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0CAN030601

March 29, 2006

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: Response to Generic Letter 2006-02, Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power

Plant Name Arkansas Nuclear One, Units 1 and 2
Docket Nos. 50-313 and 50-368
License No. DPR-51 and NPF-6

REFERENCES 1. NRC letter dated February 1, 2006, *Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power* (0CNA020601)

Dear Sir or Madam:

Per Reference 1, the NRC issued Generic Letter (GL) 2006-02 to request information for determining compliance with regulatory requirements governing electric power sources. Specifically, the NRC is requesting information regarding: (1) use of protocols between the nuclear power plant (NPP) and the transmission system operator (TSO), independent system operator (ISO), or reliability coordinator/authority (RC/RA) including transmission load flow analysis tools, (2) use of NPP/TSO protocols and analysis tools by TSOs to assist NPPs in monitoring grid conditions for consideration in maintenance risk assessments, (3) offsite power restoration procedures in accordance with Section 2 of NRC Regulatory Guide (RG) 1.155, "Station Blackout" and, (4) losses of offsite power caused by grid failures at a frequency equal to or greater than once in 20 site-years in accordance with RG 1.155. The requested information is being made under the requirements of 10 CFR 50.54(f).

The Arkansas Nuclear One, Unit 1 and Unit 2 (ANO) response to the requested information in GL 2006-02 is contained in attachment to this submittal. Responses to questions associated with Entergy offsite transmission groups are outside the direct control of ANO. However, they have been confirmed by offsite organizations to the extent practical. Entergy is not making any commitments as a result of our response to this letter. If you have any questions or require additional information, please contact Steve Bennett at 479-858-4626.

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I declare under penalty of perjury that the foregoing is true and correct.

Executed on March 29, 2006.

Sincerely,

Thomas A. Marlow

TAM/sab

Attachment: Response to Generic Letter 2006-02 for ANO-1 and ANO-2

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Attachment to

0CAN030601

Response to Generic Letter 2006-02 for ANO-1 and ANO-2

Response to Generic Letter 2006-02 for ANO-1 and ANO-2

Requested Information

Use of protocols between the NPP licensee and the TSO, ISO, or RC/RA and the use of analysis tools by TSOs to assist NPP licensee in monitoring grid conditions to determine the operability of offsite power systems under plant TS.

GDC 17, 10 CFR Part 50, Appendix A, requires that licensees minimize the probability of the loss of power from the transmission network given a loss of the power generated by the nuclear power unit(s).

NRC Request 1 - *Use of protocols between the NPP licensee and the TSO, ISO, or RC/RA to assist the NPP licensee in monitoring grid conditions to determine the operability of offsite power systems under plant TS.*

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

ENS Response to Request 1(a):

Entergy Nuclear South (ENS) plants [i.e., Grand Gulf Nuclear Station, River Bend Nuclear Station, Waterford Steam Electric Station, Unit 3 (Waterford 3) and Arkansas Nuclear One, Units 1 and 2] utilize a combination of formal agreements, procedures, protocols and/or actions to have Entergy Transmission, who is the Entergy transmission system operator, provide notification to each ENS plant if the predicted post-trip voltage does not meet the minimum value(s) specified in ENS procedure[1] ENS-DC-199, *Off-Site Power Supply Design Requirements*. This procedure is an ENS controlled procedure that is jointly reviewed by both Entergy Transmission and ENS. It contains the specifics pertaining to preferred offsite sources, including acceptable voltage, frequency and power delivery requirements for each ENS plant. The formal agreement for ANO is referred to as the *Arkansas Nuclear One Switchyard and Transmission Interface Agreement*.

The formal agreements for each site provide a general framework for the establishment of procedures and processes that are deemed by each agreement to be of importance to the safe operation of the respective ENS site. Each agreement contains the requirement that the respective ENS site be provided with an assured source of offsite power in accordance with procedures to be agreed upon by the respective ENS site and Entergy Transmission.

The monitoring process used by Entergy Transmission to predict ENS plant post-trip voltages is contained in ENS procedure ENS-DC-201, *ENS Transmission Grid Monitoring*. This procedure is also an ENS controlled procedure that is jointly reviewed by both Entergy Transmission and ENS. This procedure contains the Transmission/ENS Off-Line Post Trip Voltage Analysis & Monitoring Process. This process is implemented by Entergy Transmission procedures.

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1 Compliance with GDC-17, as documented in the license basis and plant Technical Specifications for ENS plants, is not predicated on such agreements. Additionally, ENS plants are considered regulated, not de-regulated and ENS plants are part of vertically-integrated, Entergy Corporation.

These procedures collectively implement near-term advance (day-ahead) grid analysis specifically for ENS to use in determining the status of the Entergy Transmission grid, particularly near ENS plants. This monitoring uses Siemens Power Technologies International (Siemens PTI) PSS/E transmission analysis software program, performed for the next day, using daily cases representing that day of the month. These cases specifically consider the trip of each ENS unit and the application of design basis accident loads. These cases are also re-performed during the period of interest if previously identified specific contingencies occur or, if Entergy Transmission determines that system conditions have significantly changed during the period that could affect the offsite power source post-trip voltage availability for any ENS unit (combined trip of ANO units). This allows the analysis to remain bounding if system conditions change. The results of these analyses are then compared to the specific ENS unit post-trip voltage requirements for each respective ENS site. If the results indicate the potential for ENS site specific requirements would not be met, Entergy Transmission determines if these requirements can be met for the period of interest by making changes to transmission system configuration/operation. If Entergy Transmission determines that the requirements cannot be met or are not being met, then notification to the affected plants is required. ENS plant compliance with GDC-17, as documented in the license basis and plant technical specifications (TS) for each ENS plant, is not predicated on such an agreement. Specifically, Section 1.4 of ANO-1 Safety Analysis Report (SAR) and Section 3.1 of the ANO-2 SAR provide discussion each unit's compliance with GDC-17 (Electrical Power Systems).

Additionally, compliance with GDC-17 as stated in NUREG-0800 is based on:

each [offsite power] circuit has been sized with sufficient capacity to supply all connected loads, and

results of the grid stability analysis indicated that loss of the largest generating capacity being supplied to the grid, loss of largest load from the grid, loss of the most critical transmission line, or loss of the unit itself will not cause grid instability.

