7590-01 (P)

NUCLEAR REGULATORY COMMISSION

Proposed Generic Communication

Grid Reliability And The Impact On Plant Risk And The Operability

Of Offsite Power

AGENCY: Nuclear Regulatory Commission.

ACTION: Notice of opportunity for public comment.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is proposing to issue a generic letter (GL) to request that addressees submit information to the NRC concerning the status of their compliance with GDC 17, 10 CFR 50.63, 10 CFR 50.65, and plant technical specifications governing electric power in accordance with 10 CFR 50.54(f). This request is to obtain information from addressees in four areas: (1) use of nuclear power plant/transmission system operator protocols and real time contingency analysis programs to monitor grid conditions to determine operability of offsite power systems under plant technical specifications, (2) use of nuclear power plant/transmission system operator protocols and real time contingency analysis programs to monitor grid conditions for consideration in maintenance risk assessments, (3) offsite power restoration procedures in accordance with Section 2 of Regulatory Guide 1.155, “Station Blackout,” and (4) losses of offsite power caused by grid failures at a frequency of $ 20 Years in accordance with Regulatory Guide 1.155.

This *Federal Register* notice is available through the NRC’s Agencywide Documents Access and Management System (ADAMS) under accession number ML050810504.

DATES: Comment period expires [60 days after FRN is published]. Comments submitted after this date will be considered if it is practical to do so, but assurance of consideration cannot be given except for comments received on or before this date.

ADDRESSEES: Submit written comments to the Chief, Rules and Directives Branch, Division of Administrative Services, Office of Administration, U.S. Nuclear Regulatory Commission, Mail Stop T6-D59, Washington, DC 20555-0001, and cite the publication date and page number of this *Federal Register* notice. Written comments may also be delivered to NRC Headquarters, 11545 Rockville Pike (Room T-6D59), Rockville, Maryland, between 7:30 am and 4:15 pm on Federal workdays.

FOR FURTHER INFORMATION, CONTACT: John G. Lamb at 301-415-1446 or by email at jgl1@nrc.gov or Jose Calvo at 301-415-2774 or by email at jac7@nrc.gov .

SUPPLEMENTARY INFORMATION:

NRC GENERIC LETTER 2005-XX: GRID RELIABILITY AND THE IMPACT ON PLANT RISK AND THE OPERABILITY OF OFFSITE POWER

ADDRESSES

All holders of operating licenses for nuclear power reactors except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

PURPOSE

In order to determine if compliance is being maintained with U.S. Nuclear Regulatory Commission (NRC) regulatory requirements governing electric power for your plant, the NRC is issuing this generic letter to obtain information from its licensees in four areas:

(1) use of nuclear power plant/transmission system operator protocols and real time contingency analysis programs to monitor grid conditions to determine operability of offsite power systems under plant technical specifications

(2) use of nuclear power plant/transmission system operator protocols and real time contingency analysis programs to monitor grid conditions for consideration in maintenance risk assessments

(3) offsite power restoration procedures in accordance with Section 2 of Regulatory Guide 1.155, “Station Blackout”

(4) losses of offsite power caused by grid failures at a frequency of $ 20 Years in accordance with Regulatory Guide 1.155.

Pursuant to 10 CFR 50.54(f), addressees are required to submit a written response to this generic letter.

BACKGROUND

Based on information obtained from inspections and risk insights developed by an internal NRC expert panel, and further described below, the staff is concerned with several conditions associated with assurance of grid reliability such that compliance with applicable regulations may not be assured. Use of long term periodic grid studies and informal communication arrangements to monitor real time grid operability, potential shortcomings in grid reliability evaluations performed as part of maintenance risk assessments, lack of preestablished arrangements identifying local grid power sources and transmission paths, and potential elimination of grid events from operating experience are some conditions that could potentially impact compliance. The staff identified these issues as a result of considering the August 14, 2003 blackout event.

On August 14, 2003, the largest power outage in U.S. history occurred in the Northeastern United States and parts of Canada. Nine U.S. nuclear power plants (NPPs) tripped. Eight of these, along with one NPP that was already shut down, lost offsite power. The length of time until power was available to the switchyard ranged from approximately 1 hour to six and one-half hours. Although the onsite emergency diesel generators (EDGs) functioned to maintain safe shutdown conditions, this event was significant in terms of the number of plants affected and the duration of the power outage.

