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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, 6.3-43, and 6.3-57**

Enclosure 1 contains GE's response to the subject NRC RAIs transmitted via the Reference 1 letter.

If you have any questions about the information provided here, please let me know.

Sincerely,

Kathy Sedney for

David H. Hinds
Manager, ESBWR

D068

Reference:

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 – 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, 6.3-43, and 6.3-57

cc: AE Cubbage USNRC (with enclosures)
GB Stramback GE/San Jose (with enclosures)
eDRF 0000-0053-3505

Enclosure 1

MFN 06-465

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, 6.3-43, and 6.3-57

NRC RAI 6.3-41:

There is a narrow opening between the gravity driven cooling system (GCDS) pool airspace and the drywell (DW). DCD Tier 2, Section 6.3.2.7.2, states that the GCDS pool airspace opening to the DW will be covered by mesh screens or equivalent to prevent debris from entering the GDCS pool and potentially blocking the coolant flow through the fuel. Please specify wither a mesh screen or an alternate feature will be used to prevent debris from entering the GDCS pool.

The size of the opening between the GDCS pool airspace and the DW and the proposed mesh screen may significantly reduce the amount of the debris getting into the pool, however, it does not eliminate the possibility that a nearby two-phase jet may push a certain amount of debris into the pool and cause injection line or fuel bundle inlet blockage. Without strainers at the inlet of the GDCS injection lines, any debris brought into the GDCS pool by two-phase jets could possibly get into the injection lines and potentially block valves in the system. Please evaluate the current GDCS design and justify why strainers are not necessary at the inlet of the GDCS injection lines to prevent debris from causing injection line and/or fuel bundle blockages.

GE Response:

A perforated steel plate will be used instead of a mesh screen. The holes in the plate will be smaller than the orifice holes in the fuel support casts. This dimensioning will assure that the holes in the steel plate will be smaller than the GDCS injection line nozzle into the reactor vessel and the GDCS piping and valves. The steel plate will provide protection against missiles and a two-phase jet. Although debris may enter the pool through the perforated plate, the holes are sufficiently small such that only fragments of metallic materials from larger objects can enter into the GDCS pools. Depending on the location of the debris entering the GDCS pool some portion of the debris could enter the GDCS piping and could flow into the reactor vessel. Since the debris size will be much smaller size than the cross sectional area in the piping, valves, or injection line nozzle, no flow blockage will occur. Any debris getting into the vessel will have a chance to settle onto the bottom head of the vessel or be carried upwards into a fuel bundle or bundles but stopped at the lower tie-plate by a fuel debris filter. Due to the dispersion of the limited debris material that could ultimately enter the reactor vessel and due to the large population of fuel bundles (1132), no significant flow blockage within a given fuel bundle can reasonably be expected.

DCD Impact:

DCD Tier 2, Revision 3, Section 6.3.2.7.2, paragraph will be revised as noted in the attached markup.

"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 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 be 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 a dynamic event."

NRC RAI 6.3-43:

Provide additional details on the single failure analysis for the gravity driven cooling system (GDCS). Include details on the selection of the valve that fails and demonstrate that it is the most conservative single failure of the GDCS.

GE Response:

Check valves and squib valves are the only active components in GDCS. They are in series, and if either one fails, the effect is the loss of an injection line branch. Because there are no other active components in GDCS, an assumed failure of any one valve is equally conservative.

DCD Impact:

No DCD changes will be made in response to this RAI.

NRC RAI 6.3-57:

Discuss how you plan to verify the assumed flow rates of the passive systems.

GE Response:

Flows are not assumed in the GDCS, rather water tank volumes and losses in flow paths are assumed. These are modeled using the TRACG code. Flow testing for GDCS is described in DCD Tier 1, Table 2.4.2-1.

DCD Impact:

No DCD changes will be made in response to this RAI.