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# DRAFT REGULATORY GUIDE

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Contains CTs that may be changed under RITS 4b.

## DRAFT REGULATORY GUIDE DG-1244

*(Proposed Revision 1 to Regulatory Guide 1.93, dated December 1974)*

# AVAILABILITY OF ELECTRIC POWER SOURCES

## A. INTRODUCTION

This regulatory guide describes guidelines that the staff of the U.S. Nuclear Regulatory Commission (NRC) considers acceptable when the available electric power sources are less than the number of sources required by the limiting conditions for operation (LCOs) for a facility. This regulatory guide is applicable to single- and multiple-unit plants and is consistent with the improved Standard Technical Specifications (iSTS) (NUREG-1430–1434 (Refs. 1–5)). The LCO-required actions and specified completion times referred to in this regulatory guide are based on the completion times presented in Regulatory Guide 1.93, "Availability of Electric Power Sources," Revision 0, issued December 1974, which have been incorporated into the required actions in the iSTS.

Title 10, Section 50.36(c)(2), of the *Code of Federal Regulations* (10 CFR 50.36(c)(2)) (Ref. 6), requires that the technical specifications include the LCOs, which are defined as the lowest functional capability or performance levels of equipment required for safe operation of the facility. Furthermore, the same regulations require that, when an LCO of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met.

General Design Criterion (GDC) 17, "Electric Power Systems," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," (GDC 17) requires, in part, the following:

- Two physically independent circuits shall supply electric power from the offsite transmission network to the onsite electric distribution system. Each of these circuits shall be designed to be available in sufficient time following a loss of all onsite alternating current (ac) power supplies and the other offsite electric power circuits. One of these circuits shall be designed to be available within a few seconds following a loss-of-coolant accident.

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This regulatory guide is being issued in draft form to involve the public in the early stages of the development of a regulatory position in this area. It has not received final staff review or approval and does not represent an official NRC final staff position. Public comments are being solicited on this draft guide (including any implementation schedule) and its associated regulatory analysis or value/impact statement. Comments should be accompanied by appropriate supporting data. Written comments may be submitted to the Rules, Announcements, and Directives Branch, Office of Administration, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; submitted through the NRC's interactive rulemaking Web page at http://www.nrc.gov; or faxed to (301) 492-3446. Copies of comments received may be examined at the NRC's Public Document Room, 11555 Rockville Pike, Rockville, MD. Comments will be most helpful if received by November 26, 2010.

Electronic copies of this draft regulatory guide are available through the NRC's interactive rulemaking Web page (see above); the NRC's public Web site under Draft Regulatory Guides in the Regulatory Guides document collection of the NRC's Electronic Reading Room at http://www.nrc.gov/reading-rm/doc-collections/; and the NRC's Agencywide Documents Access and Management System (ADAMS) at http://www.nrc.gov/reading-rm/adams.html, under Accession No. ML100840581. The regulatory analysis may be found in ADAMS under Accession No. ML101870610.

- The licensee shall provide redundant onsite ac power supplies.

- The licensee shall provide redundant onsite direct current (dc) power supplies.

For nuclear power plants (NPPs) that were not licensed in accordance with GDC 17, the updated final safety analysis report provides the applicable design criteria.

The NRC issued Generic Letter (GL) 2006-02, "Grid Reliability and the Impact on Plant Risk and Operability of Offsite Power" on February 1, 2006 (Ref. 7) to obtain, in part, information on the following issues from its licensees:

- the use of protocols between the nuclear power plant (NPP) and the transmission system operator (TSO), independent system operator (ISO), or reliability coordinator/authority (RC/RA) and the use of transmission load flow analysis tools (analysis tools) by TSOs to assist NPPs in monitoring grid conditions to determine the operability of offsite power systems under plant technical specifications;

- the use of NPP/TSO protocols and analysis tools by TSOs to assist NPPs in monitoring grid conditions for consideration in maintenance risk assessments;

The NRC issues regulatory guides to describe to the public methods that the staff considers acceptable for use in implementing specific parts of the agency's regulations, to explain techniques that the staff uses in evaluating specific problems or postulated accidents, and to provide guidance to applicants. Regulatory guides are not substitutes for regulations and compliance with them is not required.