The loss of all alternating current (AC) power to the essential and nonessential switchgear buses at a NPP involves the simultaneous loss of offsite power (LOOP), turbine trip, and the loss of the onsite emergency power supplies (typically EDGs). Such an event is referred to as a station blackout (SBO). Risk analyses performed for NPPs indicate that the loss of all AC power can be a significant contributor to the core damage frequency. Although NPPs are designed to cope with a LOOP event through the use of onsite power supplies, LOOP events are considered precursors to SBO. An increase in the frequency or duration of LOOP events increases the probability of core damage.

The NRC issued a regulatory issue summary (RIS 2004-5, “Grid Operability and the Impact on Plant Risk and the Operability of Offsite Power,” dated April 15, 2004) to advise NPP addressees of the requirements in Section 50.65 of Title 10 of the *Code of Federal Regulations* (10 CFR 50.65), “Requirements for monitoring the effectiveness of maintenance at nuclear power plants”; 10 CFR 50.63, “Loss of all alternating current power”; 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 17, “Electric power systems”; and plant technical specifications on operability of offsite power. In addition, the NRC issued Temporary Instruction (TI) 2515/156, “Offsite Power System Operational Readiness,” dated April 29, 2004, which instructed the regional offices to perform follow up inspections at plant sites on the issues

identified in the RIS. The NRC needs additional information from its licensees in the four areas identified above in order to determine if regulatory compliance is being maintained.

APPLICABLE REGULATORY REQUIREMENTS

GDC 17 and plant technical specifications (TSs)

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 transmission network (grid) is the source of power to the offsite power system. The final paragraph of GDC 17 requires, in part, provisions to minimize the probability of the loss of power from the transmission network given a loss of power generated by the nuclear power unit. The loss of power generated by the nuclear power unit (trip) is an anticipated operational occurrence. It is therefore necessary that the offsite power circuits be designed to be available following a trip of the unit in order to permit the functioning of SSCs necessary to respond to the event.

The trip of an NPP, however, can affect the grid so as to result in a LOOP. Foremost among such effects is a reduction in the plant's switchyard voltage as a result of the loss of the reactive power supply to the grid from the NPP's generator. If the voltage is low enough, the plant's

degraded voltage protection could actuate and separate the plant safety buses from offsite power. A less likely event would be that the trip of a nuclear plant causes grid instability, potential grid collapse, and subsequent LOOP due to the loss of the real and/or reactive power support supplied to the grid from the plant's generator.

In general, plant TSs require the offsite power system to be operable as part of the limiting condition for operation and specify what actions to be taken when the offsite power system is not operable. Plant operators should therefore be aware of (1) the capability of the offsite power system to supply power, as specified by TS, during operation and (2) situations that can result in a LOOP following a trip of the plant. If the offsite power system is not capable of providing the requisite power in either situation, the system should be declared inoperable and pertinent plant TS provisions followed.

10 CFR 50.65

Section 50.65(a)(4) requires that licensees assess and manage the increase in risk that may result from proposed maintenance activities before performing the maintenance activities. These activities include, but are not limited to, surveillances, post-maintenance testing, and corrective and preventive maintenance. The scope of the assessment may be limited to structures, systems, and components (SSCs) that a risk-informed evaluation process has shown to be significant to public health and safety.

In NRC Regulatory Guide (RG) 1.182, the NRC endorsed the February 22, 2000, revision to Section 11 of NUMARC 93-01, Revision 2, as providing methods that are acceptable for meeting 10 CFR 50.65(a)(4). The revised Section 11 addressed grid stability and offsite power availability in several areas. Section 11.3.2.8 states:

> emergent conditions may result in the need for action prior to conduct of the assessment, or could change the conditions of a previously performed assessment. Examples include plant configuration or mode

changes, additional SSCs out of service due to failures, or *significant changes in external conditions (weather, offsite power availability)* [emphasis added].

Additionally, Section 11.3.4 states, in part, that "the assessment for removal from service of a single SSC for the planned amount of time may be limited to the consideration of *unusual external conditions that are present or imminent (e.g., severe weather, offsite power instability)"* [emphasis added].

Accordingly, licensees should perform grid reliability evaluations as part of the maintenance risk assessment required by 10 CFR 50.65 before taking a risk-significant piece of equipment (including but not limited to an EDG, a battery, a steam-driven pump, an alternate AC power source, etc.) out of service to do maintenance activities, including surveillances, post-maintenance testing, and corrective and preventive maintenance. The likelihood of LOOP and SBO should be considered in the maintenance risk assessment, whether quantitatively or qualitatively. If the grid reliability evaluation indicates that marginally adequate grid conditions may exist during maintenance activities, the licensee should consider rescheduling maintenance activities that tend to increase the LOOP frequency or reduce the capability to cope with a LOOP or SBO. If there is some overriding need to perform maintenance on risk-significant equipment under conditions of degraded grid stability, the licensee should consider alternate equipment protection measures and compensatory actions to reduce the risk.

