U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

OFFICE OF NUCLEAR REACTOR REGULATION

9.5.6 EMERGENCY DIESEL ENGINE STARTING SYSTEM

REVIEW RESPONSIBILITIES

Primary - ~~Power Systems Branch (PSB)~~Plant Systems Branch (SPLB)[1]

Secondary - None

I. AREAS OF REVIEW

The ~~PSB~~SPLB[2] review of the emergency diesel engine starting system (EDESS) includes those system features necessary to assure reliable starting of the emergency diesel engine following a loss of offsite power to assure conformance with the requirements of General Design Criteria 2, 4, 5, and 17. The review includes the system air compressors, air dryers, air receivers, devices to crank the diesel engine, valves, piping up to the connection to the engine interface(1), filters, and associated ancillary instrumentation and control systems.

1. The ~~PSB~~SPLB[3] reviews the EDESS to verify that:

   a. Each emergency diesel engine has reliable, redundant starting systems of adequate starting capacity.

   b. The system complies with appropriate seismic requirements and quality standards, and has been properly designed, fabricated, erected, and tested.

   c. Essential portions of the system are housed within seismic Category I structures capable of protecting the system from extreme natural phenomena, missiles, and

(1)As defined by the engine manufacturer.

the effects of pipe whip or jet impingement from high-and moderate-energy pipe breaks.

d. For those plants that designate an emergency diesel engine as an alternate ac power source, the SPLB will determine the adequacy of the EDESS to perform its function in the event of a station blackout.[4]

~~2. The PSB will determine the adequacy of design, installation, inspection and testing of all electrical components (sensing, control, and power) required for proper operation of the system, including interlocks.~~[5]

Review Interfaces:[6]

SPLB also performs the following reviews under the SRP sections indicated:[7]

1. The ~~Auxiliary Systems Branch (ASB)~~SPLB determines that the EDESS is in accordance with SRP Section 3.6.1~~Branch Technical Positions SPLB 3-1 and MEB 3-1~~ for breaks in high-energy and moderate-energy piping systems outside containment.[8]

2. The SPLB performs the review~~s~~ for fire protection ~~are coordinated and performed by the Chemical Engineering Branch~~ as part of ~~their~~its primary review responsibility for SRP Section 9.5.1.[9]

In addition, ~~the review of the diesel engine starting system,~~ [10]the ~~PSB~~SPLB[11] will coordinate the evaluations of other branches that interface with the overall review of the system as follows:

1. The ~~Structural Engineering Branch (SEB)~~Civil Engineering and Geosciences Branch (ECGB)[12] determines the acceptability of the design analyses, procedures, and criteria used to establish the ability of structures housing the system to withstand the effects of natural phenomena such as the safe shutdown earthquake (SSE), the probable maximum flood (PMF), and tornado missiles as part of its primary review responsibility for SRP Sections 3.3.1, 3.3.2, 3.5.3, 3.7.1 through 3.7.4, 3.8.4, and 3.8.5.

2. The Mechanical Engineering Branch (E[13]MEB) determines that components, piping, and structures are designed in accordance with applicable codes and standards as part of its primary review responsibility for SRP Sections 3.9.1 through 3.9.3.

3. The E[14]MEB determines the acceptability of the seismic and quality group classifications for system components as part of its primary review responsibility for SRP Sections 3.2.1 and 3.2.2.

4. The ~~Auxiliary Systems Branch~~EMEB determines that the EDESS is in accordance with SRP Section 3.6.2~~Branch Technical Position MEB 3-1~~ for breaks in high-energy and moderate-energy piping systems outside containment.[15]

5. The Materials and Chemical Engineering Branch ~~(MTEB)~~(EMCB)[16] verifies, upon request, the compatibility of the materials of construction with service conditions.

6. The ~~Procedures and Test Review Branch~~Quality Assurance and Maintenance Branch (HQMB) determines the acceptability of the pre-operational and startup tests as part of its primary review responsibility for SRP Section 14.~~0~~2.[17] The HQMB also performs reviews for quality assurance ~~are coordinated and performed by the Quality Assurance Branch~~ as part of ~~their~~its primary review responsibility for SRP ~~Section~~Chapter 17~~.0~~.[18]

7. The Technical Specifications Branch (TSB) performs a review~~s~~ of the technical specifications ~~are coordinated and performed by the Licensing Branch~~ as part of ~~their~~its primary review responsibility for SRP Section 16.0.[19]

~~2~~8. The ~~PSB~~Electrical Engineering Branch (EELB) will determine the adequacy of design, installation, inspection and testing of all electrical components (sensing, control, and power) required for proper operation of the system, including interlocks as part of its responsibility for SRP Section 8.3.1.[20] The EELB also determines the adequacy of proposed alternate ac sources for station blackout as part of its primary review responsibility for SRP Sections 8.2 and 8.4 (proposed).[21]

For those areas of review identified above as being part of ~~the primary review responsibility of other branches~~reviews under other SRP sections, the acceptance criteria necessary for the review and their methods of application are contained in the referenced SRP section ~~of the corresponding primary branches~~[22].

