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3/12/08

73 FR 13258

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May 12, 2008

Mr. Michael T. Lesar
Chief, Rulemaking, Directives and Editing Branch
Office of Administration
US Nuclear Regulatory Commission
Washington, DC 20555-0001

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RULES AND DIRECTIVES
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USNRC

Subject: Proposed License Renewal Interim Staff Guidance: Staff Position on the License Renewal Rule (10 CFR 54.4) as it relates to the Station Blackout Rule (10 CFR 50.63)

Project Number: 689

Dear Mr. Lesar:

On behalf of the nuclear energy industry, the Nuclear Energy Institute (NEI) is submitting the enclosed comments on Proposed License Renewal Interim Staff Guidance LR-ISG-2008-01: Staff Guidance Regarding the Station Blackout Rule (10 CFR 50.63), as requested in the *Federal Register* on March 5, 2008 (73 Fed. Reg. 13258).

The proposed ISG predefines the Station Blackout (SBO) scoping boundary at switchyard circuit breakers for all plants. This prescriptive definition does not acknowledge unique aspects for each plant design. In order to address this, it is important that LR applications be reviewed individually to ensure the boundary of the offsite power source is scoped for the SBO recovery path in a manner that is consistent with that credited in the licensee's Current Licensing Basis (CLB).

The specification of a predefined SBO scoping boundary is a clear departure from previous reviews and is a change in the staff's position contained in the current ISG. Prior scoping determinations were made based on the plant specific CLB and did not include switchyard circuit breakers in several cases. Use of a prescribed SBO scoping boundary is contrary to the regulatory requirements. In accordance with 10 CFR 54.4 (a)(3), if the switchyard circuit breakers are not relied on in safety analyses or plant evaluations to demonstrate compliance with the SBO regulation, the breakers are not required to be included in license renewal scope.

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S. Sakai (SXS11)

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The enclosed comments provide additional information to support our position that there is no regulatory or technical basis for inclusion of switchyard circuit breakers as a predefined SBO scoping boundary for license renewal. Additional clarifications and comments on the proposed ISG are also enclosed. We would welcome the opportunity to discuss the enclosed comments with NRC staff. Please contact me or Julie Keys at (202) 739-8128; jyk@nei.org should you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "John C. Butler". The signature is written in a cursive style with a long horizontal stroke at the end.

John C. Butler

Enclosure

c: Mr. Brian E. Holian, NRC
Ms. Stacie Sakai, NRC
NRC Document Control Desk

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Each comment includes a quotation of the proposed ISG text being addressed by the comment. The quoted text is indented to set it apart from the comment.

Comment 1

Rationale, paragraph 12: "The circuit breaker, as the scoping boundary, provides connection to offsite power via the switchyard bus, which can be powered by any of the incoming transmission lines. This breaker should be at the transmission system voltage to ensure adequate protection of safety bus and the recovery of offsite power. The staff believes that the circuit breaker needs to be within the scope of license renewal because of its ability to provide plant power, protect downstream circuits and provide plant operator-controlled isolation and energization ability. In addition, a circuit breaker coordinates with other protective devices to minimize the probability of loss of offsite power and prevent transients from affecting the onsite distribution system as offsite power is being restored. For these reasons, a circuit breaker remains as the scoping boundary. Using a disconnect switch or other component downstream of the breaker is not consistent with the staff position of compliance with the SBO rule and is not acceptable for meeting the SBO scoping requirements for license renewal."

The conclusion that a switchyard circuit breaker is the only acceptable SBO scoping boundary is not supported by the arguments presented in this paragraph. In some cases the arguments presented do not have a solid regulatory basis, and/or do not reflect actual plant and switchyard design and operation.

The primary basis provided for the staff position in this paragraph is: "that the circuit breaker needs to be within the scope of license renewal because of its ability to provide plant power, protect downstream circuits and provide plant operator-controlled isolation and energization ability." A discussion of each of these criteria follows.

