



U.S. NUCLEAR REGULATORY COMMISSION
STANDARD REVIEW PLAN
OFFICE OF NUCLEAR REACTOR REGULATION

8.1 ELECTRIC POWER - INTRODUCTION

REVIEW RESPONSIBILITIES

Primary - Power Systems Branch (PSB)

Secondary - None

I. AREAS OF REVIEW

The PSB reviews the applicant's description of the offsite power grid system with regard to the interrelationships between the nuclear unit, the utility grid and the interconnecting grids. The PSB reviews the onsite power systems to assure that given a loss of the offsite power system and a single failure in the onsite power system sufficient power will be available for mitigating the design basis events. PSB also reviews acceptance criteria that will be implemented in the design of the above systems.

II. ACCEPTANCE CRITERIA

Table 8-1, "Acceptance Criteria and Guidelines for Electric Power Systems," lists the acceptance criteria currently applied by the staff to electric power systems. Implementation of these criteria in accordance with applicable guidelines of regulatory guides and Branch Technical Positions will provide assurance that systems will perform their design safety functions when required.

III. REVIEW PROCEDURES

The PSB reviews Section 8.1 of the SAR to assure the following items are included: a brief description of the utility grid and its interconnections to other grids and to the nuclear unit; a brief general description of the onsite power system; and the design bases, criteria, standards, regulatory guides, and technical positions that will be implemented in the design of the electric power systems, including a discussion describing the extent to which these criteria, and guidelines are followed and a positive statement with regard to conformance of the design to each.

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USNRC STANDARD REVIEW PLAN

Standard review plans are prepared for the guidance of the Office of Nuclear Reactor Regulation staff responsible for the review of applications to construct and operate nuclear power plants. These documents are made available to the public as part of the Commission's policy to inform the nuclear industry and the general public of regulatory procedures and policies. Standard review plans are not substitutes for regulatory guides or the Commission's regulations and compliance with them is not required. The standard review plan sections are keyed to the Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants. Not all sections of the Standard Format have a corresponding review plan.

Published standard review plans will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience.

Comments and suggestions for improvement will be considered and should be sent to the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D.C. 20555.

The review is performed as follows:

1. PSB will establish that the utility grid is adequately described, and that the interconnections between the nuclear unit, the utility grid, and other grids are clearly defined. The descriptions should state whether facilities are existing or planned; if planned, the respective completion dates should be provided. The descriptions should not conflict with the more detailed information in subsequent sections of Chapter 8 of the SAR, and may reference these sections.
2. PSB confirms that the description of the onsite power system is not in conflict with the more detailed information on this system in subsequent sections of Chapter 8, and descriptions may reference these sections.
3. PSB will confirm that the criteria and guidelines identified as being applicable to the design of electric power systems include those listed in Table 8-1. The SAR should include a discussion regarding the applicability of the criteria and guidelines listed and a statement to the effect that they will be implemented (CP) or are implemented (OL) in the design of electrical power systems.
4. A typical agenda for a site visit to be carried out as part of the operating license review has been included as Appendix 8-B to this SRP section.

IV. EVALUATION FINDINGS

The reviewer verifies that sufficient information is presented in the SAR and that his review supports conclusions of the following type, to be included in the staff's Safety Evaluation Report:

Section 8.1 of the Safety Analysis Report provides a brief description of the utility grid and its interconnections to other grids and the nuclear unit; a brief general description of the onsite a-c and d-c power system; and the design criteria that has been implemented in the design of the electric power systems.

The staff has determined that an electric power system design that conforms to the applicable general design criteria and positions of regulatory guides, and branch technical positions set forth in Table 8-1, "Acceptance Criteria and Guidelines for Electric Power Systems," provides a sufficient basis for acceptance of the electric power system.

The staff concludes that the design criteria that has been implemented for the electric power system are in accordance with the acceptance criteria set forth in Table 8-1 and are acceptable as noted below in the following sections of Chapter 8.

V. IMPLEMENTATION

The following is intended to provide guidance to applicants and licensees regarding the NRC staff's plans for using this SRP section.

Except in those cases in which the applicant proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the method described herein will be used by the staff in its evaluation of conformance with Commission regulations.

Implementation schedules for conformance to parts of the method discussed herein are contained in the referenced regulatory guides.

