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MFN 06-465 Supplement 1

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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 68 - Engineered Safety Features - RAI Numbers 6.3-41 S01 and 6.3-41 S02**

Enclosure 1 contains GE's response to the subject NRC RAI originally transmitted via the Reference 1 letter and supplemented by two NRC requests for clarification.

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

Sincerely,

Kathy Sedney for

James C. Kinsey
Project Manager, ESBWR Licensing

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References:

1. MFN 06-379, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 68 Related to ESBWR Design Certification Application*, October 10, 2006

Enclosure:

1. MFN 06-465 Supplement 1 - Response to Portion of NRC Request for Additional Information Letter No. 68 - Related to ESBWR Design Certification Application - Engineered Safety Features - RAI Numbers 6.3-41 S01 and 6.3-41 S02

cc: AE Cubbage USNRC (with enclosures)
BE Brown GE/Wilmington (with enclosures)
GB Stramback GE/San Jose (with enclosures)
eDRF 0000-0066-4690

Enclosure 1

MFN 06-465 Supplement 1

Response to Portion of NRC Request for

Additional Information Letter No. 68

Related to ESBWR Design Certification Application

Engineered Safety Features

RAI Numbers 6.3-41 S01 and 6.3-41 S02

NRC RAI 6.3-41 S01:

Please address the following two questions related to GDCS pool opening perforated screen design.

(A) In GE's response to RAI 6.3-41 (MFN06-465), GE stated that the hole size of the perforated screen is less than that of the fuel assembly inlet orifice. Please provide the ESBWR minimum orifice diameter and the minimum GDCS injection line diameter. Clarify the design criteria of sizing the perforated screen.

(B) In GE's response to RAI 6.3-41 (MFN06-465), GE indicated that the GDCS opening screen will be designed to provide protection against the two-phase jet impingement and the missile attack. Please specify the type of limiting two phase jet regarding its source, strength and duration. If it is the intention for GE to complete the design of the perforated screen during the DCD phase, please provide the relevant analysis and evaluation reports. If not, discuss the plan to complete the design and the relevant design criteria.

GE Response:

(A) The minimum fuel assembly inlet orifice diameter is 38 mm (1.5 inch). The GDCS injection line consist of a nominal 200 mm line which branches into two nominal 150 mm lines with each terminating at an injection nozzle of 76 mm (3.0 inch) diameter. Since the fuel assembly inlet orifice is a smaller diameter than any other flow path within the GDCS, limiting the hole diameter in the perforated screen to a maximum of 38 mm will ensure debris entering the GDCS will be able to pass unimpeded through the flow path up to and including the fuel assembly inlet orifice. DCD Tier 2, Section 6.3.2.7.2, paragraph 14 will be revised in DCD Tier 2, Revision 4, to provide the value of 38 mm (1.5 inch) as the maximum hole diameter in the perforated screen.

(B) Protection against dynamic effects associated with postulated pipe breaks is described in DCD Tier 2, Revision 3, Section 3.6. The analysis of the GDCS is part of a larger pipe break analysis program, which is described in DCD Tier 2, Revision 3, Subsection 3.6.5 as a COL applicant item. DCD Tier 2, Section 6.3.2.7.2, paragraph 14 will be revised in DCD Tier 2, Revision 4, to provide a reference to DCD Tier 2, Section 3.6, as the location of the evaluation of protection against the dynamic effects associated with postulated pipe ruptures.

DCD Impact:

DCD Tier 2, Section 6.3.2.7.2, paragraph 14 will be revised in DCD Tier 2, Revision 4, as shown in the attached markup.

NRC RAI 6.3-41 S02:

In response to RAI 6.3-41, GE added the following to DCD, Tier 2, Rev. 3, Section 6.3.2.7.2: The GDCS pool airspace opening to DW will be covered by a perforated steel plate to prevent debris from entering pool and potentially blocking the coolant flow through the fuel. The holes in the perforated steel plate will smaller than the orifice holes in the fuel support castings. However, the GDCS injection system consists of one 200-mm (8-inch) pipe mounted with a temporary strainer, which can be clogged with debris, reducing the GDCS injection flow (DCD, Tier 2, Rev. 3, Section 6.3.2.7.2). Please explain the effect of the temporary strainer on the GDCS injection flow.

GE Response:

It is not intended for the temporary strainer to remain as part of the system configuration. The strainer will be removed after initial flushing of the GDCS injection lines. DCD Tier 2, Section 6.3.2.7.2, paragraph 6 will be revised in DCD Tier 2, Revision 4, to provide a footnote to require removal of the temporary strainer after initial flushing of the GDCS injection lines.

DCD Impact:

DCD Tier 2, Section 6.3.2.7.2, paragraph 6 will be revised in DCD Tier 2, Revision 4, as shown in the attached markup.

6.3.2.7.2 System Description

Detailed System Description

[DCD Tier 2, Section 6.3.2.7.2, paragraph 6]

Each division of the GDCS injection system consists of one 200-mm (8-inch) pipe (with a temporary strainer[1] and a block valve) exiting from the GDCS pool. Just after the 200-mm (8-inch) block valve a 100-mm (4-inch) deluge line branches off and is terminated with three 50-mm (2-inch) squib valves and deluge line tailpipe to flood lower drywell. The 200-mm (8-inch) injection line continues after the 100-mm (4-inch) deluge line connection from the upper drywell region through the drywell annulus where the 200-mm (8-inch) line branches into two 150-mm (6-inch) branch lines each containing a check valve, squib valve, and block valve. Each division of the long-term system consists of one 150-mm (6-inch) equalizing line with two block valves, a check valve and a squib valve. All piping is stainless steel and rated for reactor pressure and temperature. Figure 6.3-1 illustrates the arrangement of GDCS piping configuration.

[DCD Tier 2, Section 6.3.2.7.2, paragraph 14]

Suppression pool equalization lines have an intake strainer to prevent the entry of debris material into the system that might be carried into the pool during a large break LOCA. The GDCS pool airspace opening to the DW will be covered by a perforated steel plate to prevent debris from entering pool and potentially blocking the coolant flow through the fuel. Protection against the dynamic effects associated with postulated pipe ruptures is described Section 3.6. The maximum holes diameters in the perforated steel plate are 38 mm (1.5 inch) ~~will smaller than the orifice holes in the fuel support castings~~. A splash guard is added to the opening to minimize any sloshing of GDCS pool water into the drywell following dynamic event.

[1] Temporary strainer will be removed after initial flushing of GDCS injection lines.