II. ACCEPTANCE CRITERIA

Acceptability of the diesel engine starting system, as described in the applicant's safety analysis report (SAR), is based on specific regulations,[23] general design criteria, regulatory guides, and industry standards. Information obtained from other Federal agencies and reports, military specifications, available technical literature, and operational performance data obtained from similarly designed systems at other plants having satisfactory operational experience will also be utilized to determine EDESS acceptability.

The design of the EDESS is acceptable if the integrated design of the system is in accordance with the following criteria:

1. General Design Criterion 2, as related to the ability of structures housing the system to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, and floods, as established in Chapters 2 and 3 of the SAR. Acceptance is based on meeting Position 13 to the appendix to Regulatory Guide 1.117, as related to the protection of structures, systems, and components (SSC)[24] important to safety from the effects of tornado missiles.

2. General Design Criterion 4, with respect to structures housing the systems and the system itself being capable of withstanding the effects of externally and internally generated missiles, pipe whip, and jet impingement forces associated with pipe breaks. Acceptance is based on meeting Position C.1 of Regulatory Guide 1.115 as related to the protection of SSC important to safety from the effects of turbine missiles.

3. General Design Criterion 5, as related to the capability of shared systems and components important to safety to perform required safety functions.

4. General Design Criterion 17 as related to the capability of the diesel engine air starting system to meet independence and redundancy criteria. Specific criteria and guidance necessary to meet the relevant requirements of GDC 17 are as follows:

   a. Regulatory Guide 1.9 as related to the design of the diesel air starting systems.

   ~~b. Branch Technical Position ICSB-17 (PSB) as related to diesel engine air starting systems' protective interlocks during accident conditions.~~[25]

   ~~c~~b[26]. NUREG/CR-0660 "Enhancement of Onsite Emergency Diesel Generator Reliability" (Reference 10)[27].

   ~~d~~c[28]. ANSI/IEEE Std~~andard~~[29] 387 as related to the design of the diesel engine air starting system (Reference 11)[30].

   ~~e~~d[31]. Diesel Engine Manufacturers Association (DEMA) Standard (Reference 12)[32] as related to the design of the diesel air starting system.

   ~~f~~e[33]. Each diesel engine should be provided with a dedicated air starting system consisting of an air compressor, an air dryer, one or more air receiver(s), piping, injection lines and valves, and devices to crank the engine as recommended by the engine manufacturer.

   ~~g~~f[34]. As a minimum, the air starting system should be capable of cranking a cold diesel engine five times without recharging the receiver(s). The air starting system capacity should be determined as follows: (1) each cranking cycle duration should be approximately 3 seconds; (2) consist of two to three engine revolutions; or (3) air start requirements per engine start provided by the engine manufacturer; whichever air start requirement is larger.

   ~~h~~g[35]. Alarms should be provided which alert operating personnel if the air receiver pressure falls below the minimum allowable value.

   ~~i~~h[36]. Provisions should be made for the periodic or automatic blowdown of accumulated moisture and foreign material in the air receiver(s), and other critical points of the system.

   ~~j~~i[37]. Starting air should be dried to a dew point of not more than 10°C (50°F)[38] when installed in a normally controlled 21°C (70°F)[39] environment, otherwise the starting air dew point should be controlled to at least 5.5°C (10°F)[40] less than the lowest expected ambient temperature.

Plants that have emergency ac sources in excess of minimum redundancy requirements for loss-of-offsite-power conditions may use one of the existing emergency sources as an alternate

ac (AAC) power source for the purposes of coping with a station blackout, provided it meets the applicable criteria for an AAC source. For a plant relying on an emergency diesel engine as an AAC power source, the design of the starting system for that engine is acceptable if it meets 10 CFR Part 50.63, "Loss of All Alternating Current Power," paragraph (a)(2), and Regulatory Guide 1.155, Position C.3.[41]

Technical Rationale:[42]

The technical rationale for application of the above acceptance criteria to the emergency diesel engine starting system is discussed in the following paragraphs.

