Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

August 23, 2012

10 CFR 50.4
10 CFR 50.90

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Sequoyah Nuclear Plant, Units 1 and 2
Facility Operating License Nos. DPR-77 and DPR-79
Docket Nos. 50-327 and 50-328

Subject: **Response to NRC Request for Additional Information Regarding the Application to Modify Technical Specifications in Support of Unit Station Service Transformer Modification (TS-SQN-12-01) (TAC Nos. ME8772 and ME8773)**

Reference:

1. Letter from TVA to NRC, "Application to Modify Technical Specifications in Support of Unit Station Service Transformer Modification (TS-SQN-12-01)," dated May 23, 2012

2. Letter from NRC to TVA, "Sequoyah Nuclear Plant, Units 1 and 2 – Request for Additional Information Regarding Use of the Unit Station Service Transformers as a Power Source to an Offsite Circuit (TAC Nos. ME8772 and ME8773)," dated July 31, 2012

3. Letter from NRC to TVA, "Sequoyah Nuclear Plant, Units 1 and 2 – Request for Additional Information Regarding Use of the Unit Station Service Transformers as a Power Supply to an Offsite Circuit (TAC Nos. ME8772 and ME8773)," dated August 3, 2012

By letter dated May 23, 2012 (Reference 1), the Tennessee Valley Authority (TVA) submitted a request for an amendment to the Facility Operating License Nos. DPR-77 and DPR-79 for the Sequoyah Nuclear Plant (SQN), Units 1 and 2. The license amendment request (LAR) proposed to revise SQN Technical Specification (TS) 3/4.8.1 for Units 1 and 2 to include a surveillance requirement (SR) to demonstrate the required offsite circuits

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OPERABLE at least once per 18 months by manually and automatically transferring the power supply to a 6.9 kV Unit Board from the normal supply to the alternate supply. This change is necessary as a result of the planned modifications to the plant design and operating configuration that will allow use of the unit station service transformers (USSTs) as a power supply to an offsite circuit.

By letter dated July 31, 2012 (Reference 2), the Nuclear Regulatory Commission (NRC) forwarded a request for additional information (RAI) regarding the subject LAR supporting use of the USSTs as an offsite circuit power supply for SQN, Units 1 and 2. As agreed, the response to the RAI is due 30 days from its date of issuance, or August 30, 2012. Subsequently, by letter dated August 3, 2012 (Reference 3), the NRC forwarded a second RAI regarding the subject LAR. The second RAI is due 30 days from its date of issuance, or September 4, 2012, which is the next business day following a weekend and holiday. To facilitate the NRC's review, the TVA responses to both NRC RAIs are provided under this cover letter.

Enclosure 1 to this letter provides TVA's responses to the questions forwarded to TVA in the first RAI (Reference 2) as submitted by the NRC Electrical Engineering Branch (EEEB). In response to a request by the NRC for an additional change to TS 3/4.8.1, as documented in EEEB RAI Question 4, Attachments 1 and 2 to Enclosure 1 provide the existing TS and Bases pages marked-up to show the requested TS change and associated Bases change. Attachments 3 and 4 to Enclosure 1 provide the existing TS and Bases pages retyped that incorporate the changes. With the exception of a minor editorial correction, which is discussed in the response to EEEB Question 1.b, no other changes have been made to the previously submitted LAR.

Enclosure 2 to this letter provides TVA's responses to the questions forwarded to TVA in the second RAI (Reference 3) as submitted by the NRC Health Physics and Human Performance Branch (AHPB).

Consistent with the standards set forth in 10 CFR 50.92(c), TVA has determined that the proposed additional change to TS 3/4.8.1 for SQN, Units 1 and 2, as provided in this letter does not affect the no significant hazards considerations associated with the proposed TS amendment previously provided in Reference 1. TVA has further determined that the proposed amendment still qualifies for a categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter, the enclosures, and the attachments to the Tennessee Department of Environment and Conservation.

There are no regulatory commitments included in this submittal. If you have any questions, please contact Clyde Mackaman at (423) 751-2834.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 23rd day of August 2012.

Respectfully,

J. W. Shea
Vice President, Nuclear Licensing

Enclosures:

1. Response to NRC Electrical Engineering Branch (EEEB) Request for Additional Information (RAI)
2. Response to NRC Health Physics and Human Performance Branch (AHPB) Request for Additional Information (RAI)

cc (Enclosures):

NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Sequoyah Nuclear Plant
Director, Division of Radiological Health, Tennessee State Department of Environment and Conservation

ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT
UNITS 1 AND 2

RESPONSE TO NRC ELECTRICAL ENGINEERING BRANCH (EEEB)
REQUEST FOR ADDITIONAL INFORMATION (RAI)

Subject: **Application to Modify Technical Specifications in Support of Unit Station Service Transformer Modification (TS-SQN-12-01)**

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4. Modified Proposed TS Bases Changes (Final Typed) for SQN, Units 1 and 2

1.0 EEEB RAI QUESTION 1

The LAR states that the implementation of the Unit 2 USST modifications will enable the output of USST 2A to be aligned as the normal power supply to 6.9 kV Shutdown Board 2A-A via Unit Board 2B, and the output of USST 2B to be aligned as the normal power supply to 6.9 kV Shutdown Board 2B-B via Unit Board 2C, beginning with plant startup following the SQN Unit 2 refueling outage in the fall of 2012. Similarly, it states that implementation of the Unit 1 USST modifications will enable the output of USST 1A to be aligned as the normal power supply to 6.9 kV Shutdown Board 1A-A via Unit Board 1B, and the output of USST 1B to be aligned as the normal power supply to 6.9 kV Shutdown Board 1B-B via Unit Board 1C, beginning with plant startup following the SQN Unit 1 refueling outage in the fall of 2013.

Provide the following:

a. *Summary of the analysis which concluded that the voltage requirements to the plant safety system buses and components are not affected by the proposed modifications.*

b. *Summary of the transmission system study, including grid stability analysis performed by TVA, to determine if the SQN offsite power systems (161 kV and 500 kV) are adequate to meet General Design Criterion 17 requirements.*

c. *The short circuit current ratings of the plant auxiliary electrical system breakers and buses that support the proposed modifications.*

d. *The failure modes of USST load tap changers on the Class 1E buses and equipment.*

e. *Verify that the capacities of USSTs are adequate for normal, anticipated operational occurrence, and accident loads.*

1.1 TVA Response - EEEB Question 1.a

The calculations performed for power system response while fed through the USSTs demonstrate safety related medium voltage board recovery above the degraded voltage reset value before the degraded voltage relaying times out, adequate time zero voltage to start and accelerate the loads, acceptable starting and operating voltage for the motor-operated valves, and adequate voltage to the USST load tap changers (LTCs). Therefore, it is concluded that the power system response while fed through the USSTs is acceptable.

1.2 TVA Response - EEEB Question 1.b

The purpose of the Transmission System Study (TSS) is to determine if the Sequoyah Nuclear (SQN) offsite power system is adequate to meet 10 CFR 50, Appendix A, General Design Criterion (GDC) 17 requirements. The analyses performed for the TSS include a load flow study, transient stability study, and short circuit (fault) study.