This regulatory guide contains information collection requirements covered by 10 CFR Part 50 that the Office of Management and Budget (OMB) approved under OMB control number 3150-0011. The NRC may neither conduct nor sponsor, and a person is not required to respond to, an information collection request or requirement unless the requesting document displays a currently valid OMB control number.

# B. DISCUSSION

## Background

Pursuant to GDC 17, an electric power system is required to supply power to loads important to safety in an NPP. Nuclear plants with more power sources than the number of sources required by GDC 17 may be able to withstand the multiple failures and still satisfy the LCOs. However, during the normal course of operation, any NPP may lose power sources to the extent that the LCOs are not met. This regulatory guide provides specific guidance to address situations in which the electric power source(s) is less than the adequate number of power sources.

## Loss of Offsite Power

For NPPs licensed in accordance with the GDC in Appendix A to 10 CFR Part 50, the design criteria for onsite and offsite electrical power systems are provided in GDC 17. For NPPs not licensed in accordance with the GDC in Appendix A, the applicable design criteria are provided in the updated final safety analysis report. These reports set forth criteria similar to GDC 17, which requires, among other things, that an offsite electric power system be provided to permit the functioning of certain structures,

systems, and components (SSCs) important to safety in the event of anticipated operational occurrences and postulated accidents.

The technical specifications of operating NPPs include the operational restrictions resulting from the loss of power sources. In general, plant technical specifications require the operability of the offsite power system as a part of the LCOs and specify actions to be taken when the offsite power system is inoperable. Plant operators should be aware of (1) the capability of the offsite power system to supply power during operation and (2) situations that can result in a loss of offsite power or inadequate voltage following a trip of the plant or other transmission contingencies (which could potentially degrade the offsite power supplies) identified by the grid operator. If the offsite power system cannot provide the requisite power in either situation, the licensee should declare the system inoperable and follow pertinent plant technical specification provisions.

The transmission network (grid) is the source of power to the offsite power system. Accordingly, licensees should perform grid reliability evaluations as part of the maintenance risk assessment required by 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants" (Ref. 8) (the Maintenance Rule) before performing "grid-risk-sensitive" maintenance activities. If the grid reliability evaluation indicates that degraded grid reliability conditions may exist during maintenance activities, the licensees should consider rescheduling any grid-risk-sensitive maintenance activities. If there is some overriding need to perform grid-risk-sensitive activities under existing or imminent conditions of degraded grid reliability, the licensee should consider alternate equipment protection measures and compensatory actions to manage or minimize the risk.

A licensee's ability to comply with technical specifications for offsite power may depend on grid conditions and plant status. In particular, maintenance on, and the degraded conditions of, the key elements of the plant switchyard and offsite power grid can affect the operability of the offsite power system, especially during times of high grid load and high grid stress. A communication protocol with the plant's TSO combined with an understanding of the TSO capabilities can help the NPP operator understand changes in the grid that can affect plant operations. The capability and reliability of the power grid is important to the licensee and can be used to determine the effects of these changes on the operability of the plant's offsite electrical power system.

Data collected in response to GL 2006-02 (Ref. 7) determined that the majority of TSOs serving NPP sites have analysis tools which give the TSO the capabilities to determine the impact of the loss or unavailability of various transmission system elements, or contingencies, on the condition of the grid. The transmission systems can generally cope with several contingencies without undue impairment of grid reliability, but it is important that the NPP operator know when the transmission system near the NPP can no longer sustain NPP voltage based on the TSO's analysis of a N-1 of contingencies. This knowledge helps the operator understand the general condition of the NPP offsite power system. To satisfy the maintenance rule, the NPP operator should know the grid's condition before taking a risk-significant piece of equipment out-of-service, and should monitor it for as long as the equipment remains out-of-service.

Grid reliability evaluations should be performed as part of the maintenance risk assessment required by 10 CFR 50.65(a)(4). To perform meaningful and comprehensive grid reliability evaluations it is essential that the NPP licensee communicate with the TSO before and periodically during the performance of any grid-risk-sensitive activities. The communication between the NPP operator and grid TSO should enable the NPP operator to obtain up-to-date information on existing and projected grid conditions for use in maintaining a current and valid risk assessment and in managing possibly changing risk. The communication with the TSO should include whether a loss of NPP electrical output could

impact the local grid, as well as, activities that increase the likelihood of a plant trip or a loss of offsite power.