As confirmed in the definitions of Generic Letter 2006-02, for a given disturbance, stability equates to maintaining a state of equilibrium and not a specific voltage. However, Entergy Transmission is presently required by the applicable Regional Coordinating Council to perform periodic studies to ensure compliance with their grid stability criteria and planning standards. These criteria include limits on the maximum allowable voltage deviation and duration of transients for a given grid disturbance. Therefore, these analyses provide additional ENS plant offsite power (stability) assurance beyond that required by GDC-17 for stability considerations.

(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.*

ENS Response to Request 1(b):

The process described for the Entergy response to NRC Request 1(a) is a look-ahead analysis that covers the following day. As such, this process does not incorporate an explicit time period requirement for notification, because the period of interest is in the future (next day). This allows Entergy Transmission to evaluate the projected system

conditions and provides an opportunity to possibly prevent the actual occurrence of grid conditions that would not meet ENS requirements. If, following such evaluations for the next day, or, following the occurrence of specific predetermined grid contingencies reevaluated during the present period, there are indications that ENS site specific requirements will not be met or are not met, notification to the affected plants is required. Likewise, should actual real-time conditions occur that are outside of ENS requirements without projecting additional contingencies, then notification is also provided. While the present day reevaluation and, if required, the real-time notifications do not have an explicit time requirement stated, it is expected by both parties that such communications would be performed promptly. ENS procedures require Entergy Transmission to receive periodic training by ENS on the importance of offsite power to nuclear safety and the necessity of prompt resolution of such issues.

(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.

ENS Response to Request 1(c):

Grid conditions and status are the primary responsibility of Entergy Transmission for ENS plants. The observable parameters for ENS plants include voltage and frequency, generator reactive output, breaker status, status of certain lines, and certain switchyard alarm points.

The Entergy Transmission organization has procedures and practices as indicated in the Entergy response to NRC Request 1(a), that require plant notification in the event that actual or projected ENS specific grid conditions are not met. As such, ENS does not explicitly dictate that the individual sites perform periodic inquiries of the Entergy Transmission organization for determination of grid status. However, this does not preclude ENS from performing a grid status check with Entergy Transmission if the sites deem such information to be beneficial in a given situation, using communications protocols provided in ENS procedures. Additionally, if the daily monitoring process is determined by Entergy Transmission to be unavailable, plant notification is required per Entergy Transmission procedures.

ANO has a specific procedure for each unit that assures that identified site conditions that could impact the Entergy grid are (or would be) communicated to Entergy Transmission. These Electrical System Operations procedures [OP-1107.001 and 2107.001] require contacting Entergy Transmission for many different site actions and conditions. The following is a list of different site conditions that require contact with Entergy Transmission:

- When operation involves the use of the ANO startup transformers (e.g. verifying prior to placing in service, voltage adjustments).
- When an offsite transmission line from ANO is or will be out-of-service (OOS).
- When utilizing main transformer backfeed to onsite power.
- When operating switchyard disconnects required for plant operation.
- When performing TS required weekly verification of offsite power sources.

Additionally, ANO procedures for emergency diesel generator (EDG) operations [OP-1104.036 and OP-2104.036] specify contacting Entergy Transmission when placing EDGs into service (e.g., normally scheduled TS surveillances) or for scheduled or emergent maintenance when an EDG is/will be out of service to verify offsite grid status.

ANO Units 1 and 2 have weekly TS required surveillances to contact Entergy Transmission to verify operability of the dedicated offsite Startup transformers via system configuration. In addition, both units have Plant Computer Monitoring Systems which monitor offsite grid voltages (161 KV and 22 KV) and provide alarms at established alarm limits for the voltage supplied to the dedicated offsite Startup Transformers. ANO also has the capability to monitor North and South 500 KV transmission line voltage and Operations has the ability to set alarm limits for these parameters. Alarming of any of these parameters on an actual grid condition would lead Operations to contact Entergy Transmission and determine if any grid disturbances were in existence. Also dedicated control room annunciators would actuate on loss of a startup transformer and procedural direction would require contacting Entergy Transmission.

ANO abnormal [OP-1203.037, 1203.012B, 1203.012C, 2203.012A, 2203.012B] and emergency operating [OP-1202.007, 1202.008, 2202.008, 2202.009] procedures have actions for both units to contact Entergy Transmission for conditions such as restoring offsite power or determining grid stability and when main generator related problems or EDG operations exist.

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

ENS Response to Request 1(d):

Plant operators receive training to ensure their understanding of the function and operation of the ANO onsite and offsite electrical distribution system and components. Training includes both initial and continuing training programs which consist of a combination of classroom, practical factors (e.g. qualification guides and job performance measures), and simulator training. These methods provide instruction and administer testing to assess the proficiency and knowledge levels of operators in the use of procedures for basic operation of the electrical distribution system, assessing grid conditions, and responding to abnormal and/or emergency conditions. Training is provided in both the licensed and non-licensed training programs. Additionally, lessons learned from operating experience associated with offsite and onsite electrical distribution, such as Significant Operating Event Report (SOER) 99-01, are incorporated into the training curriculum. Testing methods include written exams, job performance measures, and simulator performance evaluation.

(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.

ENS Response to Request 1(e):

ENS plants have a combination of formal agreements, procedures, protocols and practices as described in the response to NRC Request 1(a); therefore this question is not applicable.

(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 setpoint value requirements; including NPP licensees using allowable value in its TSs) or LOOP after a trip of the reactor unit(s).

ENS Response to Request 1(f):

As discussed under the response to NRC Request 1 (a), ENS plants utilize a combination of formal agreements, procedures, protocols and/or actions to have Entergy Transmission provide notification to each ENS plant if the predicted post-trip voltage does not meet the minimum value(s) specified in ENS Procedure DC-199. This procedure contains the specific information pertaining to preferred offsite sources, including acceptable voltage, frequency and power delivery requirements for each ENS plant.

