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W3F1-2006-0014

April 3, 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
Waterford Steam Electric Station, Unit 3
Docket No. 50-382
License No. NPF-38

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

Dear Sir or Madam:


Per Reference 1, the NRC issued Generic Letter 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).

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The Waterford 3 response to the requested information in GL 2006-02 is contained in the attachment to this submittal. Responses to questions associated with Entergy offsite transmission groups are outside the direct control of Waterford 3. 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 Charles DeDeaux at (504) 739-6531.

I declare under penalty of perjury that the foregoing is true and correct. Executed on April 3, 2006.

Sincerely,

A handwritten signature in black ink, appearing to read "Joe Unruh", with a long horizontal flourish extending to the right.

JEV/CED/cbh

Attachment: Response to Generic Letter 2006-02 for Waterford 3

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bcc:	Licensing Green Folder File	
	Waterford 3 Records Center	(W-GSB-100)

Attachment to 1

W3F1-2006-0014

Response to Generic Letter 2006-02 for Waterford 3

Response to Generic Letter 2006-02 for Waterford 3

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):

Yes. 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] 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 procedure¹ 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 Waterford 3 is referred to as "Waterford Steam Electric Station Unit No.3 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 the Entergy Transmission organization.

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

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.

Trip Voltage Analysis & Monitoring Process. This process is implemented by Entergy Transmission Procedures.

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. 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 can not be met or are not being met, then notification is required to the affected plant. ENS plant compliance with GDC-17, as documented in the license basis and plant Technical Specifications for each ENS plant, is not predicated on such an agreement.

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. This provides additional ENS plant offsite power (stability) assurance in addition to 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, Nuclear Notification 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 re-evaluation 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 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 Nuclear deems 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.

Waterford 3 has specific procedures that assure identified site conditions that could impact the Entergy grid be communicated to Entergy Transmission. These procedures require contacting Entergy Transmission for many different site actions and conditions. The following are examples of different site conditions that require contact with Entergy Transmission:

- OP-006-008 *Transformer Operation*, Operation of the Waterford 3 transformers (e.g. verifying prior to placing in service) when an offsite transmission line from Waterford 3 is or will be out-of-service (OOS).
- OP-600-038, *Waterford 3 Switching Station*, Operation of switchyard disconnects required for plant operation.
- OP-903-007, *Turbine Inlet Valve Cycling Test*, Waterford 3 power reduction.
- OP-006-009, *Electrical Bus Outages*, Operation of switching station disconnect switches
- OP-006-001, *Plant Distribution (7KV, 4KV and SSD) System*, Re-alignment of breakers in the switchyard.

- OP-500-004, *Annunciator Response Procedure*, Requires Operations personnel to call the TSO upon detection of low voltage (3940V) on the 4160V safety related busses.
- OP-901-212, *Rapid Plant Power Reduction*, Contains a step to notify the load dispatcher of the down power.
- OP-901-211, *Generator Malfunction*, Requires the operator to notify the load dispatcher on a main generator loss of load condition.
- OP-010-005, *Plant Shutdown*, Requires the load dispatcher to be notified prior to reducing plant power.
- Emergency Operating Procedures OP-902-003, *Loss of Offsite Power/Loss of Forced Circulation Recovery*, OP-902-005, *Station Blackout Recovery*, and OP-902-008, *Functional Recovery*, Contain steps to restore power to electrical busses when power and resources are available. Licensed operator training reinforces expectations to contact the grid operator when restoring power to the plant to confirm availability of the grid.
- OP-903-115, *Train A Integrated Emergency Diesel Generator/Engineering Safety Features Test*, and OP-903-116, *Train B Integrated Emergency Diesel Generator/Engineering Safety Features Test*, contain guidance to verify offsite power will be stable for the next 24 hours during the 24 hour diesel run.

Training reinforces expectations for operators to routinely communicate with offsite agencies when changes in plant generation capability or grid instability are observed.

(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 Waterford 3 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 extensively 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-DC-199, *Off Site Power Design Requirements*. This procedure contains the specifics 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 Nuclear Notification is required. While the present reevaluations 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 Nuclear on the importance of ENS offsite power to Nuclear Safety and the necessity of prompt resolution of such issues.

