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To: Jennifer Bobiak; Larry Scholl; Ram Bhatia  
Date: 6/17/04 10:32AM  
Subject: Re: TI 2515/156

Jen, Larry, Ram,

Please find attached the VY resident staff responses to TI 2515/156. If you have any questions, please call.

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## Vermont Yankee Response to TI 2515/156

### Key Questions:

**Question I. Determine if the agreements in place include notification requirements to inform the NPP when the grid is stressed to the point that a trip of the NPP would result in inadequate post-trip switchyard voltages (less than the design basis voltage) for either actual grid condition or potential (i.e., anticipatory contingency) grid conditions within any predetermined time limits. How is the NPP operator warned of the potential problem? Provide a brief discussion.**

**Answer I.** A communication protocol does exist between Entergy Vermont Yankee (VY) and the RTO at ISO New England (ISO) as delineated in Master/Satellite Procedure #1, "Nuclear Plant Transmission Operations." Per this procedure, ISO and other satellite operations staff (REMVAC II at VY) must communicate with VY anytime grid voltage or required sources of off-site power are in jeopardy at any given time. To that end, if ISO determines that actual voltages or calculated post-contingency voltages at VY's 345 kilovolt (KV) and/or 115 KV switchyards fall below established minimum values (342 KV and 115 KV respectively) they (ISO or REMVAC II) will contact the VY main control room so that Entergy can assess the situation and take action if necessary. ISO and REMVAC procedures are available in the main control room for operators to refer to in the event of grid or VY electrical bus problems. Master/Satellite Procedure #1 does not discuss any response time or allowable time delay for notifications. Discussions with VY Operations Department personnel indicates that communications between ISO, REMVAC II, and VY are expected to take place as soon as possible following the identification of grid or bus voltage anomalies.

**Question II. Does the agreement between the licensee and the RTO/TSO include the required voltage range and the post-trip load from the NPP that will be connected to the grid? Provide a brief discussion including how the voltage range relates to the safety bus degraded voltage relay setpoint.**

**Answer II.** Master/Satellite Procedure #1 states that following a trip of VY, REMVAC II operators must confirm that 115 KV is maintained in conjunction with a combined station load of 30 megawatts (MWs) with cooling towers in operation and 20 MWs with cooling towers secured. The above voltage and load values are consistent with those discussed in Vermont Yankee calculation VYC 1088 as they relate to the safety bus degraded voltage relay setpoints.

**Question III. How often does the RTO/TSO calculate post-trip voltage at the NPP? Provide a brief discussion.**

**Answer III.** The RTO uses a computer program to automatically calculate the projected grid conditions following postulated trip of the plant. This calculation is performed approximately every 15 minutes.

**Vermont Yankee Response to TI 2515/156****A. 10 CFR 50.65(a)(4), Maintenance Rule:**

**Question 1. Does licensee obtain current grid condition information from the RTO/TSO prior to maintenance on risk significant equipment as required by 10 CFR 50.65(a)(4)? Provide a brief discussion.**

**Answer 1.** Yes. In accordance with Vermont Yankee Administrative Procedure (AP) 0172, "Work Schedule Risk Management," the licensee does obtain current grid condition information from ISO New England prior to performing maintenance on risk significant equipment including emergency diesel generators (EDGs), the diesel-driven fire pump (DDFP), the start-up transformers, and the station blackout power supply (tie to the Vernon Dam). A communication protocol exists between Vermont Yankee (VY) and the RTO at ISO New England (ISO) as delineated in Master/Satellite Procedure #1, "Nuclear Plant Transmission Operations." Per this procedure, ISO and other satellite operations staff (REMVAC II at VY) must communicate with the licensee anytime grid voltage or required sources of off-site power are in jeopardy at any given time. To that end, if ISO determines that actual voltages or calculated post-contingency voltages at VY's 345 kilovolt (KV) and/or 115 KV switchyards fall below established minimum values (342 KV and 115 KV respectively) they (ISO or REMVAC II) will contact the VY main control room so that work management personnel can plan maintenance on risk significant equipment or alter existing maintenance plans as necessary to minimize risk.

**Question 2. Does the review address potential post-contingency grid conditions (i.e., degraded grid)?**

**Answer 2.** Yes. The communication protocol between VY and ISO does address potential post-contingency conditions as delineated in Master/Satellite Procedure #1. If ISO determines that calculated post-contingency voltages at VY's 345 kilovolt (KV) and/or 115 KV switchyards fall below established minimum values (342 KV and 115 KV respectively) they (ISO or REMVAC II) will contact the VY main control room so that Entergy can assess the situation and take action if necessary. This is taken into account during maintenance planning including provisions for re-analysis due to emergent conditions.