If the analysis results indicate the potential for ENS site specific requirements to not be met, Entergy Transmission determines if these requirements can be met for the period of interest by making changes to transmission system configuration/operation. If Entergy Transmission determines that the requirements can not be met or are not being met, then plant notification is required. While the present re-evaluations and, if required, the real-time notifications do not have an explicit time requirement stated, it is expected by both parties that such communications would be performed promptly. Entergy Transmission receives periodic training by ENS on the importance of ENS offsite power to Nuclear Safety and the necessity of prompt resolution of such issues.

ENS supports Entergy Transmission plans to implement an enhanced on-line monitoring system during the summer of 2006. This system uses real-time models of the transmission grid and load flow analysis tools to determine if the transmission grid can meet the specific offsite power requirements for the nuclear sites, while including the effects of plant trip. This on-line enhanced system will include a notification time requirement if the ENS site specific Offsite Power requirements cannot be met.

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

ENS Response to Request 1(g):

Each ENS unit has degraded voltage protection schemes designed to ensure the capability to power essential loads for safe shutdown of each unit. The minimum voltage requirements for each ENS site are listed in Procedure ENS-DC-199. As stated in 1(a), if these voltage requirements cannot be met for a specific plant, then ENS plant notification is required.

Under normal ANO power operations, the plant distribution buses (including the plant safety buses) receive their power from the main generators via the Unit Auxiliary Transformers. The main generator's voltage regulators have the capability to minimize voltage changes from the switchyard. The degraded voltage protection would only operate if the main generators were unable to provide the voltage support needed to overcome a degraded voltage condition in the switchyard. If low switchyard voltages cause the voltage of the generators to sag below 21.3 KV for ANO-1 or 21.7 KV for ANO-2, then it is possible for the degraded voltage relays to operate and separate the safety buses from their normal power source and power the safety buses from the Emergency Diesel Generators (EDGs). Under this condition it is likely that both units would experience a reactor/turbine trip and the in plant loads would be reduced.

Under an accident or plant trip condition, each ANO unit's plant loads are transferred from their normal power source (Main Generator and Unit Auxiliary Transformer) to their respective Offsite Power Source (Start-up #1 Transformer for Unit 1 and Start-up #3 Transformer for Unit 2). These sources have automatic voltage regulation, due to the ±10% automatic voltage regulators that are installed in the ANO switchyard. For moderately degraded voltages in the switchyard from a grid event, the automatic voltage regulators would respond to restore the voltages to acceptable levels. For severely degraded voltages in the switchyard (greater than can be corrected by the ±10% automatic voltage regulators), then degraded voltage relays would operate to isolate the safety buses from the offsite power source and power them from the EDGs.

NRC Request 2 - *Use of criteria and methodologies to assess whether the offsite power system will become inoperable as a result of a trip of your NPP.*

(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.*

ENS Response to Request 2(a)

Yes, Entergy Transmission utilizes the Siemens PTI transmission analysis program as the analysis tool to predict ENS plant offsite power voltages under various transmission grid contingencies. This transmission analysis program is one of the leading software programs used by electric utilities to perform detailed transmission grid studies. Using this program, Entergy Transmission performs detailed transmission studies for the next day, using daily cases representing that day of the month. These cases specifically consider the trip of each ENS unit and the application of design basis accident loads. These cases provide the advantage of the accuracy of a near term projection of expected loads and load flows, system generating unit status, expected transmission system elements in or out of service and specific site requirements, in a single analysis. These cases are also re-performed during the period of interest (i.e. present day) if previously identified specific contingencies occur or, if Entergy Transmission determines that system conditions have significantly changed during the period that could adversely affect the offsite power source post-trip voltage availability for any ENS unit. This allows the analysis to remain bounding if system conditions change. The results of these analyses are then compared to the post-trip voltage requirements for each respective ENS site. If the results indicate the potential for ENS site specific requirements may not be met, Entergy Transmission then determines if these requirements can be met for the period of interest by making changes to transmission system configuration/operation. If Entergy Transmission determines that the requirements cannot be met or are not being met, then plant notification is required.

Per the unit-specific licensing basis for each ENS site and the requirements of ENS procedures, studies are performed on a periodicity as specified within the license basis to confirm that the offsite power system will remain operable following a trip of that unit. As a minimum per ENS DC-199, grid studies are performed at least every three years (ANO is presently performing grid studies every two years). These studies are performed using an industry accepted Transmission Analysis Program, equivalent to the Siemens PTI program mentioned above. The periodic analyses incorporate updated grid configurations and conditions, which are projected for a future period of interest (generally 2 or more years) and include such multiple contingencies as the ENS unit trip and design basis accident loading combined with significant other concurrent transmission/generation contingencies to confirm the adequacy of these sources to remain operable following such an event. This includes future projections for system load peaks and power transfers through the Entergy system, as determined by Entergy Transmission System Planning. Once submitted to ENS by Entergy Transmission, these analyses are reviewed by ENS engineering personnel to confirm that the analyses provide the necessary assurance of the operability of the offsite power sources following a unit trip. This review is documented per the requirements of ENS Procedure DC-199. The ANO onsite

calculations incorporate the changes to the onsite electrical distribution system as well as incorporate the results of these periodic transmission system studies, to confirm continuous GDC-17 compliance.

(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?*

ENS Response to Request 2(b):

Yes. Entergy Transmission uses the above analysis tools, in conjunction with procedures, as the basis for determining when conditions warrant ENS plant notification.

(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.*

ENS Response to Question 2(c):

Yes. As stated in 2(a) the day-ahead analysis tool would predict the voltage conditions that would result from an ENS plant trip well in advance of the actual condition and ENS plant notification would occur at that time. The specific ENS site requirements relative to offsite power are contained in DC-199.

(d) *If your TSO uses an analysis tool, how frequently does the analysis tool program update?*

ENS Response to Request 2(d):

Entergy Transmission uses near-term advance (day-ahead) grid analysis specifically designed to notify ENS sites of adverse conditions on the grid. These cases are also re-performed during the period of interest (i.e. present day) if previously identified specific contingencies occur or, if Entergy Transmission determines that system conditions have significantly changed, during the period that could affect adversely the offsite power source post-trip voltage availability for any ENS unit. This allows the analysis to remain bounding if system conditions change.