ENS plans to implement an enhanced on-line monitoring system with Entergy Transmission 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 for plant notification 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):

Waterford 3 has degraded voltage protection schemes designed to ensure the capability to power essential loads for safe shutdown. The operation of the degraded voltage protection schemes are described in Waterford 3 UFSAR section 8.3.1.1.2.8. Further

details were provided in Attachments to Waterford 3 letters W3F1-2004-0115 and W3F1-2005-0004, 'Supplement to Amendment Request NPF-38-249, Extended Power Uprate'

Specific minimum grid voltages for each ENS plant are provided in procedure ENS-DC-199.

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's 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 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. 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 can not 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. 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 3 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-DC-199 'Off-Site Power Supply Design Requirements.'

- (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.

- (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 such a condition 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 a 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 require a plant shutdown per the Technical Specifications. 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 Waterford 3 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, Nuclear notification is required if the transmission grid can not be maintained or is not within the values required by ENS-DC-199 procedure. 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, Waterford 3 will enter a TRM Action and 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 the ENS unit 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. The loss of the facility would have to already occur before any action would be taken. 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, 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):

Yes. 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, it is considered 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):

Attachment 1 to the Entergy letter W3F1-2004-0115 dated November 19, 2004, provided an assessment of Waterford 3 equipment operability for a double sequencing scenario where the degraded voltage on offsite power is taken to be approximately 90% of nominal. Further details were provided in Attachment 1 to letter W3F1-2005-0004, 'Supplement to Amendment Request NPF-38-249 Extended Power Uprate'

- (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 can not be maintained or is not within the values required by ENS procedures. If an offsite source is declared inoperable, then the appropriate Technical Specification Action Statement(s) would be entered.

Per Technical Requirements Manual 3.8.1.1, Waterford 3 requires the offsite A.C. circuit voltage, as measured at the Waterford 3 Switchyard, to be such that predicted post-trip offsite A.C. circuit voltage, as determined by the Grid Operator, will be sufficient to supply post trip emergency loads. If notified by the Grid Operator that the predicted post-trip offsite A.C. circuit voltage will be less than 223 kV, a condition report is required to be initiated and an offsite A.C. circuit operability determination is required to be completed within 12 hours.

- (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):

Waterford 3 does not use voltage regulators, auto tap changing transformers, capacitors or static VAR compensators to control voltage of the offsite power system.

Annunciator response procedure OP-500-004 contains guidance for situations involving Main Generator Voltage regulator malfunctions. General Operating Procedure OP-010-004 contains guidance for Main Generator Voltage regulator normal and off normal operations. Both of these procedures are included in operator initial and continuing training.

(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):

Waterford 3 TS Bases, Final Safety Analysis Report, Design Bases Documents, and plant procedures provide adequate guidance regarding situations in which the condition of plant-controlled or monitored equipment can adversely affect the operability of the offsite power system. Therefore compliance with GDC-17 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):

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 nuclear 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, 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.

Yes. 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 in 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 Waterford 3 to coordinate planned plant outages and load reductions with the Entergy Transmission. The agreement also requires coordination by Entergy Transmission with Waterford 3 for all activities directly affecting the off-site power supply.

Specifically for Waterford 3, OI-037-000, Rev. 2, "Operations Risk Assessment Guideline," provides guidance on performing the 10 CFR 50.65(a)(4) risk assessment. Equipment Out of Service Monitor (EOOS), Waterford 3's quantitative risk assessment tool, is used to calculate risk for a specific plant configuration. Section 5.4.2 of this procedure includes a Line Stability Factor. "When the EOOS Line Stability Factor is moved into the right position, it increases the value for the likelihood of a loss of offsite electrical power (LOOP). This bar should be moved to the right position when undergoing conditions that could affect the stability of the area grid, or lines feeding Waterford 3. These conditions may include a high electrical demand combined with possible insufficient production (i.e. –rolling black-outs or brown-outs imminent), or general grid problems (i.e. – equipment failures, adverse weather in neighboring areas). Conservative judgment should be used when setting this factor."

