



BNL-79160-2007-CP

***Updating the NRC Standard Review Plan –
Chapter 8 – Electrical Systems***

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*Presented at the
American Nuclear Society 2007 Annual Meeting*

Boston, Massachusetts

June 24-28, 2007

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Updating the NRC Standard Review Plan – Chapter 8 - Electrical Systems

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INTRODUCTION

The Standard Review Plan (SRP) (Reference 2), provides guidance to the regulatory staff of the Nuclear Regulatory Commission (NRC) on performing their safety reviews of applications to construct or operate nuclear power plants, and applications to approve standard designs and sites for nuclear power plants. Chapter 8 of the SRP provides guidance related to the review of station electrical distribution systems described by the applicant in its Design Control Document (DCD) or Safety Analysis Report (SAR). As part of the 2006-2007 SAR update, all sections in this Chapter (8.1, 8.2, 8.3.1, 8.3.2, Appendix 8A, and Appendix 8B) were revised to incorporate new analyses, design approaches, and the lessons learned from the review of the AP 1000 design certification and to assure consistency with the draft Regulatory Guide DG-1145, “Combined License Applications for Nuclear Power Plants (LWR Edition).”

DESCRIPTION OF WORK

All work was performed in accordance with guidance contained in NRC Office Instruction LIC-200, “Standard Review Plan Process,” and included: (a) a review of applicable regulatory documents and industry standards issued since the last (1996) update of the SRP, (b) the development of change recommendations for NRC review that are based on the results of the literature review, and (c) the preparation of new draft SRP sections that are supported by established staff positions. Upon completion, the draft SRP sections were submitted to the NRC for review and comment.

PROPOSED CHANGES AND THEIR RATIONALE

The majority of changes that were recommended as a result of the current update consisted of updating the existing guidance in accordance with the most current revisions of NRC Regulatory Guides and industry standards. Although no new staff positions were established as a result of this update, several changes could impact the design description presented in the SAR and the scope of the review performed. Some of the more notable changes include:

1. The guidance contained in SRP Sections 8.2 and 8.3.1 (offsite and onsite ac distribution systems) was updated to incorporate the grid reliability

considerations, contingency procedures, and communications capabilities described in Generic Letter (GL) 2006-02, “Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power,” February 1, 2006. In addition, based on the guidance of GL 2006-02, and current industry standards (IEEE Std. 308 and IEEE Std. 741), the review guidance was revised to incorporate power system modeling and analysis, and power quality considerations.

2. The review guidance of Chapter 8 was also updated as necessary to incorporate requirements related to the assessment and management of the increase in risk that may result from proposed maintenance activities before performing maintenance on onsite ac power structures, systems, and components (SSCs) as described in the Maintenance Rule (10 CFR 50.65 (a) (4)). Also added were considerations for submerged safety-related cables, based on industry operating experience described in NRC Information Notice 2002-12, “Submerged Safety-Related Electrical Cables,” March 21, 2002.
3. Throughout Chapter 8 of the SRP, changes were made as necessary to address specific design issues and requirements related to the review of new plants licensed under 10 CFR 52 (Reference 3). Specific examples include incorporation of the requirements of 10 CFR 52.97(b)(1), related to Inspection Testing and Analysis Acceptance Criteria (ITAAC) for combined license applications, sharing of non-safety loads, sharing of dc power systems (batteries and chargers) between units and the use of alternate ac power sources at plants having passive safety systems.
4. For the on-site dc distribution system, the review guidance of SRP Section 8.3.2 was revised to ensure that dc power systems and vital supporting systems are of sufficient capacity to perform their intended functions, including the ability to cope with a station blackout event. SRP Section 8.3.2 was also revised to cite IEEE Std 485, “IEEE Recommended Practice for Sizing Lead-Acid Batteries for Stationary Applications,” as a method acceptable to the staff for sizing stationary lead acid batteries. Although this standard is widely used, it is not specifically endorsed by the staff in a Regulatory Guide. However, this standard has been indirectly endorsed by other means. For example, through its endorsement of NUMARC 8700 “Guidelines and Technical Bases for NUMARC Initiatives Addressing Station

Blackout in Light Water Reactors,” Revision 0, November 1997, the staff also endorsed IEEE Std. 485.

5. Appendix B of SRP Section 8.2, “Guidelines For Review Of Alternate AC Sources For Station Blackout At Nuclear Power Plants”, was deleted and replaced with a new SRP Section (Section 8.4, “Station Blackout”) to provide more comprehensive guidance related to the review of an applicant’s overall conformance to the requirements of 10 CFR 50.63, "Loss of All Alternating Current Power." As a result, SRP 8.4 incorporates criteria and guidelines that were previously contained in various other documents, including SRP 8.2 and Appendix B to SRP 8.2, RG 1.155, and NUMARC 87-00, Rev. 0.

REFERENCES

1. NRC Office Instruction, LIC-200, “Standard Review Plan (SRP) Process,” Rev. 1, May 8, 2006.
2. NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants” 1996.
3. 10 CFR Part 52, “Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants.”