With regard to conditions that emerge during a maintenance activity in progress, Section 11.3.2.8 in NUMARC 93-01, Revision 2, states that emergent conditions could change the conditions of a previously performed risk assessment. Offsite power availability is one of the examples given of an emergent condition that could change the conditions of a previously

performed risk assessment. Therefore, licensees should reassess the plant risk in view of an emergent condition, taking the worsening grid condition into account. However, this reassessment of the risk should not interfere with or delay measures to place and maintain the plant in a safe condition in response to or preparation for those worsening grid conditions.

10 CFR 50.63

Pursuant to 10 CFR 50.63, "Loss of all alternating current power," the NRC requires that each NPP licensed to operate be able to withstand an SBO for a specified duration and recover from the SBO. NRC Regulatory Guide (RG) 1.155 provides guidance for licensees to use in developing their approach for complying with 10 CFR 50.63. The RG has a series of tables that define a set of pertinent plant and plant site parameters that have been found to affect the likelihood of a plant experiencing an SBO event of a given duration. Using the tables allows a licensee to determine a plant's relative vulnerability to SBO events of a given duration and identify an acceptable minimum SBO coping duration for the plant.

With regard to grid-related losses of offsite power, Table 4 in RG 1.155 indicates that the following plant sites should be assigned to Offsite Power Design Characteristic Group P3:

> Sites that expect to experience a total loss of offsite power caused by grid failures at a frequency equal to or greater than once in 20 site-years, unless the site has procedures to recover AC power from reliable alternative (nonemergency) ac power sources within approximately one-half hour following a grid failure.

The majority of U.S. NPPs fall into the 4-hour minimum coping capability category set forth in RG 1.155. Table 2 in RG 1.155, however, indicates that a typical plant with two redundant EDGs per nuclear unit should have at least an 8-hour minimum coping duration if it falls into the

P3 group. Therefore, plants that have experienced a grid-related LOOP since they were evaluated in accordance with the SBO guidance in RG 1.155 may no longer be consistent with that guidance.

Section 2 of RG 1.155 provides guidance on the procedures necessary to restore offsite power, including losses following "grid undervoltage and collapse." Section 2 states: "Procedures should include the actions necessary to restore offsite power and use nearby power sources when offsite power is unavailable." These procedures are a necessary element in minimizing LOOP durations following a LOOP or SBO event.

DISCUSSION

Use of nuclear power plant/transmission system operator protocols and real time contingency analysis programs to monitor grid conditions to determine operability of offsite power systems under plant technical specifications

As discussed above, a licensee's ability to comply with TS governing offsite power may depend on grid conditions and plant status, in particular, maintenance being performed on, and inoperability of, key elements of the plant switchyard and offsite power grid can affect the operability of the offsite power system, particularly during times of high grid load and high grid stress. A communication interface with the plant's transmission system operator (TSO), together with other local means used to maintain NPP operator awareness of changes in the plant switchyard and offsite power grid, is important to enable the licensee to determine the effects of these changes on operability of the offsite power system. The staff found a good deal of variability in the TI 2515/156 responses on the use of these NPP/TSO communication protocols. Some licensees appear to be relying on informal NPP/TSO communication arrangements and long term grid studies without real time control of operation to within the

limits of the studies to assure offsite power operability. However, the staff also learned that most TSOs serving NPP sites now have, or will shortly have, enhanced computer capability in the form of real time contingency analysis (RTCAs) programs.

The RTCAs give the TSO the capability to determine the impact of the loss or unavailability of various transmission system elements (called contingencies) on the condition of the transmission system. The transmission systems can generally cope with a number of contingencies without undue impairment of grid reliability, but it is important for the NPP operator to know when the transmission system near the NPP can no longer sustain NPP voltage based on the TSO's analysis of a reasonable level of contingencies. This knowledge can help the operator understand the general condition of the NPP offsite power system. In order 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 monitor it for as long as the equipment remains out of service.

It is especially important for the NPP operator to know when the trip of the NPP will result in the loss of offsite power to the plant. As indicated in RIS 2004-05, a reduction in NPP switchyard voltage due to a trip is the main cause of a LOOP event. It is important to understand that the transmission systems can generally tolerate voltages lower than those required for NPP SSC operability. As a result, the TSO will not necessarily keep the transmission system voltage above the level needed for the NPP unless the TSO has been informed of the needed voltage level, and agreements have been formalized to maintain the voltage level. It was not always clear from the data collected in accordance with TI 2515/156 whether the TSO would notify the NPP of inadequate transmission system contingency voltages or inadequate voltages required for the NPP SSC operability.

