April 24, 2006

Mr. David H. Hinds, Manager, ESBWR
General Electric Company
P.O. Box 780, M/C L60
Wilmington, NC 28402-0780

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 18 RELATED TO ESBWR DESIGN CERTIFICATION APPLICATION

Dear Mr. Hinds:

By letter dated August 24, 2005, General Electric Company (GE) submitted an application for final design approval and standard design certification of the economic simplified boiling water reactor (ESBWR) standard plant design pursuant to 10 CFR Part 52. The Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed design.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter. Questions 3.9-1 and 3.9-2 concern the design and testing of depressurization valves, vacuum breakers, and critical check valves which are discussed in Section 3.9 of the ESBWR design control document. Questions 6.2-4 through 47 concern analysis of the containment, containment subcompartments, and reactor building subcompartments loads which are discussed in Section 6.2 of the ESBWR design control document. These question were sent to you via electronic mail on January 26, February 6 and 28, March 1 and 31, 2006. These questions were discussed with your staff during telecons on February 17 and March 15, 2006. You agreed to respond to these RAIs by April 28, 2006.

If you have any questions or comments concerning this matter, you may contact me at (301) 415-2863 or lwr@nrc.gov or you may contact Amy Cubbage at (301) 415-2875 or aec@nrc.gov.

Sincerely,

/RA/

Lawrence Rossbach, Project Manager
New Reactor Licensing Branch
Division of New Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 52-010
Enclosure: As stated
cc: See next page

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General Electric Company
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The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter. Questions 3.9-1 and 3.9-2 concern the design and testing of depressurization valves, vacuum breakers, and critical check valves which are discussed in Section 3.9 of the ESBWR design control document. Questions 6.2-4 through 47 concern analysis of the containment, containment subcompartments, and reactor building subcompartments loads which are discussed in Section 6.2 of the ESBWR design control document. These question were sent to you via electronic mail on January 26, February 6 and 28, March 1 and 31, 2006. These questions were discussed with your staff during telecons on February 17 and March 15, 2006. You agreed to respond to these RAIs by April 28, 2006.

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ACCESSION NO. ML061020552

OFFICE	NRBA/PM	NRBA/BC
NAME	LRossbach	LDudes
DATE	04/ /2006	04/ /2006

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Distribution for DCD RAI Letter No. 18 dated April 24, 2006

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Request for Additional Information
ESBWR Design Control Document (DCD) Section 3.9, “Mechanical Systems and Components”

RAI Number	Reviewer	Summary	Full Text
3.9-1	Razzaque M	Provide test reports for the depressurization valve (DPV) and the vacuum breaker (VB)	During the pre-application phase of the ESBWR review, GE stated that full-size testing of the DPV and the VB were conducted to demonstrate the operation and reliability of these valves. However, the technical evaluation of the design and the testing programs for the DPV and VB were not part of the ESBWR pre-application review scope. Provide additional information regarding the design and testing of DPV and VB.

3.9-2	Huang J	Provide information regarding design and testing of critical check valves (CVs).	DCD Sections 3.9.3.5.2 and Section 3.9.6.1 address issues related to check valves (CVs) but do not include adequate information to provide confidence that the CVs will be designed, manufactured, qualified, installed and periodically tested to perform their applicable safety functions. The design and testing issues for certain critical CVs, especially in passive plant designs, may need to be addressed during the design certification phase. Provide additional information regarding design conditions for each critical CV (such as flow, differential pressure, system pressure, flow temperature and ambient conditions), and prototypical or qualification testing of each size, type and model of CV under a range of differential pressure and flow conditions up to the design conditions to ensure the adequacy of CVs under design and required operating conditions. Your response should include the following information: 1. What is the design ΔP to hold these valves in close position, and what is the expected ΔP across the valve during operation. 2. What is the design ΔP to break open these valves and what is the minimum ΔP expected or available to break open these valves. 3. What is the design flow or flow velocity required to lift the disc in stable full-open position and what is the minimum flow rate expected or available when these valves are called upon to perform their intended safety function. 4. Describe qualification requirements and provide acceptance criteria for these requirements for testing each size, type, and model under required or expected operating conditions