Passive plant designs may not require multiple power sources if those passive plant designs rely on passive safety-related systems for core cooling and containment integrity. These passive safety-related systems do not require offsite electric power for valves and the related instrumentation. If offsite power is not available, the nonsafety-related onsite diesel generators should be available for important plant functions. These nonsafety-related diesel generators do not require any technical specification requirements because they are treated under the regulatory treatment of nonsafety systems. The basis for the regulatory treatment of nonsafety systems applies to those nonsafety systems that perform risk-significant functions and that, therefore, are candidates for regulatory oversight. However, if an offsite power system or a diesel generator is found to be inoperable at these plants, the licensees should make a concerted effort to restore the inoperable offsite ac source or the diesel generator to operable status within a reasonable time period.

For evolutionary plant designs that have three or four safety trains and have excess redundancy in their onsite power systems, the restrictions imposed on such plants on the loss of required onsite power sources may differ from those recommended in this guide and should be evaluated on a case-by-case basis.

## Operational Restrictions

The operational restrictions (based on the intent of GDC-17) in the technical specifications are based on the following three assumptions:

1. Meeting the Limiting Conditions for Operation Inconsistent with 50.36 and LCO 3.0.1.

   The LCOs of NPPs are met when all LCO-required electric power sources are determined to be operable in accordance with the applicable plant-specific technical specifications at the required voltage and capacity for the nuclear station and capable of withstanding a "worst case" transmission system contingency (also known as the N-1 contingency).

2. Period of Continued Operation Inconsistent with LCO 3.0.2 and 1.3.

   Under certain conditions, it may be prudent to complete any actions required by technical specifications and continue operation at power for a limited time not to exceed the plant-specific completion time allowed by the technical specifications rather than to implement an immediate shutdown upon loss of some required electric power circuits. Such decisions should be based on an evaluation of the safety significance associated with immediate shutdown against those associated with continued operation. For example, if the immediate shutdown will cause the offsite power source to become inoperable or otherwise cause transmission system degradation, the nuclear plant operator may conclude that continued power operation is a safer overall course of action provided that all actions required by the technical specifications are completed in the required completion time. The plant may delay shutdown up to the maximum time allowed by technical specifications provided that these activities do not risk further degradation of the electric power system or in any way jeopardize plant safety. If an immediate shutdown is determined to be the safer course of action, the plant should commence an orderly shutdown in parallel with efforts to restore the inoperable power source(s) to operable status. If continued power operation is determined to be the safer course, the plant operator or the TSO should use the period of continued operation to restore the inoperable or degraded power system elements and

prepare for an orderly shutdown of the plant within the plant-specific completion time allowed by the technical specifications.

3. Orderly Shutdown

If compliance with the technical specification LCO has not been restored within the required completion time limits, the nuclear plant operator shall promptly initiate an orderly shutdown in accordance with technical specifications. If resources are available, the plant operator should take all actions to improve the inoperable or degraded condition during the plant shutdown. During the plant shutdown, the TSO may take systemwide actions, such as increasing power generation or dropping selected loads, to ensure that the plant shutdown does not cause power grid instability or inadequate offsite power voltage. If the technical specification LCO is restored during the shutdown, the plant operator may terminate the shutdown and, assuming that there are no other restrictions, return the plant to rated power in accordance with the plant-specific technical specifications. However, the plant operator should also consider that the initiating condition may worsen and that a manual or automatic trip of the plant may be required or may occur.

## Levels of Power System Degradation

To develop bases for specific guidance, this guide describes the following seven levels of power system degradation in order of increasing severity:

1. The available offsite ac power sources are one less than the LCO.

This degradation level means that one of the required offsite ac sources is not available and that, therefore, the offsite ac power system has no redundancy. Operation could, therefore, safely continue if the availability of the remaining power sources is verified; however, because the system is degraded below the LCO, the technical specifications identify a time limit on continued operation. Operating experience indicates that availability and reliability are higher for typical offsite ac power sources than those of a typical onsite ac power source. Thus, if risk is evaluated in terms of availability and capability, the risk associated with the loss of an offsite power source (the source with higher availability) would appear to be more severe. However, this apparent difference in severity is usually offset by maintainability considerations—that is, the time required to detect and restore an unavailable offsite source is generally much less, especially when the grid operator uses real-time contingency analysis.

