Progress Energy

Serial: RNP-RA/06-0014

APR 03 2006

United States Nuclear Regulatory Commission
ATTN: Document Control Desk
11555 Rockville Pike
Rockville, Maryland 20852

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23

RESPONSE TO NRC GENERIC LETTER 2006-02,
"GRID RELIABILITY AND THE IMPACT ON
PLANT RISK AND THE OPERABILITY OF OFFSITE POWER"

Ladies and Gentlemen:

On February 1, 2006, NRC Generic Letter 2006-02, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power," was issued requesting that licensees provide a response within 60 days. Carolina Power and Light Company, also known as Progress Energy Carolinas, Inc. (PEC), is providing the response for H. B. Robinson Steam Electric Plant, Unit No. 2, in Attachment II to this letter.

Attachment I provides an Affirmation in accordance with the provisions of Section 182a of the Atomic Energy Act of 1954, as amended, and 10 CFR 50.54(f).

If you have any questions concerning this matter, please contact Mr. C. T. Baucom at (843) 857-1253.

Sincerely,

Jan Lucas

Jan F. Lucas
Manager – Support Services – Nuclear

BAN/ban

Attachments:

I. Affirmation
II. Response to NRC Generic Letter 2006-02, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power"

c: Dr. W. D. Travers, NRC, Region II
Mr. C. P. Patel, NRC, NRR
NRC Resident Inspector

Progress Energy Carolinas, Inc.
Robinson Nuclear Plant
3581 West Entrance Road
Hartsville, SC 29550

A123

AFFIRMATION

The information contained in letter RNP-RA/06-0014 is true and correct to the best of my information, knowledge, and belief; and the sources of my information are officers, employees, contractors, and agents of Carolina Power and Light Company, also known as Progress Energy Carolinas, Inc. I declare under penalty of perjury that the foregoing is true and correct.

Executed On: 03 April 2006

John W. Moyer
Vice President
HBRSEP, Unit No. 2

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

RESPONSE TO NRC GENERIC LETTER 2006-02, "GRID RELIABILITY AND THE IMPACT ON PLANT RISK AND THE OPERABILITY OF OFFSITE POWER"

Background

On February 1, 2006, the NRC issued Generic Letter 2006-02, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power." Responses to Generic Letter 2006-02 were required to be submitted within 60 days of the date of the letter. The following information is provided, as requested.

NRC Question 1 Topic

Use of protocols between the NPP [Nuclear Power Plant] licensee and the TSO [Transmission System Operator], ISO [Independent System Operator], or RC [Reliability Coordinator]/RA [Reliability Authority] to assist the NPP licensee in monitoring grid conditions to determine the operability of offsite power systems under plant TS [Technical Specifications].

NRC Question 1(a)

Do you have a formal agreement or protocol with your TSO?

Response 1(a)

Yes, there is a formal interface agreement between H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, and the TSO. Progress Energy Carolinas, Inc. (PEC), nuclear power plants and transmission system operations are conducted under a vertically integrated utility business model. Under this business model, the transmission system is not in an RTO (Regional Transmission Organization) or operated by an ISO (Independent System Operator) as is the case in other parts of the country. Instead, under PEC's vertically integrated utility business model, the System Operator (Grid Operations) operates the transmission system and provides guidance for the operation of generation systems (nuclear and non-nuclear). The System Operator is in the same company that holds the licenses to operate the nuclear power plants. Nuclear power plant offsite power reliability is managed by the System Operators through communications with licensed Nuclear Plant Operators and Work Control Management personnel at the plants as governed by the formal interface agreement. [Note: In subsequent responses, Grid Operations shall be referred to as the Transmission System Operator (TSO) and HBRSEP, Unit No. 2, shall be referred to as the Nuclear Power Plant (NPP).]

NRC Question 1(b)

Describe any grid conditions that would trigger a notification from the TSO to the NPP licensee and if there is a time period required for the notification.

Response 1(b)

PEC's interface agreement requires both daily and weekly communications between the NPP Operators and the TSO to discuss the status of the plant and the transmission system, review upcoming work activities, and discuss the operating conditions scheduled or anticipated for the current day and the next seven days.

In addition to normal operational communications, the TSO initiates communications to NPP Operators for the following infrequent or off-normal situations:

- Tier 1 Transmission Line Out
- Minimum Load Emergency
- System Contingency Alert
- System Reliability Alert
- Energy Emergency Alert (EEA) Levels 1 – 3
- Anticipated Loss of Coolant Accident (LOCA) Voltage Support Problem
- Actual LOCA Voltage Support Problem
- Significant Grid Frequency Problem
- Substation Problem (Plant-Impacting Substation Equipment Status Change)
- Severe Weather Conditions
- Sabotage
- Terrorism

No specific time period is applied. However, for anticipated and actual voltage support problems the requirement is to make the notification promptly.

NRC Question 1(c)

Describe any grid conditions that would cause the NPP licensee to contact the TSO. Describe the procedures associated with such a communication. If you do not have procedures, describe how you assess grid conditions that may cause the NPP licensee to contact the TSO.

