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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. 67 Related to ESBWR Design Certification Application –
             Dynamic Testing and Analysis of Systems, Components, and
             Equipment – RAI Number 3.9-87**

Enclosure 1 contains GE's 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,

Kathy Sedney for

James C. Kinsey
Project Manager, ESBWR Licensing

General Electric Company

D068

Reference:

1. MFN 06-378, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 67 Related to ESBWR Design Certification Application,* October 10, 2006

Enclosure:

1. MFN 07-203 – Response to Portion of NRC Request for Additional Information Letter No. 67 Related to ESBWR Design Certification Application – Dynamic Testing and Analysis of Systems, Components, and Equipment – RAI Number 3.9-87

cc: AE Cubbage USNRC (with enclosures)
     DH Hinds   GE (with enclosures)
     RE Brown   GE (w/o enclosures)
     eDRF   0000-0065-8636

Enclosure 1

MFN 07-203

Response to Portion of NRC Request for

Additional Information Letter No. 67

Related to ESBWR Design Certification Application

Dynamic Testing and Analysis of Systems,

Components, and Equipment – RAI Number 3.9-87

NRC RAI 3.9-87

It is stated in DCD Tier 2, Section 3.9.2.5 that an assumed break of the main steam line, the feedwater line or the reactor water cleanup/shutdown cooling line at the reactor vessel nozzle results in jet reaction and impingement forces on the vessel and asymmetrical pressurization of the annulus between the reactor vessel and the shield wall. These time-varying pressures are applied to the dynamic model of the reactor vessel system. However, the discussion to explain the basis for developing the forcing function is inadequate. Therefore, the applicant is requested to provide the following:

(a) Typical diagrams and the basis for postulating the pipe break-induced forcing function, including a description of the governing hydrodynamic equations and the assumptions used for flow path geometries, and,

(b) Tests for determining flow coefficients, and any semi-empirical formulations and scaled model flow testing for determining pressure differentials or velocity distributions.

GE Response

a) For jet reaction and jet impingement forces, diagrams and the basis for postulating break-induced forcing functions are based on Appendix B, C, and D of ANSI/ANS-58.2.

b) For determining pressure differentials or velocity distribution, analytically established values may be used instead of performing a scale model test. The development of forcing functions is based solely upon analytical techniques. Sample calculations that demonstrate the analytical method were previously submitted in GE's response to RAI 3.6-6. These sample calculations are based on hydrodynamic equations developed in F.J. Moody, "Thermal-Hydraulics of a Boiling Water Nuclear Reactor," ANS 1993, and additionally utilize the methodologies outlined by ANSI/ANS 58.2.

DCD Impact

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