Additional guidance is provided on the likelihood of LOOP in section 5.4.5 when work is performed in specific areas of the Waterford 3 switchyard, switching station, or the transformer yard using cranes or heavy equipment

(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):

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

Yes. 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 (emphasis added):

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 contact with

Entergy Transmission per checklists which confirm reliability of onsite and offsite power systems.

Specifically, OI-037-000, Rev. 2, provides plant staff guidance on when to use EOCS to assess plant risk and utilize the risk results to take appropriate actions. In general, emergent activities such as degrading grid conditions are assessed via guidance provided in the following procedural sections:

- a) Section 5.2.1 - specifies when SSCs become unavailable due to emergent activities, an assessment that considers the quantitative (EOOS tool) and qualitative aspects of risk is performed.
- b) Section 5.2.5 - specifies risk assessments should be performed for any mode of operation while factoring in changing environmental variances stated in section 5.4, such as severe weather effects, Line Stability Factor, Loss of Offsite Power, Loss of Instrument Air and other initiating events.
- c) Section 5.7 - provides established thresholds for the use of risk management actions.

(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 continually accounts for such loads as transmission system operators when balancing these loads with available generation and power import/export and load flow capability.

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 the ENS plants.

There is no correlation between grid stress due to high loading conditions and LOOP frequency in the transmission system around Waterford 3 (i.e. Amite South area).

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):

There are no formal procedures to direct the plant staff to consider time-related variations in the probability of a LOOP at Waterford 3, in the grid-risk-sensitive maintenance evaluations that emerge during ongoing maintenance activities. However, in general, there is a plant wide philosophy NOT to perform maintenance activities on LOOP sensitive equipment (EDGs, steam driven emergency feedwater system, DC batteries, etc) during the summer period. This is documented in procedure PL-159.

There is a formal written Switchyard and Transmission Interface Agreement that discusses commitments and responsibilities regarding the TSO Switchyard and related transmission facilities at Waterford 3.

The agreement consists of the following commitments and responsibilities:

- a) Waterford 3 will coordinate planned plant outages and planned load reductions with the TSO. Waterford 3 will inform the Entergy system dispatchers of such activities.
 - b) The TSO will coordinate activities directly affecting the off-site power supply to Waterford 3. As a minimum, the Entergy system dispatcher or maintenance crew will inform the Waterford 3 Operations Shift Manager while planning these activities. Activities which cannot be planned in advance as well as the detailed conduct of planned activities will be coordinated with the Waterford 3 Operations Shift Manager. These activities include, but are not limited to:
 - Removing from service any transmission line terminating in Waterford 3 Switchyard, Waterford 3 Switching Station, and Waterford 3 Transformer Yard;
 - Breaker switching which can affect the power supply to Waterford 3 (e.g., switching of lines, as identified above).
 - Maintenance activities that can affect the power supply to Waterford 3.
- (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):

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

As part of Waterford 3's on-line maintenance scheduling program, communication occurs between the TSO's system load dispatcher and the Operations Shift Manager. This communication includes such activities as planning high risk work activities during times of acceptable grid load conditions, as well as deferral of high risk plant work activities when notified by the load dispatcher that critical grid load conditions exist that require additional

controls or curtailment of work activities that may affect sustained power operation. OI-037-000, *Operations' Risk Assessment* Guideline, requires operations to contact the grid operator prior to conducting grid-risk-sensitive maintenance or surveillance activities.

- (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), Entergy Nuclear South 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 procedure ENS-DC-199, *Off-Site Power Supply Design Requirements*. 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 conditions change after the analysis was performed, Entergy Transmission will re-analyze the new configuration. 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 can not be met or are not being met, then ENS plant 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):

No, Waterford 3 does not have specific guidelines to contact the TSO periodically during risk sensitive maintenance activities. However, if any sudden changes in the grid system or in the maintenance activities affecting the grid system are observed, then calls to the TSO will be made. Also as indicated in response to question 5(e), Waterford 3 Procedure OI-037-000 provides guidance for plant personnel to contact the TSO prior to performing maintenance activities on grid sensitive equipment. Entergy Transmission also initiates notification to ENS sites when necessary.