1. GDC 2 requires that SSC important to safety be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform the safety function. Regulatory Guide 1.117 provides the methods acceptable to the staff for tornado design classification of structures, systems and components important to safety. The safety function of the EDESS is to start the emergency diesel engine following a loss of offsite power or as required by the plant protection circuitry. The reliable starting of the emergency diesel engine is necessary to ensure the prompt restoration of ac power to safety related components that are necessary to maintain the integrity of the reactor coolant pressure boundary, to safely shutdown the reactor and maintain it in a safe shutdown condition, and to prevent or mitigate the consequences of accidents. Compliance with the requirements of GDC 2 ensures that emergency ac power will be available to safety-related components in the event of a loss of offsite power resulting from natural phenomena events.

2. GDC 4 requires that SSC important to safety be designed to withstand the dynamic effects of pipe ruptures such as pipe whip and jet impingement, and externally or internally generated missiles. The safety function of the EDESS is to start the emergency diesel engines following a loss of offsite power or as otherwise required by the plant protection circuitry. In order to ensure the availability of emergency ac power, the EDESS must be capable of performing the engine start function under the expected operational and postulated accident conditions for the plant. These conditions include consideration of the dynamic effects of equipment failures such as pipe ruptures and turbine missiles, and events and conditions external to the plant. Compliance with GDC 4 provides assurance that the dynamic effects of equipment failures, and events external to the plant, will not affect the capability of the EDESS to start the emergency diesel engines.

3. GDC 5 prohibits the sharing of SSC important to safety among nuclear power units unless it can be demonstrated that such sharing will not significantly impair their ability to perform their safety functions, including in the event of an accident in one unit, an orderly shutdown and cooldown of the remaining unit. The safety function of the EDESS is to start the emergency diesel engines in the event of a loss of offsite power or as otherwise required by the plant protection circuitry. In order to ensure the availability of emergency ac power to safety-related components, the EDESS must be designed to perform this safety function in each unit regardless of events, failures, and conditions in

the other unit(s). Compliance with GDC 5 provides assurance that equipment failures and events occurring in one unit of the site will not propagate to other units of the site.

4. GDC 17, in relevant part, requires provision of an onsite electric power system to permit the functioning of SSC important to safety. GDC 17 requirements include that the onsite electric power system have sufficient independence and redundancy to perform their safety functions assuming a single failure. Typically, the emergency diesel generator system is the onsite electric power system relied upon to meet these requirements. The diesel engine starting system is integral to the emergency diesel generator system. Regulatory Guide 1.9 provides regulatory positions with regard to EDE and starting system design criteria and features applicable to GDC 17 compliance. Meeting the GDC 17 requirements provides assurance that electric power will be available for systems necessary to: 1) prevent fuel damage in the event of anticipated operational occurrences; and 2) maintain core cooling and containment integrity in the event of postulated accidents.

5. 10 CFR 50.63 requires that each light-water-cooled nuclear power plant be able to withstand and recover from a station blackout (i.e., loss of the offsite electric power system concurrent with reactor trip and unavailability of the onsite emergency ac electric power system). Paragraph (a)(2) of 50.63 establishes the conditions under which provision of an alternate ac (AAC) power source will constitute acceptable capability to withstand station blackout. Regulatory Guide 1.155 describes a method acceptable to the NRC staff for complying with 10 CFR 50.63. Plants that have emergency ac sources in excess of minimum redundancy requirements for loss-of-offsite-power conditions may use one of the existing emergency sources as an AAC power source for the purposes of coping with a station blackout. Any emergency diesel engine designated as an AAC power source is dependent on support systems such as the starting system. Compliance with 10 CFR 50.63 and the positions of Regulatory Guide 1.155 regarding the ability to cope with a station blackout provides additional defense-in-depth against unacceptable offsite radiological consequences should both offsite and onsite emergency ac power systems fail concurrently.

III. REVIEW PROCEDURES

The procedures below are used during the construction permit (CP) or review to determine that the design criteria and bases and the preliminary design as set forth in the preliminary safety analysis report meet the acceptance criteria given in subsection II of this SRP section. For the review of operating license (OL) applications, the procedures are used to verify that the initial design criteria and bases have been appropriately implemented in the final design as set forth in the final safety analysis report. The review procedures for OL applications include a determination that the content and intent of the technical specifications prepared by the applicant are in agreement with the requirements for system testing, minimum performance, and surveillance developed as a result of the ~~LGB~~TSB[43] review as indicated in subsection I of this SRP section. The reviewer will select and emphasize material from the paragraphs below, as may be appropriate for a particular case.