**Question 3. Is emergency onsite power source such as emergency diesel generator (EDG) maintenance/surveillance coordinated with the RTO/TSO?**

**Answer 3.** Yes. Major EDG overhauls require a detailed limiting condition for operation (LCO) plan in accordance with Vermont Yankee Administrative Procedure (AP) 0170, "LCO Maintenance Guideline." This is factored into the work week planning and scheduling per AP 0168, "Vermont Yankee Work Management." This effort is coordinated with ISO during long range planning sessions held quarterly and on an emergent basis when required. Because EDG surveillance testing is typically of short duration (i.e., less than 24 hours), the activity is typically not coordinated with the RTO unless the control room has identified, or has been notified of, degraded switchyard conditions that would warrant halting or delaying testing.

Vermont Yankee Response to TI 2515/156

**Question 4. Is the loss of offsite power (OSP) assumed in the 10 CFR 50.65(a)(4) review? If so, what recovery (out-of-service) time is assumed in the risk model?**

**Answer 4.** Yes. The risk assessment model used at VY assumes a probability of losing OSP as an initiating event with a probability of 0.0377/reactor-year. The probability of recovery of offsite power is estimated to be 0.97/demand, based on a recovery time of four (4) hours.

**Question 5.a. Are risk management actions put in place for EDG out-of-service for maintenance/test?**



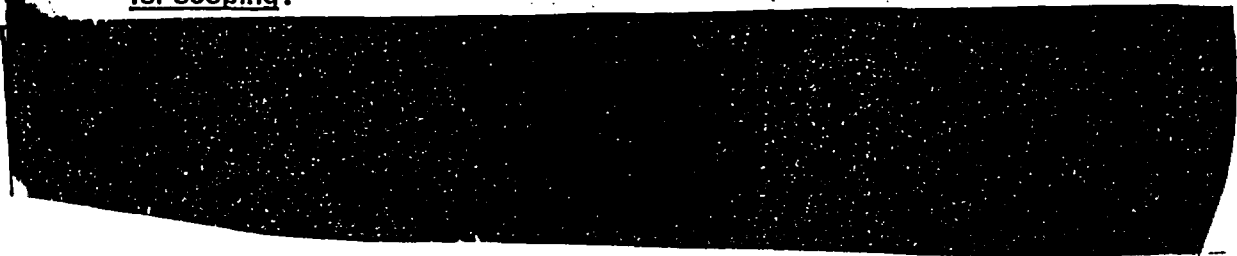
**Question 5.b. Do the risk management actions include prohibiting unnecessary switchyard activities?**

**Answer 5.b.** Yes. As discussed above, risk management actions during EDG maintenance include verification that any on-going switchyard activities are non-intrusive and unlikely to cause an initiating event or challenge to the integrity of the switchyard to supply offsite power to the plant.

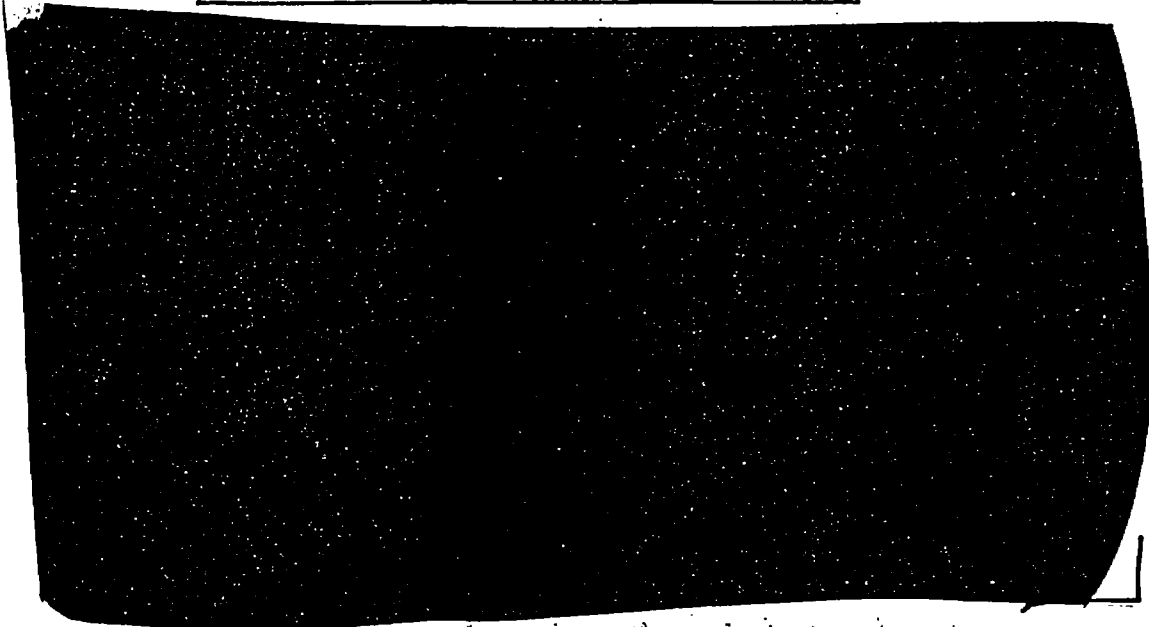
**Question 6. Are there any seasonally based restrictions on EDG maintenance/test?**