However, if the loss of an offsite source occurs because of an event associated with extensive consequences, such as a severe ice storm or forest fire, the event has severe implications. The risks associated with such an offsite loss would be compounded because of the following:

- The ability to quickly restore the offsite sources would likely be lost.
- The remaining offsite circuit could be susceptible to the same cause.
- The consequential trip probability of a number of units would be higher because of the potential loss of loads.
- The availability and capability of the offsite power system might be affected.

Inconsistent with the definition of Operability.

Thus, if the first offsite source is lost (because of a fire or ice storm), then the licensee should evaluate the susceptibility of the second source for a potential common-cause failure and continued reliability and availability and, if appropriate, should treat it as equivalent to the loss of both offsite sources. If the second offsite power source comes from an unaffected pathway, is underground, or possesses other unique design features, it may not be susceptible to a common-cause failure.

Licensees should make a concerted effort to restore the offsite ac power source during this restricted time period and should ensure that the remaining power source can accommodate the plant shutdown in accordance with the plant-specific technical specifications.

2. The available onsite ac power sources are one less than the LCO.

This degradation level means that one train of the onsite ac power system is not available for safe shutdown or to mitigate the effects of an event. In a single-unit plant, this typically means that one diesel generator is inoperable. In certain multiple-unit plants that share onsite ac supplies, this typically means that the available onsite supply does not have the capacity to mitigate the effects of events in both units.

Because any inadvertent generator trip could potentially result in a total loss of ac power, the licensee should severely restrict the time allowed for continued operation. In the absence of one onsite power source, the intent of GDC-17 is twofold:

- Avoid the risk associated with immediate shutdown.
- Minimize the risk associated with this level of degradation by severely limiting its exposure time.

Licensees should make a concerted effort to restore the onsite ac power source during the completion time period allowed by the technical specifications and should verify that the remaining offsite power source can accommodate the plant shutdown in accordance with the plant-specific technical specifications. Not consistent with 3.8.1 Actions.

3. The available offsite ac power sources are two less than the LCO.

This degradation level means that the offsite power system is not available or does not have the capability to achieve a safe shutdown and mitigate the effects of an event; however, the onsite ac system is not degraded. Thus, this level generally corresponds to the total loss (inadequate capacity, voltage, or frequency) of the offsite power sources.

Because of the normally high availability of offsite sources, this level of degradation may appear to be more severe than the next two degradation levels discussed below. However, two factors tend to decrease the severity of this degradation level as compared with the next two degradation levels. First, the configuration of the redundant onsite ac power system that remains available for this degradation level is not susceptible to a single bus or switching failure, whereas the next degradation level may be susceptible. Second, the time required to detect and restore an unavailable offsite power source is generally much less than that required for detecting and restoring an unavailable onsite ac power source.

This level of degradation can be caused by a variety of events, including the loss of two offsite circuits, the loss of the electric grid, or any other condition that renders offsite power unavailable for safe shutdown and emergency purposes. Because the onsite power system has not been degraded and because a simultaneous loss of offsite power and a loss-of-coolant accident were postulated as a design basis, a brief interval of continued operation is allowed if the onsite sources of ac power, independent of grid condition, are operable and can act as a substitute train of ac power in accordance with the plant-specific technical specifications. Note that some nuclear power units are designed to cause an automatic shutdown or initiate load rejection at this level of degradation. No further discussion is necessary for units designed to undergo an automatic shutdown at this level of degradation; however, those units that initiate load rejection are considered to remain operating within the context of this regulatory guide.

4. The available offsite and onsite ac power sources are each one less than the LCO.

This level of power system degradation results from the loss of individual redundancy in both the offsite and onsite ac power systems. Because two different sources of power provide power system redundancy, the reliability, and thus the safety, of this degradation level appears to be slightly higher than that of the previous degradation level. However, the susceptibility of this power system to a single bus or switching failure could offset this apparent improvement. For example, the failure of an emergency power distribution bus that is energized by either the single available offsite circuit or the single available onsite ac supply could render all emergency ac power from that source ineffective. Moreover, if the offsite and onsite power were available to only one train, a bus fault could render all emergency power unavailable.

