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Subject: **Response to Portion of NRC Request for Additional
Information Letter No. 233 Related to ESBWR Design
Certification Application – Site Characteristics – RAI Number
2.3-10 S03**

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 NRC letter dated August 15, 2008 (Reference 1). GEH response to RAI Number 2.3-10 S03 is addressed in Enclosure 1. The DCD markup pages related to this response are provided in Enclosure 2.

Reference 2 transmitted Supplement 2 to RAI 2.3-10 for which response was provided in Reference 3. Reference 4 transmitted Supplement 1 to RAI 2.3-10 for which response was provided in Reference 5. Reference 6 transmitted the original RAI 2.3-10 for which response was provided in Reference 7.

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

Sincerely,

Richard E. Kingston
Vice President, ESBWR Licensing

DOUG
NRC

References:

1. MFN 08-648, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 233 Related to the ESBWR Design Certification Application*, August 15, 2008.
2. MFN 07-656, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 117 Related to the ESBWR Design Certification Application*, December 6, 2007.
3. MFN 06-396 S03, Letter from GE to U.S. Nuclear Regulatory Commission, *Response to Portion of USNRC Request for Additional Information Letter No. 117 Related to ESBWR Design Certification Application – Radiation Protection – RAI Numbers 2.3-10 S02 and 12.2-25*, April 24, 2008.
4. E-mail from USNRC to GE, April 2, 2007.
5. MFN 06-396 S01, Letter from GE to U.S. Nuclear Regulatory Commission, *Response to USNRC Request for Additional Information Letter No. 37 Related to ESBWR Design Certification Application – Site Characteristics – RAI Number 2.3-10 S01*, October 15, 2007.
6. MFN 06-201, Letter from U.S. Nuclear Regulatory Commission to David H. Hinds, *Request for Additional Information Letter No. 37 Related to the ESBWR Design Certification Application*, June 21, 2006.
7. MFN 06-396, Letter from GE to U.S. Nuclear Regulatory Commission, *Response to USNRC Request for Additional Information Letter No. 37 Related to ESBWR Design Certification Application – Siting Issues – RAI Numbers 2.1-2, 2.3-7, 2.3-8, 2.3-10, 14.3-23, 14.3-24, 14.3-25, and 15.3-2*, October 20, 2006.

Enclosures:

1. Response to Portion of NRC Request for Additional Information Letter No. 233 Related to ESBWR Design Certification Application – Site Characteristics - RAI Number 2.3-10 S03
2. DCD Markup Pages

cc: AE Cubbage USNRC (with enclosures)
RE Brown GEH/Wilmington (with enclosures)
DH Hinds GEH/Wilmington (with enclosures)
eDRF 0000-0092-2226

Enclosure 1

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Response to Portion of NRC Request for

Additional Information Letter No. 233

Related to ESBWR Design Certification Application

Site Characteristics

RAI Number 2.3-10 S03

NRC RAI 2.3-10 S03

Update the DCD to include release pathway information (e.g., stack height above grade and relationship to adjacent buildings; release point shape and inside dimensions; effluent temperature, flow rate, and exit velocity) for each of the three ventilation stacks. Also verify that all three ventilation stacks are uncapped and vertically oriented.

This information will be required by COL Applicants in generating site-specific long term atmospheric dispersion site characteristics.

GEH Response

It is verified that all three ventilation stacks are uncapped and vertically oriented. The release pathway information is provided in the attached DCD markups. The pathway information provided in Appendix 2B only includes the parameters applicable to the XOQDOQ computer code for generating long-term X/Q values. As a result, the effluent temperature, flow rate, and release point shape are not included in DCD Tier 2, Appendix 2B.

DCD Impact

DCD Tier 2, Section 2.0 will be revised and Appendix 2B will be added in Revision 6 as noted in the attached markup.

Enclosure 2

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DCD Markup Pages

- Hazards in Site Vicinity
- Required Stability of Slopes
- Meteorological Dispersion (Values at Exclusion Area Boundary [EAB] and Low Population Zone [LPZ] at appropriate time intervals for short and long term)

The site parameters include a requirement that liquefaction not occur underneath Seismic Category I structures, systems, and components (SSCs) resulting from a site-specific SSE. In addition, although the ESBWR design is independent of a particular site and takes into consideration the 0.3g Regulatory Guide 1.60 spectra and representative high frequency ground spectra in Central and Eastern U.S., the evaluation of each site for liquefaction potential and slope stability uses the site-specific SSE.