**Answer 6.** Although not proceduralized, review of EDG LCO outage data indicates that VY has consistently planned EDG outages in the March and September timeframes. This corresponds to seasons wherein grid stability is not challenged by extreme cold, extreme heat, lightning, blizzards, etc. The testing of EDGs has no seasonal restrictions. However, if the control room were notified by ISO of an unstable grid condition, testing would be postponed pending grid stabilization.

**Question 7. How is the OSP system scoped in the Maintenance Rule (MR) and the basis for scoping?**



Vermont Yankee Response to TI 2515/156



**Question 8. What are the boundaries of the OSP included in the Maintenance Rule and the basis for boundaries?**

**Answer 8. VY considers the boundaries of the OSP to include the entire switchyard consistent with the guidance of Regulatory Guide 1.160 and consistent with the NRC's response to a MR Program frequently asked question (FAQ) dated March 8, 1998.**

**Vermont Yankee Response to TI 2515/156****B. 10 CFR 50.63, Station Blackout (SBO):**

**Question 1.a. Confirm the NPP grid related LOOP data (over the last 20 years) as indicated in Attachment B.**

**Answer 1.a.** Yes. The grid related LOOP data is correct.

**Question 1.b. Record number of LOOPS that have been experienced.**

**Answer 1.b.** There have been two (2) events at VY classified as "LOOPS" over the past 20 years; occurring in 1987 and 1991.

**Question 1.c. How many of the LOOPS experienced by the unit related to severe weather, plant centered, or grid centered events?**

**Answer 1.c.** Both the 1987 and 1991 LOOP events were considered to have resulted from "plant centered" events.

**Question 2. Confirm the NPP experience in LOOP recovery time as indicated in Attachment B (denoted by unit recovery time).**

**Answer 2.** The recovery times listed for both the 1987 and 1991 LOOP events are accurate based on a review of applicable LERs and operator logs.

**Question 3. What season of the year as defined by licensee were the LOOPS experienced?**

**Answer 3.** The 1987 LOOP event occurred in the Summer (August) and the 1991 LOOP event occurred in the Spring (April).

**Vermont Yankee Response to TI 2515/156****C. Offsite Electric Power Operability:**

**Question 1. What communication protocols or agreements exist between the NPP and the RTO/TSO?**

**Answer 1.** A communication protocol does exist between Entergy Vermont Yankee (VY) and the RTO at ISO New England (ISO) as delineated in Master/Satellite Procedure #1, "Nuclear Plant Transmission Operations." Per this procedure, ISO and other satellite operations staff (REMVAC II at VY) must communicate with VY anytime grid voltage or required sources of off-site power are in jeopardy at any given time. To that end, if ISO determines that actual voltages or calculated post-contingency voltages at VY's 345 kilovolt (KV) and/or 115 KV switchyards fall below established minimum values (342 KV and 115 KV respectively) they (ISO or REMVAC II) will contact the VY main control room so that Entergy can assess the situation and take action if necessary. ISO and REMVAC procedures are available in the main control room for operators to refer to in the event of grid or VY electrical bus problems. Master/Satellite Procedure #1 does not discuss any response time or allowable time delay for notifications. Discussions with VY Operations Department personnel indicates that communications between ISO, REMVAC II, and VY are expected to take place as soon as possible following the identification of grid or bus voltage anomalies.