Based on these considerations, the technical-specification-allowed completion time imposed at this level of degradation is more restrictive than that of the previous degradation level.

5. The available onsite ac power sources are two less than the LCO.

This degradation level means that the onsite ac power system cannot support a safe shutdown and mitigate the effects of an accident in the event of a loss of offsite power. In a single unit, this usually means that two diesel generators are inoperable. In multiple units that share onsite ac supplies, this degradation level usually means that the available onsite supplies, if any, do not have the capacity to mitigate the effects of an event in one unit and safely shut down the other unit(s).

Because the offsite power system is the only source of ac power at this level of degradation, the licensee should evaluate the risk associated with continued operation against that associated with immediate shutdown. (Immediate shutdown could cause grid instability, thus resulting in a total loss of ac power.) However, because any inadvertent generator trip could potentially result in a total loss of ac power, the technical specifications severely restrict the time allowed for continued operation. In addition, all work that could potentially trip the unit should be suspended. The intent of GDC-17 is twofold:

- Avoid the risk associated with immediate shutdown.
- Minimize the risk associated with this level of electrical degradation by limiting the operating time (in the applicable technical specification LCO modes) and by limiting activities that could cause an inadvertent plant shutdown.

Licensees should make a concerted effort to restore at least one onsite ac power source during the technical-specification-allowed completion time period and during the shutdown required by the technical specifications and to coordinate with the TSO to ensure that the offsite power system can accommodate the plant shutdown in accordance with the plant-specific technical specifications.

6. The available onsite dc power sources are one less than the LCO.

This degradation level means that the available dc power sources do not have the required redundancy; however, the remaining train(s) of the dc power system has (have) full functional capability to effect a safe shutdown and mitigate the effects of an event. Because a subsequent degradation in an onsite ac or dc system could jeopardize unit safety (e.g., a subsequent single failure could render the entire power system ineffective on a generator trip), the technical specifications restrict the time allowed for continued operation. If the affected dc source is restored during the technical-specification-allowed completion time, unrestricted operation may resume. If not, the licensee should promptly shut down the unit in an orderly manner to comply with technical specifications. In addition, the licensee should closely monitor the required functions of the dc system during the shutdown period and take corrective actions, if required, to ensure safety.

The passive designs (such as the AP1000) that depend heavily on dc power systems for core cooling and containment integrity typically have batteries that last for 72 hours. The design of batteries to meet the long-duration constant current demands that are required of passive designs may have different monitoring requirements (recommended by their manufacturers) than those required in current designs. Therefore, the licensee should critically monitor the required functions of these batteries during the shutdown period and take corrective actions, if required, to ensure that these batteries will perform their functions for the long duration as designed.

7. The available inverters are one less than the LCO.

This degradation level means that the available inverters do not have the required redundancy; however, the remaining trains of the inverter power system have full functional capability to prevent a reactor trip. Because a subsequent single failure of another inverter could cause a reactor trip, the licensee should severely restrict the time allowed for continued operation. If the affected inverter is restored within this time period, unrestricted operation may resume. If not, the unit should promptly be brought to an orderly shutdown.

## C. REGULATORY POSITION

The completion times provided in this section of the regulatory guide reflect an acceptable regulatory practice for designs with two or more onsite ac sources, two or more dc power sources, inverters, and two offsite power sources. These completion times also appear in the iSTS (Refs. 1–5). The plant-specific technical specifications identify specific required action completion times. Additionally, the regulatory positions in this section are based on the grid operator's capability to ensure the adequacy of the offsite power system through contingency analyses and plant design features and on the licensee's ability to manage risk-significant maintenance and surveillance activities.