The load flow study was performed using established analytical criteria to assure adequate offsite power for SQN. The load flow study is performed to demonstrate that

the TVA transmission system provides two offsite sources that will maintain the SQN bus voltage within a specified range during normal system operating conditions, as well as during accident conditions. As such, the load flow study is used to calculate the steady-state voltages and power flows during normal and loss of coolant accident (LOCA) conditions. For the normal system operating conditions, the effects of transmission system elements (i.e., switched capacitors and tap changers) are included as appropriate. For the LOCA studies, these transmission system elements are held at the pre-LOCA state following the onset of the LOCA since, while the actions of these elements typically result in higher voltages, the allowed time for the voltage to recover is too short to depend on these relatively slow controls to operate. Using these criteria, the analysis showed that the transmission system minimum bus voltage acceptance criteria were met for both the normal operating conditions and LOCA conditions, and the bus voltage was sufficiently maintained to meet GDC 17 requirements.

The transient stability study was performed to provide voltage recovery curves to determine whether the transmission system voltage recovers in time to avoid operation of the in-plant undervoltage relays and actuation of the diesel generator (DG) system. Voltage recovery was studied for the effects of normally cleared 3-phase fault scenarios following either a LOCA event or a transmission system disturbance. The analysis shows that there were no changes to the transmission system voltage recovery characteristics that would result in instability of the normally cleared faults or adversely affect operation of the SQN in-plant undervoltage relays or DG system.

The fault study analysis was performed to determine the system impedance at the SQN 161 kV and 500 kV buses using various operating configurations and scenarios. This information was provided for use as input to the alternating current (AC) system design calculations. As discussed in the response to Question 1.c in this enclosure, the short circuit (fault) current ratings of the plant auxiliary electrical system breakers and buses have been shown to adequately support the proposed USST modifications.

The results of the TSS voltage and stability analyses have been evaluated, and the results verify that the two offsite power sources (161 kV and 500 kV) for SQN will remain in compliance with GDC 17.

With respect to the GDC 17 evaluations, the LAR submittal (Reference 1 of the cover letter) contains a minor editorial/typographical error on page 14 of the enclosure. In the second paragraph under the evaluation of conformance with GDC 17, the LAR incorrectly associates the SQN, Unit 1, Generator Circuit Breaker (GCB) with the 161 kV switchyard and the SQN, Unit 2, GCB with the 500 kV switchyard. As described elsewhere in the LAR submittal, the correct configuration is that the Unit 2 USSTs and GCB are associated with the 161 kV switchyard and the Unit 1 USSTs and GCB are associated with the 500 kV switchyard.

1.3 TVA Response - EEEB Question 1.c

The medium voltage breakers (ABB brand HK-500) are 500 MVA class breakers with a one-time rating of 550 MVA. The switchgear is also rated for 550 MVA. The replacement USST transformers were designed with sufficient resistance to ensure the fault current would be below the breaker rating. Calculations performed for the USST modifications demonstrate that the new short circuit results are well within the medium voltage bus and breaker ratings (550 MVA).

1.4 TVA Response - EEEB Question 1.d

Each USST LTC supplies one Class 1E 6.9 kV Shutdown Board. The USST LTCs are designed and manufactured to give the same performance as the CSST LTCs. As is the case for the CSST LTC, the USST LTC failure modes are: loss of potential input signal; failure of LTC controller (high, low, or as is); and the LTC mechanism failure to operate or to partially operate. As the input signal is the power source for the controller, loss of potential will cause the LTC to fail as is. The LTC controller includes a backup controller to monitor the output and provides a high voltage limiter. Periodic testing of the LTC controller ensures that the device provides an acceptable response for the specified input. If the USST LTC should fail before or during an accident, the associated 6.9 kV Shutdown Board would transfer to its dedicated DG when the board voltage reached the degraded voltage relaying setpoint. High and low voltages are annunciated in the main control room.

1.5 TVA Response - EEEB Question 1.e

The USSTs are rated 24/32/40 MVA (cooling classes: ONAN/ONAF/ONAF) for a temperature rise of 55° C. Calculations performed show that the transient accident loading remains below 36 MVA, and the steady state accident loading (bounding of normal and accident) is below the 32 MVA rating.

2.0 EEEB RAI QUESTION 2

The LAR states the proposed USST modifications will include installation of generator circuit breakers (GCBs) in the isolated phase bus between the generator and main bank transformer.

Provide a detailed summary of the evaluation that shows that the new GCB ratings and capabilities are consistent with the conditions as defined in Institute of Electrical and Electronics Engineers Standard C37.013 and meet the performance tests and capabilities as stated in NUREG-0800, Section 8.2, Appendix A.

2.1 TVA Response - EEEB Question 2

Following the USST modifications, the main generator will be capable of supplying electrical power to the offsite grid, as well as supplying power to the offsite circuit (via the USSTs through the IPB) with new GCBs installed to provide isolation between the main generator and the main transformers. The GCBs are being installed as part of the USST modifications to facilitate an offsite power configuration with backfeed through the main transformers.

TVA has performed an evaluation of the new GCBs and has determined that the GCB ratings and required capabilities are consistent with the conditions as defined in Institute of Electrical and Electronics Engineers Standard (IEEE Std) C37.013. This evaluation involved the performance of several design tests by the GCB supplier (ABB Switzerland) to verify that the GCB ratings and capabilities are acceptable. These tests and their results are summarized as follows.

Rated Dielectric Strength. The rated dielectric strength of a GCB is its voltage withstand capability with specified magnitudes and waveshapes. This was tested by

performing lightning impulse tests (150 kV/165 kV) and power frequency withstand voltage tests (50 Hz, 80 kV/88 kV). The results indicated that the GCBs withstood the applied test voltages without electrical distress and no flashover occurred.

Load Current Switching. This is a test of the operational endurance capabilities of the GCBs for complete close-open (CO) operations performed under specified conditions with load current switching up to the rated continuous current of the generator. This testing consisted of 50 complete CO operations that were performed with a load current of 28 kA root mean square (rms) at 15 kV and 60 Hz. The tests results confirmed the GCB capability to close and subsequently clear during each of the 50 complete CO operations, while meeting the associated inherent transient voltage recovery (TRV) and operation endurance capabilities of IEEE Std C37.013.

Short Circuit Current Rating. The short circuit current rating of a GCB is the rms symmetrical component of the three-phase short circuit current to which all required short circuit capabilities are related. Based on the test results, the following acceptance criteria were verified consistent with Table 11 of IEEE Std C37.013.

- Peak withstand current: 466 kA (peak)
- Short time withstand current: 170 kA
- Duration of short circuit: 2.12 second
- Close, latch, carry current: 466 kA (peak)
- Short circuit interrupting capability, symmetrical: 170 kA
  DC component less than 20 percent
- Short circuit interrupting capability, asymmetrical: 170 kA
  DC component 75 percent
- Short circuit duty cycle: CO-30 min-CO

Rated Transient Recovery Voltage (TRV). At its rated maximum voltage, each GCB must be capable of interrupting three-phase grounded faults at rated short circuit current in any circuit in which the three-phase grounded circuit TRV does not exceed the rated TRV envelope. For the four grounded fault configurations tested utilizing the rated inherent TRV parameters of Tables 5 and 6 of IEEE Std C37.013, with peak TRVs of -61.2 kV (Test duty 3), -50.6 kV (Test duty 3), -42.3 kV (Test duty 4B), and -40.4 kV (Test duty 4B), the GCBs successfully closed and cleared under the applicable conditions defined in Table 11 of IEEE Std C37.013.