3.9-2 Cont'd			4. Describe qualification requirements and provide acceptance criteria for these requirements for testing each size, type, and model under required or expected operating conditions up to design-basis conditions. 5. Provide an estimate of the reliability for these check valves based on study, test data and/or any relevant operating experiences. 6. Due to design limitations or reasons of impracticality for certain old vintage plants, the ASME OM Code allows test intervals to be extended up to refueling outage. However, ESBWR has a long lead time to design the plant and should have sufficient time to include provisions or necessary design features to accommodate the quarterly test. GE is proposing a refueling outage test frequency for these valves, but no justification is provided as to why ESBWR can not be designed to accommodate the quarterly test. 7. Describe the non-intrusive techniques and acceptance criteria used to assess the degradation and performance of these valves. 8. Describe the test parameters and acceptance criteria for successful completion of the preservice and inservice testing of these valves to demonstrate continuing design-basis capability of these valves. This information should be provided for the GDCS CV, the only critical CV that has been identified so far. We will request similar information for any additional critical CVs we identify. Detailed guidance on the functional design, qualification and inservice testing of CVs can be found in SRP 3.9.6, Draft 3, April 1996.

ESBWR Design Control Document (DCD) Chapter 6 - General Clarification / Editorial

RAI Number	Reviewer	Question Summary	Full Text
6.2-4	Throm E	Clarify references in DCD Sections 6.2.1.1.5.4.1 and 6.2.1.1.5.4.2.	DCD Sections 6.2.1.1.5.4.1 and 6.2.1.1.5.4.2 refer to Section 6.2.1.1.5.7.3. Section 6.2.1.1.5.7.3 does not exist in Chapter 6 of the DCD. Correct and clarify intent.
6.2-5	Throm E	Clarify references in DCD Section 6.2.1.1.5.4.3.	DCD Section 6.2.1.1.5.4.3 refers to Section 6.2.1.1.5.4 which does not provide the leakage area. Is 6.2.1.1.5.1 the correct reference? Correct and clarify intent.
6.2-6	Throm E	Clarify meaning of paragraph on page 6.2-5 of the DCD.	The following paragraph from page 6.2-5 of the DCD needs clarification: "There is sufficient water volume in the suppression pool to provide adequate submergence over the top of the upper row of horizontal vents, as well as the PCCS return vent, when water level in RPV reaches at one meter above the top of active fuel and water is removed from the pool during post-LOCA equalization of pressure between RPV and the WW. Water inventory, including the GDCS, is sufficient to flood the RPV to at least one meter above the top of active fuel."
6.2-7	Throm E	Explain why GE referenced SRP 6.2.1.1.C Rev. 2 instead of the current version, Rev. 6 dated August 1984.	On page 6.2-7 of the DCD, SRP 6.2.1.1.C Rev. 2 is provided as the reference used to address applicable guidance employed by GE for the ESBWR design. The currently version of this SRP is Rev. 6 dated August 1984. Why has GE chosen to use the earlier version of this SRP? (Also note that the page numbering in DCD section 6.2 needs to be fixed. Page 6.2-6 should be 6.1-6, 6.2-7 should be 6.2-1 etc.)

RAI Number	Reviewer	Question Summary	Full Text
6.2-8	Throm E	Provide a discussion of the variances in the GE application of SRP 6.2.1.1.C Rev. 2 to the ESBWR with respect to Rev. 6 of this SRP.	On page 6.2-7 of the DCD, SRP 6.2.1.1.C Rev. 2 is provided as the reference used to address applicable guidance employed by GE for the ESBWR design. Provide a discussion of the variances in the GE application of this SRP to the ESBWR with respect to Rev. 6 of this SRP.

DCD Chapter 6 - Negative Pressure Design / Suppression Pool Steam Bypass

RAI Number	Reviewer	Question Summary	Full Text
6.2-9	Throm E	Provide discussion of wetwell depressurization and the events which could result in depressurization in the wetwell.	DCD Section 6.2.1.1.4 only addresses the drywell. Include a discussion for wetwell depressurization, if it can occur. Include a discussion of the events which could result in depressurization in the wetwell.
6.2-10	Throm E	Explain how are the wetwell air-space and suppression pool pressure and temperature maintained during normal operations.	Explain how are the wetwell air-space and suppression pool pressure and temperature maintained during normal operations.
6.2-11	Throm E	Provide the MSLB evaluation(s) results and compare to the design value(s). (See DCD section 6.2.1.1.4)	Provide the results of the evaluation(s) and compare to the design value(s). The DCD Section 6.2.1.1.4 indicates that the MSLB will not result in unacceptable results but it does not indicate if other LOCAs were evaluated to conclude this is the limiting case. Provide a discussion on how the limiting cases were identified, for both the drywell and wetwell. Address drywell results and, as appropriate, wetwell results.
6.2-12	Throm E	Explain how large the steam bypass leakage can be without exceeding the containment design limits. (See DCD Section 6.2.1.1.5)	The steam bypass leakage is an “assumed” value used for the DBA. Explain how large the leakage can be without exceeding the containment design limits. (See DCD Section 6.2.1.1.5)