Response 1(c)

The grid parameters observable to NPP Operators include voltage and frequency, generator reactive output, generator breaker status, and certain switchyard alarm points. NPP Operators, by procedure, notify the TSO for changes in the following grid conditions:

- Plant power changes
- Changes to switchyard voltage, and generator VAR loading

- High voltage equipment problems that could impact plant output, stability, or availability (i.e., large power transformer problems, main generator problems, isophase bus problems, etc.)
- Change in status of voltage regulating devices (such as generator voltage regulator in manual versus auto)
- Other notifications associated with plant equipment (paralleling of emergency diesel generators, Limiting Conditions for Operation (LCO), etc.)
- High switchyard voltage
- Low frequency condition

NRC Question 1(d)

Describe how NPP operators are trained and tested on the use of the procedures or assessing grid conditions in Question 1(c).

Response 1(d)

NPP Operators are trained on various degrading grid conditions both in the classroom and simulator. This includes training on the use of Conduct of Operations Procedures and the interface agreement.

The NPP Operators are trained using the simulator under the following conditions:

- Degraded grid frequency conditions requiring a manual reactor trip
- Loss of all AC power due to adverse weather
- Aircraft crash in the switchyard
- Loss of the startup transformer
- Chemical explosion that results in the loss of the dedicated shutdown diesel generator and subsequent loss of the startup transformer
- Grid instabilities
- General procedures that provide controlled changes to generator output

Classroom training consists of:

- Systems training for the switchyard and medium voltage systems
- Significant Operating Experience Report (SOER) training on loss of grid
- Interface agreement for transmission activities
- Abnormal procedures for system frequency conditions
- General procedures for maneuvering the plant

NRC Question 1(e)

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

Response to Question 1(e)

HBRSEP, Unit No. 2, has a formal agreement with the TSO.

NRC Question 1(f)

If you have an existing formal interconnection agreement or protocol that ensures adequate communication and coordination between the NPP licensee and the TSO, describe whether this agreement or protocol requires that you be promptly notified when the conditions of the surrounding grid could result in degraded voltage (i.e., below TS nominal trip set-point value requirements; including NPP licensees using allowable value in its TSs) or LOOP (loss of offsite power) after a trip of the reactor unit(s).

Response to Question 1(f)

The interface agreement requirements that are in place in this regard are accomplished by the TSO who monitors key grid parameters and uses predictive analysis tools. The procedures used by the TSO direct prompt notification of NPP Operators of conditions for which there would not be adequate switchyard voltage, including predicted nuclear plant trip conditions. Separate steps are included in these procedures for both existing conditions and conditions which are anticipated to occur. The intent of these separate steps is to provide early warning to NPP Operators of problem conditions.

NRC Question 1(g)

Describe the low switchyard voltage conditions that would initiate operation of plant degraded voltage protection.

Response to Question 1(g)

If voltage on the HBRSEP, Unit No. 2, 480V emergency buses drops below 430V (+/- 4V) for at least 10 seconds, degraded grid voltage relays (DGVR) will actuate disconnecting the safety buses from offsite power and transferring the loads to the on-site emergency diesel generators. The minimum required switchyard voltage provided to the TSO to operate the grid (113.7kV) is high enough to prevent DGVR actuation from occurring during post trip load sequencing. TSO procedures ensure minimum voltage criterion is maintained and corrective actions are taken as necessary.

NRC Question 2 Topic

Use of criteria and methodologies to assess whether the offsite power system will become inoperable as a result of a trip of your NPP.

NRC Question 2(a)

Does your NPP's TSO use any analysis tools, an online analytical transmission system studies program, or other equivalent predictive methods to determine the grid conditions that would make the NPP offsite power system inoperable during various contingencies? If available to you, please provide a brief description of the analysis tool that is used by the TSO.

Response to Question 2(a)

Yes, the TSO uses procedures based on enveloping transmission system analyses to operate the grid. As long as the grid configuration is within that allowed by the procedure under various system loading conditions, adequate nuclear plant post-trip voltage support is assured. Specific case studies are also used from time to time to support planned grid configurations when not clearly bounded by existing studies. In addition to the transmission system analysis-based procedures, the TSO also uses monitoring/predictive analysis computer programs that can predict NPP switchyard voltages expected to occur upon realization of any one of a number of possible losses to the grid, such as a trip of the NPP generator, a trip of another large generator, or the loss of an important transmission line. This monitoring/predictive analysis computer program operates based on raw data from transducers across the system which is processed through a state estimator to generate a current state snapshot of the system. The output is then processed through a contingency analysis program that generates a set of new results with various single elements of the system out of service. These results are then screened against a predetermined set of acceptance limits. Postulated scenarios that do not meet the acceptance limits are listed for review by the TSO.

NRC Question 2(b)

Does your NPP's TSO use an analysis tool as the basis for notifying the NPP licensee when such a condition is identified? If not, how does the TSO determine if conditions on the grid warrant NPP licensee notification?

Response to Question 2(b)

Yes, NPP Operators are notified by the TSO based on grid configurations being outside of predefined procedure requirements or based on unsatisfactory monitoring/predictive analysis computer program tool results.

NRC Question 2(c)

If your TSO uses an analysis tool, would the analysis tool identify a condition in which a trip of the NPP would result in switchyard voltages (immediate and/or long-term) falling below TS nominal trip setpoint value requirements (including NPP licensees using allowable value in its TSs) and consequent actuation of plant degraded voltage protection? If not, discuss how such a condition would be identified on the grid.

Response to Question 2(c)

Yes, the analysis tool used by the TSO would identify such a condition.

NRC Question 2(d)

If your TSO uses an analysis tool, how frequently does the analysis tool program update?