**Question 2. Does the licensee monitor and record the minimum transient and steady-state voltages at the safety-related bus (voltage level monitored by the degraded voltage relays) following each plant trip from the grid? Record the results of the last trip from power if easily obtained.**

**Answer 2.** The licensee does "monitor" safety bus voltage following a trip. However, operators do not record the minimum transient voltage or steady-state voltages as a matter of course. The post-trip report generated by operators following a reactor scram does not require safety bus voltages to be recorded.

The date of the last recorded reactor scram at VY was March 19, 2001. Safety bus voltage data at the time of the last scram is not specifically available. However, alarm "typer" information was retrieved and reviewed. The safety bus low voltage annunciator was not received following the scram indicating that the safety bus voltages did not fall below the annunciator setpoint conditions of safety bus voltage of 3,700 volts or less for 10 seconds.

VY's degraded voltage relay setpoint value is listed in Technical Specification 3.2.K, Table 3.4.8. The setpoint is 3,700 volts  $\pm$  40 volts with a time delay of 10 seconds  $\pm$  1 second.

**Question 3. Determine how often the NPP confirms with the RTO/TSO the RTO/TSO's allowable range of voltages at the NPP switchyard.**



## Vermont Yankee Response to TI 2515/156

**Answer 3.** There is no specified periodicity for VY to reconfirm the allowable voltage ranges at the switchyard with the RTO/TSO. However, the licensee does meet quarterly with the RTO to discuss industry lessons learned, plant operating strategies, etc. Discussions with VY Electrical Engineering staff indicated that changes made to VY electrical operating characteristics would be communicated to the RTO so that necessary procedure changes could be made. Additionally, changes would likely be discussed at the above periodic meetings well in advance of actual plant changes.

**Question 4.** Determine if the NPP operator is able to directly monitor projected post-trip switchyard voltages to determine if the voltages would be adequate to support the safety-related systems and components (i.e., Not below the design basis minimum switchyard voltages without the main generator MVA support).

**Answer 4.** VY operators have voltmeter indication in the main control room with which they can monitor the voltages on the safety buses. Additionally, there is a "Low Safety Bus Voltage" annunciator available to alert operators of degrading safety bus conditions.

**Question 5.** Does the licensee consider the impact of the loss of the NPP unit on the grid?

**Answer 5.** The licensee has provided post-trip plant load information to the RTO which is incorporated into Master/Satellite Procedure #1 (see Key Question II). This information is used by the RTO to continuously evaluate the grid conditions for potential post-contingency impact on VY.

**Question 6.a.** How does the NPP operator assure OSP operability?

**Answer 6.a.** Operators log switchyard voltage values (345 KV and 115 KV) twice daily in accordance with Vermont Yankee Operating Procedure (OP) 0150, "Conduct of Operations and Operator Rounds." Bus voltage information is taken directly from voltmeters in the main control room. Additionally, operators can monitor switchyard breaker position information in the main control room, although this is not a required action to verify operability of offsite power.

**Question 6.b.** Are plant or switchyard voltage regulating equipment (e.g., automatic load tap changers, capacitors banks, reactive power compensators) monitored and included in OSP operability?

**Answer 6.b.** VY currently uses no auxiliary voltage regulating equipment. However, the licensee does plan to install a capacitor bank to assist with the regulation of the 115 KV portion of the switchyard in support of a proposed power uprate. The capacitor bank has not yet been installed.

**Vermont Yankee Response to TI 2515/156**

**D. 10 CFR 50 Appendix B, Criterion XVI, Corrective Actions:**

**Question 1.a. Was the industry operating experience associated with the Grid Event of 8/14/03 captured in the licensee's Corrective Action Program (CAP) and assessed for applicability to the licensee's NPPs? When?**

**Answer 1.a.** Yes, industry operating experience associated with the Grid Event of 8/14/03 (as documented in Significant Event Notice (SEN) 242 and 242R1) was captured in VYs CAP and was assessed for applicability. SEN 242/242R1 was entered into the CAP September 9, 2003 at 10:16 AM.

Please also note that following the Grid Event, the licensee generated condition reports documenting the impact of the grid perturbation on continued plant operation. The plant remained online throughout the event and individual systems responded as expected and as designed.

**Question 1.b. List the major corrective actions.**

**Answer 1.b.** The Training Department, Emergency Planning Department, and Operations Department were assigned to review SEN 242 and SEN 242R1. Although some procedural enhancements were made, the licensee determined that no major equipment or program changes were necessary.

**Question 2. Did the CAP response look at LOOP frequency and OSP recovery time as it relates to the licensee's unit?**

**Answer 2.** No. The licensee considered the LOOP frequency and OSP recovery times for the unit accurate and in no need of revision.