Short-Time Current-Carrying Capability. The GCB shall be capable of carrying for *Ts* equals 1 second, any short circuit current determined from the envelope of the current wave at the time of the maximum crest, whose value does not exceed 2.74 times the rated short circuit current, and whose rms value *I* determined over the complete 1 second period does not exceed the rated short circuit current considered above. This test was performed at a short circuit current value 170 kA for a period of 2.12 seconds under Test duty 2 conditions as defined in Table 11 of IEEE Std C37.013. Following the test, an inspection indicated that the GCBs tripped freely with no visible disturbance.

Duty Cycle Capability. The duty cycle of a GCB is demonstrated by Test duties 3 and 4 (or 4A and 4B) as defined in Table 11 of IEEE Std C37.013. The time between two operations to interrupt short circuit current shall be the rated value of

30 minutes in Section 5.5 of the IEEE Std. The required CO-30 min-CO testing was performed under Test duty 3 and 4A/4B conditions. Following the tests, inspection of the GCBs did not indicate any visible change and the breakers closed and cleared freely throughout the test sequences.

Rated Continuous Current-Carrying Test. The rated continuous current of a GCB is the designated limit of current in rms amperes at the power frequency at which it is required to carry continuously without exceeding any of the conditions and ratings of Section 5.3.1 and limitations of Section 5.3.2 of IEEE Std C37.013. The test was performed at an ambient air temperature of 41.3 degrees C, continuous rated current of 22 kA, and frequency of 60 Hz. Based on the results of the testing, the final temperature was reached after 13 hours, with a conductor temperature of 100.5 degrees C and enclosure temperature of 67.0 degrees C. The recorded temperatures remained within their respective temperature rise limits of International Electrotechnical Commission (IEC) 694, and are therefore acceptable.

Mechanical Endurance Life Test. No-load mechanical operation tests are made on a complete GCB or on a single pole of the breaker if all three poles are identical to ensure its satisfactory operation in normal service without excessive maintenance. The testing consisted of 10,000 CO operations of each GCB and disconnector, and 5,000 CO operations of each earthing switch. The results of the testing are summarized as follows.

- GCB operated on all commands and did not operate without command
- After each operation of the on/off indicator, the auxiliary switch showed correct contact position
- Resistance of main circuit showed no remarkable change
- GCB complies with mechanical extended endurance test requirements of IEC 62271-100 and IEC 62271-102
- No gas loss was observed during the test
- All contact parts of the circuit breaker remained in good condition for reliable functioning
- All contact parts of the circuit breaker remained in good condition, with no undue wear, and the layer of silver coating remained on all contact areas
- All contact parts of the earthing switch remained in good condition for reliable functioning of the operating mechanism

Rated Interrupting Time. The rated interrupting time of a GCB is the maximum permissible interval between the energizing of the trip circuit at rated control voltage and rated fluid pressure of the operating mechanism and interruption of the main circuit in all poles on an opening operation. This test was performed under Test duty 3 and 4A/4B conditions as defined in Table 11 of IEEE Std C37.013. Under these conditions, the highest main circuit interrupting time was recorded as 54.1 ms. This is less than the manufacturer's rating of less than 60 ms, and is therefore acceptable.

Short Circuit Current with Delayed Current Zero. It is generally accepted that a GCB will be required, during its life, to interrupt short circuit currents from the generator source with delayed current zeros. It is also recognized that the magnitudes of these short circuit currents are considerably lower than the magnitudes of the rated short circuit currents. The capability of the GCB to interrupt the delayed current zeros can

be ascertained by computations that consider the effect of the arc voltage on the prospective short circuit current. Tests shall include a predetermined nonzero current waveform associated with the rated maximum voltage and an inherent circuit TRV, and an approximate waveform obtained either by calculation or by measurement at the GCB's particular application. Tests were performed on the GCBs by connecting two phases of the test generator to a resistance-inductance-capacitance (RLC) network to achieve a predetermined non-zero current waveform (as required in Section 6.2.7.1 of IEEE Std C37.013-1997) in the third phase, which is connected to the GCB under test. In the test, one phase carries 100% offset current with no current zero, which implies that in the other two phases the offset current is shared equally. The maximum arc duration occurs with a reduced DC offset and a reduced AC current, and the first phase to clear is not the one with the 100% offset. The testing satisfactorily shows the capability of the GCBs to clear the second phase, i.e., that the breaker can force a fast decay of the DC component with its arc resistance so that current zeros are produced. Therefore, the capability of the GCBs to interrupt the delayed current zeros was met as required using predetermined nonzero current waveforms associated with the rated maximum voltage and inherent circuit TRV.

TVA has evaluated the testing performed on the GCBs by ABB Switzerland as summarized above and determined that the described testing satisfactorily meets the requirements of IEEE C37.013 as provided in TVA's design specification. Accordingly, TVA has concluded that by successfully demonstrating that the IEEE C37.013 ratings and capability requirements are met, the performance tests and capabilities as stated in NUREG-0800, Section 8.2, Appendix A are also met.

3.0 EEEB RAI QUESTION 3

The LAR states that offsite power will normally be supplied from the USSTs to the 6.9 kV Unit Boards, and will automatically transfer to the alternate power supply to at least one circuit from the common station service transformers on a trip of the power circuit breakers (PCBs). The transfer occurs upon receipt of a PCB trip signal, whereby the Unit Board normal supply breaker opens and the alternate supply breaker closes.

Provide a summary of the bus transfer study to determine the safety buses and loads will not be adversely affected by the transfer (design limits of equipment are not exceeded) including a single failure of bus transfer scheme or a worst-case failure of components in the plant auxiliary system.

3.1 TVA Response - EEEB Question 3

The plant calculation evaluated the power system against the criteria in American National Standards Institute (ANSI) C50.41 (now National Electrical Manufacturers Association (NEMA) C50.41) to ensure that the 1.33 volts per hertz limit was not exceeded for the bus transfers. The SQN fast bus transfer is less than 6 cycles (NEMA C50.41 defines fast as less than 10 cycles), while the slow bus transfer is restrained until the board voltage is below 30%. In addition, a test was performed on SQN Unit 2 in 1982 that involved a 100% load reject. The resultant bus transfer demonstrated that no safety related motors tripped during the bus transfer.

Each Class 1E 6.9 kV Shutdown Board is supplied through a different 6.9 kV Unit Board, such that a failure of a 6.9 kV Unit Board transfer cannot impact more than one 6.9 kV Shutdown Board. Therefore, one complete load group is unaffected and remains connected to offsite power. Each of the two 6.9 kV Shutdown Boards associated with a unit will be connected to offsite power through different USSTs. The IPB and main bank transformers are common for this arrangement. Relaying for these components is designed to identify faults and will initiate the fast bus transfer from the same relay that sends an open signal to the PCBs.

4.0 EEEB RAI QUESTION 4

The requirements for offsite alternating current (AC) power sources are specified in TS 3/4.8.1, "AC Sources, Operating." The Limiting Condition for Operation (LCO) 3.8.1.1.a requires two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system to be OPERABLE in MODES 1, 2, 3, and 4. The current TS 3.8.1.1.a is not clear regarding which independent power sources are required to maintain the two required OPERABLE power sources to the required onsite Class 1E distribution system until the Unit 1 USST modifications are completed. The NRC staff requests the licensee to propose a license condition to establish this requirement.