Response to Question 2(d)

The predictive analysis computer program updates every 10 minutes.

NRC Question 2(e)

Provide details of analysis tool-identified contingency conditions that would trigger an NPP licensee notification from the TSO.

Response to Question 2(e)

Analysis tool-identified contingency conditions would include an actual or anticipated grid configuration outside the enveloping transmission system analyses-based procedure requirements as well as monitoring/predictive analysis computer program validated results that do not meet the predetermined acceptance limit for minimum required switchyard voltage. The analyzed contingencies that are evaluated include loss of another generator, loss of a significant transmission line, loss of a capacitor bank, or loss of the plant itself. If the plant voltage requirement cannot be met under any of the contingencies considered, NPP Operators will be notified. The same minimum required switchyard voltage limit bases that are used in the grid operating procedures are also used in the predictive analysis computer programs.

NRC Question 2(f)

If an interface agreement exists between the TSO and the NPP licensee, does it require that the NPP licensee be notified of periods when the TSO is unable to determine if offsite power voltage and capacity could be inadequate? If so, how does the NPP licensee determine that the offsite power would remain operable when such a notification is received?

Response to Question 2(f)

Yes, if the analysis tools are out of service such that system conditions are indeterminate, then implementing procedures used by the TSO require notification to be made. This could indicate a condition where adequate voltage support capability for HBRSEP, Unit No. 2, is outside the guidelines of the current analysis. Upon such notification, NPP Operators will evaluate offsite power operability. In addition, the TSO will continue efforts to determine by alternate method(s) (e.g., offline study) if plant voltage requirements are satisfied.

NRC Question 2(g)

After an unscheduled inadvertent trip of the NPP, are the resultant switchyard voltages verified by procedure to be bounded by the voltages predicted by the analysis tool?

Response to Question 2(g)

No, however, such analyses have been performed on a case-by-case basis to validate predicted results.

NRC Question 2(h)

If an analysis tool is not available to the NPP licensee's TSO, do you know if there are any plans for the TSO to obtain one? If so, when?

Response to Question 2(h)

The PEC TSO has an analysis tool available.

NRC Question 2(i)

If an analysis tool 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 licensee over the projected timeframe of the study?

Response to Question 2(i)

The PEC TSO has an analysis tool available.

NRC Question 2(i)(a)

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?

Response to Question 2(i)(a)

The PEC TSO has an analysis tool available.

NRC Question 2(i)(b)

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?

Response to Question 2(i)(b)

The PEC TSO has an analysis tool available.

NRC Question 2(j)

If your TSO does not use, or you do not have access to the results of an analysis tool, or 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 compensatory 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.

Response to Question 2(j)

The PEC TSO has an analysis tool available.

NRC Question 3 Topic

Use of criteria and methodologies to assess whether the NPP's offsite power system and safety-related components will remain operable when switchyard voltages are inadequate.

NRC Question 3(a)

If the TSO notifies the NPP operator that a trip of the NPP, or the loss of the most critical transmission line or the largest supply to the grid would result in switchyard voltages (immediate and/or long-term) below TS nominal trip setpoint value requirements (including NPP licensees using allowable values in its TSs) and would actuate plant degraded voltage protection, is the NPP offsite power system declared inoperable under the plant TSs? If not, why not?

Response to Question 3(a)

Upon notification from the TSO that adequate voltage support cannot be provided by the system grid in the event of a LOCA, the NPP Operator declares the offsite power system inoperable. The NPP Operator would enter TS LCO 3.8.1.A requiring that offsite power is restored to operable within 24 hours or the unit be placed in MODE 3 within 6 hours and MODE 5 within 36 hours. Contingencies that are not directly related to a unit trip and have not actually occurred, such as the postulated loss of an important transmission line or other large generator, do not necessarily make offsite power inoperable. Should such an event actually occur, making voltage support inadequate, notification from the TSO will be made and offsite power would then be declared inoperable.

Upon notification from the TSO that a condition is anticipated where adequate voltage support cannot be provided in the event of a LOCA due to the loss of the most critical transmission line, a trip of the plant, or the loss of the largest supply to the grid, the NPP Operator would take

preparatory actions without entering an LCO Action Statement. The control room would contact the on-call manager and enter an Operability Determination to evaluate the condition. This would be in accordance with OPS-NGGC-1305, "Operability Determinations." If the offsite power source becomes unavailable or is demonstrated to be inoperable, then the provisions of TS 3.8.1 would apply.

NRC Question 3(b)

If onsite safety-related equipment (e.g., emergency diesel generators or safety-related motors) is lost when subjected to a double sequencing (LOCA with delayed LOOP event) as a result of the anticipated system performance and is incapable of performing its safety functions as a result of responding to an emergency actuation signal during this condition, is the equipment considered inoperable? If not, why not?

Response to Question 3(b)

Analysis of this scenario is not part of the HBRSEP, Unit No. 2, licensing basis and there is no plant-specific evaluation of record for the subject scenario (LOCA with delayed LOOP event). If this were to occur the equipment would be considered inoperable, however, the design of the HBRSEP, Unit No. 2, emergency safeguards sequencer is such that loss of safety-related equipment during a "double-sequencing" event (LOCA with delayed LOOP) would not be expected. As stated in Updated Final Safety Analysis Report (UFSAR) Section 8.3, the emergency safeguards sequencer system sequentially starts emergency equipment during LOCA, LOOP, or LOCA/LOOP conditions. The LOOP signal is generated by the respective 480V emergency bus under-voltage relay and the LOCA signal is generated by the safety injection actuation signal relay. HBRSEP, Unit No. 2, has not analyzed the impact of delayed injection on fuel limits.