The intent of each of the following regulatory positions is to ensure that an NPP is in an acceptably safe operating mode whenever the available electric power sources are less than the technical specification LCO. Accordingly, this section discusses the seven levels of degradation of the electric

power system in order of increasing degradation; the technical specifications specify the required actions and the required action completion time for each degraded level. Whenever the technical specifications allow unrestricted operation to resume, such resumption should be contingent on the verification of the capability of the restored sources. Similarly, whenever the technical specifications allow power operation to continue during a specific degradation level, such continued power operation should be contingent upon the plant-specific technical specification requirement(s) and the following:

a. Immediately verify the availability and capability of the remaining sources.

b. Verify that the required maintenance activities do not further degrade the power system or in any way jeopardize plant safety.

c. Comply with the required actions stipulated for each LCO specified in the plant-specific technical specifications.

The conduct of maintenance or surveillance activities should be evaluated to determine compliance with 10 CFR 50.65.

The NPP operator should refer to the interface requirements specified in North American Electric Reliability Corporation Standard NUC-001-2, "Nuclear Plant Interface Coordination," issued January 22, 2010 (Ref. 9), for coordination between the NPP operators and transmission entities for the purpose of ensuring the safe operation and shutdown of the NPP.

This is in direct conflict with the definition of Operability.

The NPP operator should validate the accuracy and conservatism of the post-trip voltages predicted by the online grid analysis tool. If notified by the TSO that a trip of the NPP would result in inadequate offsite power post-trip voltages or in other transmission contingencies that would result in offsite power voltages less than the NPP design requirements, the NPP operator should declare the offsite power inoperable and then follow the actions specified in the plant-specific technical specifications.

1. The available offsite ac power sources are one less than the LCO.

   If the available offsite ac power sources are one less than the LCO, power operation may continue for a period that should not exceed 72 hours if the electric grid system capability and reserves are such that a subsequent single failure (including a trip of the unit's generator but excluding an unrelated failure of the remaining offsite circuit if the loss of an offsite source caused this degraded state) would not cause a total loss of offsite power.

   If these conditions for continued power operation are met and if the affected source is restored within 72 hours, unrestricted operation may resume. Conversely, if the actions required by the technical specifications for continued power operation are met, but the source is not restored within 72 hours, the licensee should shut down the unit in accordance with plant-specific technical specifications.

2. The available onsite ac power sources are one less than the LCO.

   If the available onsite ac power sources are one less than the LCO, power operation may continue for a period that should not exceed 72 hours, provided that the redundant diesel generator is assessed within 24 hours to be free from common-cause failure or is verified to be operable in accordance with plant-specific technical specifications.

If the affected source is restored within the time period specified in the plant-specific technical specifications, unrestricted operation may resume. Conversely, if the conditions for continued power operation are met, but the source is not restored within the time period specified in the plant-specific technical specifications, the unit should be shut down.

3. The available offsite ac power sources are two less than the LCO.

If the available offsite ac power sources are two less than the LCO, power operation may continue for 24 hours or for the time period specified in the plant-specific technical specifications if it appears likely that at least one of the offsite sources can be restored within that time. If these conditions for continued power operation are met and if both offsite sources are restored within 24 hours or within the time period specified in the plant-specific technical specifications, unrestricted operation may resume. If only one offsite source is restored within 24 hours, power operation may continue for a total time that should not exceed 72 hours in accordance with the conditions described in Regulatory Position 1. Conversely, if no offsite source is restored within the first 24-hour period of continued power operation, within 6 hours, the licensee should promptly bring the unit to a hot shutdown condition for boiling-water reactors (BWRs) (Mode 3) and to a hot standby condition for pressurized-water reactors (Mode 3) or as specified in plant-specific technical specifications.

4. The available offsite and onsite ac power sources are each one less than the LCO.

If the available offsite and onsite ac power sources are each one less than the LCO, power operation may continue for 12 hours (1) if the capacity and voltage are such that a subsequent single failure (including a trip of the unit's generator but excluding an unrelated failure of the remaining offsite circuit) would not cause a total loss of offsite power and (2) if it appears highly likely that at least one of the affected sources can be restored within 12 hours.

If these conditions for continued power operation are met and if both sources are restored within 12 hours, unrestricted operation may resume. If either an offsite or an onsite ac source is restored within 12 hours, power operation may continue for a total time that should not exceed 72 hours in accordance with the condition described in Regulatory Position 1 (or Regulatory Position 2) for the loss of one ac source. Conversely, if neither an offsite source nor an onsite source is restored within the first 12 hours of continued power operation, the licensee should shut down the plant in accordance with plant-specific technical specifications.