4.1 TVA Response - EEEB Question 4

In lieu of providing a license condition, LCO 3.8.1.1 is being modified by Note @ that specifies CSST A and CSST C are required to be available via automatic transfer at the associated 6.9 KV Unit Boards, when USST 2A and USST 2B are being utilized as normal power sources to the offsite circuits. The TS and TS Bases mark-ups and final typed pages are provided in Attachments 1 through 4 of this enclosure.

As indicated in the LAR submittal (Reference 1 of the cover letter), CSST B is a spare transformer that can be substituted for CSST A or CSST C. Note @ remains in effect until November 30, 2013, or until the USST modifications are implemented on Units 1 and 2, whichever occurs first. The current scheduled startup from the Unit 1 fall 2013 refueling outage is November 2013.

The offsite power alignment that uses USST 2A and USST 2B as power sources to 6.9 kV Shutdown Boards 2A-A and 2B-B, also uses CSST A and CSST C as power sources to 6.9 kV Shutdown Boards 1A-A and 1B-B. In this configuration, on a loss of USST 2A and USST 2B, CSST A and CSST C are immediately available to power 6.9 kV Shutdown Boards 2A-A and 2B-B via automatic transfer at the associated 6.9 kV Unit Boards. This configuration can be used after implementation of the Unit 2 USST modification and can also be used after implementation of the Unit 1 USST modification.

ATTACHMENT 1

Modified Proposed TS Changes (Mark-Ups) for SQN, Units 1 and 2

This attachment provides modified proposed Technical Specification 3/4.8.1 mark-up insert pages for Units 1 and 2. These pages include an additional change and should be inserted as a supplement to the pages provided in Attachment 1 to the enclosure of the letter from TVA to NRC, "Application to Modify Technical Specifications in Support of Unit Station Service Transformer Modification (TS-SQN-12-01)," dated May 23, 2012, (Reference 1 of the cover letter for this submittal).

Modified Proposed TS Changes (Mark-Ups) for SQN, Unit 1

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

a. Two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system@, and

b. Four separate and independent diesel generator sets each with:

1. Two diesels driving a common generator

2. Two engine-mounted fuel tanks containing a minimum volume of 250 gallons of fuel, per tank

3. A separate fuel storage system containing a minimum volume of 62,000 gallons of fuel,

4. A separate fuel transfer pump, and

5. A separate 125-volt D.C. distribution panel, 125-volt D.C. battery bank and associated charger.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With one offsite A.C. circuit of the above required A.C. electrical power source inoperable, demonstrate the OPERABILITY of the remaining offsite A.C. circuit by performing Surveillance Requirement 4.8.1.1.1.a within one hour and at least once per 8 hours thereafter. Restore at least two offsite circuits to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b.# With diesel generator set(s) 1A-A and/or 2A-A or 1B-B and/or 2B-B of the above required A.C. electrical power sources inoperable,* demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within one hour and at least once per 8 hours thereafter, and determining OPERABLE diesel generator sets are not inoperable due to comon cause failure or performing Surveillance Requirement 4.8.1.1.2.a.4 within 24 hours; restore at least four diesel generator sets to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Required actions, to verify OPERABLE diesel generator sets are not inoperable due to common cause failure or perform SR 4.8.1.1.2.a.4, shall be completed if this action is entered.

* No more than one diesel generator may be made simultaneously inoperable on a pre-planned basis for maintenance, modifications, or surveillance testing.

@ Offsite circuits utilizing USST 2A and USST 2B as the normal power sources require CSST A and CSST C to be available as the alternate power sources via automatic transfer at the associated 6.9 kV Unit Boards. (CSST B can be substituted for CSST A or CSST C.) This Note remains in effect until November 30, 2013, or until the USST modifications are implemented on Units 1 and 2, whichever occurs first.

Modified Proposed TS Changes (Mark-Ups) for SQN, Unit 2

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

a. Two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system@, and

b. Four separate and independent diesel generator sets each with:

1. Two diesels driving a common generator

2. Two engine-mounted fuel tanks containing a minimum volume of 250 gallons of fuel, per tank

3. A separate fuel storage system containing a minimum volume of 62,000 gallons of fuel,

4. A separate fuel transfer pump, and

5. A separate 125-volt D.C. distribution panel, 125-volt D.C. battery bank and associated charger.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With one offsite A.C. circuit of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining offsite A.C. circuit by performing Surveillance Requirement 4.8.1.1.1.a within one hour and at least once per 8 hours thereafter. Restore at least two offsite circuits to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b.# With diesel generator set(s) 1A-A and/or 2A-A or 1B-B and/or 2B-B of the above required A.C. electrical power sources inoperable,* demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within one hour and at least once per 8 hours thereafter, and determining OPERABLE diesel generator sets are not inoperable due to common cause failure or performing Surveillance Requirement 4.8.1.1.2.a.4 within 24 hours; restore at least four diesel generator sets to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Required actions, to verify OPERABLE diesel generator sets are not inoperable due to common cause failure or perform SR 4.8.1.1.2.a.4, shall be completed if this action is entered.

* No more than one diesel generator may be made simultaneously inoperable on a pre-planned basis for maintenance, modifications, or surveillance testing.

@ Offsite circuits utilizing USST 2A and USST 2B as the normal power sources require CSST A and CSST C to be available as the alternate power sources via automatic transfer at the associated 6.9 kV Unit Boards. (CSST B can be substituted for CSST A or CSST C.) This Note remains in effect until November 30, 2013, or until the USST modifications are implemented on Units 1 and 2, whichever occurs first.

ATTACHMENT 2

Modified Proposed TS Bases Changes (Mark-Ups) for SQN, Units 1 and 2

This attachment provides modified Technical Specification Bases Section 3/4.8 mark-up pages for Units 1 and 2. These pages replace the corresponding pages provided in Attachment 2 to the enclosure of the letter from TVA to NRC, "Application to Modify Technical Specifications in Support of Unit Station Service Transformer Modification (TS-SQN-12-01)," dated May 23, 2012, (Reference 1 of the cover letter for this submittal).

Modified Proposed TS Bases Changes (Mark-Ups) for SQN, Unit 1

A.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS (Continued)

For example, to support breaker testing, offsite power to the 6.9 kV Shutdown Boards can be realigned from normal feed to alternate feed. This would result in Shutdown Boards 1A-A and 2A-A being fed from Unit Boards 1A and 2A, respectively, and Shutdown Boards 1B-B and 2B-B being fed from Unit Boards 1D and 2D, respectively. The CSST being utilized as the alternate power source to one load group of Shutdown Boards would also be realigned (normally CSST A available to Shutdown Boards 1B-B and 2B-B or CSST C available to Shutdown Boards 1A-A and 2A-A, would be realigned to CSST A available to Shutdown Boards 1A-A and 2A-A or CSST C available to Shutdown Boards 1B-B and 2B-B).

LCO 3.8.1.1 is modified by Note @ that specifies CSST A and CSST C are required to be available via automatic transfer at the associated 6.9 KV Unit Boards, when USST 2A and USST 2B are being utilized as normal power sources to the offsite circuits. (Note that CSST B can be substituted for CSST A or CSST C.) This offsite power alignment is consistent with Configuration 3, as stated above. Note @ remains in effect until November 30, 2013, or until the USST modifications are implemented on Units 1 and 2, whichever occurs first. (The scheduled startup from the Unit 1 fall 2013 refueling outage is November 2013.) Following expiration of Note @, Configuration 3 can continue to be used.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the accident analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss of offsite power and single failure of the other onsite A.C. source.