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

ENS Response to Request 2(e):

As stated in 2(a), Entergy Transmission provides notification to the ENS plant(s) if the predicted ENS plant post-trip voltage does not meet the minimum voltage values specified in ENS Procedure DC-199 for that specific ENS plant. These post trip voltages are calculated by the Siemens PTI /PSS/E software transmission analysis program, used by many utilities for extensive transmission studies. As stated in ENS-Procedure DC-201, if any transmission system element that is directly interconnected to the ENS switchyard/substation is lost, then the software analysis is re-performed to identify whether the post trip voltages are still acceptable. Additionally, if any transmission system contingency occurs that, in the opinion of Entergy Transmission may significantly impair the unit post-trip voltage performance for any ENS site, the software analysis is re-performed to identify whether the post trip voltage are still acceptable.

(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?*

ENS Response to Request 2(f):

Entergy Transmission uses near-term advance (day-ahead) grid analysis specifically designed to monitor ENS site grid conditions. If the near-term advance (day-ahead) monitoring process is determined by Entergy Transmission to be unavailable, ENS plant notification is required per ENS Procedure DC-201. Per the requirements of ENS procedures, each affected ENS site will initiate a condition report for each daily case that results in an ENS notification by Transmission. This condition report will address operability of the affected offsite power sources for such cases.

(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?*

ENS Response to Request 2(g):

Per the requirements of ENS procedure DC-201, ENS site Engineering is required to coordinate with Entergy Transmission for a review of grid conditions that existed at the time of such an ENS unit trip to assess the accuracy of the analysis under known system conditions.

(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?*

ENS Response to Request 2(h):

Entergy Transmission uses an analysis tool; therefore this question is not applicable.

(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?*

(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?

(b) If the bounds of the analyses are exceeded, does this condition trigger the notification provisions discussed in question 1 above?

ENS Response to Request 2(i):

Entergy Transmission uses an analysis tool; therefore this question is not applicable.

(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.*

ENS Response to Request 2(j):

Entergy Transmission uses an analysis tool. ENS plants have access to the results of an analysis tool used by Entergy Transmission and Entergy Transmission makes periodic studies available to ENS to determine the adequacy of offsite power capability. Therefore this question is not applicable.

NRC Request 3 - *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.*

(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 value 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?*

Entergy Note

GL 2006-02 uses the term "Operable" in several locations with regard to postulated offsite power conditions and for showing compliance with GDC 17. Operability is based on "the capability of performing its specified safety function(s)." This is a current capability, not a postulated capability after other events not analyzed in the Safety Analysis Report. Declaring offsite circuits inoperable due to projected switchyard voltages (except in combination with a plant trip) would unnecessarily require a plant shutdown per the TSs. A premature plant shutdown would contribute to the actual degraded voltage condition. Entering the TS required action statement potentially worsens the situation that the Generic Letter was intended to avoid. Therefore, as discussed in the following responses, Entergy applies offsite power system Operability with actual or immediate conditions consistent with other Limiting Conditions for Operation within the ANO TSs.

Additionally, GL 2006-02 also appears to equate meeting GDC 17 with the Operability of the offsite circuits. As stated in Regulatory Information Summary (RIS) 2005-20, *Operability Determination Process*, Appendix C.1, *Relationship Between the General Design Criteria and the Technical Specifications*, "The general design criteria (GDC) and the TSs differ in that the GDC specify requirements for the design of nuclear power reactors, whereas the TSs specify requirements for the operation of nuclear reactors." Therefore, failure to meet a General Design Criteria is considered a degraded or nonconforming condition and an operability determination is required to determine if the associated equipment is inoperable.

ENS Response to Request 3(a):

Per the requirements of ENS procedures, plant notification is required if the transmission grid can not be maintained or is not within the values required by ENS Procedure DC-199. These values represent the acceptable ranges to demonstrate that a given offsite source will remain capable of powering the required onsite loads under design basis conditions. Per the requirements of ENS procedures, if such notification is made, ENS will initiate a condition report and evaluate operability. If this evaluation demonstrates the inability to power required onsite loads from a given offsite source, then that offsite source would be declared inoperable.

The ENS plant would declare the offsite power source inoperable for the situation where the loss of an ENS unit (combined trip of ANO units) would result in inadequate switchyard voltages that would actuate plant degraded voltage protection. ENS plants do not declare the offsite power inoperable for the situation where the loss of the most critical

transmission line or the largest supply to the grid would result in inadequate switchyard voltages. If predicting a most critical line loss or loss of the largest supply would predict a voltage below the degraded voltage protection setpoint, the ENS plant would take preparatory actions without entering a Limiting Condition for Operation (LCO), since ENS plants do not enter into a LCO until an event happens.

(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?*

ENS Response to Request 3(b):

Double sequencing is not a design basis event at ANO. However, if onsite safety related equipment is lost (as governed by plant Technical Specifications), then the equipment is declared inoperable. Additionally, if a component is unable to perform its safety function during a design basis accident condition, then it is declared inoperable.

(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).*

ENS Response to Request 3(c):

As stated in the response to 3(b) above double sequencing is not a design basis analyzed condition.

(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.*

ENS Response to Request 3(d):

As discussed in response to NRC Request 3(a), plant notification is required if the transmission grid cannot be maintained or is not within the values required by ENS procedures. If an offsite source is declared inoperable, then the appropriate TS Action Statement(s) would be entered. However, ANO TSs are not entered for grid conditions that might occur (i.e. tornados, forest fires, severe weather events).

(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.*

ENS Response to Request 3(e):

ENS believes that certain cases could result in the affected equipment being declared inoperable as described in response to NRC Requests 3(a) and 3(b). Therefore, this question is not applicable to ENS.

(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).*

ENS Response to Request 3(f):

ENS did not specify any "compensatory" actions in the ENS responses to NRC Request 3(a) through 3(e). All actions described by ENS within these responses are governed by plant procedures. Therefore, there are no applicable "compensatory" actions stated for ENS operators to be trained or tested on for this question.

NRC Request 4 - *Use of criteria and methodologies to assess whether the offsite power system will remain operable following a trip of your NPP.*

(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.*

ENS Response to Request 4(a):

Yes, the ANO operators have additional guidance in the unit specific licensing basis documents regarding the offsite power system status and conditions are monitored. However, the primary requirements for offsite system monitoring are contained in ANO plant procedures.

