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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 380 Related to Design Control Document (DCD) Revision 6 – Technical Specifications – RAI Number 9.1-129**

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) 9.1-129 sent by NRC Letter No. 380, Reference 1.

The GEH response to RAI 9.1-129 is addressed in Enclosure 1. Enclosure 2 contains the DCD markups associated with this response.

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

Sincerely,

Richard E. Kingston
Vice President, ESBWR Licensing

References:

1. MFN 09-684, Letter from U.S. Nuclear Regulatory Commission to Jerald G. Head, *Request for Additional Information Letter No. 380 Related to Design Control Document (DCD) Revision 6*, October 28, 2009

Enclosures:

1. Response to Portion of NRC Request for Additional Information Letter No. 380 Related to Design Control Document (DCD) Revision 6 – Technical Specifications – RAI Number 9.1-129
2. Response to Portion of NRC Request for Additional Information Letter No. 380 Related to Design Control Document (DCD) Revision 6 – Technical Specifications – RAI Number 9.1-129 – DCD Markups

cc: AE Cubbage USNRC (with enclosures)
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eDRF Section 0000-0109-8039

Enclosure 1

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Response to Portion of NRC Request for Additional Information Letter No. 380 Related to Design Control Document (DCD) Revision 6

Technical Specifications

RAI Number 9.1-129

NRC RAI 9.1-129

In DCD Revision 5, GEH deleted Technical Specification 4.3.1.2.c, which addresses physical dimensions of the new fuel storage in the buffer pool. The rationale provided by GEH was that requirements in Specifications 4.3.1.2.a and 4.3.1.2.b establish criteria that limit adequately reactivity. This rationale is inadequate for several reasons.

1. It does not address why the ESBWR should depart from the standard technical specifications which includes criticality controls such as physical dimensions.

2. NEDE-33374 Revision 2 relies on storage spacing and neutron poison material as key design features to limit reactivity for new fuel storage.

3. During an audit at the GEH offices in Washington, D. C., on September 29 and 30, 2009, GEH identified that the criticality control method using the beginning-of-life (BOL) lattice k-infinity in the normal reactor core configuration at cold conditions is directly linked to the rack design, which as noted in item 2 above, has storage spacing and neutron poison material as key design features.

Revise the technical specifications to include Technical Specification 4.3.1.2.c.

GEH Response

Specification 4.3.1.2.c will be added to Revision 7 of the ESBWR Generic Technical Specifications. Specification 4.3.1.2.c will provide the center-to-center storage spacing distance for fuel assemblies placed in the new fuel storage racks in the Reactor Building buffer pool. Two values will be provided since the center-to-center storage spacing is dependent upon whether the assemblies are within the same or differing rows of a given fuel storage rack.

The new fuel storage racks do not contain neutron poison material. Therefore, Specification 4.3.1.2.c will not contain reference to neutron poison material.

Additionally, consistent with NEDC-33374P, “Safety Analysis Report for Fuel Storage Racks Criticality Analysis for ESBWR Plants,” the value of k-infinity shown in Specifications 4.3.1.1.a and 4.3.1.2.a will be changed to 1.32. In Specification 4.3.1.2.a, the adjective “beginning-of-life (BOL)” will be deleted for consistency with NEDE-33374P and NUREG-1434, “Standard Technical Specifications, General Electric Plants, BWR/6.”

DCD Impact

The Generic Technical Specifications will be revised as shown in Enclosure 2.

Enclosure 2

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Response to Portion of NRC Request for Additional Information Letter No. 380 Related to Design Control Document (DCD) Revision 6

Technical Specifications

RAI Number 9.1-129

DCD Markups

4.0 DESIGN FEATURES

4.1 Site Location

COL 16.0-1-A
4.1-1

[Description to be provided by the COL applicant.]

4.2 Reactor Core

4.2.1 Fuel Assemblies

The reactor shall contain 1132 fuel assemblies. Each assembly shall consist of a matrix of Zircaloy clad fuel rods with an initial composition of slightly enriched uranium dioxide (UO_2) as fuel material, and water rods. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those fuel designs that have been analyzed with applicable NRC staff approved codes and methods and shown by tests or analyses to comply with all safety design bases. A limited number of lead test assemblies that have not completed representative testing may be placed in non-limiting core regions.

4.2.2 Control Rod Assemblies

The reactor core shall contain 269 cruciform-shaped control rod assemblies. The control material shall be boron carbide or a combination of boron carbide and hafnium metal, as approved by the NRC.

4.3 Fuel Storage

4.3.1 Criticality

4.3.1.1 The spent fuel storage racks in the Fuel Building spent fuel storage pool and in the Reactor Building buffer pool deep pit are designed and shall be maintained with:

a. Fuel assemblies having a maximum lattice k-infinity of 1.3235 in the normal reactor core configuration at cold conditions;

b. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties and biases as described in Section 9.1 of the Final Safety Analysis Report; and

4.0 DESIGN FEATURES

4.3.1.1 (continued)

c. A nominal fuel assembly center-to-center storage spacing of 168 mm (6.61 inches), with a neutron poison material between storage spaces, in the high density storage racks in the Fuel Building spent fuel storage pool and in the Reactor Building buffer pool deep pit.

4.3.1.2 The new fuel storage racks in the Reactor Building buffer pool are designed and shall be maintained with:

a. Fuel assemblies having a maximum ~~beginning-of-life (BOL)~~ lattice k-infinity of 1.32~~35~~ in the normal reactor core configuration at cold conditions; and

b. $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties and biases as described in Section 9.1 of the Final Safety Analysis Report.

c. A nominal center-to-center storage spacing of 251 mm (9.88 inches) for fuel assemblies placed in the same row of a storage rack; a nominal center-to-center storage spacing of 244 mm (9.61 inches) for fuel assemblies placed in adjacent rows of a storage rack.

4.3.2 Drainage

4.3.2.1 The Fuel Building spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below an elevation of 14.3 m (46.9 ft) above the floor of the pool.

4.3.2.2 The Reactor Building buffer pool deep pit is designed and shall be maintained to prevent inadvertent draining of the pool below an elevation of 16.2 m (53.1 ft) above the floor of the deep pit area.

4.3.3 Capacity

4.3.3.1 The Fuel Building spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 3504 fuel assemblies.

4.3.3.2 The Reactor Building buffer pool deep pit is designed and shall be maintained with a storage capacity limited to no more than 154 fuel assemblies.