The footnote for Action b of LCO 3.8.1.1 requires completion of a determination that the OPERABLE diesel generators are not inoperable due to common cause failure or performance of Surveillance 4.8.1.1.2.a.4 if Action b is entered. The intent is that all diesel generator inoperabilities must be investigated for common cause failures regardless of how long the diesel generator inoperability persists.

Action b of LCO 3.8.1.1 is further modified by a second note which precludes making more than one diesel generator inoperable on a pre-planned basis for maintenance, modifications, or surveillance testing. The intent of this footnote is to explicitly exclude the flexibility of removing a diesel generator set from service as a part of a pre-planned activity. While the removal of a diesel generator set (A or B train) is consistent with the initial condition assumptions of the accident analysis, this configuration is judged as imprudent. The term pre-planned is to be taken in the context of those activities which are routinely scheduled and is not relative to conditions which arise as a result of emergent or unforeseen events. As an example, this footnote is not intended to preclude the actions necessary to perform the common mode testing requirements required by Action b. As another example, this footnote is not intended to prevent the required surveillance testing of the diesel generators should one diesel generator maintenance be unexpectedly extended and a second diesel generator fall within its required testing frequency. Thus, application of the note is intended for pre-planned activities.

In addition, this footnote is intended to apply only to those actions taken directly on the diesel generator. For those actions taken relative to common support systems (e.g. ERCW), the support function must be evaluated for impact on the diesel generator.

The action to determine that the OPERABLE diesel generators are not inoperable due to common cause failure provides an allowance to avoid unnecessary testing of OPERABLE diesel generators. If it can be determined that the cause of the inoperable diesel generator does not exist on the OPERABLE diesel generators, Surveillance Requirement 4.8.1.1.2.a.4 does not have to be performed. If the cause of inoperability exists on other diesel generator(s), the other diesel generator(s) would be declared inoperable upon discovery and Action e of LCO 3.8.1.1 would be entered as applicable. Once the common failure is

3/4.8.1 and 3/4.8.2 A.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS

repaired, the common cause no longer exists, and the action to determine inoperability due to common cause failure is satisfied. If the cause of the initial inoperable diesel generator cannot be confirmed not to exist on the remaining diesel generators, performance of Surveillance 4.8.1.1.2.a.4 suffices to provide assurance to continued OPERABILITY of the other diesel generators.

According to Generic Letter 84-15, 24 hours is reasonable to confirm that the OPERABLE diesel generators are not affected by the same problem as the inoperable diesel generator.

Action f prohibits the application of LCO 3.0.4.b to an inoperable diesel generator. There is an increased risk associated with entering a MODE or other specified condition in the Applicability with an inoperable diesel generator and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that 1) the facility can be maintained in the shutdown or refueling condition for extended time periods and 2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

With the minimum required AC power sources not available, it is required to suspend CORE ALTERATIONS and operations involving positive reactivity additions that could result in loss of required SDM (Mode 5) or boron concentration (Mode 6). Suspending positive reactivity additions that could result in failure to meet minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than or equal to that required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM.

The requirements of Specification 3.8.2.1 provide those actions to be taken for the inoperability of A.C. Distribution Systems. Action a of this specification provides an 8-hour action for the inoperability of one or more A.C. boards. Action b of this specification provides a relaxation of the 8-hour action to 24-hours provided the Vital Instrument Power Board is inoperable solely as a result of one inoperable inverter and the board has been energized within 8 hours. In this condition the requirements of Action a do not have to be applied. Action b is not intended to provide actions for inoperable inverters, which is addressed by the operability requirements for the boards, and is included only for relief from the 8-hour action of Action a when only one inverter is affected. More than one inverter inoperable will result in the inoperability of the associated 120 Volt A.C. Vital Instrument Power Board(s) in accordance with Action a. With more than one inverter inoperable entry into the actions of TS 3.0.3 is not applicable because Action a includes provisions for multiple inoperable inverters as attendant equipment to the boards.

The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guides 1.9 "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, and 1.108 "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, August 1977, and 1.137 "Fuel-Oil Systems for Standby Diesel Generators," Revision 1, October 1979. The Surveillance Requirements for the diesel generator load-run test and the 24-hour endurance and margin test are in accordance with Regulatory Guide 1.9, Revision 3, July 1993, "Selection, Design, Qualification, and Testing of Emergency Diesel Generator Units Used as Class 1E Onsite Electric Power Systems at Nuclear Power Plants." During the diesel generator endurance and margin surveillance test, momentary transients outside the kw and kvar load ranges do not invalidate the test results. Similarly, during the diesel generator load-run test, momentary transients outside the kw load range do not invalidate the test results.

Modified Proposed TS Bases Changes (Mark-Ups) for SQN, Unit 2

For example, to support breaker testing, offsite power to the 6.9 kV Shutdown Boards can be realigned from normal feed to alternate feed. This would result in Shutdown Boards 1A-A and 2A-A being fed from Unit Boards 1A and 2A, respectively, and Shutdown Boards 1B-B and 2B-B being fed from Unit Boards 1D and 2D, respectively. The CSST being utilized as the alternate power source to one load group of Shutdown Boards would also be realigned (normally CSST A available to Shutdown Boards 1B-B and 2B-B or CSST C available to Shutdown Boards 1A-A and 2A-A, would be realigned to CSST A available to Shutdown Boards 1A-A and 2A-A or CSST C available to Shutdown Boards 1B-B and 2B-B).

LCO 3.8.1.1 is modified by Note @ that specifies CSST A and CSST C are required to be available via automatic transfer at the associated 6.9 KV Unit Boards, when USST 2A and USST 2B are being utilized as normal power sources to the offsite circuits. (Note that CSST B can be substituted for CSST A or CSST C.) This offsite power alignment is consistent with Configuration 3, as stated above. Note @ remains in effect until November 30, 2013, or until the USST modifications are implemented on Units 1 and 2, whichever occurs first. (The scheduled startup from the Unit 1 fall 2013 refueling outage is November 2013.) Following expiration of Note @, Configuration 3 can continue to be used.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the safety analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss of offsite power and single failure of the other onsite A.C. source.

The footnote for Action b of LCO 3.8.1.1 requires completion of a determination that the OPERABLE diesel generators are not inoperable due to common cause failure or performance of Surveillance 4.8.1.1.2.a.4 if Action b is entered. The intent is that all diesel generator inoperabilities must be investigated for common cause failures regardless of how long the diesel generator inoperability persists.

Action b of LCO 3.8.1.1 is further modified by a second note which precludes making more than one diesel generator inoperable on a pre-planned basis for maintenance, modifications, or surveillance testing. The intent of this footnote is to explicitly exclude the flexibility of removing a diesel generator set from service as a part of a pre-planned activity. While the removal of a diesel generator set (A or B train) is consistent with the initial condition assumptions of the accident analysis, this configuration is judged as imprudent. The term pre-planned is to be taken in the context of those activities which are routinely scheduled and is not relative to conditions which arise as a result of emergent or unforeseen events. As an example, this footnote is not intended to preclude the actions necessary to perform the common mode testing requirements required by Action b. As another example, this footnote is not intended to prevent the required surveillance testing of the diesel generators should one diesel generator maintenance be unexpectedly extended and a second diesel generator fall within its required testing frequency. Thus, application of the note is intended for pre-planned activities.