The primary reviewer will coordinate this review with the other branches' areas of review as stated in subsection I of this SRP section. The primary reviewer obtains and uses such input as required to assure that this review procedure is complete.

1. The ~~SEB~~ECGB[44] reviews the seismic design bases and the EMEB[45] reviews the quality and seismic classification as indicated in subsection I of this SRP section. The ~~PSB~~SPLB[46] assures that essential portions of the EDESS including the isolation valves separating essential and nonessential portions are classified Quality Group C and seismic Category I. Components and system descriptions in the SAR that identify mechanical and performance characteristics are reviewed to verify that the above seismic and quality classifications have been included and that the P&IDs indicate any points of change at the systems and/or systems component interfaces.

2. The reviewer establishes that the EDESS description and piping and instrumentation drawings (P&IDs) clearly delineate all modes of operation and include the means for monitoring, indicating, and controlling receiver air pressure as required by the engine starting service. The P&IDs are reviewed to determine that the receiver(s) has been provided with a pressure gauge, relief valve, drain valve, and automatic means of maintaining the receiver pressure within an allowable range, and suitable low pressure alarms. If there are piping interconnections between the dedicated air start systems, they are reviewed to verify that a failure in the interconnecting piping could not lead to the loss of starting of more than one diesel engine. The building layout drawings are examined to ascertain that sufficient space has been provided around the components to permit inspection. The reviewer verifies that the air starting system meets the specific criteria given in subsection II, item 4 of this SRP section.

3. The SAR is reviewed to assure that each diesel engine air start system has its own compressor and that the compressor capacity is adequate with respect to the air receiver capacities of the dedicated air starting system. For new applications, the compressor(s) should be of sufficient size to recharge the air start system in less than 30 minutes.[47]

4. The reviewer verifies that the system has been designed to be operated and maintained in the event of adverse environmental conditions such as hurricanes, tornadoes, or floods, and is protected against the effects of internally or externally generated missiles.

5. The reviewer determines that the failure of nonseismic Category I systems, structures, or components located close to the EDESS will not preclude operation of the system.

6. The reviewer determines that measures have been taken in the design of the EDESS to preclude the fouling of the air start valve or filter with moisture and contaminants such as oil and rust carryover. An air dryer(s) should be installed upstream of the air receiver(s) for the removal of entrained moisture.

7. The reviewer determines that essential portions of the EDESS are protected from the effects of high- and moderate-energy line breaks. Layout drawings are reviewed to assure that no high- or moderate-energy piping systems are close to the system, or that protection from the effects of failure are provided. The means of providing such

protection are discussed in Section 3.6 of the SAR and the procedures for reviewing this information are given in the corresponding SRP sections.

8. The SAR information, P&IDs, related system drawings, and failure modes and effects analyses are reviewed to assure that minimum requirements of the system will be met following design basis accidents, assuming a concurrent single active failure and loss of offsite power. The analyses presented in the SAR are reviewed to assure function of required components following postulated accidents. Utilizing the descriptions, related drawings, and analyses, the reviewer verifies that minimum system requirements are met for each degraded situation over the required time spans. For each case the design is considered acceptable if minimum system requirements are met.

9. For those plants that will use an emergency diesel generator as the alternate AC source in response to a station blackout event, the reviewer verifies the adequacy of the emergency diesel engine starting system, independent of preferred and onsite emergency ac power, in accordance with Regulatory Position C.3.3.5 of Regulatory Guide 1.155.[48]

For standard design certification reviews under 10 CFR 52, the procedures above should be followed, as modified by the procedures in SRP Section 14.3 (proposed), to verify that the design set forth in the standard safety analysis report, including inspections, tests, analysis, and acceptance criteria (ITAAC), site interface requirements and combined license action items, meet the acceptance criteria given in subsection II. SRP section 14.3 (proposed) contains procedures for the review of certified design material (CDM) for the standard design, including the site parameters, interface criteria, and ITAAC.[49] At the time of DC reviews, the diesel engine vendor may not have been selected; therefore, the interfaces between the diesel engine and the support (auxiliary) systems may not be fully defined. Portions of the EDE and associated support systems design may be considered outside the scope of the design submitted by applicants for design certification. Portions of the design determined not to be within the DC scope are the responsibility of the applicant referencing the certified design. The DC applicant's submittal should provide a conceptual design and interface requirements for that portion of the design outside the scope of the DC as required by 10 CFR 52.47(a)(1)(vi-ix).[50]