Provide plant power: To recover offsite power the credited components must be able to provide plant power. Components must provide power to the plant power transformers to meet this criterion. However, a switchyard circuit breaker is not needed, or required by regulation, to fulfill this function. Additionally, not all plants connect to the offsite power supply at a switchyard as evidenced by Figure 3 attached to the proposed ISG.

Protect downstream circuits: Components in scope must include components relied on to protect downstream circuits. Switchyard circuit breakers do not protect downstream circuits. It is the plant circuit breakers and associated protective relaying between the non-1E and 1E buses that protect downstream or plant circuits. Protective features open these breakers upon sensing abnormal conditions such as under-voltage, over-voltage, over-current, and electrical shorts. Many switchyard circuit breakers are designed to trip open only on electrical faults such that the fault is isolated from the transmission system to preserve the grid. Protection of the safety buses is provided by circuit breakers that are part of the on-site power distribution system.

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Provide plant operator-controlled isolation and energization: Components in scope must include breakers under the control of plant operators that provide isolation and energization capability. In typical switchyard designs the switchyard circuit breakers are not under the control of plant operators for isolation and energization. In fact, plant control rooms do not usually contain the physical capability to operate switchyard breakers other than the breakers that are used to connect the main generator output to the grid. Breakers that are under plant operator control for isolation and energization are the plant breakers downstream of the plant power transformers. These plant circuit breakers should be within the license renewal scoping boundary.

An additional basis for the staff position is that, "a circuit breaker coordinates with other protective devices to minimize the probability of loss of offsite power and prevent transients from affecting the onsite distribution system as offsite power is being restored." Coordination of switchyard circuit breaker protective relaying is not required for compliance with 10 CFR 50.63. This relay coordination is not mentioned in 10 CFR 50.63, RG 1.155, or the NRC Station Blackout (SBO) Safety Evaluation Reports (SERs). In the event of an SBO, the plant distribution system will be automatically disconnected from the offsite power supply, using circuit breakers in the on-site distribution system. Reconnection to the offsite power supply is a manual operation controlled by plant procedures. This connection will not be made until the grid is stable. Therefore, switchyard circuit breakers are not relied upon to prevent transients from affecting the onsite distribution system during restoration of offsite power.

Plant operator control and protective coordination as described in the draft ISG are design and performance requirements for switchyard circuit breakers that were not included in the NUREG-1109, "Regulatory/Backfit Analysis for the Resolution of Unresolved Safety Issue A-44, Station Blackout." The NUREG-1109 analysis did not contemplate imposing these new design and performance requirements on switchyard circuit breakers, and therefore no corresponding cost was evaluated for the regulatory action described in the draft ISG.

Based on the preceding discussion, at most sites, switchyard circuit breakers (or any other single device) do not satisfy all of the identified criteria, nor is there a requirement that they should. The component selected as the scoping boundary should not be expected to meet all of these criteria as long as components are included within the scope of license renewal to perform the required functions. Therefore, the last sentence in this paragraph should be deleted.

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Comment 2

Rationale, paragraph 11: "The scoping boundary, as outlined in the Standard Review Plan-License Renewal (SRP-LR), Section 2.5.2.1.1, should be from the breaker or breakers from the switchyard (connections to the line side)."

This statement should be revised to reflect the actual wording in the SRP-LR. The SRP-LR does not state that the scoping boundary should be, "from the breaker or breakers." SRP-LR, Section 2.5.2.1.1, states: "The plant system portion of the offsite power system that is used to connect the plant to the offsite power source meeting the requirements under 10 CFR 54.4(a)(3). This path typically includes the switchyard circuit breakers that connect to the offsite system power transformers (startup transformers), the transformers themselves, the intervening overhead or underground circuits between circuit breaker and transformer and transformer and onsite electrical distribution system, and the associated control circuits and structures." The key here is use of the word "typically" which means this is not always the case, and switchyard circuit breakers may not be in scope. The plant's Current Licensing Basis (CLB) determines if the switchyard circuit breakers are or are not within the SBO scoping boundary.

