

June 7, 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. 32 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. These questions concern "Hydrological Engineering," as discussed in Section 2.4 of the ESBWR design control document (DCD). These questions were sent to you via electronic mail on March 28, 2006. You did not request a telecon to discuss these questions. You agreed to respond to these questions by July 14, 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
ESBWR/ABWR Projects 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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ACCESSION NO. ML061530003

OFFICE	NESB/PM	NESB/BC(A)
NAME	LRossbach	ACubbage
DATE	06/2/2006	06/7/2006

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Distribution for DCD RAI Letter No. 32 dated June 7, 2006

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Requests for Additional Information (RAIs)
ESBWR Design Certification Review (Hydrological Engineering)

RAI Number	Reviewer	Question Summary	Full Text
2.4-3	Samaddar S	Explain the use of the maximum hydrostatic head	ESBWR design control document (DCD) Tier 2, Table 2.0-1 and DCD Tier 1, Table 5.1-1 show the maximum ground water level at 0.61 m (2.0 ft) below grade and the probable maximum flood (PMF) to be at 0.3m (1.0 ft) below grade. Therefore, during incidences of flooding, the ground water level will exceed the maximum ground water level specified in the ESBWR DCD. The applicant should clarify that the maximum hydrostatic head of the groundwater has been used in their computation of lateral pressure and buoyancy effects in the subsequent analysis of foundations in DCD Tier 2, Section 3.8.5. It is also necessary to incorporate the highest groundwater level for leak tightness of all accesses and openings below grade.
2.4-4	Samaddar S	Clarify hydrostatic head use for foundation stability	The applicant should clarify that the maximum flood level has been used as the hydrostatic head in determining the stability of subsurface materials, foundation and slopes in DCD Tier 2, Sections 2.5.4 and 2.5.5.
2.4-5	Samaddar S	Update Table 2.0-1 for design hydrostatic parameters	Revise DCD Tier 2, Table 2.0-1 to reflect the appropriate hydrologic design parameters for the reference ESBWR plant siting. The hydrologic siting parameters are: <ul style="list-style-type: none"> • Design maximum groundwater table level • Design maximum flooding level (all sources considered) • Design probable maximum precipitation (PMP) • Water Demand for normal and accident conditions • Effluent Inventory

RAI Number	Reviewer	Question Summary	Full Text
2.4-6	Samaddar S	Include COL action items for site drainage	Update DCD Tier 2, Table 2.0-1 and Table 1.10-1 to reflect a COL action item for adequate site drainage design to accommodate the design basis PMP without exceeding the flood level at 1 ft. below grade.
2.4-7	Samaddar S	Add COL action item for flood protection	Update DCD Tier 2, Table 1.10-1 to include flood protection requirement as a COL action item related to protection of below grade penetrations and openings.
2.4-8	Samaddar S	Add COL action item to ensure the PMF envelops overflow from streams and rivers	Update DCD Tier 2, Table 1.10-1 and Table 2.0-1 to reflect the COL requirement to ensure that the plant PMF design basis requirement is met as a result of overflow from streams and rivers.
2.4-9	Samaddar S	Add COL action item to ensure PMF envelops overflow from seismic dam failure	Update DCD Tier 2, Table 1.10-1 and Table 2.0-1 to reflect the COL requirement to ensure that the plant PMF design basis requirement is met as a result of seismic dam failure.
2.4-10	Samaddar S	Add COL action item to ensure PMF envelops overflow from surge and seiche.	Update DCD Tier 2, Table 1.10-1 and Table 2.0-1 to reflect the COL requirement to ensure that the plant PMF design basis requirement is met as a result of maximum surge and seiche flooding.

RAI Number	Reviewer	Question Summary	Full Text
2.4-11	Samaddar S	Add COL action item to ensure PMF envelops overflow from tsunami.	Update DCD Tier 2, Table 1.10-1 and Table 2.0-1 to reflect the COL requirement to ensure that the plant PMF design basis requirement is met as a result of tsunami flooding.
2.4-12	Samaddar S	Identify the water load for the combined heat load from normal and accident conditions	The applicant should elaborate how the requirements of GDC 44 are met by the ESBWR standard plant design. The applicant should identify the water load for the safety function associated with the removal of the combined heat load of systems, structures and components (SSCs) under normal operating and accident conditions. Provisions for additional water to provide a safe margin in the estimation of the water requirement should also be identified.
2.4-13	Samaddar S	Add COL action item for an ultimate heat sink (UHS) and piping/tunnel for water transport	Update DCD Tier 2, Section 2.5.4.12, Table 2.0-1 and Table 1.10-1 to reflect the need of an external water source and its transportation to meet the UHS needs for post-72 hours passive containment cooling.
2.4-14	Samaddar S	Ice formation allowance as COL action item	Even if an internal storage is utilized to provide the safety-related water demand, the applicant should address whether or not additional volume of water is needed to accommodate the potential for ice formation or the potential of low water conditions from ice formation.