- (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):

Waterford 3 Operators received training on ENS-DC-201, *ENS Grid Transmission Monitoring*; which establishes the expectations and processes between ENS and Entergy Transmission as it relates to ENS off-site power monitoring, grid reliability, monitoring tools, grid analysis, and communication. ENS-DC-201, in concert with ENS-DC-199, Off-site Power Supply Requirements, addresses required grid voltage for Waterford 3 operability of plant systems pre and post trip, a voltage band for grid voltage control, a set frequency for grid operability evaluation, and reporting requirements for any projection indicating that the Operations Center will not be able to maintain grid voltage in the required range within any projected three hour period, or upon the performance of the required daily analysis. The training also covered specifics on Waterford 3 grid voltage limitations pre and post trip. Technical Requirements Manual specification 3.8.1.1 and its associated bases were also covered. TRM 3.8.1.1 analysis demonstrated based on plant and grid design that Waterford 3 is not susceptible to double-sequencing. This presentation has been incorporated into lesson plan WLP-OPS-PPN01 which is given to students in initial and continuing training.

- (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 Transmissions and changes in risk during the maintenance evolution are similarly communicated as required. Therefore this question is not applicable to Waterford 3.

- (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 Transmissions. Changes in risk during the maintenance evolution are similarly communicated as required. Therefore this question is not applicable to Waterford 3.

- (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.*

ENSi Response to Request 5(k):

Since Waterford 3 maintains communication with offsite Entergy Transmissions 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 planned maintenance or 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.

Planned 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. Emergent maintenance activities and planned 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).

Waterford 3 also communicates scheduled maintenance activities that are classified as a risk to generation with the TSO and the other sites prior to performing those activities. This ensures that the TSO can assess the grid conditions and alert Waterford 3 if the maintenance activity should be rescheduled.

(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):

Waterford 3 reschedules grid risk sensitive maintenance if conditions change such that the risk assessment shows an unacceptable level for the station. For example, a Startup Transformer (SUT) outage would be rescheduled if a severe weather threat occurred (the severe weather in combination with the transformer outage, would put the plant risk index at Orange). Entergy Nuclear Management Manual Policy PL-159 directs rescheduling of high risk activities out of the Summer Reliability Threat season.

- (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. As discussed in the response to Request 5(d), Waterford 3 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 Safety System Components out of service due to failures, or significant changes in external conditions (weather, offsite power availability). Irrespective, Waterford 3 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.

Guidance for performing maintenance, under conditions that place the station in a risk status of Yellow or higher, is contained in OI-037-000 and Nuclear Management Manual Policy PL-130. Management of the risk would include a Risk Contingency Plan that addresses returning essential equipment to service, establishing protected train equipment to mitigate a LOOP or SBO, and restricting access to that equipment. Maintenance will be performed around the clock under the direction of a single point of contact. The Outage Control Center may be manned during this maintenance. The Risk Contingency Plan may contain backout or decision points and must be approved by the General Manager of Plant Operations, or the Duty Plant Manager.

- (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):

Communications between the station and the TSO concerning activities that affect the grid or the ability of the station to respond to a LOOP/SBO are governed by ENS Nuclear Management Manual Policy PL-158, "Switchyard and Transmission Interface Requirements," and Operation Instruction OI-037-000. Waterford 3 will contact the TSO prior to performing scheduled work on safety related systems that put the station risk index in the Yellow or higher. Waterford 3 also contacts the TSO if scheduled work would increase the risk of a Reactor or Turbine trip. If grid conditions are such that the loss of Waterford 3 would cause grid instability or other problems, the maintenance will be

rescheduled. If maintenance is necessary, the risk is managed through Risk Contingency Planning that will mitigate the risk. Guidelines for these actions are found in OI-037-000, ENS NMM Policies PL-130, PL-158, PL-159, and OP-901-521.

- (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):

Waterford 3 Operators are trained on the actions required by OI-037-000, and on the use of the on line risk assessment tool (EOOS) using WLP-OPS-ORA00. This training is presented during initial and continuing training classes.

- (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 portion of the 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 portion of the 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 considered applicable to Waterford 3.