ANO-1 and ANO-2 TS Bases Section 3.0.3 direct contact with Entergy Transmission for coordination of an orderly plant shutdown to ensure stability and availability of the electrical grid. ANO-2 TS Bases section 3/4.8 specifies contact with Entergy Transmission on a daily basis during EDG outages.

The ANO-1 and ANO-2 Safety Analysis Report (SAR) accident analyses either specify existence of or the loss of offsite power depending on greatest severity of impact of the accident to ANO-1/ANO-2 (most conservative assumption). Section 1.4 of ANO-1 SAR and Section 3.1 of the ANO-2 SAR specify the requirements for compliance with GDC-17 (Electrical Power Systems). Additionally, the ANO-1 and ANO-2 SARs when detailing safety related components or systems state that an assured emergency power supply (EDGs) is available in the event of a loss of offsite power.

Section 8.2 of each unit's SAR specifies details of the offsite power distribution system and its relationship with ANO. Each SAR specifies that offsite system stability will be maintained on simultaneous tripping of the main generators of both units.

Each unit has procedural instructions for Electrical System Operation [OP-1107.001 and OP-2107.001]. These procedures provide instructions for operation of non-engineered safety features electrical distribution systems and provide tests to verify operability of offsite and onsite electrical systems per TSs. These procedures include instructions on operation of switchyard, transformers and non-ESF electrical systems of 480V and above. They include operation of normal breaker alignment, transfer operations, transformer operations, and loss of load centers. Procedural instructions regarding abnormal ES bus voltages are contained in OP-1203.037 Abnormal ES Bus Voltages (Unit 1) and OP-2107.001 Electrical System Operation (Unit 2).

The ANO Switchyard and Transformer Yard Controls procedure [OP-1015.033] controls maintenance activities during high risk evolutions that could impact power lines and transformers which provide offsite power to plant.

As discussed in the response to Request 1(d), ANO operators are trained in normal, abnormal, and emergency operations including the potential for impact to both onsite and offsite power sources.

Entergy Transmission has also incorporated the allowable voltage ranges as specified in ENS procedures into Entergy Transmission Energy Management System (EMS) alarms for the system operators. These alarms provide an independent means to detect adverse effects on ENS offsite power sources due to main generator voltage regulator deviations (if such deviations are of sufficient magnitude to cause the offsite source to be outside of the allowable range as determined by ENS procedures) when the turbine generator is connected to the grid (i.e., before the postulated DBA). Additionally, EMS alarms also provide an independent means to detect adverse effects on ENS offsite power sources due to automatic voltage regulator deviations at ANO. ANO has automatic voltage regulators on each of its Offsite Power Sources (Startup-1, Startup-2, and Startup-3).

(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.*

ENS Response to Request 4(b):

The above listed documents support determination of operability of the offsite power system. Therefore compliance with GDC-17 and other TSs is assured.

Use of NPP licensee/TSO protocols and analysis tool by TSOs to assist NPP licensees in monitoring grid conditions for consideration in maintenance risk assessments

The Maintenance Rule (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 them.

NRC Request 5 *Performance of grid reliability evaluations as part of the maintenance risk assessments required by 10 CFR 50.65(a)(4).*

(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?*

ENS Response to Request 5(a):

Yes, coordination of both grid and plant major maintenance to minimize plant risk is performed by the ENS and Transmission functions, although the primary responsibility and oversight functions for these actions is performed by the ENS site organization. The site work control processes factor in scheduled switchyard activities as part of the risk evaluation process, as well as any emergent work. The site's "Switchyard and Transmission Interface Agreement", the site's specific implementing procedure for these interfaces [OP-1015.033], and the ENS NMM directive PL-158, *Switchyard and Transmission Interface Requirements,* are used to define responsibilities between the Transmission and ENS organizations for this purpose.

The control room uses a common operations procedure directive (ANO Risk Assessment Guidelines; COPD-24) for managing plant risk including impacts to offsite power. These guidelines are utilized by Operations in the work planning process and are referenced when real time emergent conditions either impact equipment availability or grid availability/stability. The directive specifies performing risk assessments when planning maintenance or performing activities with respect to trip initiators and grid reliability. The onsite EDGs, AAC diesel generator, steam driven emergency feedwater pumps, and DC power are high safety significance components and their unavailability is limited. Grid reliability is considered when removing them from service.

10CFR 50.65(a)(4) requires performance of a risk assessment prior to maintenance activities. Maintenance is defined broadly and would include surveillances, post maintenance testing, and preventive and corrective maintenance. Relative to increasing the initiating event frequency, such as the frequency of a plant trip, the industry guidance, NUMARC 93-01 (endorsed without exception by NRC Regulatory Guide 1.182, states Section 11.3.2.2 that the following should be considered:

- *The likelihood of an initiating event or accident that would require the performance of the affected safety function.*

- *The likelihood that the maintenance activity will significantly increase the frequency of a risk-significant initiating event (e.g., by an order of magnitude or more as determined by each licensee, consistent with its obligation to manage maintenance-related risk).*

Switchyard coordination is an integral part of the Switchyard and Transmission Interface Agreement. This agreement requires ANO to coordinate planned plant outages and load reductions with the Entergy Transmission. The agreement also requires coordination by Entergy Transmission with ANO for all activities directly affecting the off-site power supply.

ANO has switchyard and transformer yard procedural controls [OP-1015.033], which provide detailed scheduling and coordination requirements associated with work in the switchyard. Only personnel authorized by ANO control room management are allowed to enter and perform work in the ANO switchyard. These controls provide the means to be used for review and scheduling of switchyard or transformer yard activities performed by Entergy. It provides a summary of the responsibilities for maintenance and operation of the switchyard and transformer components as provided within the Entergy Switchyard and Transmission Interface Agreement. This procedure specifically contains a decision process which evaluates the risk associated with maintenance activities and their impact on electrical power sources.

