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MFN 09-281

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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. 269 Related to ESBWR Design Certification Application – Technical Specifications – RAI Number 16.2-40 S02**

Enclosures 1 and 2 contain the GE Hitachi Nuclear Energy (GEH) response to the subject NRC RAI transmitted via the Reference 1 letter.

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,

Richard E. Kingston
Vice President, ESBWR Licensing

Reference:

1. MFN 08-885, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 269 Related to ESBWR Design Certification Application,* October 31, 2008

Enclosures:

1. MFN 09-281 – Response to Portion of NRC Request for Additional Information Letter No. 269 Related to ESBWR Design Certification Application – Technical Specifications – RAI Number 16.2-40 S02
2. MFN 09-281 – DCD Markups for RAI Number 16.2-40 S02

cc:

AE Cubbage	USNRC (with enclosures)
JG Head	GEH (with enclosures)
DH Hinds	GEH (with enclosures)
eDRF	97-3061

Enclosure 1

MFN 09-281

Response to Portion of NRC Request for

Additional Information Letter No. 269

Related to ESBWR Design Certification Application

- Technical Specifications -

RAI Number 16.2-40 S02

NRC RAI 16.2-40 S02

The staff requests that the applicant provide a surveillance requirement for GDCS pool temperature in generic TS 3.5.2 that is consistent with the highest and lowest initial temperatures and pressures in the drywell and temperatures in the GDCS pools assumed in the analyses of design basis events. This will likely require adding temperature monitoring instrumentation for the GDCS pools. This request is related to item 255 in the DCD Rev 5 table entitled "Chapter 16 Changes From Revision 4 to Revision 5," and GTS 3.5.2 and 3.6.1.4, and 3.6.1.5. Although a 150 deg F initial drywell temperature is consistent with analysis assumptions, specifying a 150 deg F temperature limit in GTS LCO 3.6.1.5 implies that this is an acceptable temperature for normal operation. Please explain why TS should not require taking action to deal with degraded drywell cooling at temperatures much lower that this.

GEH Response

GDCS pool water temperature is relatively stable during normal operations, tracking drywell average temperature. The expected steady state GDCS pool temperature is expected to be less than 135ºF due to the drywell cooling system (DCD Tier 2, Table 9.4-12) maintaining drywell temperature at or less than 135ºF with a maximum of 150ºF (DCD Tier 2, Table 6.2-2). Maintaining a lower drywell temperature would provide an unwanted load on the drywell cooling system and lower the operating efficiency of the plant.

The average GDCS pool water temperatures are expected to gradually react to decreases and to increases in drywell average air temperature due to the large heat sinks that comprise the GDCS pool walls and floors. The drywell air temperature is required to be monitored in accordance with DCD Tier 2, Chapter 16, Technical Specification Limiting Condition for Operation 3.6.1.5. Since the drywell average air temperatures are being monitored, it is not necessary to also monitor GDCS pool water temperatures.

Although the nominal and bounding containment performance analyses are performed at an initial condition of 115ºF for the GDCS pool water temperature (DCD Tier 2, Table 6.2-6), additional analyses assuming GDCS pool water temperature as high as 150ºF were performed. Using TRACG for the limiting cases in DCD Tier 2, Sections 6.2 (main steam line break) and 6.3 (ICS drain line break) demonstrate that higher initial GDCS pool water temperatures do not have a significant impact on the containment and ECCS performance. These analyses demonstrate the relative insensitivity of the calculated peak containment pressure and temperature and reactor pressure vessel long-term water level after a DBA for increased GDCS pool water initial temperature.

The conclusion reached by the additional analyses on initial GDCS pool water temperatures as high as 150 ºF will be included in the next revision of DCD Tier 2, Section 6.3.

DCD Impact

DCD Tier 2, Subsection 6.3.2.8.3 and Chapter 16B will be revised as shown in Enclosure 2.