A LOOP signal trips the affected 480V emergency bus main breaker and its motor feeder breakers. Simultaneously, start signals are sent to the EDGs and emergency safeguards sequencers. Within 10 seconds, voltage is restored (via the EDGs) to the affected 480V emergency buses and sub-fed motor control centers. Loads required for a LOOP condition are then sequenced on.

A LOCA signal starts the EDGs, but does not connect the EDGs to the 480V emergency buses if off-site power is available. No 480V emergency bus breakers trip on a LOCA signal (with off-site power available). Sequenced loading commences immediately since there is no time delay for the EDGs to come up to speed and voltage.

A LOCA/LOOP signal results in load shedding as discussed previously for a LOOP. Similar to a LOOP, within 10 seconds, the EDGs connect to their respective 480V emergency buses after which the remaining essential loads are sequenced on.

Essential loads are divided into "load blocks" that are sequenced on to the EDGs, as shown in UFSAR Table 8.3.1-5. There are approximately 5 second delays between load blocks except for

the delay between safety injection and residual heat removal pumps which are 10 seconds. The 480V emergency bus under-voltage and degraded grid voltage relays remain available during LOCA sequencing with off-site power available. During a LOOP or LOCA/LOOP where the EDGs are supplying the emergency power systems, the load shedding function of these relays is disabled.

In the scenario described in Question 3(b), a LOCA occurs first. No load shedding will occur. If not already running, safety-related loads will start at the proper time in accordance with the emergency load sequencer program. If a LOOP occurs during load sequencing, the bus under-voltage relay logic would trip the 480V emergency bus main breaker and motor feeder breakers as discussed above. The emergency diesel generators would already be running in response to the LOCA. The EDG breakers would then close, the load sequencer would re-start, and loads would be sequenced on in accordance with the LOCA/LOOP sequencer. If a LOOP occurred first, followed by a LOCA signal during sequencing, the LOOP sequencer would terminate. Loads that had been sequenced on by the LOOP sequencer would remain running and the LOCA sequencer would start the other LOCA-required loads. EDG overloading and load sequencer "lock-up" (due to the inability of the load sequencer to reset and begin re-sequencing if interrupted) would not occur.

NRC Question 3(c)

Describe your evaluation of onsite safety-related equipment to determine whether it will operate as designed during the condition described in Question 3(b).

Response to Question 3(c)

There is no HBRSEP, Unit No. 2, plant-specific evaluation for the subject scenario (LOCA with delayed LOOP event) because this scenario is not part of the licensing basis. However, minimum steady-state, minimum transient, and maximum steady-state voltage criteria are established for each safety-related power supply in Calculation RNP-E-8.002. Voltage criteria for each power supply is established by determining the voltage requirements of individual safety-related equipment components fed from each power supply and then "transposing" the voltage requirements of individual equipment up to the power supply considering cable voltage drop. Voltage criteria for the safety-related power supplies is then used in voltage study RNP-E-8.002 as described below.

Calculation RNP-E-8.002 calculates and evaluates power system voltages, loading, and available fault current under various plant operating conditions (e.g., normal full power, LOCA). Ensuring that safety-related power supplies operate within the minimum and maximum voltage criteria (established in Calculation RNP-E-8.002 as described above) provides a high level of assurance that safety-related equipment powered from these power supplies will not incur damage which could prevent them from functioning when required to do so under normal and accident conditions. In addition to evaluating emergency power system voltage adequacy by analysis, the settings of the emergency power system degraded grid voltage relays will ensure that abnormal power system voltage "sags" will not damage safety-related equipment and will ensure that

safety-related equipment will not be subjected to sustained voltages below the manufacturers' recommended values. The DGVR settings also ensure that control circuits will function properly, control circuit fuses will not blow, and MOV actuator torque will be sufficient. As noted in the response to Question 3(b), HBRSEP, Unit No. 2, has not analyzed the impact of delayed injection (due to double sequencing) on fuel limits. However, LOOP following a LOCA is an extremely low probability event unless the two events are not independent (i.e., the LOCA caused the LOOP).

NRC Question 3(d)

If the NPP licensee 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.

Response to Question 3(d)

Refer to the Response to Question 3(a) above.

NRC Question 3(e)

If you believe your plant TSs do not require you to declare your offsite power system or safety-related equipment inoperable in any of these circumstances, explain why you believe you comply with the provisions of GDC 17 and your plant TSs, or describe what compensatory actions you intend to take to ensure that the offsite power system and safety-related components will remain operable when switchyard voltages are inadequate.

Response to Question 3(e)

Refer to the Response to Question 3(a) above.

NRC Question 3(f)

Describe if and how NPP operators are trained and tested on the compensatory actions mentioned in your answers to questions 3(a) through (e).