Inadequate NPP contingency post-trip switchyard voltages will result in TS inoperability of the NPP offsite power system due to actuation of NPP degraded voltage protection circuits during certain events that result in an NPP trip. Occasionally NPPs of certain designs have experienced other inoperabilities under these circumstances (e.g., overloaded EDGs or loss of certain safety features due to interaction with circuit breaker logic). Safety-related motors may also be started more than once under these circumstances, which could result in operation outside the motors' specifications and actuation of overload protection. Unavailability of plant controlled equipment such as voltage regulators, transformer auto tap changers, and generator automatic voltage regulation can contribute to the more frequent occurrence of inadequate NPP post-trip voltages.

The RTCA programs in use by the TSOs, together with properly implemented NPP/TSO communication protocols, can keep NPP operators better informed about conditions affecting the NPP offsite power system. However, the RTCA programs are not always available to the TSO. This was the case during the period leading up to the August 14, 2003, blackout; and events have demonstrated the data used in the programs sometimes do not represent actual conditions and capabilities. These shortcomings have been offset to some degree by notification of RTCA unavailability to NPP operators and their subsequent performance of operability determinations and by verification of the actual post-trip switchyard voltages following inadvertent NPP trips.

Use of nuclear power plant/transmission system operator protocols to monitor grid conditions for consideration in maintenance risk assessments

As set forth above, grid reliability evaluations should be performed as part of the maintenance risk assessment required by 10 CFR 50.65 before taking a risk-significant piece of equipment (including but not limited to an EDG, a battery, a steam-driven pump, an alternate AC power source, etc.) out of service to do maintenance activities, including surveillances,

post-maintenance testing, and corrective and preventive maintenance. Further, worsening grid conditions that emerge during a maintenance activity in progress could affect offsite power availability, thereby changing the conditions of a previously performed assessment. A licensee should therefore reassess the plant risk under such circumstances, taking the worsening grid condition into account. An internal NRC expert panel convened to obtain short-term grid-related risk insights found that it is important to have effective NPP configuration risk management, as required by the Maintenance Rule, during periods when the grid is degraded. In particular, a potentially significant increase in NPP risk may occur if equipment required to prevent and mitigate station blackout is unavailable when the grid is degraded.

Recent NRC studies have found that, since 1997, LOOP events have occurred more frequently during the summer (May - October), than before 1997, the probability of a LOOP event due to a reactor trip has also increased during the summer months, and the durations of LOOP events have generally increased. The staff is concerned about extended maintenance activities scheduled for equipment required to prevent and mitigate station blackout during these months, especially in areas of the country that experience a high level of grid stress.

The staff found a good deal of variability in the data collected in accordance with TI 2515/156 regarding grid reliability evaluations performed before taking risk-significant equipment out of service. Some NPPs communicate routinely with their TSOs once per shift to determine grid conditions, while others rely solely upon the TSOs to inform them of deteriorating grid conditions and do not inquire about grid conditions prior to taking risk-significant equipment out of service. Some do not consider the NPP post-trip switchyard voltages in their evaluations, and some do not coordinate risk-significant equipment maintenance with their TSOs.

The NPP/TSO communication protocol is a useful tool to obtain the information necessary for the grid reliability evaluations performed as part of the maintenance risk assessment required by 10 CFR 50.65 before a risk-significant piece of equipment is removed from service. Such a

protocol is also useful in conforming to the guidance in NUMARC 9301, Rev. 2 for reassessing plant risk in light of emergent conditions. As discussed under the previous topic, the RTCAs available to most TSOs give them the capability to determine the impact of various transmission system contingencies on the condition of the transmission system. It is important that the NPP operator know when the transmission system near the NPP cannot sustain a reasonable level of contingencies. The NPP operator should know the general condition of the NPP offsite power system before removing an SSC from service under the maintenance rule and for as long as the equipment remains out of service.

Offsite power restoration procedures in accordance with Section 2 of Regulatory Guide 1.155

LOOP events can also have numerous unpredictable initiators, such as natural events, potential adversaries, human error, or design problems. Pursuant to 10 CFR 50.63, "Loss of all alternating current power," the NRC requires that each NPP licensed to operate be able to withstand a station blackout (SBO) for a specified duration and recover from the SBO. NRC Regulatory Guide (RG) 1.155 provides NRC guidance for licensees to use in developing their approaches for complying with 10 CFR 50.63. Section 2 of RG 1.155 provides guidance on the procedures necessary to restore offsite power, including losses following "grid undervoltage and collapse." Section 2 states: "Procedures should include the actions necessary to restore offsite power and use nearby power sources when offsite power is unavailable."