DCD Chapter 6 - Containment Subcompartment Loads

Note: RAIs 6.2-13 through 6.2-30 need to be addressed for the reactor shield annulus subcompartment only

RAI Number	Reviewer	Question Summary	Full Text
6.2-13	Throm E	Provide a synopsis of the piping break analyses performed and a justification for the selection of the design bases accident (break size and location) for each subcompartment.	Provide a synopsis of the piping break analyses performed and a justification for the selection of the design bases accident (break size and location) for each subcompartment. Include a discussion of the use of leak-before-break in limiting the pipe break area. Provide this information as part of the DCD Tier 2, Section 6.2.1.2.1, "Design Bases." This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.
6.2-14	Throm E	Describe the extent to which pipe restraints are used to limit the break area of the pipe ruptures.	Describe the extent to which pipe restraints are used to limit the break area of the pipe ruptures. Provide this information as part of DCD Tier 2, Section 6.2.1.2.1, "Design Bases." This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.
6.2-15	Throm E	Provide the margin applied to the calculated differential pressures for use in the structural design of the subcompartment walls and equipment supports.	Provide the margin applied to the calculated differential pressures for use in the structural design of the subcompartment walls and equipment supports. Provide this information as part of DCD Tier 2, Section 6.2.1.2.1, "Design Bases." This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.

RAI Number	Reviewer	Question Summary	Full Text
6.2-16	Throm E	Provide plan and elevation drawings showing (i) component and equipment locations, (ii) the routing of high energy lines and the (iii) vent (include doors, blowout panels, etc. as appropriate) locations and configurations for each subcompartment analyzed.	Provide plan and elevation drawings showing (i) component and equipment locations, (ii) the routing of high energy lines and the (iii) vent (include doors, blowout panels, etc. as appropriate) locations and configurations for each subcompartment analyzed. The subcompartment volumes and vent paths should be tabularized. For example, see Regulatory Guide 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition) Rev. 3 (ADAMS ML011340072, ML011340108, and ML011340116), Section 6.2.1.2. Provide this information in DCD Tier 2, Section 6.2.1.2.2, "Design Features." This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.
6.2-17	Throm E	For vent areas which become available only after the occurrence of a pipe break (for example blowout panels, or as a result of insulation collapsing or being blown out), identify the manner in which these are treated, and justify the vent areas used in the analyses.	For vent areas which become available only after the occurrence of a pipe break (for example blowout panels, or as a result of insulation collapsing or being blown out), identify the manner in which these are treated, and justify the vent areas used in the analyses. Provide the dynamic analyses of the available vent area as a function of time (pressure) and the supporting test data. Provide this information in DCD Tier 2, Section 6.2.1.2.2, "Design Features." This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.

RAI Number	Reviewer	Question Summary	Full Text
6.2-18	Throm E	Provide a description of the computer program used to calculate the mass and energy release from a postulated pipe break. Discuss the conservatism of the blowdown model with respect to the pressure response of the subcompartment.	Provide a description of the computer program used to calculate the mass and energy release from a postulated pipe break. Discuss the conservatism of the blowdown model with respect to the pressure response of the subcompartment. If the computer code being used has not been previously reviewed by the staff, provide a comparison of the results to those predicted by an accepted code as justification for its use. Provide this informationin DCD Tier 2, Section 6.2.1.2.3, “Design Evaluation.” This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.
6.2-19	Throm E	Provide a description of the computer program used to calculate the pressures, differential pressures and flow rates between subcompartment. Discuss the conservatism of the model with respect to the pressure response of the subcompartment.	Provide a description of the computer program used to calculate the pressures, differential pressures and flow rates between subcompartment. Discuss the conservatism of the model with respect to the pressure response of the subcompartment. Include a discussion of sensitivity studies to justify time steps, nodalization, and any other criteria used by GE to justify the final model used for licensing evaluations. If the computer code being used has not been previously reviewed by the staff, provide a comparison of the results to those predicted by an accepted code as justification for its use. Provide this information in DCD Tier 2, Section 6.2.1.2.3, “Design Evaluation.” This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.
6.2-20	Throm E	Provide the assumed initial operating conditions of the plant such as reactor power level and subcompartment pressure, temperature, and humidity.	Provide the assumed initial operating conditions of the plant such as reactor power level and subcompartment pressure, temperature, and humidity. Provide this information in DCD Tier 2, Section 6.2.1.2.3, “Design Evaluation.” This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.

