15.0 SAFETY ANALYSES

15.1 Introduction

This chapter provides analyses of the plant's responses to postulated disturbances in process variables and postulated equipment failures or malfunctions, determines their consequences, and evaluates the capability of the plant to control or accommodate these events. These analyses help determine the limiting conditions for operation, limiting safety system settings, and design specifications for safety-related components and systems.

This chapter includes a discussion of: (1) the classification of the transients and accidents and the analyses results in order to ensure that the applicant has considered a sufficiently broad spectrum of initiating events and postulated equipment failures, (2) the frequency of occurrence for initiating events for anticipated operational occurrences and highly unlikely accidents, (3) plant characteristics considered in the safety evaluation, (4) assumed protection system actions, (5) evaluation of individual initiating events and systems that operate to reduce the probability of occurrence of specific events, and (6) analysis of anticipated transients without scram. The safety analyses provide a significant contribution to the selection of limiting conditions for plant operation, limiting safety system settings, and design specifications for plant components and systems from the standpoint of public health and safety.

15.2 Summary of Application

Chapter 15 of the Fermi 3 Combined License (COL) Final Safety Analysis Report (FSAR) Revision 3 incorporates by reference, with no departures, Chapter 15, "Safety Analyses" of Revision 9 of the ESBWR Design Control Document (DCD).

In addition, in FSAR Subsection 15.3.10.5, "Radiological Consequences," the applicant provides the following:

Supplemental Information

- STD SUP 15.3-1

The applicant stated that procedures will discuss the use of nuclear instrumentation to aid in detecting a possible mislocated fuel bundle after fueling operation.

15.3 Regulatory Basis

The regulatory basis of the information incorporated by reference presented in this application is addressed in Chapter 15 of the Final Safety Evaluation Report (FSER) related to the ESBWR DCD. In addition, STD SUP 15.3-1 is subject to the requirements of GDC 13, "Instrumentation and Control," and the relevant guidance of the Commission regulations in the acceptance criteria of Section 15.4.7, "Inadvertent Loading and Operation of a Fuel Assembly in an Improper Position," of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," or the Standard Review Plan (SRP).

15.4 Technical Evaluation

As documented in NUREG-XXXX, the NRC staff reviewed and approved Chapter 15 of the certified ESBWR DCD. The staff reviewed Chapter 15 of the Fermi 3 COL FSAR and checked the referenced DCD to ensure that the combination of the DCD and the information in the COL represent the complete scope of information relating to this review topic.[1] The NRC staff's review confirmed that the information contained in the application and incorporated by reference addresses the required information related to safety analyses.

The staff reviewed the information contained in the COL FSAR:

Supplemental Information

The applicant stated that procedures will detail the use of nuclear instrumentation to help in detecting a possible mislocated fuel bundle after fuel loading. The staff found that the supplemental information is acceptable because it is consistent with the acceptance criteria in SRP 15.4.7 that states that plant operating procedures should include a provision requiring that reactor instrumentation be used to search for potential fuel-loading errors after fueling operations in order to meet the requirements of GDC 13.

The staff's evaluation of the radiological consequences associated with the Design Basis Accidents (DBA) and the COL Information Item 2.0-1-A is discussed in Section 2.1- Site Characteristics of this SER.

Part 4: Technical Specifications (TSs), Reporting Requirements Section 5.6.3(c), Core Operating Limit Report (COLR) states that:

> "The core operating limits shall be determined such that all applicable limits, (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met."

The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC. The Fermi TSs are evaluated in Chapter 16 of this SER.

15.5 Post Combined License Activities

There are no post COL activities related to this section.

15.6 Conclusion

The NRC staff's finding related to information incorporated by reference is in NUREG–XXXX. NRC staff reviewed the application and checked the referenced DCD. The staff's review confirmed that the applicant has addressed the required information, and

[1] See *"Finality of Referenced NRC Approvals"* in SER Section 1.2.2, for a discussion on the staff's review related to verification of the scope of information to be included in a COL application that references a design certification.

no outstanding information is expected to be addressed in the COL FSAR related to this section. Pursuant to 10 CFR 52.63(a) (5) and 10 CFR Part 52 Appendix [x] Section VI.B.1, all nuclear safety issues relating to “Safety Analyses” that were incorporated by reference have been resolved. In addition, the staff found that the additional information in the application meets the relevant NRC regulations and is consistent with the guidance in Chapter 15 of NUREG–0800.