Response to Question 3(f)

NPP Operators are trained in the classroom and simulator on OMM-001-2, "Shift Routines and Operating Practices," SORMC GD-22, "Robinson Plant Voltage Support & Coordination," and application of TS. These procedures describe the actions required if the TSO notifies the plant of the inability to support LOCA voltage. EPP-1, "Loss of All AC Power," directs the NPP Operator's response to a total loss of offsite power to ensure that some source of onsite power is restored. AOP-024, "Loss of Instrument Bus," directs the actions required once an emergency bus has separated from offsite power and has been re-energized by its emergency diesel generator. NPP Operators are also trained on electrical system design and operation, including

degraded grid response, emergency bus separation, and emergency diesel loading. Additional training has been developed for the classroom and simulator to further the understanding of the NPP Operator for plant response and applicable actions under degraded grid voltage conditions. Emergency Operating Procedure PATH-1, "Reactor Trip or Safety Injection," has continuous action statements which state, "If offsite power is lost, then restart emergency safeguard equipment." This ensures that the safety-related equipment is restarted to provide its safety function in the event that power is interrupted once the equipment has been actuated. This would be referred to as the double-sequencing of the LOCA with a delayed LOOP. Although this scenario is not analyzed, the NPP Operators are trained to use the continuous action steps within the procedures to ensure that core cooling is restored in a controlled and timely manner.

NRC Question 4 Topic

Use of criteria and methodologies to assess whether the offsite power system will remain operable following a trip of your NPP.

NRC Question 4(a)

Do the NPP operators have any guidance or procedures in plant TS bases sections, the final safety analysis report, or plant procedures regarding situations in which the condition of plant-controlled or -monitored equipment (e.g., voltage regulators, auto tap changing transformers, capacitors, static VAR compensators, main generator voltage regulators) can adversely affect the operability of the NPP offsite power system? If so, describe how the operators are trained and tested on the guidance and procedures.

Response to Question 4(a)

Yes, there is guidance in the TS Bases regarding the HBRSEP, Unit No. 2, offsite power circuit. In addition, the voltage regulator for the main generator is trained on in the classroom, qualification process, and with the simulator. Annunciator Panel Procedures (APP)-009 and APP-050 provide actions for failures within the main generator voltage regulator. These procedures have an effect on the onsite power sources and have limited impact on the offsite power sources.

NRC Question 4(b)

If your TS bases sections, the final safety analysis report, and plant procedures do not provide guidance regarding situations in which the condition of plant-controlled or -monitored equipment can adversely affect the operability of the NPP offsite power system, explain why you believe you comply with the provisions of GDC 17 and the plant TSs, or describe what actions you intend to take to provide such guidance or procedures.

Response to Question 4(b)

Refer to the Response to Question 4(a) above. Guidance exists within the TS Bases regarding the HBRSEP, Unit No. 2, offsite power circuit credited in the TS. HBRSEP, Unit No. 2, was constructed prior to the issuance of General Design Criterion (GDC) 17, and therefore the requirements of GDC 17 are not applicable to HBRSEP, Unit No. 2. The UFSAR provides a discussion of how HBRSEP, Unit No. 2, would comply with a plant-specific adaptation of the proposed Appendix A to 10 CFR 50, "General Design Criteria for Nuclear Power Plants." This was presented in the UFSAR as GDC 39.

NRC Question 5 Topic

Performance of grid reliability evaluations as part of the maintenance risk assessments required by 10 CFR 50.65(a)(4).

NRC Question 5(a)

Is a quantitative or qualitative grid reliability evaluation performed at your NPP as part of the maintenance risk assessment required by 10 CFR 50.65(a)(4) before performing grid-risk-sensitive maintenance activities? This includes surveillances, post-maintenance testing, and preventive and corrective maintenance that could increase the probability of a plant trip or LOOP or impact LOOP or SBO coping capability, for example, before taking a risk-significant piece of equipment (such as an EDG, a battery, a steam-driven pump, an alternate AC power source) out-of-service?

Response to Question 5(a)

Yes, maintenance on plant equipment is planned and scheduled using ADM-NGGC-0204, "Work Management." This procedure directs determination of the overall plant risk associated with the proposed removal of specific systems, structures, and components (SSCs) from service. The requirement of this procedure is implemented at HBRSEP, Unit No. 2, in accordance with OMM-048, "Work Coordination and Risk Assessment," which requires consideration of increases in plant risk caused by planned maintenance. This risk is determined by use of the "EOOS" program. The "EOOS" program allows input of the specific SSCs proposed to be removed from service, and displays the change in risk in graphical and numerical format. If the change in plant risk based on these maintenance activities reaches a predetermined threshold, the plant is required to take specific actions outlined in OMM-048. Input is also made to the "EOOS" program for work activities which may adversely affect the offsite power supplies.

NRC Question 5(b)

Is grid status monitored by some means for the duration of the grid-risk-sensitive maintenance to confirm the continued validity of the risk assessment and is risk reassessed when warranted? If not, how is the risk assessed during grid-risk-sensitive maintenance?

Response to Question 5(b)

Yes, the Progress Energy Nuclear Generation Group has established NGGM-IA-0003, "Transmission Interface Agreement for Operation, Maintenance, and Engineering Activities at Nuclear Plants," which specifies the responsibilities and lines of communication for the various organizations responsible for the operation, maintenance, and engineering of transmission facilities associated with nuclear plants, as well as the consideration of the impact their activities may have on their respective transmission facilities. This directive clearly defines the requirements for communication of planned activities, and changes in plant SSC status which may affect grid stability/reliability. The TSO is required to monitor system conditions to ensure adequate voltage is maintained to support each nuclear plant in the event of an accident, and promptly notify the NPP Operator of existing or anticipated conditions that would result in inadequate voltage support. OMM-048, "Work Coordination and Risk Assessment," requires that plant risk be reassessed based on emergent failures or degradation of plant SSCs.