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 sources² that could be made available to resupply your plant following a LOOP event.*

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 this procedure annually per Northeast Reliability Council (NERC) training requirements. Entergy Transmission is not responsible for the use of any onsite sources under site control.

(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

²

This includes items such as nearby or onsite gas turbine generators, portable generators, hydro generators, and black-start fossil power plants.

following a LOOP event and such re-supply is designated as a priority activity within Entergy Transmission restoration plans, as previously described.

Waterford 3 Emergency Operating Procedures OP-902-003, *Loss of Offsite Power/Loss of Forced Circulation Recovery*, OP-902-005, *Station Blackout Recovery*, and OP-902-008, *Functional Recovery*, contain steps to restore power to electrical busses when power and resources are available. Licensed operator training reinforces expectations to contact the grid operator when restoring power to the plant to confirm availability of the grid.

- (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):

Waterford 3 experienced a loss of offsite power, during Hurricane Katrina in August 2005, due to damage to the transmission network.

In response to Station Blackout Rule, Waterford 3 evaluated the coping requirements based on the guidance provided in NUMARC 87-00 which was endorsed by Regulatory Guide 1.155. Section 3 of NUMARC 87-00 (endorsed by RG position 3.1) provides guidance for determining site susceptibility to Grid-Related Loss of Off-Site Power events. Part 1A of section 3.2.1 of NUMARC 87-00 provides the following definition:

'Grid-related loss of off-site power events are defined as LOOPS that are strictly associated with the loss of the transmission and distribution system due to insufficient generating capacity, excessive loads, or dynamic instability. Although grid failure may also be caused by other factors, such as severe weather conditions or brush fires, these events are not considered grid related since they were caused by external events'.

Based on this definition, Waterford 3 has not experienced a total LOOP caused by grid failure.

(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):

In response to the Station Blackout Rule, NUMARC 87-00, Section 3 was used to determine a proposed SBO duration of four hours. The penalty factor for a potential LOOP event related to severe and extremely severe weather were factored in the assumptions associated with the location of Waterford 3. The following plant factors were identified in determining the proposed SBO duration:

AC power Design Characteristic Group P2 was based on:

1. Expected frequency of grid related Loss of Offsite Power does not exceed once per 20 years.
2. Estimated frequency of LOOP events due to extremely severe weather placed Waterford 3 in ESW Group 4.
3. Estimated frequency of LOOP events due to severe weather placed Waterford 3 in SW Group 2.
4. The offsite power system is in the I3 group.

The Katrina related LOOP event was the only LOOP event in the history of the plant. The penalty factors for weather related probability of LOOP have not changed. All other assumptions remain valid. Hence no further actions are needed for compliance with 10CFR 50.63.

(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):

No further re-evaluation was needed based on the response to question 8b above.

(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):

Waterford 3 Engineering evaluated the SBO coping capabilities in response to the power uprate project in 2004, and made appropriate changes to the impacted calculations.

On August 29, 2005 at 07:59, a Loss of Offsite Power (LOOP) occurred with the plant in Mode 4. At the time of the LOOP, the plant site was experiencing tropical storm winds. The loss of offsite power occurred due to the Entergy transmission system damage caused by Hurricane Katrina. Entergy believes that this LOOP event did not result in re-analysis of the SBO response capability and the plant is still in compliance with the provisions of 10 CFR 50.63.

NUMARC 87-00, Section 3 was used to determine a proposed SBO duration of four hours. The penalty factor for a potential LOOP event related to severe and extremely severe weather were factored in the assumptions associated with the location of Waterford 3. The following plant factors were identified in determining the proposed SBO duration:

AC power Design Characteristic Group P2 was based on:

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2. Estimated frequency of LOOP events due to extremely severe weather placed Waterford 3 in ESW Group 4.
3. Estimated frequency of LOOP events due to severe weather placed Waterford 3 in SW Group 2.
4. The offsite power system is in the I3 group.

The Katrina related LOOP event was the only LOOP event in the history of the plant. The penalty factors for weather related probability of LOOP have not changed. Hence no further actions are needed for compliance with 10CFR 50.63.

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 Waterford 3 is in compliance with NRC regulatory requirements and no further actions are necessary.