IV. EVALUATION FINDINGS

The reviewer verifies that sufficient information has been provided and that his review supports conclusions of the following type, to be included in the staff's safety evaluation report:

> The emergency diesel engine starting system (EDESS) includes an air compressor, air dryer(s), filters, valves, and all components and piping connecting to the engine interfaces necessary to assure that the system will be available and capable of starting the diesel engine following a loss of offsite power. The scope of review of the system for the_____ plant included layout drawings, flow diagrams, piping and instrumentation diagrams, and descriptive information for the emergency diesel engine starting system and supporting systems essential to its operation. The essential portions of the EDESS that are necessary for the safe shutdown of the reactor or necessary to mitigate the consequences of an accident are designed to seismic Category I and Quality Group C.

The staff concludes that the design of the emergency diesel engine starting system is acceptable and meets the requirements of GDC 2, 4, 5, and 17. This conclusion is based on the following:

1. The applicant met the requirements of GDC 2, "Design Bases for Protection Against Natural Phenomena," with respect to the ability of structures housing the EDESS and the system itself to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, and floods, and GDC 4, "Environmental and ~~Missile~~Dynamic Effects[51] Design Bases," with respect to structures housing the system and the system itself being capable of withstanding the effects of externally and internally generated missiles, pipe whip, and jet impingement forces associated with pipe breaks. The EDESS is housed in a seismic Category I structure which provides protection from the effects of tornado, tornado missiles, turbine missiles, and floods. This meets the positions of Regulatory Guides 1.115, "Protection Against Low-Trajectory Turbine Missiles," Position C.1, and 1.117, "Tornado Design Classification," Appendix Position 13.

2. The applicant has met the requirements of GDC 5, "Sharing of Structures, Systems and Components," with respect to capability of shared systems and components important to safety to perform required safety functions. Each unit of the _____ plant has its own emergency diesel generators, whose EDESS is not shared between the diesel generators.

3. The applicant has met the requirements of GDC 17, "Electric Power Systems," with respect to the capability of the air starting system to meet independence and redundancy criteria. Each EDESS is independent and physically separated from the other system serving the redundant diesel generator. A single failure in any one of the systems will affect only the associated diesel generator. Each of the starting systems is capable of cranking a cold diesel engine five times without recharging the air receiver(s). This meets the positions of Regulatory Guide 1.9, "Selection, Design, ~~and~~ Qualification and Testing of Emergency Diesel-Generator Units Used as Class 1E ~~Standby (~~Onsite~~)~~ Electric Power Systems at Nuclear Power Plants."[52] The applicant has also met the positions of ~~Branch Technical Position ICSB-17(PSB), "Diesel Generator Protective Trip Circuit Bypasses," and~~[53] NUREG/CR-0660, "Enhancement of Onsite Emergency Diesel Generator Reliability." The applicant has met the requirements of the following industry standards: IEEE Std~~andard~~[54] 387, "IEEE Standard Criteria for Diesel Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations," and Diesel Engine Manufacturers Association (DEMA) Standard.

If the applicant proposes to designate an emergency diesel generator as the alternate AC source in response to a station blackout event, the following finding should be included:

The applicant has met the requirements of 10 CFR 50.63, "Loss of All Alternating Current Power," relevant to the design of the EDESS for the Alternate ac power source. The EDESS supporting the Alternate ac power source can start its associated diesel

generator and system can be recharged independent of preferred and onsite emergency ac power for the specified duration of the station blackout. This meets the positions of Regulatory Guide 1.155 "Station Blackout."[55]

For design certification reviews, the findings will also summarize, to the extent that the review is not discussed in other safety evaluation report sections, the staff's evaluation of inspections, tests, analyses, and acceptance criteria (ITAAC), including design acceptance criteria (DAC), site interface requirements, and combined license action items that are relevant to this SRP Section.[56]

V. IMPLEMENTATION

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

This SRP section will be used by the staff when performing safety evaluations of license applications submitted by applicants pursuant to 10 CFR 50 or 10 CFR 52.[57] 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.

The provisions of this SRP section apply to reviews of applications docketed six months or more after the date of issuance of this SRP section.[58]

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

VI. REFERENCES

1. 10 CFR 50.63, "Loss of all alternating current power."[59]

~~1~~2. 10 CFR Part 50, Appendix A, General Design Criterion 2, "Design Bases for Protection Against Natural Phenomena."