In addition, this footnote is intended to apply only to those actions taken directly on the diesel generator. For those actions taken relative to common support systems (e.g. ERCW), the support function must be evaluated for impact on the diesel generator.

The action to determine that the OPERABLE diesel generators are not inoperable due to common cause failures provides an allowance to avoid unnecessary testing of OPERABLE diesel generators. If it can be determined that the cause of the inoperable diesel generator does not exist on the OPERABLE diesel generators, Surveillance Requirement 4.8.1.1.2.a.4 does not have to be performed. If the cause of inoperability exists on other diesel generator(s), the other diesel generator(s) would be declared inoperable upon discovery and Action e of LCO 3.8.1.1 would be entered as applicable. Once the common failure is repaired, the common cause no longer exists, and the action to determine inoperability due to common cause failure is satisfied. If the cause of the initial inoperable diesel generator cannot be confirmed not to exist on the remaining diesel generators, performance of Surveillance 4.8.1.1.2.a.4 suffices to provide assurance of continued OPERABILITY of the other diesel generators.

ATTACHMENT 3

Modified Proposed TS Changes (Final Typed) for SQN, Units 1 and 2

This attachment provides modified proposed Technical Specification 3/4.8.1 final typed insert pages for Units 1 and 2. These pages include an additional change and should be inserted as a supplement the pages provided in Attachment 3 to the enclosure of the letter from TVA to NRC, "Application to Modify Technical Specifications in Support of Unit Station Service Transformer Modification (TS-SQN-12-01)," dated May 23, 2012, (Reference 1 of the cover letter for this submittal).

Modified Proposed TS Changes (Final Typed) for SQN, Unit 1

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

a. Two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system@, and

b. Four separate and independent diesel generator sets each with:

1. Two diesels driving a common generator

2. Two engine-mounted fuel tanks containing a minimum volume of 250 gallons of fuel, per tank

3. A separate fuel storage system containing a minimum volume of 62,000 gallons of fuel,

4. A separate fuel transfer pump, and

5. A separate 125-volt D.C. distribution panel, 125-volt D.C. battery bank and associated charger.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With one offsite A.C. circuit of the above required A.C. electrical power source inoperable, demonstrate the OPERABILITY of the remaining offsite A.C. circuit by performing Surveillance Requirement 4.8.1.1.1.a within one hour and at least once per 8 hours thereafter. Restore at least two offsite circuits to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b.# With diesel generator set(s) 1A-A and/or 2A-A or 1B-B and/or 2B-B of the above required A.C. electrical power sources inoperable,* demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within one hour and at least once per 8 hours thereafter, and determining OPERABLE diesel generator sets are not inoperable due to comon cause failure or performing Surveillance Requirement 4.8.1.1.2.a.4 within 24 hours; restore at least four diesel generator sets to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Required actions, to verify OPERABLE diesel generator sets are not inoperable due to common cause failure or perform SR 4.8.1.1.2.a.4, shall be completed if this action is entered.

* No more than one diesel generator may be made simultaneously inoperable on a pre-planned basis for maintenance, modifications, or surveillance testing.

@ Offsite circuits utilizing USST 2A and USST 2B as the normal power sources require CSST A and CSST C to be available as the alternate power sources via automatic transfer at the associated 6.9 kV Unit Boards. (CSST B can be substituted for CSST A or CSST C.) This Note remains in effect until November 30, 2013, or until the USST modifications are implemented on Units 1 and 2, whichever occurs first.

Modified Proposed TS Changes (Final Typed) for SQN, Unit 2

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

a. Two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system@, and

b. Four separate and independent diesel generator sets each with:

1. Two diesels driving a common generator

2. Two engine-mounted fuel tanks containing a minimum volume of 250 gallons of fuel, per tank

3. A separate fuel storage system containing a minimum volume of 62,000 gallons of fuel,

4. A separate fuel transfer pump, and

5. A separate 125-volt D.C. distribution panel, 125-volt D.C. battery bank and associated charger

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With one offsite A.C. circuit of the above required A.C. electrical power sources inoperable, demonstrate the OPERABILITY of the remaining offsite A.C. circuit by performing Surveillance Requirement 4.8.1.1.1.a within one hour and at least once per 8 hours thereafter. Restore at least two offsite circuits to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b.# With diesel generator set(s) 1A-A and/or 2A-A or 1B-B and/or 2B-B of the above required A.C. electrical power sources inoperable,* demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within one hour and at least once per 8 hours thereafter, and determining OPERABLE diesel generator sets are not inoperable due to common cause failure or performing Surveillance Requirement 4.8.1.1.2.a.4 within 24 hours; restore at least four diesel generator sets to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Required actions, to verify OPERABLE diesel generator sets are not inoperable due to common cause failure or perform SR 4.8.1.1.2.a.4, shall be completed if this action is entered.

* No more than one diesel generator may be made simultaneously inoperable on a pre-planned basis for maintenance, modifications, or surveillance testing.

@ Offsite circuits utilizing USST 2A and USST 2B as the normal power sources require CSST A and CSST C to be available as the alternate power sources via automatic transfer at the associated 6.9 kV Unit Boards. (CSST B can be substituted for CSST A or CSST C.) This Note remains in effect until November 30, 2013, or until the USST modifications are implemented on Units 1 and 2, whichever occurs first.

ATTACHMENT 4

Modified Proposed TS Bases Changes (Final Typed) for SQN, Units 1 and 2

This attachment provides modified Technical Specification Bases Section 3/4.8 final typed pages for Units 1 and 2. These pages replace the corresponding pages provided in Attachment 4 to the enclosure of the letter from TVA to NRC, "Application to Modify Technical Specifications in Support of Unit Station Service Transformer Modification (TS-SQN-12-01)," dated May 23, 2012, (Reference 1 of the cover letter for this submittal).

Modified Proposed TS Bases Changes (Final Typed) for SQN, Unit 1

A.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS (Continued)

For example, to support breaker testing, offsite power to the 6.9 kV Shutdown Boards can be realigned from normal feed to alternate feed. This would result in Shutdown Boards 1A-A and 2A-A being fed from Unit Boards 1A and 2A, respectively, and Shutdown Boards 1B-B and 2B-B being fed from Unit Boards 1D and 2D, respectively. The CSST being utilized as the alternate power source to one load group of Shutdown Boards would also be realigned (normally CSST A available to Shutdown Boards 1B-B and 2B-B or CSST C available to Shutdown Boards 1A-A and 2A-A, would be realigned to CSST A available to Shutdown Boards 1A-A and 2A-A or CSST C available to Shutdown Boards 1B-B and 2B-B).

LCO 3.8.1.1 is modified by Note @ that specifies CSST A and CSST C are required to be available via automatic transfer at the associated 6.9 KV Unit Boards, when USST 2A and USST 2B are being utilized as normal power sources to the offsite circuits. (Note that CSST B can be substituted for CSST A or CSST C.) This offsite power alignment is consistent with Configuration 3, as stated above. Note @ remains in effect until November 30, 2013, or until the USST modifications are implemented on Units 1 and 2, whichever occurs first. (The scheduled startup from the Unit 1 fall 2013 refueling outage is November 2013.) Following expiration of Note @, Configuration 3 can continue to be used.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the accident analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss of offsite power and single failure of the other onsite A.C. source.