Enclosure 2

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DCD Markups for

RAI Number 16.2-40 S02

In all cases core temperature limits are not exceeded for the spectrum of break sizes postulated, indicating that the sizing and actuation logic of the ADS, assuming the failure of one valve to actuate, is adequate. ~~The limiting case for ADS operation is the small break LOCA, where the break itself contributes little to the depressurization of the vessel.~~

Although the nominal and bounding containment performance analyses are performed at an initial condition of 115ºF for the GDCS pool water temperature (DCD Tier 2, Table 6.2-6), additional analyses assuming GDCS pool water temperature as high as 150ºF were performed. Using TRACG for the limiting cases in Sections 6.2 (main steam line break) and 6.3 (ICS drain line break) demonstrate that higher initial GDCS pool water temperatures do not have a significant impact on the containment and ECCS performance. These analyses demonstrate the relative insensitivity of the calculated peak containment pressure and temperature and reactor pressure vessel long-term water level after a DBA for increased GDCS pool water initial temperature.

6.3.2.8.4 Testing and Inspection Requirements

See Subsection 7.3.5.4 for ADS logic testing requirements.

6.3.2.8.5 Instrumentation Requirements

Further description of the ADS instrumentation is provided in Subsection 7.3.1.1.

6.3.2.9 Isolation Condenser System

6.3.2.9.1 Design Bases

Refer to Subsection 5.4.6.1.

6.3.2.9.2 System Description

Refer to Subsection 5.4.6.2.

6.3.2.9.3 Safety Evaluation

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

6.3.2.9.4 Testing and Inspection Requirements

Refer to Subsection 5.4.6.4.

6.3.2.9.5 Instrumentation Requirements

Refer to Subsection 5.4.6.5 and 7.4.4.

6.3.2.10 Standby Liquid Control System

6.3.2.10.1 Design Bases

Refer to Subsection 9.3.5.1.

6.3.2.10.2 System Description

Refer to Subsection 9.3.5.2.

BASES

BACKGROUND (continued)

Each of the eight GDCS injection subsystem squib valves is equipped with four squib initiators ~~(i.e., actuators)~~. A signal to any of the four ~~actuators~~ initiators will actuate the valve. Three of the four ~~actuators~~ initiators on each valve are actuated by the Safety System Logic and Control System/Engineered Safety Features (SSLC/ESF) described in the Bases for LCO 3.3.5.1, "Emergency Core Cooling System (ECCS) Instrumentation" and LCO 3.3.5.2, "Emergency Core Cooling System (ECCS) Actuation." The fourth ~~actuator~~ initiator is actuated by the Diverse Protection System (DPS), which is designed to mitigate digital protection system common mode failures.

Each of the four GDCS equalizing train squib valves is equipped with four squib initiators ~~(i.e., actuators)~~. A signal to any of the four ~~actuators~~ initiators will actuate the valve. Three ~~actuators~~ initiators on each valve are actuated by the SSLC/ESF described in the Bases for LCO 3.3.5.1 and LCO 3.3.5.2. The fourth ~~actuator~~ initiator is actuated by the DPS. The equalizing trains are needed for the long term cooling only and are not automatically actuated by the DPS. The DPS ~~actuator~~ initiator is provided only for manual initiation of the equalizing train.

~~Actuation p~~Power to each of the three safety-related ~~actuators~~ initiators on each ECCS valve is supplied from a different division of the DC and Uninterruptible AC Electrical Power Distribution. As such, at least two of the three ~~actuators~~ initiators in each ECCS valve will be associated with divisions required by LCO 3.8.6, "Distribution Systems - Operating."

The GDCS is designed to ensure that no single active component failure will cause inadvertent initiation of GDCS or prevent automatic initiation and successful operation of the minimum required ECCS subsystems when any three of the four divisions of DC and Uninterruptible AC Electrical Power Distribution and the associated instrumentation divisions are OPERABLE.

Although the nominal and bounding containment performance analyses are performed at an initial condition of 115ºF for the GDCS pool water temperature, additional analyses assuming GDCS pool water temperature as high as 150ºF were performed. These analyses demonstrate the relative insensitivity of the calculated peak containment pressure and temperature and reactor pressure vessel long-term water level after a DBA for increased GDCS pool water initial temperature. Therefore, monitoring of the GDCS pool temperature is not required.