The SRP-LR, Section 2.1.3.1.3, provides additional guidance to the reviewer for determining whether or not switchyard circuit breakers are in scope for SBO. Section 2.1.3.1.3 states: "For SBO, the reviewer verifies that the applicant's methodology would include those SSCs relied upon during the "coping duration" and "recovery" phase of an SBO event. In addition, because 10 CFR 50.63(c)(1)(ii) and its associated guidance in Regulatory Guide 1.155 include procedures to recover from an SBO that include offsite and onsite power, the plant system portion of the offsite power system that is used to connect the plant to the offsite power source should also be included within the scope of the rule."

The switchyard circuit breakers are not relied upon during the coping duration. The duration is based in part on the expected frequency of loss of offsite power and the probable time needed to restore offsite power. RG 1.155 uses Tables 2 through 8 to determine the "coping time". These tables (as they pertain to offsite power) deal with independence of offsite power groups (table 5) and various weather groups (Tables 6, 7, and 8). None of these tables discusses a switchyard circuit breaker.

When discussing offsite power RG 1.155 focuses on the procedures for recovery of offsite power. SRP-LR 2.1.3.1.3 directs the reviewer to these procedures to determine the plant system portion of the offsite power system. Additional design functions of the offsite power system are identified in the references, such as GDC 17, cited in RG 1.155. While switchyard circuit breakers may be used to provide some of these design functions, there is no requirement to use a switchyard circuit breaker for that purpose. Devices in the onsite portion of the system can and do perform these functions.

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Comment 3

Rationale, paragraph 7: "Based on the above, licensees rely on both the offsite and onsite power systems to meet the requirements of the SBO rule. Elements of both offsite and onsite power are necessary to determine the required coping duration under 10 CFR 50.63(a)(1), and the procedures required by 10 CFR 50.63(c)(1)(ii) must address both offsite power and onsite power restoration. It follows, therefore, that both systems are used to demonstrate compliance with the SBO rule and must be included within the scope of license renewal consistent with the requirements of 10 CFR 54.4(a)(3)."

Clarify these statements to indicate that these systems must be included within the scope of license renewal but only to the extent that they are relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with 10 CFR 50.63, as required by 10 CFR 54.4(a)(3). The 10 CFR 54.4(a)(3) requirement is, "All systems, structures, and components relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance..." must be included in the scope of license renewal. While it is true that both the onsite power systems and the configuration of offsite power systems must be considered to determine the coping duration for SBO it does not follow that both systems perform a function relied on to demonstrate compliance with 10 CFR 50.63. Unless identified in the plant's current licensing basis, there is no function that the offsite power system must perform to demonstrate compliance with 10 CFR 50.63.

Comment 4

Rationale, paragraph 8: "The staff has recently noted during the review of license renewal applications that some applicants have not included all of the components and structures within the scope of license renewal needed for recovering the offsite source from an SBO event as required by 10 CFR 54.4(a)(3).

This statement should be revised to indicate the scope is limited to the plant portion of the offsite power system, and as required by 10 CFR 54.4(a)(3), only to those, "systems, structures, and components relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance..." As written, this statement is ambiguous, not demonstrably correct, and could lead to including the entire offsite power grid up to and including the designated black start power source for the grid within the scope of license renewal.

The previous ISG on SBO scoping recognized this issue and attempted to place a reasonable limit on what equipment should be included in the scope of license renewal stating, "the plant portion of the offsite power system that is used to connect the plant to the offsite power source should be included within the scope of license renewal." This key conclusion of the original ISG has been deleted from the proposed ISG. The phrase, "plant portion", was used to acknowledge plant design and CLB differences between plants, recognizing that a more specific description would not be applicable to all plants. Reinsert "plant portion" in the current draft ISG.

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Comment 5

Rationale, paragraph 9: "...the staff has assessed the offsite power recovery paths that are credited in the licensee evaluation of SBO coping duration. ... The staff's regulatory assessment and acceptance of licensees' compliance with the SBO rule for offsite power is based on the site-related characteristics and power design characteristics as defined in RG 1.155, and also the availability and reliability of the offsite power including the protective coordination of switchyard breakers."