NRC Question 5(c)

Is there a significant variation in the stress on the grid in the vicinity of your NPP site caused by seasonal loads or maintenance activities associated with critical transmission elements? Is there a seasonal variation (or the potential for a seasonal variation) in the LOOP frequency in the local transmission region? If the answer to either question is yes, discuss the time of year when the variations occur and their magnitude.

Response to Question 5(c)

Yes, the summer peak loads (July and August) as well as spring and fall maintenance outage activities, result in variation in the stress on the capability of the grid to supply power. These variations are predictable, planned for, and managed. The magnitude of the variations results in less margin in the system to provide adequate voltage support. For this reason, additional analytical studies are used to ensure adequate voltage support is maintained during these periods. Seasonal variation regarding LOOP events is indicated below. These events were plant centered and are not indicative of the reliability of the grid in the local transmission region.

Seasonal Variation Loop Events

Plant	Spring Mar.-May	Summer June-Aug.	Fall Sept.-Nov.	Winter Dec.-Feb.
HBRSEP, Unit No. 2	0	1	0	1

NRC Question 5(d)

Are known time-related variations in the probability of a LOOP at your plant site considered in the grid-risk-sensitive maintenance evaluation? If not, what is your basis for not considering them?

Response to Question 5(d)

Variations in the probability of a LOOP are addressed based on notification protocols with the TSO and local weather predictions, regardless of the time of year. Additional information regarding maintenance and risk assessment practices is provided in the Response to Question 5(a) above.

NRC Question 5(e)

Do you have contacts with the TSO to determine current and anticipated grid conditions as part of the grid reliability evaluation performed before conducting grid-risk-sensitive maintenance activities?

Response to Question 5(e)

Refer to the Response to Question 5(b) above. Also, requirements are given for the TSO to contact the NPP Operator each day to discuss plant status, and to conduct a review of upcoming work activities, as well as communications each week to discuss operating conditions scheduled or anticipated for the next seven days. The TSO is also required to monitor system conditions to ensure adequate voltage is maintained to support each nuclear plant in the event of an accident, and promptly notify the NPP Operator of existing or anticipated conditions that would result in inadequate voltage support. The NPP Operator is directed to notify the TSO of any plant activity that may impact generation capability.

NRC Question 5(f)

Describe any formal agreement or protocol that you have with your TSO to assure that you are promptly alerted to a worsening grid condition that may emerge during a maintenance activity.

Response to Question 5(f)

Interface agreements are in place between the TSO and the NPP Operator. The agreements, along with the operating procedures used by the TSO, ensure that early notification of worsening grid conditions take place. This occurs whether or not a specific maintenance activity is in progress at the plant.

With respect to potential grid problems that may be anticipated, the agreement requires both daily and weekly communications between the NPP Operator and the TSO to discuss the status of the plant and the transmission system, review upcoming work activities, and discuss the operating conditions scheduled or anticipated for the next day and the next seven days.

With respect to potential grid problems that may occur with little or no advance warning, the TSO is in a unique position to anticipate and assess grid problems via information obtained from the grid Supervisory Control and Data Acquisition System (SCADA System), communications with field personnel, communications with neighboring utilities, and timely reports from various

weather services. Implementing procedures require that the TSO monitor system conditions and promptly notify the NPP Operator of any existing or anticipated conditions that would result in inadequate voltage support.

NRC Question 5(g)

Do you contact your TSO periodically for the duration of the grid-risk-sensitive maintenance activities?

Response to Question 5(g)

No, the interface agreement does not specifically require additional periodic communication during grid-risk-sensitive maintenance activities. However, condition-specific communication would be provided should plant or grid conditions significantly change. The TSO is also required to monitor system conditions to ensure adequate voltage is maintained to support each nuclear plant in the event of an accident, and promptly notify the NPP Operator of existing or anticipated conditions that would result in inadequate voltage support. The NPP Operator is directed to notify the TSO of any plant activity that may impact generation capability.

NRC Question 5(h)

If you have a formal agreement or protocol with your TSO, describe how NPP operators and maintenance personnel are trained and tested on this formal agreement or protocol.

Response to Question 5(h)

NPP Operators are trained on NGGM-IA-0003, "Transmission Interface Agreement for Operation, Maintenance, and Engineering Activities at Nuclear Plants." This is presented in a classroom setting. Many of the major actions required by the NPP Operators have been incorporated into plant procedure OMM-001-2, "Shift Routines and Operating Practices." OMM-001-2 training is also performed in the classroom.

Plant maintenance personnel perform minimal work in the switchyard or with grid components. Any support of transmission maintenance personnel is scheduled through Outage and Scheduling which ensures evaluations/assessments are complete prior to allowing work.

Transmission maintenance personnel are responsible for maintenance on transmission lines, switchyard equipment (i.e., breakers and relaying), and transformers that supply offsite power into the plant. These personnel receive initial and annual refresher training in accordance with Section 11.2 of NGGM-IA-0003.

NRC Question 5(i)

If your grid reliability evaluation, performed as part of the maintenance risk assessment required by 10 CFR 50.65(a)(4), does not consider or rely on some arrangement for communication with the TSO, explain why you believe you comply with 10 CFR 50.65(a)(4).