The ANO procedure also stipulates the development and completion of plant and component impact statements which detail exact work to be performed and the controls required. This procedure includes a list of maintenance exceptions that have been evaluated to have no impact on the plant. These activities typically do not require impact statements and are added to the integrated plant schedules as scheduled activity items. For all other activities, component and plant impact statements are prepared to assess the possible impact on the plant. These activities, once approved, are also placed on the integrated plant schedules. These processes assure that the work is thoroughly evaluated for its impact on the plant. Also, by adding the activities to the integrated plant schedules, they are evaluated to assure there are no conflicts with other in-house activities, thus maintaining adequate defense-in-depth. Operations Work Management Liaisons are involved, via the impact statements and integrated schedule, to insure that grid activities are coordinated with in house activities so that adequate electrical diversity is maintained at all times.

(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?*

ENS Response to Request 5(b):

Yes. Entergy Transmission grid status is monitored by Entergy Transmission as described in the ENS response to question 1.

NUMARC 93-01 does not define "grid-risk-sensitive maintenance", so there is no unique guidance for such activities. The following guidance is included in Section 11.3.2.8:

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). The following guidance applies to this situation:

- *The safety assessment should be performed (or re-evaluated) to address the changed plant conditions on a reasonable schedule commensurate with the safety significance of the condition. Based on the results of the assessment, ongoing or planned maintenance activities may need to be suspended or rescheduled, and SSCs may need to be returned to service.*

- *Performance (or re-evaluation) of the assessment should not interfere with, or delay, the operator and/or maintenance crew from taking timely actions to restore the equipment to service or take compensatory actions.*

- *If the plant configuration is restored prior to conducting or re-evaluating the assessment, the assessment need not be conducted, or re-evaluated if already performed.*

In addition to previous responses directed to assessment of grid stability during maintenance, EDG outages and Startup Transformer outages, require daily contact with Entergy Transmission per checklists which confirm reliability of onsite and offsite power systems.

(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.*

ENS Response to Request 5(c):

No. Within the context of the definition provided for "Grid Stress or a Stressed Grid" for this generic letter, Entergy transmission system loads typically reach annual maximums within the summer months, however Entergy Transmission System Operators continually account for such loads when balancing these loads with available generation and power import/export and load flow capability.

Major transmission lines near the ENS site that might affect the viability of the Offsite Power System and/or the nuclear generation, have their maintenance outages scheduled away from the summer or peak load times or during plant outages to avoid grid stress in the vicinity of the plant. ANO has not experienced a total loss of offsite power (LOOP) caused by grid for the last 25 years.

Entergy Transmission maintains grid stability with an automatic load shedding system. This system sheds up to 30% of the system load in three successive increments of degrading grid frequency. Entergy Transmission also maintains a stable grid by shedding

selective load if necessary after potential re-dispatch solutions are exhausted to ensure continued grid reliability. Thus, two goals exist: Grid Reliability and Service Reliability. The residential and commercial customers may experience electrical outages at the distribution level while the grid is unaffected. Hence, offsite power continues to be available to ENS plants.

ANO uses a common operations procedure [1015.044] specifically for Summer Reliability Operations to ensure that certain components important to unit availability are operating in the optimum condition. This procedure specifies requirements for onsite electrical distribution related components and directs usage of the ANO Switchyard Controls procedure [1015.033] for switchyard related components.

Additionally, EPRI TR-1011759, dated December 2005, has shown that there is no statistically significant seasonal-regional variation in recorded LOOP events from 1997 to 2004.

(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?*

ENS Response to Request 5(d):

Yes, The ANO Equipment Out of Service online risk model [COPD-24] is based on the guidance of NUMARC 93-01 which states that [risk] assessments should consider the impact of maintenance activities on availability of electrical power. Specifically, the assessments for maintenance activities involving the switchyard and transformer yard should consider the impact on offsite power availability.

The ANO model uses a time-averaging technique to account for the time at which offsite power could be out of service and for restoration. The technique is documented in EPRI TR-1009187, *Treatment of Time Interdependencies in Fault Tree Generated Cutset Results*. Offsite Power restoration data utilized in this analysis is based on industry experience (EPRI data) and the offsite power recovery analysis is periodically updated to reflect this experience.

Guidance to ANO operators establishes activities that can impact AC/DC power, including the potential impact to offsite power, as having high safety significance. The ANO guidance for performing maintenance related risk sensitivities has the operator establish any offsite power vulnerabilities as medium to high risk that would typically defer any switchyard activities. See response to Request 6(c) also.

(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?*

ENS Response to Request 5(e):

Yes, ENS plants contact Entergy Transmission at any time necessary, using communications protocols provided in ENS procedures.

As discussed in the response to Request 5(a), the ANO switchyard and transformer yard controls procedure [OP-1015.033] provides detailed scheduling and coordination requirements associated with work in the switchyard. This procedure includes a list of maintenance exceptions that have been evaluated to have no impact on the plant. These activities typically do not require impact statements and are added to the integrated plant schedules as scheduled activity items. For all other activities, component and plant impact statements are prepared to assess the possible impact on the plant. These activities, once approved, are also placed on the integrated plant schedules. These processes assure that the work is thoroughly evaluated for its impact on the plant.

(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.*

ENS Response to Request 5(f):

As discussed in the response to NRC Request 1(a), ENS plants utilize a combination of formal agreements, procedures, protocols and/or actions to have Entergy Transmission provide notification to each ENS plant if the predicted post-trip voltage does not meet the minimum value(s) specified by ENS in ENS procedures. This is an ENS controlled procedure that is jointly reviewed by both Entergy Transmission and ENS. It contains the specifics pertaining to preferred offsite sources, including acceptable voltage, frequency and power delivery requirements for each ENS plant.

If analysis results indicate the potential for ENS site specific requirements to not be met, Entergy Transmission determines if these requirements can be met for the period of interest by making changes to transmission system configuration/operation. If Entergy Transmission determines that the requirements cannot be met or are not being met, then ENS notification is required. Per the requirements of ENS-DC-201, if such notification is made, ENS will initiate a condition report and evaluate operability. Thus, ENS plant operations will be made aware of worsening grid conditions that could result in the ENS site inability to meet the post-trip design basis accident load requirements from the offsite power source.

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

ENS Response to Request 5(g):

Yes. Whenever any risk significant preplanned or emergent maintenance is required that could impact offsite power, Entergy Transmission is contacted.

