ENCLOSURE 2

MFN 06-001

GE Responses to NRC Request for Additional Information

Letter No. 2 for the ESBWR Design Certification Application

DCD Markups

Table 2.0-1

Envelope of ESBWR Reference Plant Site Design Parameters, Considerations and/or Limits

Subsection	Subject	Parameters/Considerations/Limits
2.4.5	Probable Maximum Surge and Seiche Flooding	ESBWR DCD: None; the probable maximum flood (PMF), as defined in ANSI/ANS 2.8, is at least 0.3m (1 ft) below grade. COL applicant to supply site-specific information in accordance with the SRP 2.4.5.
2.4.6	Probable Maximum Tsunami	ESBWR DCD: None; the probable maximum flood (PMF), as defined in ANSI/ANS 2.8, is at least 0.3m (1 ft) below grade. COL applicant to supply site-specific information in accordance with the SRP 2.4.6.
2.4.7	Ice Effects	ESBWR DCD: None; the plant design has no safety-related service water system to be affected by ice flooding or blockage. COL applicant to supply site-specific information in accordance with the SRP 2.4.7.
2.4.8	Cooling Water Channels and Reservoirs	ESBWR DCD: None; the plant design has no safety-related service water system that would require transport and impoundment of plant cooling water.[CEB19] In the ESBWR design, the ultimate heat sink (UHS) is the atmosphere, which receives steam generated by boiling in the Isolation Condenser (IC) and Passive Containment Cooling (PCC) System pools and the Spent Fuel Pool. A separate safety-related service water system with a dedicated UHS reservoir is not required. The water volumes needed to ensure operation of the IC and PCC Systems and to keep the Spent Fuel Pools filled for cooling are described in Subsection 9.2.5, Ultimate Heat Sink. COL applicant to supply site-specific information in accordance with the SRP 2.4.8.
2.4.9	Channel Diversion	ESBWR DCD: None; the plant design has no safety-related service water system that would be adversely affected by natural stream channel diversion. COL applicant to supply site-specific information in accordance with the SRP 2.4.9.

- Regulatory Guide 1.102 describes acceptable flood protection to prevent the safety-related facilities from being adversely affected; and
- Regulatory Guide 1.27 describes the ultimate heat sink capabilities that apply.

2.4.8 Cooling Water Canals and Reservoirs

ESBWR DCD: None; the plant design has no safety-related service water system that would require transport and impoundment of plant cooling water. In the ESBWR design, the ultimate heat sink (UHS) is the atmosphere, which receives steam generated by boiling in the Isolation Condenser (IC) and Passive Containment Cooling (PCC) System pools and the Spent Fuel Pool. A separate safety-related service water system with a dedicated UHS reservoir is not required. The water volumes needed to ensure operation of the IC and PCC Systems and to keep the Spent Fuel Pools filled for cooling are described in Subsection 9.2.5, Ultimate Heat Sink.

In accordance with SRP 2.4.8, this section of the COL applicant's SAR presents the basis for the hydraulic design of canals and reservoirs used to transport and impound plant cooling water. In addition, the hydraulic design basis for protection of structures (e.g., riprap) is presented. For canals, the areas of discussion include the design basis for capacity, protection against wind waves, erosion, sedimentation buildup, and freeboard, and (where applicable) the ability to withstand a Probable Maximum Flood (PMF), surges, etc. For reservoirs, the areas of discussion include the design basis for capacity, PMF design basis, wind wave and runup protection, discharge facilities (low level outlet, spillway, etc.), outlet protection, freeboard, and erosion and sedimentation processes.

Acceptance criteria relate to the following regulations:

- 10 CFR Part 50, §50.55a requires structures, systems, and components to be designed and constructed to quality standards commensurate with the importance of the safety function to be performed.
- General Design Criterion 2 (GDC 2) requires structures, systems, and components important to safety to be designed to withstand the effects of floods.
- General Design Criterion 44 (GDC 44) requires an ultimate heat sink capable of accepting the plant's heat load under normal and accident conditions.
- 10 CFR Part 100 requires that hydrologic characteristics be considered in the evaluation of the site.

2.4.9 Channel Diversions

ESBWR DCD: None; the plant design has no safety-related service water system that would be adversely affected by natural stream channel diversion.

In accordance with SRP 2.4.9, in this section of the COL applicant's safety analysis report (SAR), the geohydrologic design basis is developed to assure that the plant and essential water supplies will not be adversely affected by natural stream channel diversion, or that in such an event, alternate water supplies are available to safety-related equipment.

The review includes:

- Historical channel diversions, including cutoffs and subsidence.

3.7 SEISMIC DESIGN

For seismic design purposes, all structures, systems, and components of the ESBWR standard plant are classified into Seismic Category I (C-I), Seismic Category II (C-II), or Non-Seismic (NS) in accordance with the requirements to withstand the effects of the Safe Shutdown Earthquake (SSE) as defined in Section 3.2. For those C-I and C-II structures, systems and components in the reactor building complex, the effects of other dynamic loads caused by reactor building vibration (RBV) caused by suppression pool dynamics are also considered in the design. Although this section addresses seismic aspects of design and analysis in accordance with Regulatory Guide 1.70, the methods of this section are also applicable to RBV dynamic loadings, unless noted otherwise.

The safe shutdown earthquake (SSE) is that earthquake which is based upon an evaluation of the maximum earthquake potential considering the regional and local geology, seismology, and specific characteristics of local subsurface material. It is the earthquake that produces the maximum vibratory ground motion for which Seismic Category I structures, systems and components (SSC) are designed to remain functional. These systems and components are those necessary to ensure the following:

- The integrity of the reactor coolant pressure boundary (RCPB);
- The capability to shut down the reactor and maintain it in a safe condition; or
- The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the applicable guidelines exposures set forth in 10 CFR 100 (10 CFR 50.34(a)).

Seismic Category II (C-II) includes all plant SSC which perform no safety-related function, and whose continued function is not required, but whose structural failure or interaction could degrade the functioning of a Seismic Category I structure, system or component to an unacceptable safety level, or could result in incapacitating injury to occupants of the control room. Thus, this category includes the SSC whose structural integrity, not their operational performance, is required. Seismic Category II SSC are designed and/or so physically arranged that the SSE would not cause unacceptable structural interaction or failure. For fluid systems, this requires an appropriate level of pressure boundary integrity when located near sensitive equipment. The methods of seismic analysis and design acceptance criteria for C-II SSC are the same as C-I; however, the procurement, fabrication and construction requirements for C-II SSC are in accordance with industry practices. Seismic Category II (C-II) items are those corresponding to positions C.2 and C.4 of Regulatory Guide 1.29.

Non-seismic (NS) structures and equipment are those that do not fall into Seismic Category I or II definitions. NS structures and equipment are designed for seismic requirements in accordance with the International Building Code (IBC) Reference 3.7-1. The building structures are classified as Category IV (Power Generating Stations) with an Occupancy Importance Factor of 1.5. Either of the methods permitted by IBC, simplified analysis or dynamic analysis, is acceptable for determination of seismic loads on NS structures and equipment.

The Operating Basis Earthquake (OBE) is not an ESBWR design requirement. Consistent with the Appendix S to 10 CFR 50, the design requirements associated with the OBE, when the level of OBE ground motion is chosen to be one-third of the SSE ground motion, are satisfied without