RAI Number	Reviewer	Question Summary	Full Text
2.4-15	Samaddar S	Safety-related water flow rate and volume as design parameter and COL action item	The applicant should provide an estimate of the water flow rate/volume needed from the external source accounting for loss due to ice formation and other loss from exposure.
2.4-16	Samaddar S	Include design parameter for post 72-hours water need satisfaction as COL action	Update DCD Tier 2, Table 1.10-1 and Table 2.0-1 to reflect that water flow rate or water volume required for post-72 hours is a COL action item to ensure that design basis requirement is met.
2.4-17	Samaddar S	Channel flow rate as COL action	Identify the flow requirements (gallons per hour) of the delivery channels to meet the post-72 hours UHS water needs and normal cooling water needs.
2.4-18	Samaddar S	Include channel flow rate as a design parameter to be satisfied as COL action	Update DCD Tier 2, Table 1.10-1 and Table 2.0-1 to reflect that channel flow rate is a COL action item to ensure that design basis requirement is met.
2.4-19	Samaddar S	COL action for loss of flood protection	The applicant should address the potential adverse effects of a loss of flood protection and any action required during a subsequent COL application should be identified as a COL Action Item in DCD Tier 2, Section 2.4.10.
2.4-20	Samaddar S	Include loss of flooding as a design parameter to be satisfied as COL action	Update DCD Tier 2, Table 1.10-1 and Table 2.0-1 to reflect that this loss of protection from flooding is a COL action item to ensure that design basis requirement is met.

RAI Number	Reviewer	Question Summary	Full Text
2.4-21	Samaddar S	Design parameter satisfaction of cooling water need and its transport as COL action	Update DCD Tier 2, Table 1.10-1 and Table 2.0-1 to reflect that this is a COL action item to ensure that design basis requirement is met.
2.4-22	Samaddar S	Cooling Water needed beyond 72 hours	DCD Tier 2, Section 3.1.4.15 cites the isolation condenser (IC)/passive containment cooling (PCC) pools as performing the UHS function. Section 1.2.2.4.1 states that the IC/PCC pool have an installed capacity of 72 hours of reactor heat decay removal beyond which makeup water from a water supply outside the reactor building is utilized. The applicant should identify this safety related source and associated water transport system. Any action required during subsequent COL application should be identified as a COL Action Item in Section 2.4.11.
2.4-23	Samaddar S	Cool water volume/delivery rate in considering low water conditions	The applicant should define the volume and the minimum delivery rate of the cooling water that would be required to be stored and delivered by the external water source.
2.4-24	Samaddar S	Include establishing the hydrogeologic regime as a COL action	Update DCD Tier 2, Table 1.10-1 and Table 2.0-1 to reflect the COL requirement to ensure that the plant design basis requirement for the hydrogeologic regime is met.

RAI Number	Reviewer	Question Summary	Full Text
2.4-25	Samaddar S	Groundwater contaminant limits to prevent structural degradation	Based on DCD Tier 1, Section 3.1, the ESBWR plant design life is 60 years. Since the design groundwater elevation is 2 ft. below grade, foundations of safety related structures and other safety related embedded structures and components will be subject to degradation from contaminants, such as chlorides, in the groundwater. Specify limits on groundwater contaminants that ESBWR design is suitable for. Alternatively, describe any measures that the COL applicant must take to prevent degradation through groundwater contaminants.
2.4-26	Samaddar S	Include Radionuclide transport characteristics as a COL action item	Update DCD Tier 2, Table 1.10-1 and Table 2.0-1 to reflect the COL requirement to ensure that the plant design basis requirement for radionuclide transport characteristics is met.
2.4-27	Samaddar S	Non-seismic /Category I radwaste building classification inconsistent between Tier 1 & Tier 2	In DCD Tier 2 the applicant has taken credit for the design of the radwaste storage vaults for non-leakage, or at least the reduction of leakage during all events, including seismic events. DCD Tier 1 identifies the Radwaste building as a non-seismic category structure. This difference should be explained.
2.4-28	Samaddar S	Radionuclide inventory for accident release	Identify the source terms that have a potential for leakage into the groundwater during any of the operations considered in the design of the radwaste building operation.

RAI Number	Reviewer	Question Summary	Full Text
2.4-29	Samaddar S	Radwaste building failure, measures to mitigate liquid radwaste release	The ESBWR design uses a radwaste building designed to RG 1.143; therefore, failure of radwaste building and the radwaste storage tanks due to safe shutdown earthquake (SSE) cannot be precluded. Discuss what measures must be taken by the COL applicant in the event of a total release of the entire radwaste inventory at the site.
2.4-30	Samaddar S	include Radionuclide transport mechanism effects on future water users as a COL action	Update DCD Tier 2, Table 1.10-1 and Table 2.0-1 to reflect the COL requirement to ensure that the plant design basis requirement for radionuclide transport mechanism effects on future water users is met.
2.4-31	Samaddar S	COL action item for water related technical specification.	Identify a COL Action Item that requires the development of any hydrological condition limiting plant operations related to water elevation at reservoirs, or indications from monitoring wells, etc, that depend on site specific conditions.

ESBWR

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