~~2~~3. 10 CFR Part 50, Appendix A, General Design Criterion 4, "Environmental and ~~Missile~~Dynamic Effects[60] Design Bases."

~~3~~4. 10 CFR Part 50, Appendix A, General Design Criterion 5, "Sharing of Structures, Systems, and Components."

~~4~~5. 10 CFR Part 50, Appendix A, General Design Criterion 17, "Electric Power Systems."

~~5~~6. Regulatory Guide 1.9, "Selection, Design, ~~and~~ Qualification and Testing of Emergency Diesel Generator Units Used as Class 1E ~~Standby (~~Onsite~~)~~ Electric Power Systems at Nuclear Power Plants."[61]

~~6. Regulatory Guide 1.68, "Initial Test Programs for Water Cooled Reactor Power Plants."[62]~~

7. Regulatory Guide 1.115, "Protection Against Low-Trajectory Turbine Missiles."

8. Regulatory Guide 1.117, "Tornado Design Classification."

9. Regulatory Guide 1.155, "Station Blackout."[63]

~~9. Branch Technical Position ASB 3-1, "Protection Against Postulated Piping Failures in Fluid Systems Outside Containment," attached to SRP Section 3.6.1.[64]~~

~~10. Branch Technical Position MEB 3-1, "Postulated Break and Leakage Locations in Fluid System Piping Outside Containment," attached to SRP Section 3.6.2.[65]~~

~~11. Branch Technical Position ICSB-17 (PSB), "Diesel Generator Protective Trip Circuit Bypasses," attached to SRP Section 8.3.2, Appendix 8A.[66]~~

~~14~~10[67]. NUREG/CR-0660, "Enhancement of Onsite Emergency Diesel Generator Reliability~~.~~," University of Dayton Research Institute; UDR-TR-79-07; February 1979.[68]

~~12~~11[69]. ANSI/IEEE Std~~andard~~ 387-1984, "IEEE Standard Criteria for Diesel Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations~~.~~," American National Standards Institute.[70]

~~13~~12[71]. Diesel Engine Manufacturers Association (DEMA) Standard 1974[7273].

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SRP Draft Section 9.5.6
Attachment A - Proposed Changes in Order of Occurrence

Item numbers in the following table correspond to superscript numbers in the redline/strikeout copy of the draft SRP section.

Item	Source	Description
1.	Current PRB names and abbreviations.	Editorial change to reflect current PRB names and responsibilities for SRP section 9.5.6.
2.	Current PRB names and abbreviations.	Editorial change to reflect current PRB names and responsibilities for SRP section 9.5.6.
3.	Current PRB names and abbreviations.	Editorial change to reflect current PRB names and responsibilities for SRP section 9.5.6.
4.	**Integrated Impact 262.**	Added provisions to review the EDESS with regard to station blackout requirements for those plants that designate an EDE as an alternate ac power source.
5.	Editorial.	The review of electrical components including interlocks was moved to a Review Interface. The responsibility for SRP Section 9.5.6 was previously assigned to the Power Systems Branch (now the Electrical Engineering Branch). Although the SPLB now has responsibility for diesel engine support systems, the EELB maintains responsibility for the review of the emergency diesel generator and associated control circuitry including the interlocks.
6.	SRP-UDP format item.	Revised review interface section of Areas of Review to be consistent with SRP-UDP required format which uses a number/paragraph format to distinguish individual reviews performed by other PRBs.
7.	SRP-UDP format item.	Added lead-in sentence for SRP section interfaces that are also reviewed by the Primary Review Branch for SRP Section 9.5.6.
8.	Current PRB names and abbreviations.	Editorial change to separate text and reflect current PRB names and responsibilities for SRP Section 3.6.1. Reference to BTP ASB 3-1 was deleted to simplify future updates and because it will be reviewed as part of the SRP interface with Section 3.6.1.
9.	Current PRB names and abbreviations.	Editorial change to reflect current PRB names and responsibilities for SRP section 9.5.1.
10.	Editorial.	Revised the lead-in sentence for those areas of review for which the PRB for SRP Section 9.5.6 must interface with other PRBs. This change is consistent with SRP-UDP format guidance.
11.	Current PRB names and abbreviations.	Editorial change to reflect current PRB names and responsibilities for SRP section 9.5.6
12.	Current PRB names and abbreviations.	Editorial change to separate text and reflect current PRB names and responsibilities for SRP sections 3.3.1, 3.3.2, 3.5.3, 3.7.1 through 3.7.4, 3.8.4 and 3.8.5.