5. The available onsite ac power sources are two less than the LCO.

If the available onsite ac electric power sources are two less than the LCO, power operation may continue for a period that should not exceed 2 hours. If both onsite ac electric power sources are restored within these 2 hours, unrestricted operation may resume. If only one onsite ac power source is restored within these 2 hours, power operation may continue for a total time that should not exceed 72 hours in accordance with the conditions described in Regulatory Position 2 for the loss of one onsite ac source. Conversely, if no onsite ac source can be restored within the first 2 hours of continued power operation, the licensee should shut down the plant in accordance with plant-specific technical specifications.

6. The available onsite dc power sources are one less than the LCO.

If the available onsite dc power sources are one less than the LCO, power operation may continue for a period that should not exceed 2 hours. If the affected dc source is restored within

these 2 hours, unrestricted operation may resume. If not, the licensee should shut down the plant in accordance with plant-specific technical specifications. The licensee should closely monitor the required functions of the dc system during the shutdown process and take necessary actions (such as cross-connecting a supply or shedding optional loads) to ensure safe shutdown.

7. The available inverters are one less than the LCO.

If the available inverters are one less than the LCO, power operation may continue for a period that should not exceed the 24 hour time period specified in the standard technical specifications. If the affected inverter is restored within this time period, unrestricted operation may resume. If not, the licensee should shut down the plant in accordance with plant-specific technical specifications.

# D. IMPLEMENTATION

The purpose of this section is to provide information on how applicants and licensees may use this guide and information regarding the NRC's plans for using this Regulatory Guide. In addition, it describes how the NRC staff has complied with the Backfit Rule, 10 CFR 50.109 and any applicable finality provisions in 10 CFR Part 52.

The regulatory positions in this draft guide are based on the grid operator's capability to ensure the adequacy of the offsite power system through contingency analysis and plant design features. Based on the licensee's response to GL 2006-02, existing standard and plant-specific technical specifications, and the requirements of 10 CFR 50.63, "Loss of all Alternating Current Power" (Ref. 10) and 50.65, the staff believes that this regulatory guide reflects the majority of current regulatory practices and may be used when evaluating compliance for operating nuclear power plants with a Safety Evaluation Report issued after July 1, 1974.

**Applicant and Licensees' Use**

Applicants and licensees may (i.e., voluntarily) use the information in this regulatory guide to develop applications for initial licenses, amendments to licenses, or other requests for NRC regulatory approval (e.g., exemptions). Licensees may use the information in this regulatory guide for actions which do not require prior NRC review and approval (e.g., changes to a facility design under 10 CFR 50.59 which do not require prior NRC review and approval). Licensees may use the information in this Regulatory Guide or applicable parts to resolve regulatory or inspection issues (e.g., by committing to comply with provisions in the regulatory guide).

Current licensees may continue to use the guidance that was found acceptable for complying with specific portions of the regulations as part of their license approval process, which may be a previous version of this Regulatory Guide.

A licensee who believes that the NRC staff is inappropriately imposing this Regulatory Guide as part of a request for a license amendment or request for a change to a previously issued NRC regulatory approval may file a backfitting appeal with the NRC in accordance with applicable procedures.

**NRC Staff Use**

The NRC staff does not intend or approve any imposition or backfitting of the guidance in this Regulatory Guide. The staff does not expect any existing licensee to use or commit to using the guidance in this Regulatory Guide in the absence of a licensee-initiated change to its licensing basis. The NRC staff does not expect or plan to request licensees to voluntarily adopt this Regulatory Guide to resolve a generic regulatory issue. The NRC staff does not expect or plan to initiate NRC regulatory action which would require the use of this regulatory guide (e.g. issuance of an order requiring the use of the Regulatory Guide, requests for information under 10 CFR 50.4(f) as to whether a licensee intends to commit to use of this regulatory guide, generic communication, or promulgation of a rule requiring the use of this Regulatory Guide) without further back-fit consideration.

