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U.S. Nuclear Regulatory Commission
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Subject: Response to Portion of NRC Request for Additional Information Letter No. 242 Related to ESBWR Design Certification Application - Emergency Core Cooling Systems - RAI Number 6.3-88

Enclosure 1 contains the GE Hitachi Nuclear Energy (GEH) response to the subject NRC RAI transmitted via the Reference 1 letter. DCD Markups related to 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

A002
D068
NRO

Reference:

1. MFN 08-646, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 242 Related to ESBWR Design Certification Application*, August 13, 2008

Enclosures:

1. MFN 08-803 - Response to Portion of NRC Request for Additional Information Letter No. 242 Related to ESBWR Design Certification Application - Emergency Core Cooling Systems - RAI Number 6.3-88
2. MFN 08-803 - Response to Portion of NRC Request for Additional Information Letter No. 242 Related to ESBWR Design Certification Application - Emergency Core Cooling Systems - RAI Number 6.3-88 - DCD Markups

cc: AE Cabbage USNRC (with enclosures)
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Enclosure 1

MFN 08-803

**Response to Portion of NRC Request for
Additional Information Letter No. 242
Related to ESBWR Design Certification Application**

Emergency Core Cooling Systems

RAI Number 6.3-88

NRC RAI 6.3-88:

Section 6.3.2.7.2, "System Description," in the ESBWR DCD Tier 2 (Revision 5) states that the GDCS injection squib valve is designed such that, in the event of squib actuation, no missiles are generated that could impact the operation of any system valves, components, or instrumentation. This design criterion is not included in the DCD for the GDCS deluge valve. GEH is requested to address this design criterion for the GDCS deluge valve.

GEH Response:

The design criterion for not generating missiles is applicable to the Gravity-Driven Cooling System deluge line squib valves, and DCD Tier 2, Subsection 6.3.2.7.2 will be revised to reflect this criterion.

DCD Impact:

DCD Tier 2, Subsection 6.3.2.7.2, will be revised as noted in the attached markup.

Enclosure 2

MFN 08-803

**Response to Portion of NRC Request for
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Related to ESBWR Design Certification Application**

Emergency Core Cooling Systems

RAI Number 6.3-88

DCD Markups

26A6642AT Rev. 06

ESBWR

Design Control Document/Tier 2

GDCS Check Valve

The GDCS check valves are designed and installed such that the valves are fully open with zero differential pressure across the valve and fully closed with a low reverse differential pressure to prevent back flow. The check valve is a long duration submersible, piston check valve (of suitable pattern such as Y-pattern or axial flow) installed in a horizontal or vertical piping run. The valve meets the requirements for minimum fully open flow coefficient in the forward flow direction and maximum fully open flow coefficient in the reverse flow direction. The reverse flow coefficient addresses the case in which a check valve sticks in the fully open position following a LOCA. Type testing is performed to verify the valve meets the reverse flow coefficient requirement. The results of the testing and a comparison of the measured flow coefficient to the maximum value is documented in a report. The check valve is classified as Quality Group A, Seismic Category I, and ASME Section III Class 1.

Remote check valve position indication is provided in the main control room by position-indication instrumentation.

Deluge Valve

The deluge valve is a 50 mm (2 inch) squib valve similar in design to the SLC squib valves or ADS depressurization valves. To minimize the probability of common mode failure, the deluge valve pyrotechnic booster material is different from the booster material in the other GDCS squib valves. The pyrotechnic charge for the deluge valve is qualified for the severe accident environment in which it must operate.

The deluge valve is designed to meet the following requirements:

- The valve remains closed with zero leakage under all normal operating and design basis conditions, during anticipated operational occurrences and following the inadvertent opening of a GDCS injection line squib valve while the RPV is at normal operating pressure.
- The valve is designed such that, in the event of squib actuation, no missiles are generated that could impact the operation of any system valves, components or instrumentation within the DW.
- The valve is designed to survive the severe accident environment and still perform its intended function.
- The valve provides remote indication of "valve opened" and "valve closed" status.
- The valve has a C_v greater than $11.2 \text{ m}^3/\text{hr}/\text{kPa}^{1/2}$ ($130 \text{ gpm}/\text{psi}^{1/2}$) at full flow. The valve manufacturer performs a full flow test and provides test data to verify the minimum required valve C_v .

6.3.2.7.3 Safety Evaluation

GDCS performance evaluation during a LOCA is covered in Subsection 6.3.3.

All piping and valves (including supports) connected with the RPV, including squib valves, and up to and including the check valve are classified as follows:

- Safety-Related,