Preestablished agreements with NPP TSOs that identify local power sources and transmission paths that could be made available to resupply NPPs following a LOOP event help to minimize the durations of LOOP events, especially unpredictable LOOP events. Discussions with NPP licensees indicate that some licensees do not have such agreements in place, but instead attempt restoration of their EDGs following a potential SBO. RIS 2004-05 states that NPPs should have procedures available consistent with the guidance in Section 2 of RG 1.155 for restoration of offsite power following a LOOP or SBO event.

Losses of offsite power caused by grid failures at a frequency of $20 years in accordance with Regulatory Guide 1.155

The data collected in accordance with TI2515/156 indicate that some nuclear power plants have experienced grid-related LOOP events since the nuclear power plants were initially analyzed in accordance with the criteria in RG 1.155. The staff is concerned that these nuclear power plants have not been reanalyzed to determine whether their SBO coping durations remain consistent with the guidance in RG 1.155 subsequent to these LOOP events. The staff is also concerned that some plants may be inappropriately eliminating some of these grid events from their operating experience data base.

In view of the above, power reactor licensees may depend on information obtained from their TSOs in order to make operability determinations for TS compliance; to perform risk assessments under the maintenance rule; and to assure compliance with the SBO rule. Accordingly, the NRC staff is requesting information on such matters from addresses. The NRC staff has not, however, identified any corrective actions that might be warranted.

REQUESTED INFORMATION

In accordance with 10 CFR 50.54(f), addressees are required to submit written responses to this generic letter within 60 days of its date.

In their responses, addressees are requested to answer the following questions and provide the information to the NRC with respect to each of their NPPs:

Use of nuclear power plant/transmission system operator protocols and real time contingency analysis programs to monitor grid conditions in accordance with GDC 17 and to determine operability of offsite power systems under plant technical specifications

1. General Design Criterion (GDC) 17, “Electric power systems,” of Appendix A, ”General Design Criteria for Nuclear Power Plants,” to Title10, Part 50, of the Code of Federal Regulations (CFR) requires, in part, that licensees minimize the probability of the loss of power from the transmission network given a loss of power generated by the nuclear power unit. In order to determine if you have taken the necessary steps to minimize the probability of loss of offsite power (LOOP) following a reactor trip in accordance with GDC 17, describe what formal agreements you have for your transmission system operator (TSO) to promptly notify you when conditions of the surrounding grid are such that degraded voltage (i.e., below TS requirements) or LOOP could occur following a trip of the reactor unit. Would the low switchyard voltage initiate operation of plant degraded voltage protection?

   Specifically, what is the time period required for the notification? Do you have procedures to periodically check with the TSO to determine the grid condition and ascertain any conditions that would require a notification? Describe the grid conditions that would trigger a notification.

   If you do not have a formal agreement with your TSO, please describe why you believe you comply with the provisions of GDC 17 as stated above, or describe what actions you intend to take to establish the necessary formal agreement with your TSO.

2. GDC 17 requires, in part, that licensees minimize the probability of the loss of power from the transmission network given a loss of power generated by the nuclear power unit. In order to determine if you have taken the necessary steps to minimize the probability of LOOP following a reactor trip in accordance with GDC 17, describe how you ensure that the offsite power system will remain operable following a trip of your NPP.

We are particularly interested in information regarding whether your NPP's TSO uses a real-time contingency analysis (RTCA) program to determine grid conditions that would make the NPP offsite power system inoperable in the event of various contingencies? The type of information we are interested in includes the following: Does your NPP's TSO use the RTCA program as the basis for notifying the NPP when such a condition is identified? Would the RTCA program utilized by your TSO identify the condition where a trip of the NPP results in switchyard voltages (immediately and/or long-term) below the minimum TS requirements and operation of plant degraded voltage protection? How frequently does the RTCA program update? Provide details of RTCA-identified contingency conditions that would trigger an NPP notification from the TSO. Is the NPP notified of periods when the RTCA program is unavailable to the TSO, and does the NPP conduct an offsite power system operability determination when such a notification is received? Subsequent to an unscheduled inadvertent trip of the NPP, are the resultant switchyard voltages verified by procedure to be bounded by the voltages predicted by the RTCA?

If a RTCA program is not available to the NPP's TSO, are there any plans for the TSO to obtain one? If so, on what schedule? If an RTCA program is not available, does your TSO perform periodic studies to verify that adequate offsite power capability, including adequate NPP post-trip switchyard voltages (immediate and/or long-term), will be available to the NPP over the projected time frame of the study? Are the key assumptions and parameters of these periodic studies translated into TSO guidance to ensure that the transmission system is operated within the bounds of the analyses? If the bounds of the analyses are exceeded, does this condition trigger the notification provisions discussed in question 1 above?