During inspections of specific facilities, the staff may suggest or recommend that licensees consider various actions consistent with staff positions in this regulatory guide. Such suggestions and recommendations would not ordinarily be considered backfitting even if prior versions of this Regulatory Guide are part of the licensing basis of the facility with respect to the subject matter of the inspection. However, the staff may not represent to the licensee that: (i) the licensee's failure to comply with the positions in this Regulatory Guide constitutes a violation; (ii) the licensee may avoid the violation by agreeing to comply with this Regulatory Guide; or (iii) the only acceptable way for the licensee to address the NRC-identified non-compliance or violation is to commit to this Regulatory Guide (i.e., including this Regulatory Guide in the facility's licensing basis).

If an existing licensee seeks a license amendment or change to an existing regulatory approval, and the staff's consideration of the request involves a regulatory issue which is directly relevant to this Regulatory Guide and the specific subject matter of the new or revised guidance is an essential consideration in the NRC staff's determination of the acceptability of the licensee's request, the staff may require the licensee to use this Regulatory Guide as a prerequisite for NRC approval. This is not considered back-fitting as defined in 10 CFR 50.109(a)(1) or a violation of any of the issue finality provisions in 10 CFR Part 52.

**Conclusion**

This regulatory guide is not being imposed upon current licensees and may be voluntarily used by existing licensees. In addition, this Regulatory Guide is issued in conformance with all applicable internal NRC policies and procedures governing backfitting. Accordingly, the NRC's staff issuance of this regulatory guide is not considered backfiting, as defined in 10 CFR 50.109(a)(1), nor is it deemed to be in conflict with any of the issue finality provisions in 10 CFR Part 52.

# REFERENCES[1]


1. NUREG-1430, "Standard Technical Specifications—Babcock and Wilcox Plants: Specifications (Volume 1) and Bases (Volume 2)," Revision 3, U.S. Nuclear Regulatory Commission, Washington, DC, June 2004.

2. NUREG-1431, "Standard Technical Specifications—Westinghouse Plants: Specifications (Volume 1) and Bases (Volume 2)," Revision 3, U.S. Nuclear Regulatory Commission, Washington, DC, June 2004.

3. NUREG-1432, "Standard Technical Specifications–Combustion Engineering Plants: Specifications (Volume 1) and Bases (Volume 2)," Revision 3, U.S. Nuclear Regulatory Commission, Washington, DC, June 2004.

4. NUREG-1433, "Standard Technical Specifications—General Electric Plants (BWR/4): Specifications (Volume 1) and Bases (Volume 2)," Revision 3, U.S. Nuclear Regulatory Commission, Washington, DC, June 2004.

5. NUREG-1434, "Standard Technical Specifications—General Electric Plants (BWR/6): Specifications (Volume 1) and Bases (Volume 2)," Revision 3, U.S. Nuclear Regulatory Commission, Washington, DC, June 2004.

6. 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," U.S. Nuclear Regulatory Commission, Washington, DC.

7. NRC Generic Letter 2006-03, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power," February 1, 2006, U.S. Nuclear Regulatory Commission, Washington, DC (ML060180352).

8. 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," U.S. Nuclear Regulatory Commission, Washington, DC.

9. NUC-001-2, "Nuclear Plant Interface Coordination," North American Electric Reliability Corporation, Princeton, NJ, January 22, 2010.[2]

10. 10 CFR 50.63, "Loss of All Alternating Current Power," U.S. Nuclear Regulatory Commission, Washington, DC.


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1 Publicly available NRC published documents listed herein are available electronically through the Electronic Reading room on the NRC's public Web site at: http://www.nrc.gov/reading-rm/doc-collections/. The documents can also be viewed on-line or printed for a fee in the NRC's Public Document Room (PDR) at 11555 Rockville Pike, Rockville, MD; the mailing address is USNRC PDR, Washington, DC 20555; telephone 301-415-4737 or (800) 397-4209; fax (301) 415-3548; and e-mail PDR.Resource@nrc.gov.

2 Copies of North American Electric Reliability Standards may be obtained from the North American Electric Reliability Corporation (NERC) are available electronically at NERC's Web site (http://www.nerc.com/index.php) or by contacting NERC Headquarters at 116-390 Village Blvd., Princeton, NJ 08540-5721; telephone (609) 452-8060; fax (609) 452-9550.