VI. REFERENCES

None

ATTACHMENT

STANDARD REVIEW PLAN

TABLE 8-1

ACCEPTANCE CRITERIA AND GUIDELINES FOR ELECTRIC POWER SYSTEMS

The matrix of Table 8-1 identifies the acceptance criteria (denoted by "A") and the guidelines (denoted by "G") and their applicability to the various sections of Chapter 8.0. The acceptance criteria define the requirements established by the Commission for power systems important to safety; the guidelines amplify these requirements and provide more explicit basis for evaluation of the conformance of the power systems to these Commission requirements. Acceptance criteria and guidelines are not included herein when the primary review responsibility for these aspects of power systems are reviewed in accordance with sections other than Chapter 8.0 of the SRP.

The Branch Technical Positions listed herein are contained in Appendix 8-A to Section 8.1 of the SRP.

ACCEPTANCE CRITERIA AND GUIDELINES FOR ELECTRIC POWER SYSTEMS - TABLE 8-1

8.1-4

CRITERIA	TITLE	APPLICABILITY (SAR Section)			REMARKS
		8.2	8.3.1	8.3.2	
1. General Design Criteria (GDC), Appendix A to 10 CFR Part 50					
a. GDC 2	Design Bases for Protection Against Natural Phenomena		A	A	
b. GDC 4	Environmental and Missile Design Bases		A	A	
c. GDC 5	Sharing of Structures, Systems, and Components	A	A	A	
d. GDC 17	Electric Power Systems	A	A	A	

TABLE 8-1 (CONTINUED)

CRITERIA	TITLE	APPLICABILITY (SAR Section)			REMARKS
		8.2	8.3.1	8.3.2	
e. GDC 18	Inspection and Testing of Electrical Power Systems	A	A	A	
f. GDC 50	Containment Design Bases		A	A	
2. Regulatory Guides (RG)					
a. RG 1.6	Independence Between Redundant Standby (Onsite) Power Sources and Between Their Distribution Systems		G	G	
b. RG 1.9	Selection, Design, and Qualification of Diesel-Generator Units Used as Standby (Onsite) Electric Power Systems at Nuclear Power Plants		G		See IEEE 387
c. RG 1.32	Use of IEEE Std 308, "Criteria for Class 1E Power Systems for Nuclear Power Generating Stations"	G	G	G	See IEEE 308
d. RG 1.47	Bypassed and Inoperable Status Indication for Nuclear Power Plant Safety Systems	G	G	G	
e. RG 1.63	Electric Penetration Assemblies in Containment Structures for Light-Water-Cooled Nuclear Power Plants		G	G	See IEEE 317
f. RG 1.75	Physical Independence of Electric Systems		G	G	See IEEE 384
g. RG 1.81	Shared Emergency and Shutdown Electric Systems for Multi-Unit Nuclear Power Plants	G	G	G	
h. RG 1.106	Thermal Overload Protection for Electric Motors on Motor-Operated Valves		G	G	

TABLE 8-1 (CONTINUED)

CRITERIA	TITLE	APPLICABILITY (SAR Section)			REMARKS
		8.2	8.3.1	8.3.2	
i. RG 1.108	Periodic Testing of Diesel Generators Used as Onsite Power Systems at Nuclear Power Plants		G		
j. RG 1.118	Periodic Testing of Electric Power and Protection Systems		G	G	See IEEE 338
k. RG 1.128	Installation Design and Installation of Large Lead Storage Batteries for Nuclear Power Plants			G	See IEEE 484
l. RG 1.129	Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Nuclear Power Plants			G	See IEEE 450
5.3. Branch Technical Positions					
a. BTP ICSB 4	Requirements on Motor-Operated Valves in the ECCS Accumulator Lines		G		
b. BTP ICSB 8 (PSB)	Use of Diesel-Generator Sets for Peaking		G		
c. BTP ICSB 11 (PSB)	Stability of Offsite Power Systems	G			
d. BTP ICSB 18 (PSB)	Application of the Single Failure Criterion to Manually-Controlled Electrically-Operated Valves		G		
e. BTP ICSB 21	Guidance for Application of RG 1.47	G	G	G	
f. BTP PSB-1	Adequacy of Station Electric Distribution System Voltages		G		

TABLE 8-1 (CONTINUED)

CRITERIA	TITLE	APPLICABILITY (SAR Section)			REMARKS
		8.2	8.3.1	8.3.2	
h. BTP PSB-2	Criteria for Alarms and Indications Associated with Diesel-Generator Unit Bypassed and Inoperable Status		G		
4. NUREG Reports					
a. NUREG/CR 0660	Enhancement of Onsite Diesel Generator Reliability		G		