RAI Number	Reviewer	Question Summary	Full Text
6.2-21	Throm E	Provide a description of and justification of the subsonic and sonic flow models used in vent flow calculations.	Provide a description of and justification of the subsonic and sonic flow models used in vent flow calculations. The degree of entrainment assumed for the vent mixture should also be discussed and justified. Provide this information in DCD Tier 2, Section 6.2.1.2.3, “Design Evaluation.” This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2
6.2-22	Throm E	Provide a description of the piping system within a subcompartment that is assumed to rupture, the location of the break within the subcompartment, and the break size.	Provide a description of the piping system within a subcompartment that is assumed to rupture, the location of the break within the subcompartment, and the break size. Give the inside diameter of the rupture of line and the location and size of any flow restrictions within the line postulated to fail. Provide this information in DCD Tier 2, Section 6.2.1.2.3, “Design Evaluation.” This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2
6.2-23	Throm E	Provide the subcompartment nodalization information in accordance with the formats of Regulatory Guide 1.70, Rev. 3, Section 6.2.1.2.	Provide the subcompartment nodalization information in accordance with the formats of Regulatory Guide 1.70, “Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition) Rev. 3 (ADAMS ML011340072, ML011340108, and ML011340116), Section 6.2.1.2. Demonstrate that the selected nodalization maximizes the differential pressures as a basis for establishing the design pressures for the structures and component supports. Provide this information in DCD Tier 2, Section 6.2.1.2.3, “Design Evaluation.” This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2

RAI Number	Reviewer	Question Summary	Full Text
6.2-24	Throm E	Provide graphs of the pressure responses of all subnodes within a subcompartment as functions of time to permit evaluations of the effect on structures and component supports.	Provide graphs of the pressure responses of all subnodes within a subcompartment as functions of time to permit evaluations of the effect on structures and component supports. Provide this information in DCD Tier 2, Section 6.2.1.2.3, “Design Evaluation.” This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2
6.2-25	Throm E	Provide the mass and energy release data for the postulated pipe breaks in tabular form, with time in seconds, mass release rate in kg/sec, enthalpy of mass released in kJ/kg, and energy release rate in W/sec.	Provide the mass and energy release data for the postulated pipe breaks in tabular form, with time in seconds, mass release rate in kg/sec, enthalpy of mass released in kJ/kg, and energy release rate in W/sec. A minimum of 20 data points should be used from time zero to the time of peak pressure. The mass and energy release data should be given for at least the first three seconds. Provide this information in DCD Tier 2, Section 6.2.1.2.3, “Design Evaluation.” This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2
6.2-26	Throm E	For all vent flow paths, provide the flow conditions (subsonic or sonic) up to the time of peak pressure.	For all vent flow paths, provide the flow conditions (subsonic or sonic) up to the time of peak pressure. Provide this information in DCD Tier 2, Section 6.2.1.2.3, “Design Evaluation.” This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2
6.2-27	Throm E	Provide a detailed description of the method used to determine vent loss coefficients.	Provide a detailed description of the method used to determine vent loss coefficients. Provide a tabulation of the vent paths for each subcompartment and the loss coefficients. Provide this information in DCD Tier 2, Section 6.2.1.2.3, “Design Evaluation.” This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2

