GE Energy

James C. Kinsey
Project Manager, ESBWR Licensing

PO Box 780 M/C J-70
Wilmington, NC 28402-0780
USA

T 910 675 5057
F 910 362 5057
jim.kinsey@ge.com

MFN 07-009 Supplement 1

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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. 85 - Containment Systems - RAI Number 6.2-150 S01**

Enclosure 1 contains GE's response to the subject NRC RAI originally transmitted via the Reference 1 letter and supplemented by an NRC request 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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NRO

Reference:

1. MFN 07-054, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 85 Related to ESBWR Design Certification Application*, January 19, 2007

Enclosure:

1. MFN 07-009 Supplement 1 - Response to Portion of NRC Request for Additional Information Letter No. 85 - Related to ESBWR Design Certification Application - Containment Systems - RAI Number 6.2-150 S01

cc:

AE Cubbage	USNRC (with enclosures)
BE Brown	GE/Wilmington (with enclosures)
GB Stramback	GE/San Jose (with enclosures)
eDRF	0000-0065-4212R2

Enclosure 1

MFN 07-009 Supplement 1

Response to Portion of NRC Request for

Additional Information Letter No. 85

Related to ESBWR Design Certification Application

Containment Systems

RAI Number 6.2-150 S01

NRC RAI 6.2-150:

DCD, Tier 2, Revision 2, Section 6.2.1.1.4 states that "In order to prevent excessive negative pressure the drywell spray flow rate must be less than 227 m3/hr (1000 gpm)." Please state the assumptions used to calculate this spray flow rate, including the timing of spray initiation.

GE Original Response:

An analysis has been performed to determine the maximum negative differential pressures (drywell to wetwell, and drywell to reactor building) resulting from several different drywell spray initiation scenarios, including manual drywell spray initiation following a feedwater line break and a main steamline break inside containment, and an inadvertent drywell spray initiation with no break at the most limiting initial drywell, wetwell, and reactor building initial conditions. For each of these scenarios, drywell spray flow rate was assumed to be 2000 gpm. For additional conservatism and to account for uncertainties in the design of the drywell spray piping system, including drywell spray flow limiting design features, a value of 1000 gpm has been established as the maximum operating limit.

For the feedwater line and main steamline break scenarios, the analyses assume that the manual drywell spray injection is initiated at the worst possible time, which is the point in time when there is a low air content in the drywell relative to the wetwell. This occurs when the drywell pressure peaks and begins to decrease, and just prior to the drywell to wetwell vacuum breakers opening. The assumed temperature of the drywell spray water in each of these scenarios is 293°K.

The conclusion of these analyses is that the maximum negative differential pressures remain within the design criteria for each of the above scenarios.

NRC RAI 6.2-150 S01:

GE stated in response to RAI 6.2-150, MFN 07-009, that "No DCD changes will be made in response to this RAI." The information concerning the assumptions used to calculate the spray flow rate, including the timing of spray initiation should have been included in the DCD. Revise the DCD to include the appropriate information provided in RAI response 6.2-150.

GE Response:

GE will revise DCD Tier 2, Section 6.2.1.1.4, in DCD Tier 2, Revision 4, to include the appropriate information.

DCD Impact:

DCD Tier 2, Section 6.2.1.1.4, paragraph 2, will be revised and a new paragraph added in DCD Tier 2, Revision 4, as shown in the attached markup.

[DCD Tier 2, Section 6.2.1.1.4, 2nd Paragraph]

Drywell depressurization following a LOCA is expected to produce the most severe negative pressure transient condition in the DW. The results of the ~~M~~main ~~S~~steam ~~L~~line break analysis show that the containment does not reach negative pressure relative to the reactor building, and the maximum ~~W~~wetwell-~~D~~drywell differential pressure is within the design capability. This calculation assumes one available drywell-wetwell vacuum breaker with an area of 0.2 m^2, which is conservative with respect to the planned installed vacuum breaker area.

An evaluation of the effect of drywell spray on containment integrity for a main steam line break and a feedwater line break was performed to determine the maximum negative differential pressures (drywell to wetwell, and drywell to reactor building). This evaluation assumed that a drywell spray flow rate of 454 m^3/hr (2000 gpm) at a temperature of 293°K is initiated at the worst possible moment (i.e., when the drywell pressure has peaked just prior to the opening of the drywell-wetwell vacuum breakers), and verified that the maximum negative differential pressures remain within the design criteria. For additional conservatism and to account for uncertainties in the design of the drywell spray piping system, including drywell spray flow limiting design features, a value of ~~In order to prevent excessive negative pressure the drywell spray flow rate must be less than~~ 227 m^3/hr (1000 gpm) has been established as the maximum design operating limit (see Subsection 9.1.3).