

1.0 Introduction

This document provides the Tier 1 material for the U.S. EPR. Tier 1 means the portion of the design-related information contained in a generic Final Safety Analysis Report (FSAR) that is approved and certified by the design certification rule. The design descriptions, interface requirements, and site parameters are derived from Tier 2 information. Tier 1 information includes:

- Definitions and general provisions.
- Design descriptions.
- Inspections, tests, analyses, and acceptance criteria (ITAAC).
- Significant site parameters.
- Significant interface requirements.

The information in the Tier 1 portion of the FSAR is extracted from the detailed information contained in Tier 2. While the Tier 1 information must address the complete scope of the design to be certified, the amount of design information is proportional to the safety significance of the structures and systems of the design.

1.1 Definitions

Acceptance Criteria - the performance, physical condition, or analysis result for a structure, system, or component that demonstrates the design commitment is met.

Analysis - a calculation, mathematical computation, or engineering or technical evaluation. Engineering or technical evaluations could include, but are not limited to, comparisons with operating experience or design of similar structures, systems, or components.

As-installed - the physical properties of the structure, system, or component following the completion of its installation or construction activities at its final location at the plant site.

As-built - for components, the as-shipped condition of a component when it arrives at the plant site. For systems and structures fabricated onsite, it is equivalent to “as-installed.”

As-built Reconciliation - the reconciliation of deviations to the design. For components, it is provided as part of the QA Data Package. For piping, it is the reconciliation of deviations between the design or construction drawings and the as-installed piping. For structures, it is the reconciliation of deviations between design or construction drawings and the as-constructed structure.

Basic Configuration (for a structure) - as labeled on associated figures, the arrangement of U.S. EPR standard structures that includes basic features such as building separations, decoupling gaps, relational building locations, certain room identifications, and external hazards barriers.

Design Commitment - the portion of the design description that is verified by ITAAC.

Design Description - the portion of the design that is certified.

Design Plant Grade - the elevation of the soil around the Nuclear Island assumed in the design of U.S. EPR.

Division (for electrical systems or equipment) - the designation applied to a given safety-related system or set of components which are physically, electrically, and functionally independent from other redundant sets of components.

Division/Train (for mechanical systems or equipment) - the designation applied to a given safety-related system or set of components which are physically, electrically, and functionally independent from other redundant sets of components.

Functional Arrangement (for a system) - the as-installed physical arrangement of components to provide the service for which the system is intended and which is described in the system design description.

Inspect or Inspection - visual observations, physical examinations, or reviews of records based on visual observation or physical examination that compares the structure, system, or component condition to one or more design commitments. Examples include walkdowns, configuration checks, measurements of dimensions, and nondestructive examinations.

Test - the actuation or operation, or establishment of specified conditions to evaluate the performance or integrity of as-built structures, systems, or components, unless explicitly stated otherwise.

Type Test - a test on one or more sample components of the same type and manufacturer to qualify other components of that same type and manufacturer. A type test is not necessarily a test of the as-built structures, systems or components.

1.2 General Provisions

The following general provisions are applicable to the design descriptions, figures, and the associated ITAAC.

The absence of any discussion or depiction of an item in the design description or accompanying figures shall not be construed as prohibiting a licensee from using such an item, unless it would prevent an item from performing its safety functions as described or depicted in the design description or accompanying figures.

When the term “operate,” “operates,” or “operation” is used with respect to an item discussed in the acceptance criteria, it refers to the actuation and running of the item. When the term “exist,” “exists,” or “existence” is used with respect to an item discussed in the acceptance criteria, it means that the item is present and meets the design commitment.

1.2.1 Design Descriptions and Figures

The design descriptions pertain only to the design of structures, systems and components of a U.S. EPR standard design and not to their operation, maintenance, and administration. In the event of an inconsistency between the design descriptions and the Tier 2 Information, the design descriptions shall govern.

The design descriptions include a narrative and simplified schematic figures in Tier 1, where the figures are provided. The narratives state the system purpose, significant performance characteristics, and safety functions. The narrative includes a statement of whether or not the system is safety related, system location, key design features, seismic and ASME code classifications, major controls and displays, interlocks, Class 1E power sources and divisions, and interface requirements, as applicable.

Figures are provided for most systems, with the amount of information depicted based on the safety significance of the structures, systems, and components (SSC). Where figures are not required, generally for simple non-safety-significant systems, the narrative is sufficient to describe the system. The figures are intended to depict the functional arrangement of the significant SSC of the standard design. Valve position indications shown on these figures do not represent a specific operational state. For continuation labels on the figures, the sheet number in the label refers to the native file name shown in the lower right corner of the figures, not to the sheet number listed above the figure with the figure title. The native file name consists of three parts—the system designation (normally the KKS system name), followed by the native sheet number, followed by an indication of either Tier 1 or Tier 2. For example, native file name FAL02T1 refers to the fuel pool purification system (FAL), native sheet 02, for Tier 1. If a continuation label refers to a figure of a different system, it is identified in the continuation label, with the system designation preceding the native sheet number of the continuation figure. If the continuation is on a native sheet number within the same system, the system designation on the continuation label is not included.

1.2.2 Implementation of ITAAC

Inspections, tests, analyses, and acceptance criteria (ITAAC) are provided in tables with the following three column format:

| Commitment Wording | Inspections, Tests, Analyses | Acceptance Criteria |
|--------------------|------------------------------|---------------------|
|--------------------|------------------------------|---------------------|

Each design commitment in the left-hand column of the ITAAC tables has an associated requirement for inspections, tests, or analyses (ITA) specified in the middle column of the tables.

The identification of a separate ITA entry for each design commitment shall not be construed to require that separate inspections, tests, or analyses must be performed for each design commitment. Instead, the activities associated with more than one ITA entry may be combined, and a single inspection, test, or analysis may be sufficient to implement more than one ITA entry.

An ITA may be performed by the licensee of the plant, or by its authorized vendors, contractors, or consultants. Furthermore, an ITA may be performed by more than a single individual or group, may be implemented through discrete activities separated by time, and may be performed at any time prior to fuel load, including before issuance of the Combined License (COL) for those ITAAC that do not necessarily pertain to as-installed equipment. Additionally, ITA may be performed as part of the activities that are required to be performed pursuant to 10 CFR Part 50 (including, for example, the QA program required under Appendix B to Part 50). Therefore, an ITA need not be performed as a separate or discrete activity.

1.2.3 Discussion of Matters Related to Operations

In some cases, the design descriptions in this document refer to matters of operation, such as normal valve or breaker alignment during normal operational modes. Such discussions are provided solely to place the design description provisions in context, for example, to explain automatic features for opening or closing valves or breakers upon off-normal conditions. Such discussions shall not be construed as requiring operators during operation to take any particular action (e.g., to maintain valves or breakers in a particular position during normal operation).

1.2.4 Interpretation of Figures

The design descriptions include the figures in Tier 1, where the figures are provided. They are intended to depict the functional arrangement of the significant SSC of the standard design. An as-built facility referencing the certified design should be consistent with the functional arrangement shown in the figures.

1.2.5 Rated Reactor Core Thermal Power

The U.S. EPR is designed for a rated reactor core power level of 4590 megawatts thermal (MW_t).