As stated in Procedure 1015.033, "During high risk evolutions, maintenance activities on power lines and transformers which provide offsite power to the plant will be avoided." Some examples of high risk evolutions include:

- CRDM Breaker Trip Testing
- RCS in Reduced Inventory
- Emergency Diesel Generator is inoperable on affected unit (when required)
- Severe Weather Conditions
- Equipment out of service that results in above minimal risk based on the EOOS system.

(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.*

ENS Response to Request 5(h):

ANO operators receive training, as described in the answer to question 1(d) above, which includes training in the use of an ANO specific procedure that implements switchyard and transformer controls. This procedure provides guidance with respect to the requirements of the Switchyard and Transmission Interface Agreement and applies to the operation, maintenance, and access controls for the ANO switchyard and transformer yard. The procedure provides a method for review and scheduling of proposed switchyard and transformer yard work activities and describes responsibilities for maintenance and operation of switchyard and transformer yard components.

(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).*

ENS Response to Request 5(i):

As previously discussed, risk sensitive maintenance activities are communicated with Entergy Transmission and changes in risk during the maintenance evolution are similarly communicated as required. Therefore this question is not applicable to ANO.

(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.*

ENS Response to Request 5(j):

As previously discussed, risk sensitive maintenance activities are communicated with Entergy Transmission and changes in risk during the maintenance evolution are similarly communicated as required. Therefore this question is not applicable to ANO.

(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.*

ENS Response to Request 5(k):

Since ANO maintains communication with offsite Entergy Transmission for risk-sensitive maintenance, no alternative communications are considered necessary.

NRC Request 6. *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).*

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

ENS Response to Request 6(a):

Entergy Transmission maintenance is classified as either scheduled (planned) maintenance or unscheduled (emergent) maintenance. Additionally, ENS has an added tool where planned transmission system outages, relevant to ENS sites, are posted on an Entergy Intranet web page.

Scheduled maintenance activities with the potential to affect ENS operation are incorporated into the near-term advance (day-ahead) grid analysis specifically for ENS to use in determining the status of the Entergy Transmission grid, particularly near ENS plants. Unscheduled maintenance activities and scheduled maintenance activities with the potential to affect ENS operation are required to be coordinated with the affected ENS site per the formal agreements indicated in this response for each respective ENS site.

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

ENS Response to Request 6(b):

Scheduled and unscheduled ENS unit outages and ENS unit power reductions are communicated between ENS units, Entergy System Planning and Operation and Entergy Transmission for transmission security purposes. Also see response to Request 5(a).

(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?*

ENS Response to Request 6(c):

Yes. Per ANO procedure [OP-1015.033] a "Scheduled Maintenance Process" is used when it is determined that switchyard maintenance will affect either unit in some manner and greater than 7 weeks notification of planned activity is provided. An "Unscheduled Maintenance Process" is used when less than 7 weeks notice for maintenance is provided to ANO or for unforeseen circumstances. In either case, the applicable Unit Operations Work Liaison will determine if maintenance is allowed using a specific decision matrix while in Modes 1 through 4. The first question that is asked in this decision process is "Could maintenance cause reactor or turbine trip, a LOOP, or exceed TS time limit?" If the answer to this question is "Yes", then maintenance will be deferred to an outage. However, if a TS time limit is being exceeded, then the procedure directs the plant to be placed in a mode where maintenance can be allowed. ANO has a similar decision matrix for switchyard maintenance while in Modes 5 and 6.

This ANO procedure establishes a primary Point of Contact (POC) who is responsible for coordination of grid maintenance and testing. The POC facilitates preparation and review of these impact statements with assistance from Operations and Engineering. These activities, once approved, are placed on the integrated plant schedules. These processes assure that the work is thoroughly evaluated for its impact on the plant. Also, by adding the activities to the integrated plant schedules, they are evaluated to assure there are no conflicts with other in-house activities, thus maintaining adequate defense-in-depth. The Operation Liaisons are involved, via the impact statements and integrated schedule, to insure that grid activities are coordinated with in house activities so that adequate electrical diversity is maintained at all times. The POC works closely with the Operation Liaisons and Transmission Group in communication and coordination of these activities.

Note: Per the ANO Switchyard and Transmission Interface Agreement, ANO has maintenance responsibility (including necessary repair or replacement) for the ANO support transformers, main output transformers, and any other equipment to the point of the defined power transmission interface. Based on this agreement and the ANO Switchyard and Transformer Yard Controls procedure [OP-1015.033], ANO currently has maintenance responsibility for the ANO-1 and ANO-2 startup, main and auxiliary transformers as well as the auxiliary equipment associated with these transformers, i.e. cooling, instrumentation, nitrogen capping, annunciation, etc. All other equipment located in the switchyard is maintained by Entergy Transmission.

As discussed in the response to Request 5(a), Entergy also limits high risk component removal and maintenance through our Equipment Out of Service model controlled by COPD-24.

(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.)*

ENS Response to Request 6(d):

Yes, when time allows an assessment of risk is preformed prior to switchyard related maintenance [OP-1015.033]. As discussed in the response to Request 5(d), ANO has clear guidance on ensuring the risk is minimized where grid sensitive maintenance could occur. However, as discussed in the response to 5(b), 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). Irrespective, ANO applies the most appropriate risk and deterministic tools available to ensure plant and grid protection. If maintenance must be performed during grid-sensitive periods, the in-plant risk directive limits all other maintenance activities that would worsen the risk to the plant or the grid. If additional actions are needed, then compensatory measures will be taken to the extent practical. All grid-sensitive maintenance requires control room management approval prior to work being performed.

(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.*

ENS Response to Request 6(e):

All actions described in the responses to Requests 6(a) through 6(d), are directed by either Entergy Transmission agreements and/or ANO specific procedures. These agreements and procedures are not new to Entergy Transmission or ANO and have been exercised on a routine basis. Entergy believes that the specific requirements of the procedures discussed are effective and repeatable to ensure grid-sensitive maintenance is reduced to a minimum.