If your TSO does not use, or you do not have access to the results of a RTCA program, or that your TSO does not perform and make available to you periodic studies that determine the adequacy of offsite power capability; please describe why you believe you comply with the provisions of GDC 17 as stated above, or describe what actions you intend to take to ensure that the offsite power system will be sufficiently reliable and remain operable with high probability following a trip of your NPP.

3. GDC 17 requires, in part, that licensees minimize the probability of the loss of power from the transmission network given a loss of power generated by the nuclear power unit. NPP TS requirements also require that the plant's offsite power system be operable as part of the plant's limiting conditions of operation. In order to determine if you have taken the necessary steps to minimize the probability of LOOP following a reactor trip in accordance with GDC 17 and your plant TS, describe how you ensure that the NPP's offsite power system and safety-related components will remain operable when degraded switchyard voltages are present.

   Specifically, when the TSO notifies the NPP operator a trip of the NPP would result in switchyard voltages (immediately and/or long term) below TS minimum requirements and would result in operation of plant degraded voltage protection, is the NPP offsite power system declared inoperable under the plant TSs? If not, why not? If onsite safety-related equipment (e.g., emergency diesel generators or safety-related motors) are lost and incapable of performing their required safety functions as a result of responding to an emergency actuation signal during this condition, are they declared inoperable as well? If not, why not? Do you evaluate onsite safety-related equipment to

determine whether it will operate as designed during this condition? When the NPP is notified by the TSO of other grid conditions that may impair the capability or availability of offsite power, are any plant TS action statements entered? If so, please identify them.

If you believe your plant TS does not require you to declare your offsite power system or safety-related equipment inoperable in any of the aforementioned scenarios, describe why you believe you comply with the provisions of GDC 17 and your plant TS as stated above, or describe what actions you intend to take to ensure that the offsite power system and safety-related components will remain operable when degraded switchyard voltages are present.

4. GDC 17 requires, in part, that licensees minimize the probability of the loss of power from the transmission network given a loss of power generated by the nuclear power unit. NPP TS requirements also require that the plant's offsite power system be operable as part of the plant's limiting conditions of operation. In order to determine if you have taken the necessary steps to minimize the probability of LOOP following a reactor trip in accordance with GDC 17 and your plant TS, describe how you ensure that the offsite power system will remain operable following a trip of your NPP.

Specifically, do the NPP operators have any guidance in plant TS Bases sections, the Final Safety Analysis Report, or plant procedures regarding situations where the condition of plant-controlled or -monitored equipment (e.g., voltage regulators, auto tap changing transformers, capacitors, static VAR compensators, main generator voltage regulators, etc.) can adversely affect the operability of the NPP offsite power system?

If your TS Bases sections, the Final Safety Analysis Report, or plant procedures do not provide guidance regarding situations where the condition of plant-controlled or -monitored equipment can adversely affect the operability of the NPP offsite power

system, describe why you believe you comply with the provisions of GDC 17 and the plant TS as stated above, or describe what actions you intend to take to ensure that guidance exists to address situations where the condition of plant-controlled or -monitored equipment can adversely affect the operability of the NPP offsite power system.

Use of nuclear power plant/transmission system operator protocols to monitor grid conditions for consideration in maintenance risk assessments required by 10 CFR 50.65

5. 10 CFR 50.65(a)(4) requires that licensees assess and manage the increase in risk that may result from proposed maintenance activities before performing the maintenance activities. As set forth above, grid reliability evaluations should be performed as part of the maintenance risk assessment required by 10 CFR 50.65 before taking a risk-significant piece of equipment (including but not limited to an EDG, a battery, a steam-driven pump, an alternate AC power source, etc.) out of service to do maintenance activities, including surveillances, post-maintenance testing, and corrective and preventive maintenance. In order to determine if you have taken the necessary steps to assess and manage the increase in risk that may result from proposed maintenance activities before performing the maintenance activities, please describe how you perform the grid reliability evaluations as part of the maintenance risk assessment required by 10 CFR 50.65.