Response to Question 5(i)

Arrangements are in place for communication between the NPP Operator and the TSO.

NRC Question 5(j)

If risk is not assessed (when warranted) based on continuing communication with the TSO throughout the duration of grid-risk-sensitive maintenance activities, explain why you believe you have effectively implemented the relevant provisions of the endorsed industry guidance associated with the maintenance rule.

Response to Question 5(j)

As described elsewhere in this response, risk is assessed when warranted.

NRC Question 5(k)

With respect to questions 5(i) and 5(j), you may, as an alternative, describe what actions you intend to take to ensure that the increase in risk that may result from proposed grid-risk-sensitive activities is assessed before and during grid-risk-sensitive maintenance activities, respectively.

Response to Question 5(k)

HBRSEP, Unit No. 2, does not intend to take any alternate actions at this time.

NRC Question 6 Topic

Use of risk assessment results, including the results of grid reliability evaluations, in managing maintenance risk, as required by 10 CFR 50.65(a)(4).

NRC Question 6(a)

Does the TSO coordinate transmission system maintenance activities that can have an impact on the NPP operation with the NPP operator?

Response to Question 6(a)

Yes, the TSO coordinates transmission system maintenance activities that can have an impact on plant operation with the NPP Operator and the onsite Plant Transmission Activities Coordinator

(PTAC). The Interface Agreement (NGGM-IA-0003) defines and controls the interfaces for operations, maintenance, and engineering activities. The PTAC serves as the single point of contact for transmission engineering, construction, and maintenance activities impacting the nuclear plant. In addition, the TSO communicates directly with the NPP Operators regarding operational interfaces as described in the Interface Agreement.

NRC Question 6(b)

Do you coordinate NPP maintenance activities that can have an impact on the transmission system with the TSO?

Response to Question 6(b)

Yes, the coordination of testing and maintenance activities at HBRSEP, Unit No. 2, which could affect electrical supply, is performed by the plant Outage and Scheduling organization and the PTAC, in accordance with NGGM-IA-0003. These activities are integrated into the on-line and outage scheduling processes in accordance with applicable site procedures. On-line maintenance risk evaluations are performed for each work week as schedule changes occur. Safe shutdown risk assessments are also performed to evaluate each outage schedule prior to the outage. These reviews include representatives from the applicable transmission area maintenance staff. This provides direct attention to transmission outage activities and aids in assessing their effects on defense-in-depth for electrical power supply.

NRC Question 6(c)

Do you consider and implement, if warranted, the rescheduling of grid-risk-sensitive maintenance activities (activities that could (i) increase the likelihood of a plant trip, (ii) increase LOOP probability, or (iii) reduce LOOP or SBO coping capability) under existing, imminent, or worsening degraded grid reliability conditions?

Response to Question 6(c)

Yes, the TSO communicates daily with the NPP Operator to discuss system conditions. Additionally, the TSO notifies the NPP Operator if any conditions are met that would indicate challenges to grid stability/reliability. EDG and switchyard maintenance activities are not scheduled concurrently. Grid conditions are evaluated prior to authorizing work on an EDG or in the switchyard. Section 6.2 of NGGM-IA-0003 discusses the "day to day operations" responsibilities and communications between the TSO and the NPP Operator. Section 7.2.8 of the Interface Agreement describes the process for deferring previously scheduled work when needed. Also, see the Response to Question 6(d) for a further explanation of procedure OMM-001-2, "Shift Routines and Operating Practices."

NRC Question 6(d)

If there is an overriding need to perform grid-risk-sensitive maintenance activities under existing or imminent conditions of degraded grid reliability, or continue grid-risk-sensitive maintenance when grid conditions worsen, do you implement appropriate risk management actions? If so, describe the actions that you would take. (These actions could include alternate equipment protection and compensatory measures to limit or minimize risk.)

Response to Question 6(d)

Yes, NGGM-IA-0003, "Transmission Interface Agreement for Operation, Maintenance, and Engineering Activities at Nuclear Plants," clearly defines the requirements for communication of planned activities and changes in plant SSC status that may affect grid stability/reliability. The TSO is required to monitor system conditions to ensure adequate voltage is maintained to support each nuclear plant in the event of an accident, and promptly notify the NPP Operator of existing or anticipated conditions that would result in inadequate voltage support.

Additionally, OMM-048, "Work Coordination and Risk Assessment," requires that plant risk be reassessed based emergent failure or degradation of plant SSCs. Plant risk would also be reassessed based on degraded grid reliability. The results of the "EOOS" risk assessment would then be compared to the On-line Plant Risk Assessment Levels of OMM-048.

NRC Question 6(e)

Describe the actions associated with questions 6(a) through 6(d) above that would be taken, state whether each action is governed by documented procedures and identify the procedures, and explain why these actions are effective and will be consistently accomplished.

Response to Question 6(e)

For Questions 6(a) through 6(d) above, applicable procedures are identified for each respective question. Requirements and guidelines have been incorporated into written procedures and documents to help assure consistent and effective implementation.

NRC Question 6(f)

Describe how NPP operators and maintenance personnel are trained and tested to assure they can accomplish the actions described in your answers to question 6(e).

Response to Question 6(f)

NPP Operators are trained on OMM-048 to address the risk-significance and compensatory actions that are taken when the offsite and/or onsite power sources are at a reduced capacity or in jeopardy. This training is presented to the NPP Operators by an individual from the Outage and Scheduling Unit who implements OMM-048 on a daily basis.