(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).*

ENS Response to Request 6(f):

As discussed in the answer to question 5(h) above, training is provided on an ANO specific procedure which provides controls for switchyard and transformer yard activities. The procedure assigns responsibilities and establishes interfaces for coordination of scheduled and unscheduled maintenance. Risk factors and impacts of specific work activities are identified and evaluated in accordance with the guidance of this procedure and a decision making process is provided to determine if specific maintenance activities are to be allowed.

Maintenance of the switchyard is the primary responsibility of Entergy Transmission. However, per OP-1015.033, the ANO POC is required to maintain technical knowledge of the switchyard/transformer yard equipment including diagnostic and maintenance activities. The POC is also responsible to verify the training and/or qualification of off-site personnel who work on transformers.

(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).*

ENS Response to Request 6(g):

ENS believes that there is effective coordination between ENS operators and Entergy Transmission maintenance activities, so this question is not applicable.

(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.*

ENS Response to Request 6(h):

ENS believes that there is effective coordination between ENS operators and Entergy Transmission maintenance activities, so this question is not applicable.

(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).*

ENS Response to Request 6(i):

No alternate actions are considered necessary and therefore, this question is not applicable to ANO.

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

Pursuant to 10 CFR 50.63, 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 RG 1.155 gives licensees guidance on developing their approaches for complying with 10 CFR 50.63.

NRC Request 7. *Procedures for identifying local power sources that could be made available to resupply your plant following a LOOP event. This includes items such as nearby or onsite gas turbine generators, portable generators, hydro generators, and black-start fossil power plants.*

Note: Section 2, "Offsite Power," of RG 1.155 (ADAMS Accession No. ML003740034) states:

Procedures should include the actions necessary to restore offsite power and use nearby power sources when offsite power is unavailable. As a minimum, the following potential causes for loss of offsite power should be considered:

- Grid undervoltage and collapse

- Weather-induced power loss

Preferred power distribution system faults that could result in the loss of normal power to essential switchgear buses

(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.*

ENS Response to Request 7(a):

Formal agreements previously described between ENS plants and Entergy Transmission dictate priority restoration of offsite power to these units. Entergy Transmission maintains restoration plans for the Entergy Transmission system. The plans include the use of system black-start capable generation, where available. Such restoration plans consider all available Entergy Transmission restoration options, including but not limited to use of other local-area generation for re-supply of ENS plants. Restoration of off site power to ENS facilities has the highest restoration priority. Grid operators train on these plans annually per National Energy Reliability Council (NERC) training requirements. Additionally, ANO has established three alternate plans for the restoration from a system blackout. Two of these include the use of nearby hydro-electric generation. Entergy Transmission is not responsible for the use of any onsite generation sources under site control.

In response to the station blackout rule, ANO installed a 4.4 MW Alternate AC Diesel generator (AAC generator) which significantly exceeds the capacity of any of the four onsite EDGs. This AAC generator can be connected to any of the two safety buses for either ANO unit.

(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.*

ENS Response to Request 7(b):

ENS operators are responsible for the use of ENS onsite resources under ENS control, only. Entergy Transmission is responsible for the use of Entergy system resources, including, but not limited to, use of local-area (offsite) generation to re-supply ENS plants following a LOOP event and such re-supply is designated as a priority activity within Entergy Transmission restoration plans, as previously described.

ANO has procedures for both LOOP and station blackout conditions. For ANO-1, the Emergency Diesel Generator Operation procedure [OP-1104.036] provides guidance for normal and abnormal EDG operation. The ANO-1 Degraded Power EOP [OP-1202.007] directs the operation of the EDGs in the event of a unit LOOP. The ES Electrical System Operation procedure [OP-1107.002] provides guidance to the operator for tying the AAC generator onto vital buses. The ANO-1 Blackout EOP (OP-1202.008) directs the operator to use OP-1107.002 to connect AAC generator in the event of a loss of offsite power.

For ANO-2, the Emergency Diesel Generator Operation procedure [OP-2104.036] also provides guidance for normal and abnormal EDG operation. The ANO-2 Loss of Offsite Power EOP [OP-2202.007] directs the operation of the EDGs in the event of a unit LOOP. Alternate AC Diesel Generator Operations procedure [OP-2104.037] provides the necessary guidance for the proper operation of the AAC generator and auxiliary systems. The ANO-2 Station Blackout EOP [OP-2202.008] directs the operator to use OP-2104.037 to connect AAC generator in the event of a loss of offsite power.

ANO-1 and ANO-2 reactor operators are trained to mitigate and restore bus vital power under a LOOP and a complete station blackout.

(c) *If you have not established an agreement with your plant's TSO to identify local power sources that could be made available to resupply 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.*

ENS Response to Request 7(c):

ENS has agreements previously described between ENS plants and Entergy Transmission that dictate priority restoration of offsite power to ENS units. Entergy Transmission maintains restoration plans for the Entergy Transmission system. The plans include the use of system black-start capable generation, where available. Such restoration plans consider all available Entergy Transmission restoration options, including but not limited to use of other (offsite) local-area generation for re-supply of ENS plants. Therefore, this question is not applicable.

Losses of offsite power caused by grid failures at a frequency of equal to or greater than once in 20 site-years in accordance with Table 4 of Regulatory Guide 1.155 for complying with 10 CFR 50.63

Pursuant to 10 CFR 50.63, 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 RG 1.155 gives licensees guidance on developing their approaches for complying with 10 CFR 50.63.

NRC Request 8. *Maintaining SBO coping capabilities in accordance with 10 CFR 50.63.*

(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?*

ENS Response to Request 8(a):

No, ANO has not experienced a total loss of offsite power (LOOP) caused by grid failure since the stations' submittal for Station Blackout Rule is in accordance with 10 CFR 50.63. As stated in question 7(a), ANO has a 4.4 MW AAC generator available onsite in the event of a LOOP.

The ANO AAC generator is a "10 minute Alternate AC Generator" as defined by 10CFR50.63 and NUMARC 87-00.

(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?*

ENS Response to Request 8(b):

This question is not applicable to ANO.

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

ENS Response to Request 8(c):

This question is not applicable to ANO.

(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.*

ENS Response to Request 8(d):

This question is not applicable to ANO.

Actions to ensure compliance

NRC Request 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.*

ENS Response to Request 9

Entergy believes that ANO is in compliance with NRC regulatory requirements and no further actions are necessary.