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6.2-28	Throm E	If SCAM is used for subcomparment loads analyses, please provide, for reference, a copy of: NEDE-21526, 76NED99 General Electric Co., "Subcompartment Analysis Methods (SCAM)," NEDE-21526, 76NED99, Class II (Proprietary), Revision 0, February 1977.	If SCAM is used for subcomparment loads analyses, please provide, for reference, a copy of: NEDE-21526, 76NED99 General Electric Co., "Subcompartment Analysis Methods (SCAM)," NEDE-21526, 76NED99, Class II (Proprietary), Revision 0, February 1977. This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2
6.2-29	Throm E	Identify and describe the method(s) used for the shield annulus response to high energy line breaks evaluation.	Consideration of asymmetric loads on the reactor pressure vessel, 6.2.1.2.2-Reactor Shield Annulus. It is not clear which method, (1) NEDO-24548, "Technical Description Annulus Pressurization Load Adequacy Evaluation," D.K. Sharma, General Electric Company, January 1979; (2) NEDE-21526, 76NED99, General Electric Co., "Subcompartment Analysis Methods (SCAM)," NEDE-21526, 76NED99, Class II (Proprietary), Revision 0, February 1977; or (3) some alternative method, is used for the shield annulus response to high energy line breaks. Identify and describe the method(s) used for this evaluation.
6.2-30	Throm E	Provide the pipe break selection and characteristics and the annulus model for the thermal-hydraulic response to the pipe break.	Provide the pipe break selection and characteristics (including the method used to develop the mass and energy releases) and the annulus model for the thermal-hydraulic response to the pipe break (compartment descriptions, flows between compartments, compartment pressures and differential pressure between compartments). This information is necessary to evaluate ESBWR reactor shield annulus response to high energy line breaks.

RAI Number	Reviewer	Question Summary	Full Text
6.2-31	Throm E	Provide additional information regarding high energy line break evaluations.	In addition to the “major components” identified in DCD Tier 2, Section 6.2.3.2, are there other subcompartments in the reactor building (RB) that have been considered for high energy line break evaluations? Are breaks in the RWCU system the only high energy lines in the RB? Are the breaks shown in DCD Tier 2, Table 6.2-11 the only breaks which could lead to subcompartment pressurization and dP across structures?
6.2-32	Throm E	For each applicable subcompartment, provide figure(s) of the model(s) and the results of the analyses.	DCD Figure 6.2-18 is called “typical”. In addition, there is a reference on the figure to a “sub model 2.” This models does not appear to be in the DCD, provide it. For each applicable subcompartment, provide figure(s) of the model(s) and the results of the analyses.
6.2-33	Throm E	Besides the ones described in the DCD, are there other models for other compartments?	Besides the ones described in the DCD, are there other models for other compartments? If so, include them in the DCD.
6.2-34	Throm E	Provide a description of the high energy lines within each subcompartment and a justification for the selection of the design bases accident for each subcompartment.	Provide a description of the high energy lines within each subcompartment and a justification for the selection of the design bases accident (break size and location) for each subcompartment. Provide this information in DCD Tier 2, Section 6.2.3.2, “Design Description.” This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.

RAI Number	Reviewer	Question Summary	Full Text
6.2-35	Throm E	Provide the margin applied to the calculated differential pressures for use in the structural design of the subcompartment walls and equipment supports.	Provide the margin applied to the calculated differential pressures for use in the structural design of the subcompartment walls and equipment supports. Provide this information in DCD Tier 2, Section 6.2.3.2, "Design Description." This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.
6.2-36	Throm E	Provide a description of the computer program used to calculate the mass and energy release from a postulated pipe break.	Provide a description of the computer program used to calculate the mass and energy release from a postulated pipe break. Discuss the conservatism of the blowdown model with respect to the pressure response of the subcompartment. If the computer code being used has not been previously reviewed by the staff, provide a comparison of the results to those predicted by an accepted code as justification of its acceptability. Provide this information in DCD Tier 2, Section 6.2.1.2.3, "Design Evaluation." This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.
6.2-37	Throm E	Discuss the conservatism of the model (CONTAIN 2.0 code) with respect to the pressure response of the subcompartment. Include a discussion of sensitivity studies to justify time steps, nodalization, and any other criteria used by GE to justify the final model used for licensing evaluations.	The CONTAIN 2.0 code is used for the RB subcompartment analyses. Discuss the conservatism of the model with respect to the pressure response of the subcompartment. Include a discussion of sensitivity studies to justify time steps, nodalization, and any other criteria used by GE to justify the final model used for licensing evaluations. How does GE's application compare with the SMSAB-02-04, "CONTAIN Code Qualification Report/User Guide for Auditing Subcompartment Analysis Calculations," September 2002 (ADAMS ML023220288)? Provide this information in DCD Tier 2, Section 6.2.1.2.3, "Design Evaluation." This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.

