Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402-2801

January 31, 2007

10 CFR 50.54(f)

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

Gentlemen:

In the Matter of	)	Docket Nos. 50-259	50-260
Tennessee Valley Authority	)	50-296	50-327
		50-328	50-390

BROWNS FERRY NUCLEAR PLANT (BFN) UNITS 1, 2 & 3, SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 & 2 AND WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 - REQUEST FOR ADDITIONAL INFORMATION REGARDING RESOLUTION OF GENERIC LETTER 2006-02, GRID RELIABILITY AND THE IMPACT ON PLANT RISK AND THE OPERABILITY OF OFFSITE POWER (TAC NOS. MD0947 THROUGH MD1050)

This letter provides TVA's response to NRC's request for additional information dated December 5, 2006, regarding Generic Letter 2006-02. The enclosure provides TVA's response. This information is provided pursuant to 10 CFR 50.54(f).

There are no new regulatory commitments made by this letter. Please direct any questions to Rob Brown at (423) 751-7228.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 31 day of January, 2007.

Sincerely,

Beth A. Wetzel

Beth Wetzel
Manager, Corporate Nuclear Licensing
and Industry Affairs

Enclosure
cc: See page 2

A123

Enclosure
cc (Enclosure):

Brendan T. Moroney, Senior Project Manager
U.S. Nuclear Regulatory Commission
One White Flint North
MS 08G9A
11555 Rockville Pike
Rockville, Maryland 20852-2738

Margaret H. Chernoff, Senior Project Manager
U.S. Nuclear Regulatory Commission
One White Flint North
MS 08G9A
11555 Rockville Pike
Rockville, Maryland 20852-2738

U.S. Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85
Atlanta, Georgia 30303-8931

NRC Senior Resident Inspector
Browns Ferry Nuclear Plant
10833 Shaw Road
Athens, Alabama 35611-6970

NRC Senior Resident Inspector
Sequoyah Nuclear Plant
2600 Igou Ferry Road
Soddy Daisy, Tennessee 37379-3624

NRC Senior Resident Inspector
Watts Bar Nuclear Plant
1260 Nuclear Plant Road
Spring City, Tennessee 37381-2000

ENCLOSURE

REQUEST FOR ADDITIONAL INFORMATION REGARDING RESOLUTION OF GENERIC LETTER 2006-02, GRID RELIABILITY AND THE IMPACT ON PLANT RISK AND THE OPERABILITY OF OFFSITE POWER

This enclosure provides TVA Nuclear's (TVAN) response to questions 1 and 5 in accordance with NRC's request for additional information dated December 5, 2006, regarding Generic Letter 2006-02. TVAN's response is as follows:

Offsite Power Operability

1. **Switchyard Minimum Voltage**

   In response to question 1(g) you did not identify specific minimum switchyard voltage limits (kV) that you supplied to the local transmission entity. Please, provide the following information:

   What is the specific minimum acceptable switchyard voltage included in your protocol agreement with your grid operator (GO) and what was the basis for this value?

   Response
   TVAN does not use a specific minimum voltage to perform auxiliary power analyses. For our plants, "acceptable switchyard voltage" is a combination of a minimum voltage coupled with a maximum voltage drop (pre-event to post-event). This is because the voltages available to plant safety busses are regulated by automatic load tap changers (LTC). The nature of this design is such that several factors must be considered when establishing switchyard voltage criteria (e.g. LTC response time, maximum pre-event tap setting, tap step size, total tap range, and switchyard voltage response).

   The specific switchyard voltage criteria for each TVAN plant are as follows:

   BFN: $\geq$ 495kV and $\leq$ 30kV drop (500 kV switchyard)
   $\geq$ 159kV and $\leq$ 4kV drop (161 kV switchyard)

   SQN: $\geq$ 153kV and $\leq$ 13kV drop (161 kV switchyard)

   WBN: $\geq$ 153kV and $\leq$ 11kV drop (161 kV switchyard)

These criteria have been summarized for clarity. Other criteria have been analyzed for rare or future operating conditions. The bases for the above values are to:

1. Provide the widest possible range of allowable switchyard voltage,
2. Provide adequate starting, accelerating, and operating voltage for required safety loads during required accident and operating scenarios, and
3. Prevent initiation of plant degraded voltage protection.

How is this value related to your technical specification degraded voltage relay setpoints?

Switchyard voltages that do not meet the listed criteria could initiate the plant degraded voltage protection. However, each plant's auxiliary power system analysis ensures that degraded voltage protection will not be initiated during required accident and operating scenarios when the switchyard voltage meets the listed criteria.