The design basis for protection against missiles is specified in the DCD Tier 2 Section 3.5, such that external missiles are adequately addressed in the design for buildings and structures, and the building/structure design is verified by appropriate ITAAC.

The site characteristics information for each site is addressed in the Combined License (COL) applicant's final safety analysis report (FSAR) in accordance with 10 CFR 52.79. See Subsection 2.0.1, Item 2.0-1-A. Appendix 2A provides ARCON96 source/receptor inputs for use by COL applicants in the confirmation of site-specific X/Q values. Appendix 2B provides the ventilation stack gaseous effluent release pathway information used in calculating the standard plant long term X/Q values.

The guidance in NUREG-0800 identifies information needed for evaluation of a proposed site. See Subsection 2.0.1, Items 2.0-2-A through 2.0-30-A.

2.0.1 COL Information

2.0-1-A Site Characteristics Demonstration

A COL applicant referencing the ESBWR DCD demonstrates that site characteristics for a given site fall within the ESBWR DCD site parameter values per 10 CFR 52.79. (Section 2.0)

2.0-2-A through 2.0-30-A Standard Review Plan Conformance

A COL applicant will provide information in accordance with NRC guidance in NUREG-0800, Standard Review Plan (SRP) sections for site characteristics. A COL applicant follows applicable NRC guidance for preparing the COL application, depending upon whether the applicant will reference an Early Site Permit or not. (Section 2.0 and Table 2.0-2 – see Table 2.0-2 for detailed COL item numbering by SRP section)

2.0.2 References

- 2.0-1 GE Hitachi Nuclear Energy, "ESBWR Certification Probabilistic Risk Assessment," NEDO-33201, Class I (Non-proprietary), Revision 3, May 2008.
- 2.0-2 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures, ASCE 7-02, 2002.

APPENDIX 2B VENTILATION STACK PATHWAY INFORMATION FOR LONG-TERM X/Q VALUES**2B.1 Discussion**

This appendix provides the gaseous effluent release pathway information for each of the three ventilation stacks used in calculating the standard plant long term X/Q values; this gaseous effluent release pathway information may also be used in generating site-specific long term X/Q values. Table 2B-1 provides the relevant ventilation stack parameters for use with the XOQDOQ computer code (Reference 2B-1).

2B.2 COL Information

None.

2B.3 References

2B-1 U.S. Nuclear Regulatory Commission, "XOQDOQ: Computer Program for the Meteorological Evaluation of Routine Effluent Releases at Nuclear Power Stations," NUREG/CR-2919, September 1982.

Table 2B-1**Ventilation Stack Parameters**

<u>Building Stack (Release Point)</u>	<u>Stack Average Velocity</u> <u>m/sec</u> <u>(ft/min)</u>	<u>Stack Inside Diameter</u> <u>m</u> <u>(ft)</u>	<u>Stack Release Height Above Grade</u> <u>m</u> <u>(ft)</u>	<u>Height of Building Above Grade</u> <u>m</u> <u>(ft)</u>	<u>Building Dimensions</u> <u>m</u>
<u>Reactor/ Fuel Building Stack</u>	<u>17.78</u> <u>(3,500)</u>	<u>2.40</u> <u>(7.9)</u>	<u>52.62</u> <u>(172.6)</u>	<u>48.05</u> <u>(157.6)</u>	<u>Reactor Building:</u> <u>X-Z plane: 49 x 48.05</u> <u>Y-Z plane: 49 x 48.05</u> <u>Fuel Building:</u> <u>X-Z plane: 21 x 22.85</u> <u>Y-Z plane: 49 x 22.85</u>
<u>Turbine Building Stack</u>	<u>17.78</u> <u>(3,500)</u>	<u>1.95</u> <u>(6.4)</u>	<u>71.3</u> <u>(234.0)</u>	<u>52.0</u> <u>(170.6)</u>	<u>X-Z plane: 115 x 52</u> <u>Y-Z plane: 59 x 52</u>
<u>Radwaste Building Stack</u>	<u>17.78</u> <u>(3,500)</u>	<u>1.34</u> <u>(4.4)</u>	<u>18</u> <u>(59.1)</u>	<u>12.0</u> <u>(39.4)</u>	<u>X-Z plane: 32.8 x 12</u> <u>Y-Z plane: 65 x 12</u>