RAI Number	Reviewer	Question Summary	Full Text
6.2-38	Throm E	Provide the assumed initial operating conditions of the plant such as reactor power level and subcompartment pressure, temperature, and humidity.	Provide the assumed initial operating conditions of the plant such as reactor power level and subcompartment pressure, temperature, and humidity. Provide this information as part of DCD Tier 2, Section 6.2.1.2.3, “Design Evaluation.” This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.
6.2-39	Throm E	Provide a description of and justification of the subsonic and sonic flow models used in vent flow calculations.	Provide a description of and justification of the subsonic and sonic flow models used in vent flow calculations. The degree of entrainment assumed for the vent mixture should also be discussed and justified. Provide this information as part of DCD Tier 2, Section 6.2.1.2.3, “Design Evaluation.” This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.
6.2-40	Throm E	Provide the piping system within a subcompartment that is assumed to rupture, the location of the break within the subcompartment, and the break size.	Provide the piping system within a subcompartment that is assumed to rupture, the location of the break within the subcompartment, and the break size. Give the inside diameter of the rupture of line and the location and size of any flow restrictions within the line postulated to fail. Provide this information as part of DCD Tier 2, Section 6.2.1.2.3, “Design Evaluation.” This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.
6.2-41	Throm E	Demonstrate that the selected nodalization maximizes the differential pressures as a basis for establishing the design pressures for the structures and component supports.	Demonstrate that the selected nodalization maximizes the differential pressures as a basis for establishing the design pressures for the structures and component supports. Provide this information as part of DCD Tier 2, Section 6.2.1.2.3, “Design Evaluation.” This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.

RAI Number	Reviewer	Question Summary	Full Text
6.2-42	Throm E	Provide graphs of the pressure responses of all subnodes within a subcompartment as functions of time to permit evaluations of the effect on structures and component supports.	Provide graphs of the pressure responses of all subnodes within a subcompartment as functions of time to permit evaluations of the effect on structures and component supports. Provide this information as part of DCD Tier 2, Section 6.2.1.2.3, “Design Evaluation.” This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.
6.2-43	Throm E	Provide the mass and energy release data for the postulated pipe breaks in tabular form, with time in seconds, mass release rate in kg/sec, enthalpy of mass released in kJ/kg, and energy release rate in W/sec.	Provide the mass and energy release data for the postulated pipe breaks in tabular form, with time in seconds, mass release rate in kg/sec, enthalpy of mass released in kJ/kg, and energy release rate in W/sec. A minimum of 20 data points should be used from time zero to the time of peak pressure. The mass and energy release data should be given for at least the first three seconds. Provide this information as part of DCD Tier 2, Section 6.2.1.2.3, “Design Evaluation.” This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.
6.2-44	Throm E	For all vent flow paths, provide the flow conditions (subsonic or sonic) up to the time of peak pressure.	For all vent flow paths, provide the flow conditions (subsonic or sonic) up to the time of peak pressure. Provide this information as part of DCD Tier 2, Section 6.2.1.2.3, “Design Evaluation.” This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.

RAI Number	Reviewer	Question Summary	Full Text
6.2-45	Throm E	Provide a detailed description of the method used to determine vent loss coefficients.	Provide a detailed description of the method used to determine vent loss coefficients. Provide a tabulation of the vent paths for each subcompartment and the loss coefficients. Provide this information as part of DCD Tier 2, Section 6.2.1.2.3, "Design Evaluation." This information is necessary to evaluate ESBWR subcomparment loads per SRP 6.2.1.2 and RG 1.70, Section 6.2.1.2.
6.2-46	Throm E	Provide, in electronic format, the CONTAIN 2.0 models for the limiting case for each reactor building subcomparment model.	Provide, in electronic format, the CONTAIN 2.0 models for the limiting case for each reactor building subcomparment model to allow the staff to perform independent studies.
6.2-47	Throm E	Provide tabularized subcompartment volumes and vent paths.	Provide tabularized subcompartment volumes and vent paths to allow the staff to perform independent analyses. See for example, Regulatory Guide 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition) Rev. 3 (ADAMS ML011340072, ML011340108, and ML011340116), Section 6.2.1.2.

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