HBRSEP, Unit No. 2, maintenance personnel perform minimal work in the switchyard or with grid components. Transmission maintenance personnel are responsible for maintenance on transmission lines, switchyard equipment (i.e., breakers and relaying), and transformers that supply offsite power into the plant. These personnel receive initial and annual refresher training in accordance with Section 11.2 of NGGM-IA-0003.

NRC Question 6(g)

If there is no effective coordination between the NPP operator and the TSO regarding transmission system maintenance or NPP maintenance activities, please explain why you believe you comply with the provisions of 10 CFR 50.65(a)(4).

Response to Question 6(g)

Effective coordination between the NPP Operator and the TSO regarding transmission system maintenance or plant maintenance activities is in accordance with the Interface Agreement, NGGM-IA-0003.

NRC Question 6(h)

If you do not consider and effectively implement appropriate risk management actions during the conditions described above, explain why you believe you effectively addressed the relevant provisions of the associated NRC-endorsed industry guidance.

Response to Question 6(h)

Appropriate risk management actions are implemented during the conditions described above.

NRC Question 6(i)

You may, as an alternative to questions 6(g) and 6(h) describe what actions you intend to take to ensure that the increase in risk that may result from grid-risk-sensitive maintenance activities is managed in accordance with 10 CFR 50.65(a)(4).

Response to Question 6(i)

The increase in risk that may result from grid-risk-sensitive maintenance activities is managed in accordance with 10 CFR 50.65(a)(4) as described in the preceding responses.

NRC Question 7 Topic

Procedures for identifying local power sources that could be made available to resupply your plant following a LOOP event.

NRC Question 7(a)

Briefly describe any agreement made with the TSO to identify local power sources that could be made available to resupply power to your plant following a LOOP event.

Response to Question 7(a)

An agreement is in place to restore power to HBRSEP, Unit No. 2, as soon as possible following a LOOP event. In addition, a TSO procedure provides detailed instructions for prompt plant offsite power restoration. The procedure specifies various means of accomplishing the required power restoration. TSO personnel are trained on this procedure annually in accordance with North American Electric Reliability Council (NERC) training requirements.

NRC Question 7(b)

Are your NPP operators trained and tested on identifying and using local power sources to resupply your plant following a LOOP event? If so, describe how.

Response to Question 7(b)

Yes, while the TSO is restoring offsite power using offsite power sources following a LOOP event, the immediate concern of the NPP Operator is to ensure power to the emergency buses from the onsite EDGs. The NPP Operators are trained on the restoration of onsite power sources such as the dedicated shutdown diesel generator through the use of DSP-002, "Hot Shutdown Using the Dedicated/Alternate Shutdown System," Attachment 9, and emergency diesel generators through the use of EPP-1, "Loss of All AC Power." System Operations Reference Manual Carolinas (SORMC)-GD-2 identifies the sequence and sources of offsite generators that can provide power to the plant switchyard. The NPP Operators are exposed to the guidance within this manual, but are not trained on, nor responsible to use, offsite generators to restore power to the plant switchyard. The TSO, not NPP Operators, implements these actions using local power sources to re-supply the plant following a LOOP.

NRC Question 7(c)

If you have not established an agreement with your plant's TSO to identify local power sources that could be made available to re-supply power to your plant following a LOOP event, explain why you believe you comply with the provisions of 10 CFR 50.63, or describe what actions you intend to take to establish compliance.

Response to Question 7(c)

As described above, the necessary agreements and implementing procedures are in place.

NRC Question 8 Topic

Maintaining SBO coping capabilities in accordance with 10 CFR 50.63.

Question 8(a)

Has your NPP experienced a total LOOP caused by grid failure since the plant's coping duration was initially determined under 10 CFR 50.63?

Response to Question 8(a)

No. HBRSEP, Unit No. 2, has experienced one LOOP event since the plant's coping duration was initially determined under 10 CFR 50.63, however, the event was classified as a "Plant Centered Event" that was not caused by grid failure. Therefore, HBRSEP, Unit No. 2, does not meet the criteria for re-evaluating the Station Blackout coping duration.

NRC Question 8(b)

If so, have you reevaluated the NPP using the guidance in Table 4 of RG 1.155 to determine if your NPP should be assigned to the P3 offsite power design characteristic group?

Response to Question 8(b)

See the Response to Question 8(a) above.

NRC Question 8(c)

If so, what were the results of this reevaluation, and did the initially determined coping duration for the NPP need to be adjusted?

Response to Question 8(c)

See the Response to Question 8(a) above.

NRC Question 8(d)

If your NPP has experienced a total LOOP caused by grid failure since the plant's coping duration was initially determined under 10 CFR 50.63 and has not been reevaluated using the guidance in Table 4 of RG 1.155, explain 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.

Response to Question 8(d)

See the Response to Question 8(a) above.

NRC Question 9

If you determine that any action is warranted to bring your NPP into compliance with NRC regulatory requirements, including TSs, GDC 17, 10 CFR 50.65(a)(4), 10 CFR 50.63, 10 CFR 55.59 or 10 CFR 50.120, describe the schedule for implementing it.

Response to Question 9

No additional action is required to bring HBRSEP, Unit No. 2, into compliance with the plant licensing-basis.