Item	Source	Description
13.	Current PRB names and abbreviations.	Editorial change to separate text and reflect current PRB names and responsibilities for SRP sections 3.9.1 through 3.9.3.
14.	Current PRB names and abbreviations.	Editorial change to separate text and reflect current PRB names and responsibilities for SRP sections 3.2.1 and 3.2.2.
15.	Current PRB names and abbreviations.	Editorial change to separate text and reflect current PRB names and responsibilities for SRP section 3.6.2. Reference to BTP MEB 3-1 was deleted to simplify future updates and because it will be reviewed as part of the SRP interface with 3.6.2.
16.	Current PRB names and abbreviations.	Editorial change to separate text and reflect current PRB names and responsibilities.
17.	Current PRB names and abbreviations and Editorial changes.	Editorial change to separate text, revise the reference to SRP Section 14.0 to 14.2, and reflect current PRB names and responsibilities for SRP Section 14.2.
18.	Current PRB names and abbreviations, Editorial.	Editorial change to separate text and reflect current PRB names and responsibilities for SRP Chapter 17. Note that the text is changed to state "Chapter 17" instead of "Section 17.0", since Section 17.0 does not exist and Chapter 17 encompasses the necessary SRP sections reviewed per this interface.
19.	Current PRB names and abbreviations.	Editorial change to separate text and reflect current PRB names and responsibilities for SRP Section 16.0.
20.	Editorial, Current PRB names and abbreviations.	The review of electrical components including interlocks was moved from the Areas of Review for the PRB responsible for SRP Section 9.5.6 to a Review Interface. The responsibility for SRP Section 9.5.6 was previously assigned to the Power Systems Branch (now the Electrical Engineering Branch). Although the SPLB now has responsibility for diesel engine support systems, the EELB maintains responsibility for the review of the emergency diesel generator and associated control circuitry including the interlocks.
21.	SRP-UDP Integration of SBO Issues	Added interface describing reviews of AAC sources by EELB under SRP Section 8.2, Appendix 8-C and SRP Section 8.4.
22.	.SRP-UDP format item	Revised using standard text to address both the interfaces listed with other SPLB reviews and with other PRBs.
23.	**Integrated Impact 262.**	Added the word regulations to the list of document types used as acceptance criteria to accommodate incorporation of 10 CFR 50.63 regarding station blackout.

Item	Source	Description
24.	Editorial.	Added the acronym "SSC" for structures, systems and components to simplify the text.
25.	**Integrated Impact 260**.	Deleted Acceptance Criteria II.4.b associated with BTP ICSB-17 which has been superseded by Regulatory Guide 1.9.
26.	Editorial item.	Renumbered Acceptance Criteria.
27.	SRP-UDP format item.	Added parenthetical reference identification to the existing citation of NUREG/CR-0660.
28.	Editorial item.	Renumbered Acceptance Criteria.
29.	**Integrated Impact 793.**	Updated the designation for IEEE Std 387 by adding ANSI and abbreviating the term "Standard" to "Std" to be consistent with IEEE usage.
30.	SRP-UDP format item.	Added parenthetical reference identification to the existing citation of IEEE Std 387.
31.	Editorial item.	Renumbered Acceptance Criteria.
32.	SRP-UDP format item.	Added parenthetical reference identification to the existing citation of the DEMA Standard.
33.	Editorial item.	Renumbered Acceptance Criteria.
34.	Editorial item.	Renumbered Acceptance Criteria.
35.	Editorial item.	Renumbered Acceptance Criteria.
36.	Editorial item.	Renumbered Acceptance Criteria.
37.	Editorial item.	Renumbered Acceptance Criteria.
38.	SRP-UDP format item, Metrication Policy.	50°F converted to 10°C.
39.	SRP-UDP format item. Metrication Policy.	70°F converted to 21°C.
40.	SRP-UDP format item. Metrication Policy.	10°F (incremental) converted to 5.6°C (incremental).
41.	**Integrated Impact 262.**	Added 10 CFR 50.63 as Acceptance Criteria for those plants that will use an emergency diesel generator as the alternate AC source in response to a station blackout.
42.	SRP-UDP format item.	Technical Rationale were developed for the Acceptance Criteria in accordance with the format requirements for the SRP-UDP.
43.	Current PRB names and abbreviations.	Editorial change to reflect current PRB names and responsibilities.