The last sentence of this paragraph should be deleted. Alternatively, it should be revised to state explicitly what the staff's regulatory assessment was based on and where the assessment is documented. As written, this statement implies more analysis and evaluation of the offsite power recovery paths than is required by SBO regulations or documented in SBO analyses.

The offsite power supply, "design characteristics as defined in RG 1.155," are those listed in RG 1.155, Table 5, related to independence of the offsite power groups and those listed in RG 1.155, Tables 6-8, related to defining weather groups which provide estimated frequencies of loss of offsite power.

The circuit configurations depicted in RG 1.155, Figures 1, 2, and 3 show the switchyards only as "black boxes", with the offsite power connections shown simply as paths which emerge from the switchyard. RG 1.155 does not address any internal switchyard design or operating configurations, components, or connections. Neither RG 1.155 nor NUMARC 87-00 discuss protective coordination of switchyard breakers nor is this discussed in the regulation for SBO, 10 CFR 50.63. The use of RG 1.155 is misleading in this context.

As required by the regulation and implementation guidance documents, licensee evaluations of offsite power supplies for SBO deal with independence of the power sources and not detailed design considerations like protective relay coordination. The NRC SBO safety evaluation reports also do not discuss detailed design considerations such as protective coordination of switchyard breakers of the offsite power supply.

License renewal is intended to manage the effects of aging to maintain the assumptions supporting CLB requirements and analyses. The implicit availability and reliability of the distributed interconnected grid is all that was assumed in the SBO coping duration determination. There is no assumed level of availability or reliability that must be maintained during the license renewal term.

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Comment 6

Rationale, paragraph 10: "The staff considers each plant design individually, reviewing the plant's FSAR and associated electrical drawings. The key to performing the scoping for the SBO recovery path is defining the boundary of the offsite power source at the switchyard."

White each plant should be reviewed individually, statements elsewhere in the proposed ISG that predefine the SBO scoping boundary at certain switchyard circuit breakers are inconsistent with the concept of determining the scoping boundary based on the plant CLB.

The second statement should be revised to indicate the key to performing scoping for the SBO recovery path is defining the boundary of the offsite power source as credited in the CLB. The CLB may not include any switchyard or substation components.

Comment 7

Rationale, paragraph 2: "General Design Criterion (GDC) 17, "Electric Power Systems," requires that two physically independent circuits shall supply electric power from the transmission network to the onsite electric distribution system. These circuits must be designed and located so as to minimize to the extent practical the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions. A switchyard common to both circuits is acceptable. Each of these circuits shall be designed to be available soon enough **after a loss of all onsite alternating current (ac) power supplies and the loss of the other offsite electric power circuit** to ensure that specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded. One of these circuits (the immediate access circuit) shall be designed to be available within a few seconds following a loss-of-coolant accident to ensure the maintenance of core cooling, containment integrity, and other vital safety functions."

The ISG discussion on GDC 17 should be deleted. GDC 17 is a design standard which is not directly related to compliance with 10 CFR 50.63 or the recovery of offsite power. While the discussion in the proposed ISG is consistent with GDC 17, the scenario discussed is not SBO. The entire thrust of GDC 17 is directed at maintaining offsite power availability during power operations "after a loss of all onsite alternating current (ac) power supplies and the loss of the other offsite electric power circuit." GDC 17 specifies multiple off-site power circuits designed to "minimize to the extent practical the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions." These are design requirements to ensure the plant safety analyses are bounding, not requirements related to recovery from SBO. The only specific discussion of GDC 17 found in NRC RG 1.155 is in Section B, "Discussion," where GDC 17 is listed as one of the standards that provide design criteria and guidance on the independence of the offsite power circuits.

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Comment 8

Rationale, paragraph 3: "The plant technical specifications embody the operational restrictions for the design requirements for the loss of offsite power sources."

The discussion of technical specifications should be removed from the ISG unless the relevance to compliance with 10 CFR 50.63 and recovery of offsite power can be shown. The plant technical specifications for offsite power availability have nothing to do with coping with an SBO or with power recovery following an SBO to demonstrate compliance with §50.63. In fact, the offsite power technical specifications existed long before the promulgation of the SBO rule.

