive vibration amplitudes, if they exist, are detected at the earliest possible time. The data collected also helps establish the margin to safety associated with steady state and AOO conditions and helps confirm the pretest analytical vibration calculations. This testing fulfills the initial startup test requirements of Regulatory Guide 1.20

for a vibration measurement and inspection program for prototype reactor internals. A complete description of the reactor internals vibration test program is provided in Appendix 3L.

Prerequisites

The applicable preoperational phase testing is complete and plant management has reviewed the test procedure(s) and approved the initiation of testing. The initial vibration analysis computations and specifications of acceptance criteria shall be complete. These results shall be utilized to define final inspection and measurement programs. Reactor vessel components and structures shall be installed and secured as designed in expectation of being subjected to rated volumetric core flow. This includes the steam separator and dryer assembly and reactor vessel head. The assembly and disassembly of vessel internals shall be choreographed such that structures and components requiring remote inspections are accessible at the proper times. The required sensors shall be installed and calibrated prior to the flow testing. All other systems, components and structures shall be available, as required, to support the reactor internals vibration assessment program. For each scheduled testing iteration, the plant shall be in the appropriate operational configuration with specified testing complete.

Description

The reactor internals vibration testing subsequent to fuel loading is performed during the power ascension phase and includes intermediate and high power and flow conditions during steady-state operation. AOOs that are expected to result in limiting or significant levels of reactor internals vibration are also included.

The reactor internals vibration assessment program consists of two parts: a vibration analysis program, and an inspection and measurement program. The vibration analysis portion is performed on the final design, prior to the initial startup test, and the results are used to develop the measurement and inspection portions of the program. The initial startup test therefore consists of an instrumented flow test and pre- and post-test inspections as described in the following paragraphs:

Pre-flow Vessel Inspection — The pre-flow inspection is performed primarily to establish and document the status of vessel internal structures and components. Some of the inspection requirements may be met by normal visual fabrication inspections. The majority of the inspection requirements are met by visual and remote observations of the installed reactor internals in a flushed and drained vessel. The following types of structures and components shall be included in the vessel internals inspection program:

- Major load bearing elements, including lateral, vertical and torsional supports;