Item	Source	Description
44.	Current PRB names and abbreviations.	Editorial change to reflect current PRB names and responsibilities.
45.	Current PRB names and abbreviations.	Editorial change to reflect current PRB names and responsibilities.
46.	Current PRB names and abbreviations.	Editorial change to reflect current PRB names and responsibilities.
47.	**Integrated Impact 552**	Added a sentence to Review Procedure III.3 with regard to compressor capacity requirements.
48.	**Integrated Impact 262.**	Added a Review Procedure for 10 CFR 50.63 and Regulatory Guide 1.155 requirements with regard to start systems on emergency diesel generators used as alternate ac power sources for coping with station blackout.
49.	SRP integration format item	Added boiler-plate statement regarding reviews performed in accordance with 10 CFR 52.
50.	10 CFR 52 applicability changes. Disposition of PIs 24309 and 24310.	Added a paragraph to address reviews for design certification applicants consistent with the approach taken in CE 80+ and ABWR FSERs.
51.	SRP-UDP format Item, Reformat reference citations.	Updated the title of GDC 4
52.	SRP-UDP format item. Verification of references.	Revised the Title of Regulatory Guide 1.9.
53.	**Integrated Impact 260**.	Deleted text in Evaluation Findings associated with BTP ICSB-17 which has been superseded by Regulatory Guide 1.9.
54.	Editorial.	Abbreviated the term "Standard" to be "Std" consistent with IEEE usage.
55.	**Integrated Impact 262**.	Added specific Evaluation Finding for meeting 10 CFR 50.63 and Regulatory Guide 1.155. For those plants that will use a diesel generator as the alternate AC source in response to a station blackout.
56.	10 CFR 52 applicability related editorial change.	Design Certification is mentioned as appropriate in those paragraphs of the SRP in accordance with SRP-UDP requirements.
57.	SRP-UDP Format Item	Added boiler-plate statement indicating the applicability of the SRP to 10 CFR 52 license applications.
58.	SRP-UDP Format Item	Added boiler-plate statement describing the applicability of the SRP to existing and new applications.
59.	**Integrated Impact 262.**	Added 10 CFR 50.63 to the list of references.

Item	Source	Description
60.	Editorial	Updated title of GDC 4.
61.	Editorial.	Renumbered reference and updated title of Regulatory Guide 1.9.
62.	Editorial.	Deleted reference to Regulatory Guide 1.68 which is not mentioned in the text of the SRP Section.
63.	**Integrated Impact 262.**	Added Regulatory Guide 1.155 to the list of references.
64.	Editorial change.	The Branch Technical Position (BTP) is only discussed in the Review Interface portion of the SRP. The topics covered by the BTP will be addressed by the review interface with the associated SRP section. Therefore, it is not necessary to reference the BTP in this SRP section.
65.	Editorial change.	The Branch Technical Position (BTP) is only discussed in the Review Interface portion of the SRP. The topics covered by the BTP will be addressed by the review interface with the associated SRP section. Therefore, it is not necessary to reference the BTP in this SRP section.
66.	**Integrated Impact 260.**	Deleted reference to BTP ICSB-17 which has been superseded by Regulatory Guide 1.9.
67.	Editorial.	Renumbered reference due to the addition or deletion of previous references.
68.	SRP-UDP format Item, Reformat reference citations.	Updated the reference for NUREG/CR-0660.
69.	Editorial.	Renumbered reference due to the addition or deletion of previous references.
70.	**Integrated Impact 793.**	Updated the reference to IEEE Std 387 to include the date of the latest version endorsed by the NRC and the ANSI designator.
71.	Editorial.	Renumbered reference due to the addition or deletion of previous references.
72.	**Integrated Impact 714.**	The reference to the DEMA standard is revised to include the date of the version in effect when the SRP was published. According to the 28th annual edition of the Encyclopedia of Associations, the Diesel Engine Manufacturers Association (DEMA) is no longer active. Therefore, the standard will not be updated.
73.	Unverified Reference.	A copy of the DEMA Standard could not be obtained and the DEMA organization is listed in reference material regarding associations as being inactive.

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Integrated Impact No.	Issue	SRP Subsections Affected
260	Deletion of reference to BTP ICSB-17 which was superseded by Regulatory Guide 1.9.	II.4, IV.3, and VI.
262	Incorporates the Station Blackout requirements of 10 CFR 50.63 and Regulatory Guide 1.155 with regard to EDGs as alternate ac sources.	I.3, II, III.12, IV, and VI.
552	Added Review Procedure with regard to starting air system compressor capacity and sizing for evolutionary plants.	III.3
714	Added date to DEMA Standard reference.	VI.13
793	Updated the IEEE Std 387 reference.	II.d, and VI.12.