Technical specification limiting conditions for operation provide the necessary configuration such that the plant response to design bases events will be bounded by the plant safety analysis. Once a design basis SBO event is entered, by definition of SBO, none of the technical specification required power sources are available. Technical specifications for offsite power sources are no longer relevant other than to direct entry into the appropriate limiting condition of operation.

It is not clear what is meant by "embody the operational restrictions for the design requirements" or what is meant by "design requirements for the loss of offsite power sources". The design requirements for the loss of offsite power sources would seem to be the onsite emergency power sources.

Comment 9

Rationale, paragraph 14: "The staff recognizes that there are interface and control agreements between the licensee and transmission system operator. These agreements do not preclude the applicant from complying with requirements specified in 10 CFR 54.4 and 10 CFR 54.21."

These statements should be deleted from the proposed ISG. The intent of these statements is not clear. No applicant has attempted to use these agreements to preclude complying with the regulatory requirements.

The industry has stated in the past, and maintains that, as a practical matter, equipment beyond the formal interface points between a Nuclear Power Plant (NPP) and the Transmission System Owner/Operator is adequately covered by reliability standards mandated by the Federal Energy Regulatory Commission (FERC) to satisfy NPP safety requirements, and there is little or no benefit to including this same equipment in the scope of license renewal.

The Electricity Modernization Act of 2005, enacted as Title XII, Subtitle A, of the Energy Policy Act of 2005 (EPAAct 2005), added section 215 to the Federal Power Act, requiring that FERC-certified Electric Reliability Organizations (ERO) develop mandatory and enforceable reliability standards for the bulk power system. Once approved, the

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Reliability Standards may be enforced by the ERO, subject to Commission (FERC) oversight, or by the Commission (FERC) independently.

As evidenced by this move to develop mandatory and enforceable reliability standards, steps are being taken by FERC to enhance the regulation and reliability of the Bulk-Power System to ensure it does not degrade. Nuclear plant switchyards are not set aside from the rest of the Bulk-Power System and are subject to this same regulation aimed at preserving reliability. In fact, FERC has recently noticed its proposed approval of the, "Nuclear Plant Interface Coordination Reliability Standard (NUC-001-1)," in the Federal Register (Vol. 73, No. 61 / Friday, March 28, 2008 / Proposed Rules, Page 16586).

Comment 10

Rationale, paragraph 1: "...each light-water-cooled nuclear power plant... must be able to withstand and recover from an SBO of a specified duration that is based on factors that include "(iii) The expected frequency of loss of offsite power; and (iv) The probable time needed to restore offsite power.""

Clarify the ISG to quote the language used in 10 CFR 50.63. 10 CFR 50.63(a)(1) states: "each light-water-cooled nuclear power plant... must be able to withstand for a specified duration and recover from a station blackout as defined in § 50.2." The statement that a plant must be able to "withstand and recover from an SBO of a specified duration," is different than the specific wording in the rule. The ISG should be clarified to quote the language used in the rule.

Comment 11

Rationale, paragraph 3: "The electric grid is the source of power to the offsite power system."

This statement should be clarified. The electric grid is the offsite power system and one of the sources of power to the on-site distribution system.

Comment 12

Rationale, paragraph 5: "The agency based the criteria specified in RG 1.155 to calculate a plant-specific coping duration on the expected frequency of loss of offsite power and the probable time needed to restore offsite power, as well as the other two factors (onsite emergency ac power source redundancy and reliability) specified in 10 CFR 50.63(a)(1).

This statement should be reworded for clarity. Suggested rewording is: "The criteria specified in RG 1.155 to calculate a plant-specific coping duration include the expected frequency of loss of offsite power."

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Comment 13

Rationale, paragraph 5: "In requiring that a plant's coping duration be based in part on the probable time needed to restore offsite power, 10 CFR 50.63(a)(1) specifies that the offsite power system be an assumed method of recovering from an SBO."