The footnote for Action b of LCO 3.8.1.1 requires completion of a determination that the OPERABLE diesel generators are not inoperable due to common cause failure or performance of Surveillance 4.8.1.1.2.a.4 if Action b is entered. The intent is that all diesel generator inoperabilities must be investigated for common cause failures regardless of how long the diesel generator inoperability persists.

Action b of LCO 3.8.1.1 is further modified by a second note which precludes making more than one diesel generator inoperable on a pre-planned basis for maintenance, modifications, or surveillance testing. The intent of this footnote is to explicitly exclude the flexibility of removing a diesel generator set from service as a part of a pre-planned activity. While the removal of a diesel generator set (A or B train) is consistent with the initial condition assumptions of the accident analysis, this configuration is judged as imprudent. The term pre-planned is to be taken in the context of those activities which are routinely scheduled and is not relative to conditions which arise as a result of emergent or unforeseen events. As an example, this footnote is not intended to preclude the actions necessary to perform the common mode testing requirements required by Action b. As another example, this footnote is not intended to prevent the required surveillance testing of the diesel generators should one diesel generator maintenance be unexpectedly extended and a second diesel generator fall within its required testing frequency. Thus, application of the note is intended for pre-planned activities.

In addition, this footnote is intended to apply only to those actions taken directly on the diesel generator. For those actions taken relative to common support systems (e.g. ERCW), the support function must be evaluated for impact on the diesel generator.

The action to determine that the OPERABLE diesel generators are not inoperable due to common cause failure provides an allowance to avoid unnecessary testing of OPERABLE diesel generators. If it can be determined that the cause of the inoperable diesel generator does not exist on the OPERABLE diesel generators, Surveillance Requirement 4.8.1.1.2.a.4 does not have to be performed. If the cause of inoperability exists on other diesel generator(s), the other diesel generator(s) would be declared inoperable upon discovery and Action e of LCO 3.8.1.1 would be entered as applicable. Once the common failure is

3/4.8.1 and 3/4.8.2 A.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS

repaired, the common cause no longer exists, and the action to determine inoperability due to common cause failure is satisfied. If the cause of the initial inoperable diesel generator cannot be confirmed not to exist on the remaining diesel generators, performance of Surveillance 4.8.1.1.2.a.4 suffices to provide assurance to continued OPERABILITY of the other diesel generators.

According to Generic Letter 84-15, 24 hours is reasonable to confirm that the OPERABLE diesel generators are not affected by the same problem as the inoperable diesel generator.

Action f prohibits the application of LCO 3.0.4.b to an inoperable diesel generator. There is an increased risk associated with entering a MODE or other specified condition in the Applicability with an inoperable diesel generator and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that 1) the facility can be maintained in the shutdown or refueling condition for extended time periods and 2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

With the minimum required AC power sources not available, it is required to suspend CORE ALTERATIONS and operations involving positive reactivity additions that could result in loss of required SDM (Mode 5) or boron concentration (Mode 6). Suspending positive reactivity additions that could result in failure to meet minimum SDM or boron concentration limit is required to assure continued safe operation. Introduction of coolant inventory must be from sources that have a boron concentration greater than or equal to that required in the RCS for minimum SDM or refueling boron concentration. This may result in an overall reduction in RCS boron concentration but provides acceptable margin to maintaining subcritical operation. Introduction of temperature changes including temperature increases when operating with a positive MTC must also be evaluated to ensure they do not result in a loss of required SDM.

The requirements of Specification 3.8.2.1 provide those actions to be taken for the inoperability of A.C. Distribution Systems. Action a of this specification provides an 8-hour action for the inoperability of one or more A.C. boards. Action b of this specification provides a relaxation of the 8-hour action to 24-hours provided the Vital Instrument Power Board is inoperable solely as a result of one inoperable inverter and the board has been energized within 8 hours. In this condition the requirements of Action a do not have to be applied. Action b is not intended to provide actions for inoperable inverters, which is addressed by the operability requirements for the boards, and is included only for relief from the 8-hour action of Action a when only one inverter is affected. More than one inverter inoperable will result in the inoperability of the associated 120 Volt A.C. Vital Instrument Power Board(s) in accordance with Action a. With more than one inverter inoperable entry into the actions of TS 3.0.3 is not applicable because Action a includes provisions for multiple inoperable inverters as attendant equipment to the boards.

The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guides 1.9 "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, and 1.108 "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, August 1977, and 1.137 "Fuel-Oil Systems for Standby Diesel Generators," Revision 1, October 1979. The Surveillance Requirements for the diesel generator load-run test and the 24-hour endurance and margin test are in accordance with Regulatory Guide 1.9, Revision 3, July 1993, "Selection, Design, Qualification, and Testing of Emergency Diesel Generator Units Used as Class 1E Onsite Electric Power Systems at Nuclear Power Plants." During the diesel generator endurance and margin surveillance test, momentary transients outside the kw and kvar load ranges do not invalidate the test results. Similarly, during the diesel generator load-run test, momentary transients outside the kw load range do not invalidate the test results.

Modified Proposed TS Bases Changes (Final Typed) for SQN, Unit 2

For example, to support breaker testing, offsite power to the 6.9 kV Shutdown Boards can be realigned from normal feed to alternate feed. This would result in Shutdown Boards 1A-A and 2A-A being fed from Unit Boards 1A and 2A, respectively, and Shutdown Boards 1B-B and 2B-B being fed from Unit Boards 1D and 2D, respectively. The CSST being utilized as the alternate power source to one load group of Shutdown Boards would also be realigned (normally CSST A available to Shutdown Boards 1B-B and 2B-B or CSST C available to Shutdown Boards 1A-A and 2A-A, would be realigned to CSST A available to Shutdown Boards 1A-A and 2A-A or CSST C available to Shutdown Boards 1B-B and 2B-B).

LCO 3.8.1.1 is modified by Note @ that specifies CSST A and CSST C are required to be available via automatic transfer at the associated 6.9 KV Unit Boards, when USST 2A and USST 2B are being utilized as normal power sources to the offsite circuits. (Note that CSST B can be substituted for CSST A or CSST C.) This offsite power alignment is consistent with Configuration 3, as stated above. Note @ remains in effect until November 30, 2013, or until the USST modifications are implemented on Units 1 and 2, whichever occurs first. (The scheduled startup from the Unit 1 fall 2013 refueling outage is November 2013.) Following expiration of Note @, Configuration 3 can continue to be used.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the safety analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss of offsite power and single failure of the other onsite A.C. source.

The footnote for Action b of LCO 3.8.1.1 requires completion of a determination that the OPERABLE diesel generators are not inoperable due to common cause failure or performance of Surveillance 4.8.1.1.2.a.4 if Action b is entered. The intent is that all diesel generator inoperabilities must be investigated for common cause failures regardless of how long the diesel generator inoperability persists.

Action b of LCO 3.8.1.1 is further modified by a second note which precludes making more than one diesel generator inoperable on a pre-planned basis for maintenance, modifications, or surveillance testing. The intent of this footnote is to explicitly exclude the flexibility of removing a diesel generator set from service as a part of a pre-planned activity. While the removal of a diesel generator set (A or B train) is consistent with the initial condition assumptions of the accident analysis, this configuration is judged as imprudent. The term pre-planned is to be taken in the context of those activities which are routinely scheduled and is not relative to conditions which arise as a result of emergent or unforeseen events. As an example, this footnote is not intended to preclude the actions necessary to perform the common mode testing requirements required by Action b. As another example, this footnote is not intended to prevent the required surveillance testing of the diesel generators should one diesel generator maintenance be unexpectedly extended and a second diesel generator fall within its required testing frequency. Thus, application of the note is intended for pre-planned activities.