TVAN plants monitor for degraded voltage on the safety busses (6.9kV or 4kV level). A time delay is utilized to prevent unnecessary transfer to the onsite power sources for anticipated momentary voltage dips. The analytical bases for the degraded voltage relay (DVR) setpoints are summarized as follows:

1. The DVR dropout point is based on the minimum safety buss voltage that provides adequate voltage to required safety loads during worst-case loading conditions.
2. The tightest possible tolerance is used between DVR reset and dropout points. If analysis shows that the safety buss voltage drops below the dropout point for required accidents and operating scenarios, the voltage must recover above the reset point within the time delay value.
3. The time delay setpoint is based on the safety analysis time allowed to transfer to the onsite power supply. SQN utilizes a longer time delay when no accident signal is present.

The degraded voltage protection setpoints for each TVAN plant are:

<u>BFN (4.16kV Busses)</u>

DVR setpoint:	3920 volts (nominal, decreasing)
Time Delay:	6.9 seconds

<u>SQN (6.9kV Busses)</u>

DVR setpoint:	93.5 percent (nominal, decreasing)
Time Delay:	9.5 seconds

<u>WBN (6.9kV Busses)</u>

DVR setpoint:	96 percent (nominal, decreasing)
Time Delay:	10 seconds

Maintenance Rule

5. **Seasonal Variation in Grid Stress (Reliability and Loss-of-offsite Power (LOOP) Probability)**

   Certain regions during certain times of the year (seasonal variations) experience higher grid stress as is indicated in Electric Power Research Institute (EPRI) Report 1011759, Table 4-7, Grid LOOP Adjustment Factor, and NRC NUREG/CR-6890. Do you adjust the base LOOP frequency in your probabilistic risk assessment (PRA) and Maintenance Rule evaluations for various seasons?

   Response
   No. Grid stress and predicted LOOP frequency at the three TVAN sites has not shown a correlation to seasonal variations.

   If you do not consider seasonal variations in base LOOP frequency in your PRA and Maintenance Rule evaluations, explain why it is acceptable not to do so.

   TVA's Power System Operations organization (PSO) operates TVA's transmission power system (TPS). PSO/TPS is a robust supplier of offsite power to TVA's three nuclear plants. PSO/TPS is the sole transmission supplier to TVA's nuclear plants. According to PSO/TPS, power has been delivered at 99.999 percent reliability to TVA customers over the past seven years. This exceptional reliability reveals no significant issues related to seasonal variations.

   The North American Electric Reliability Council (NERC) audits have confirmed that PSO/TPS is exceptional in many areas. NERC has awarded TVA five "Examples of Excellence," and recently cited TVA for three more nominations. One of the rewards is for real time reliability information. This capability in conjunction with special large industrial customer contracts allows for significant power load reduction during peak load conditions or emergencies to avoid degraded grid conditions.

   PSO/TPS also classifies grid conditions for reliability. When real time grid changes occur, PSO/TPS notifies the affected TVAN plant Main Control Room(s) of the escalation or lowering of grid condition status. Based on these classifications, TVAN assesses the work in-progress and the most expedient method to terminate risk sensitive activities as appropriate.

   In addition to having a strong reliable grid and processes as mentioned above, TVAN utilizes a LOOP initiating event frequency in the PRA that is based on site-specific initiating event data. The Pickard, Lowe and Garrick, Inc. (PLG)-0500, Volume 6, Revision 1 (proprietary), "Database for Probabilistic Risk Assessment of Light Water Nuclear Power Plants," provides the basis for site values that are Bayesian updated as part of the periodic PRA update process. The determination of the LOOP initiating event frequency is a continuous process and provides an annualized frequency that incorporates site-specific events and provides a realistic approach to PRA methodology for

LOOP. Because the base PRA model is used to determine an annual core damage frequency and large early release frequency, the weighting of the LOOP frequency (i.e., increasing the frequency in the summer and winter and decreasing the frequency in the fall and spring) would have no net effect on the contribution of LOOP on the annual core damage or large early release frequency. The risk associated with plant related activities is therefore minimized by the continuous communications between the PSO/TPS and the plant Main Control Room as well as the use of a site-specific LOOP initiating event frequencies.

Finally, TVA schedules most major outages in the spring and fall with respect to meeting the challenges of peak summer power loads when seasonal power usage is higher. This further reduces the risk of grid instability.