Revise the wording to state that "10 CFR 50.63(a)(1) implicitly credits the offsite power system as an assumed method of recovering from SBO." 10 CFR 50.63(a)(1) does not "specify" that the offsite power system be an assumed method of recovering from an SBO. Connection to the offsite power system is one method of recovering from SBO.

Comment 14

Rationale, paragraph 8: "Failure to include all of the structures and components within the scope of license renewal will result in those structures and components not being subject to aging management review, and the effects of aging will not be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis for the period of extended operation in accordance with 10 CFR 54.21(a)(1) and (a)(3)."

Revise these statements to simply state that failure to include structures and components within the scope of license renewal will result in those structures and components not being subject to aging management review. As written, it is presupposed that "the effects of aging will not be adequately managed" if the structures and components are not included in an aging management review. This rationale assumes, without a clear basis for doing so, that the design, operation, and maintenance practices relied on to establish the initial basis for the SBO recovery duration are no longer adequate. Even without an aging management review the intended functions will be maintained by the same processes credited during the initial license term for maintaining those functions. The same configuration and processes for maintenance and operation that are the basis for acceptability during the current license term are assured to the same degree during the period of extended operation.

Comment 15

Rationale, paragraph 11: "If there is a circuit breaker between the power transformer (startup, reserve, auxiliary, or main transformer) and the switchyard bus, and the circuit breaker is directly bolted to the switchyard bus..."

This statement should be clarified. The phrase "directly bolted" should not be used to describe the connection to the switchyard bus. No breaker is ever directly bolted to the switchyard bus. The only thing that is connected directly to a switchyard circuit breaker is a flexible connection (like a transmission conductor), which is then connected to a disconnect switch which is then connected to the switchyard bus.

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Comment 16

Rationale, paragraph 11: "If there is a disconnect switch, but no circuit breaker exists between the transformer and the switchyard bus, then the circuit breaker(s) connected to the switchyard bus that feeds the power transformer (startup, reserve, auxiliary, or main transformer) should be acceptable as the scoping boundary."

This statement should be revised to clarify which circuit breaker(s) is being referred to as being acceptable as the scoping boundary. Also, it is unclear what is meant by the phrase "should be acceptable." This phrase should be replaced with a more positive statement or the basis for the uncertainty explained. It should be noted that the two configurations discussed in this paragraph are not the only acceptable configurations and that the SBO CLB determines what is in scope. For example, in the drawings attached to the ISG, Figure 3 shows a configuration where the connection is made directly to offsite transmission lines with no switchyard bus involved.

Comment 17

Rationale, paragraph 13: "... the staff has determined that the offsite recovery paths that must be included within the scope of license renewal...consist of circuits from two independent sources.... This path includes (1) switchyard circuit breakers... (6) control circuit cables and connections...associated with components in the recovery path.... The control circuit cables and its connections for the switchyard breakers are not within the scope of license renewal."

The statement that switchyard breaker control cables are not within the scope of license renewal should be identified as an exception and expanded to identify other components that are also excluded from scope (switchyard control house, control and protective relays, DC power supplies for the relays, etc.). In addition, the rationale for making this exception should be stated, otherwise it appears to conflict with previous NRC positions on scoping of support systems.

Comment 18

Rationale, paragraph 13: "For the switchyard breakers, bolted connections to the switchyard bus and structural components..."

This statement should be clarified. The phrase "directly bolted" should not be used to describe the connection to the switchyard bus. See comment 15 above.

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Comment 19

Rationale, paragraph 13: "Figures of different configurations of the SBO offsite power recovery path that are acceptable to the staff... are available via ADAMS..."

The drawings should be corrected to match the text. The text repeats that the switchyard circuit breakers are the boundary; however, all the drawings show a disconnect switch as the boundary. As shown in the drawings there is always a disconnect switch installed on both sides of a switchyard circuit breaker. The drawings should be corrected to distinguish between these components. If the breaker is to be the boundary then the drawings should show the line side disconnect switch using a dashed line and not within LR scope.