In addition, this footnote is intended to apply only to those actions taken directly on the diesel generator. For those actions taken relative to common support systems (e.g. ERCW), the support function must be evaluated for impact on the diesel generator.

The action to determine that the OPERABLE diesel generators are not inoperable due to common cause failures provides an allowance to avoid unnecessary testing of OPERABLE diesel generators. If it can be determined that the cause of the inoperable diesel generator does not exist on the OPERABLE diesel generators, Surveillance Requirement 4.8.1.1.2.a.4 does not have to be performed. If the cause of inoperability exists on other diesel generator(s), the other diesel generator(s) would be declared inoperable upon discovery and Action e of LCO 3.8.1.1 would be entered as applicable. Once the common failure is repaired, the common cause no longer exists, and the action to determine inoperability due to common cause failure is satisfied. If the cause of the initial inoperable diesel generator cannot be confirmed not to exist on the remaining diesel generators, performance of Surveillance 4.8.1.1.2.a.4 suffices to provide assurance of continued OPERABILITY of the other diesel generators.

ENCLOSURE 2

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT
UNITS 1 AND 2

RESPONSE TO NRC HEALTH PHYSICS AND HUMAN PERFORMANCE BRANCH (AHPB) REQUEST FOR ADDITIONAL INFORMATION (RAI)

Subject: **Application to Modify Technical Specifications in Support of Unit Station Service Transformer Modification (TS-SQN-12-01)**

CONTENTS

1.0 AHPB RAI QUESTION 1

Will any procedure changes be required to support the transformer modification (e.g., loss of off-site power)?

1.1 TVA Response - AHPB Question 1

Yes. A review of existing station procedures was performed for modification impact. The documents reviewed included annunciator response procedures, general operating procedures, system operating procedures, abnormal operating procedures, emergency operating procedures, surveillance instructions, technical instructions, and periodic instructions. Numerous procedures have been identified as requiring development or revision to reflect the pending modification. For example, Abnormal Operating Procedure (AOP) AOP-P.01, "Loss of Offsite Power," has been identified for revision to address restoration of offsite power using the USSTs. Similar review efforts are planned for the maintenance procedures.

2.0 AHPB RAI QUESTION 2

Will any changes to training be required to support the transformer modification? If not, how will operators know what changes were made? Note: Arguments made on the basis that the SR is virtually identical to the old SR are not acceptable - because the old SR was deleted in 1997, it should be treated as if it was new.

2.1 TVA Response - AHPB Question 2

Yes. The TVA training processes require a training needs analysis be performed on new and revised procedures. The procedure changes being made for the USST/GCB modification are also required to be evaluated for licensed operators, non-licensed operators, and maintenance personnel. New tasks are required to be analyzed to determine training needs. Training material is required to be developed and presented for any identified training needs.

It is anticipated that the new GCB, Technical Specification changes and procedure changes will require approximately three hours of classroom training. In addition, walk down(s) of new equipment may be conducted, as needed, to support the training and procedure changes. There may also be task performance evaluations (TPE) required on the new tasks for non-licensed operators.

It is anticipated that the additional training will be given to job incumbents and incorporated into the existing initial training programs.

3.0 AHPB RAI QUESTION 3

Will any changes to displays, controls, alarms, annunciators or the safety parameter display system be required to support the transformer modification?

3.1 TVA Response - AHPB Question 3

New Control Room controls and indication are provided for generator synchronization and GCB control. Additionally, controls are provided to allow remote USST cooling control and LTC control. Indication changes in the Control Room include LTC and GCB status and alarms, and microprocessor relay annunciation. The safety parameter display system is not impacted by this modification.

New local controls and annunciation for USST operation and monitoring are provided to control transformer cooling, control cabinet heating, LTC test and control, USST tank temperature monitoring, winding temperature monitoring, and dissolved gas monitoring. New local controls are also provided for GCB control and status monitoring, including GCB spring energy, GCB disconnects control and indication, GCB side ground switch control and indication, control panel heater operation, and local alarm indication.

4.0 AHPB RAI QUESTION 4

Are the actions to manually back up the automatic reconfiguration of power sources performed in the control room? If not, what environmental conditions are expected?

4.1 TVA Response - AHPB Question 4

Yes, operator actions taken to effect a manual transfer of the power supply to a 6.9 kV Unit Board from the normal supply to the alternate supply are performed from the main control room.

5.0 AHPB RAI QUESTION 5

Are there any time constraints on manual backup (e.g., are there time limits beyond which the action will not be effective, or equipment will be damaged)?

5.1 TVA Response - AHPB Question 5

No. To comply with the requirements of 10 CFR 50, Appendix A, GDC 17, the SQN electrical design includes two immediate access offsite circuits. To maintain this design assumption while a USST is supplying power to an offsite circuit, automatic transfer capability from the USST power supply to a CSST power supply is required. In the event the USST power supply becomes unavailable, power will be automatically transferred from the normal power supply (USST) to the alternate power supply (CSST). Manual transfer capability is verified to provide a backup to the automatic transfer. Manual transfer capability is not assumed in the accident analysis for the mitigation of an event, and is not credited for meeting the requirements of GDC 17. Therefore, there are no time restraints associated with a manual transfer of power supplies to an offsite circuit.

6.0 AHPB RAI QUESTION 6

Does the licensee plan to perform a simulation or a walkthrough of the proposed manual actions under realistic conditions to determine whether:

- *the procedures are complete, technically accurate, and usable;*

- *the training program appropriately addressed the changes in plant systems and the proposed action(s);*
- *the proposed action(s) can be completed within the time criterion for each applicable scenario?*

6.1 TVA Response - AHPB Question 6

The manual transfer of power supplies to an offsite circuit is not assumed in the accident analysis for the mitigation of an event, and is not credited for meeting the requirements of GDC 17. Therefore, there are no time restraints associated with a manual transfer of power supplies to an offsite circuit. However, if the plant modifications result in revisions to AOPs or Emergency Operating Procedures (EOPs), the procedures are required to be verified and validated in accordance with their governing processes. Revised procedures may be walked down, as needed, to verify accuracy and usability.

TVA procedure NPG-SPP-09.3.1, Guidelines for Preparation of Design Inputs and Change Impact Screen, requires, in part, the performance of a training needs analysis for proposed plant changes. NPG-SPP-09.3.1 also requires configuration control of the simulator to be maintained when plant changes or modifications are performed.

The SQN simulator is based on Unit 1. The first phase of the USST/GCB modification will occur on Unit 2. Therefore, no permanent changes to the simulator are planned to reflect the modifications to Unit 2. It is anticipated that a remote function will be added to the simulator model to emulate the new Unit 2 configuration for GCB trips and interlocks, as well as use of the USSTs as an electrical power source. Current plans are to modify the simulator to reflect the changes being made to the Unit 1 control room, in conjunction with the Unit 1 USST/GCB modification.

It is anticipated that licensed operators will receive demonstration training on plant response with the new electrical configuration and will be presented classroom training on the differences between the CSSTs and USSTs. The identified training will be incorporated into the initial license training program as appropriate.