Specifically, is a grid reliability evaluation performed at your NPP as part of the maintenance risk assessment required by 10 CFR 50.65, before taking a risk-significant piece of equipment (including an EDG, a battery, a steam-driven pump, an alternate AC power source, etc.) out of service to do maintenance activities, including surveillances, post-maintenance testing, and corrective and preventive maintenance? Are seasonal variations in the probability of a LOOP at your plant site considered in the evaluation? Is

the summer (May - October) a period of peak stress on the grid surrounding your NPP site? Do you contact the TSO to determine current and anticipated grid conditions as part of the grid reliability evaluation performed prior to taking risk-significant equipment out of service? Do you use a formal agreement or use formal procedures with your TSO, or do you contact the TSO periodically over the course of the out-of-service condition to check for a worsening grid condition that could emerge during a maintenance activity in progress? Is the TSO expected to notify the NPP of such a condition?

If a grid reliability evaluation that includes consideration of seasonal variations in LOOP probability is not performed as part of the maintenance risk assessment required by 10 CFR 50.65, and a formal agreement with the TSO or formal procedures to aid in the communication between the NPP and TSO are nonexistent (i.e., not part of the maintenance risk assessment required by 10 CFR 50.65), describe why you believe you comply with the provisions of 10 CFR 50.65(a)(4) as stated above; or describe what actions you intend to take to ensure that the increase in risk that may result from proposed maintenance activities is assessed and managed in accordance with 10 CFR 50.65(a)(4).

6. 10 CFR 50.65(a)(4) requires that licensees assess and manage the increase in risk that may result from proposed maintenance activities before performing the maintenance activities. As set forth above, grid reliability evaluations should be performed as part of the maintenance risk assessment required by 10 CFR 50.65 before taking a risk-significant piece of equipment out of service to do maintenance activities, including surveillances, post-maintenance testing, and corrective and preventive maintenance. In order to determine if you have taken the necessary steps to assess and manage the increase in risk that may result from proposed maintenance activities before performing

the maintenance activities, please describe how you perform the grid reliability evaluations as part of the maintenance risk assessment required by 10 CFR 50.65. Specifically, does the TSO coordinate transmission system maintenance activities that can have an impact on the NPP operation with the NPP operator? Does the NPP operator coordinate NPP maintenance activities that can have an impact on the transmission system with the TSO? How are these matters accomplished?

If there is no coordination between the NPP operator and the TSO regarding transmission system maintenance or NPP maintenance activities, describe why you believe you comply with the provisions of 10 CFR 50.65(a)(4) as stated above, or describe what actions you intend to take to ensure that the increase in risk that may result from proposed maintenance activities is assessed and managed in accordance with 10 CFR 50.65(a)(4).

Offsite power restoration procedures in accordance with 10 CFR 50.63 as developed in Section 2 of Regulatory Guide 1.155

7. Pursuant to 10 CFR 50.63, the NRC requires that each NPP licensed to operate be able to withstand a SBO for a specified duration and recover from the SBO. NRC Regulatory Guide (RG) 1.155 provides guidance for licensees to use in developing their approach for complying with 10 CFR 50.63. In order to determine if your current practices are consistent with the SBO requirements of 10 CFR 50.63 as developed in RG 1.155 please address the following:

Consistent with the recommendations in Section 2 of RG 1.155, it is expected that you have established an agreement with your plant's TSO that identify local power sources and transmission paths that could be made available to resupply your plant following a LOOP event. Briefly describe any agreement made with the TSO.

If you have not established an agreement with your plant's TSO that identifies local power sources and transmission paths that could be made available to resupply your plant following a LOOP event, describe why you believe you comply with the provisions of 10 CFR 50.63 as developed in RG 1.155, or describe what actions you intend to take to establish such an agreement with your plant's TSO.

Losses of offsite power caused by grid failures at a frequency of $20 years in accordance with 10 CFR 50.63 as developed in Table 4 of Regulatory Guide 1.155

8. Pursuant to 10 CFR 50.63, the NRC requires that each NPP licensed to operate be able to withstand a SBO for a specified duration and recover from the SBO. NRC Regulatory Guide (RG) 1.155 provides guidance for licensees to use in developing their approach for complying with 10 CFR 50.63. In order to determine if your current practices are consistent with the SBO requirements of 10 CFR 50.63, describe how your NPP maintains its SBO coping capabilities in accordance with 10 CFR 50.63.

   Specifically, has your NPP site experienced a grid-related total loss of offsite power since its coping duration under 10 CFR 50.63 was initially determined? If so, has the NPP been reevaluated using the guidance in Table 4 of RG 1.155 to determine if it should be assigned to the P3 offsite power design characteristic group? What were the results of this reevaluation, and was the initially determined coping duration for the NPP adjusted?

   If your NPP site experienced a grid-related total LOOP since the coping duration under 10 CFR 50.63 was initially determined and has not been reevaluated using the guidance in Table 4 of RG 1.155, describe why you believe you comply with the provisions of 10 CFR 50.63 as stated above, or describe what actions you intend to take to ensure that the NPP maintains its SBO coping capabilities in accordance with 10 CFR 50.63.

Actions to ensure compliance

9. If you determine that any action is warranted to bring your NPP into compliance with NRC regulatory requirements, including TS, GDC 17, 10 CFR 50.65(a)(4), or 10 CFR 50.53, describe the schedule for implementing it.

The required written response should be addressed to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, 11555 Rockville Pike, Rockville, Maryland 20852, under oath or affirmation under the provisions of Section 182a of the Atomic Energy Act of 1954, as amended, and 10 CFR 50.54(f). In addition, a copy of the response should be sent to the appropriate regional administrator.

Addressees may request extension of the time in which a response to this generic letter is required in writing within 30 days of the date of this generic letter. The NRC will not grant such an extension except for good cause shown.

An addressee should consult SECY-04-0191, "Withholding Sensitive Unclassified Information Concerning Nuclear Power Reactors From Public Disclosure," dated October 19, 2004, to determine if its response contains sensitive unclassified (nonsafeguards) information and should be withheld from public disclosure. SECY-04-0191 is available on the NRC public Web site.

REASONS FOR INFORMATION REQUEST

This generic letter requests addressees to submit information. The requested information will enable the NRC staff to determine whether applicable requirements (plant TSs in conjunction with 10 CFR Part 50, Appendix A, General Design Criteria 17; 10 CFR 50.65(a)(4); and 10 CFR 50.63) are being met in regard to the grid topics addressed.

RELATED GENERIC COMMUNICATIONS

NRC Regulatory Issue Summary 2004-05, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power," dated April 15, 2004 (ADAMS Accession No. ML040990550).

BACKFIT DISCUSSION

Under the provisions of Section 182a of the Atomic Energy Act of 1954, as amended, and 10 CFR 50.54(f), this generic letter transmits an information request for the purpose of verifying compliance with applicable existing requirements. Specifically, the requested information will enable the NRC staff to determine whether applicable requirements (plant TSs in conjunction with 10 CFR Part 50, Appendix A, General Design Criteria 17; 10 CFR 50.65(a)(4); and 10 CFR 50.63) are being met in regard to the grid topics addressed. No backfit is either intended or approved in the context of issuance of this generic letter. Therefore, the staff has not performed a backfit analysis.

***FEDERAL REGISTER* NOTIFICATION**

A notice of opportunity for public comment on this generic letter was published in the *Federal Register* (xx FR xxxxx) on {date}. [Comments were received from {indicate the number of commentors by type}. The staff considered all comments that were received. The staff's evaluation of the comments is publicly available through the NRC's Agencywide Documents Access and Management System (ADAMS) under Accession No. ML05xxxxxxx.]

SMALL BUSINESS REGULATORY ENFORCEMENT FAIRNESS ACT

The NRC has determined that this action is not subject to the Small Business Regulatory Enforcement Fairness Act of 1996.

PAPERWORK REDUCTION ACT STATEMENT

This generic letter contains information collection requirements that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). These information collections were approved by the Office of Management and Budget, approval number 3150-0011, which expires on February 28, 2007.

The burden to the public for these mandatory information collections is estimated to average 60 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of these information collections, including suggestions for reducing the burden, to the Records and FOIA/Privacy Services Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet electronic mail to INFOCOLLECTS@NRC.GOV; and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0011), Office of Management and Budget, Washington, DC 20503.

Public Protection Notification

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

CONTACT

Please direct any questions about this matter to the technical contact(s) or the Lead Project Manager listed below, or to the appropriate Office of Nuclear Reactor Regulation (NRR) project manger.

/RA/

Bruce A. Boger, Director
Division of Inspection Program Management
Office of Nuclear Reactor Regulation

Technical Contact: James Lazevnick, NRR
301-415-2782

Lead Project Manager: John Lamb, NRR
301-415-1446

END OF DRAFT GENERIC LETTER

Documents may be examined, and/or copied for a fee, at the NRC's Public Document Room at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland. Publicly available records will be accessible electronically from the Agencywide Documents Access and Management System (ADAMS) Public Electronic Reading Room on the Internet at the NRC Web site, http://www.nrc.gov/NRC/ADAMS/index.html. If you do not have access to ADAMS or

if you have problems in accessing the documents in ADAMS, contact the NRC Public Document Room (PDR) reference staff at 1-800-397-4209 or 301-415-4737 or by e-mail to pdr@nrc.gov.

Dated at Rockville, Maryland, this 6th day of April 2005.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Patrick H. Hiland, Chief
Reactor Operations Branch
Division of Inspection Program Management
Office of Nuclear Reactor Regulation