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J. L. Wilson
Vice President, Sequoyah Nuclear Plant

February 25, 1992

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

Gentlemen:

In the Matter of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328

SEQUOYAH NUCLEAR PLANT (SQN) - UNITS 1 AND 2 - REVISED RESPONSE TO NRC QUESTIONS FROM THE AUGUST 7, 1986, TELEPHONE CALL

Reference: TVA letter to NRC dated September 11, 1986

Background

On August 7, 1985, a telephone call was held between TVA and NRC to discuss the Sequoyah auxiliary power system (APS). As the result of this telephone conversation, NRC telecopied a set of questions to TVA for a response. Question 5 of this telecopy read as follows:

> "Provide the results of the worst case calculation for voltages on the Class 1E buses for the condition of starting a reactor coolant pump with the buses loaded as in an accident situation."

In the referenced response, TVA stated with the 161-kilovolt (kV) grid at 159 kV, it would be possible to start one reactor coolant pump (RCP) without resulting in a lower voltage on the affected Class 1E, 6.9-kV shutdown board to the level at which the degraded voltage relay will operate. The supporting calculation that provided this justification was SQN-APS-002, "Effect of RCP Starting on 6.9 kV Shutdown Bd." SQN-APS-002 analyzed the effect of starting one 6000-horsepower RCP motor on the Class 1E, 6.9-kV shutdown board under the following conditions: (1) the 161-kV grid at 159 kV (degraded grid voltage); (2) one unit under an accident; and (3) the other unit undergoing a full load rejection. This analysis was performed by modeling the common station service transformers (CSSTs) that were in service in 1986. These transformers do not have the auto-load tap changers that are currently being installed.

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In 1990, a condition adverse to quality (CAQ) was identified against calculations that were complete but were not formally issued. This CAQ, SQP900305SCA, was originally initiated in response to calculations that had been prepared and checked for the 1987 cable test program but were not issued. As a result of this CAQ, a review of the calculation cross-reference indexing system showed that SQN-APS-002 had also been prepared and checked, but never issued.

In 1991, another CAQ (SQ910229) was initiated when it was discovered that SQN-APS-002 had been used as a basis for the 1986 NRC response referenced above. A deficiency was discovered in the unissued version of Calculation SQN-APS-002. A review of the input data for the old calculation showed that there had been a typographical error in the data input. This calculation contained an error in its transformer impedance value. This value, in turn, affected the results of this calculation and resulted in an erroneous conclusion.

NRC staff was notified of this issue and that a revised response would be forthcoming.

Analysis Results

The new analysis was performed using TVA's quality assurance approved computerized analysis program, "Electrical Load Monitoring System Alternating Current." The APS was modeled using the 1986 electrical configurations. The results of this reanalysis concluded that starting one RCP motor would cause the corresponding Class 1E, 6.9-kV shutdown board to transfer to the diesel generators (D/Gs).

The acceleration time of the RCP motor is greater than the degraded voltage time delay setpoint to transfer to the D/G with a safety-injection (SI) signal. The degraded setpoint is 6560 volts (V). In order for the transfer not to occur, the corresponding shutdown board voltage must recover to 6600 V in 7.4 seconds or less. The RCP motor acceleration time will not allow the voltage to recover above the degraded voltage setpoint of the relays in time to prevent transfer of shutdown board loads to the D/Gs.

An additional analysis was performed to see what effect the planned electrical configuration (CSSTs with auto-load tap changers) would have on this scenario. The results of this analysis also showed that with the 161-kV switchyard under degraded voltage conditions, the transfer to the D/Gs would still occur. Only if the new CSSTs with the auto-load tap changers are installed and the 161-kV grid is at 164 kV will the transfer of the 6.9-kV shutdown boards to the D/Gs not take place.

The results of this analysis supersede TVA's original response to Question 5 provided to NRC in the referenced letter. The revised response only affects Question 5; all other responses are unaffected.

Impact of the New Result

The significance of this finding does not affect any accident analysis as described in Chapter 15 of the Updated Final Safety Analysis Report. A review of this chapter does not indicate that the starting of an RCP is required to mitigate any design basis accident (DBA). The emergency core cooling pumps are the safety-related equipment that help maintain core cooling in the event of an accident. The RCPs at SQN are not safety-related and are not 10 CFR 50.49 equipment. Therefore, these pumps could not be relied upon to start in the event of a DBA nor are they designed to do so.

It should also be noted that this analysis, SQN-APS-002, is performed anticipating extreme plant conditions as described above. A review of SQN emergency instructions for DBA events has verified that an RCP is not attempted to be restarted until the SI signal is reset. Any RCP start after SI signal reset would not initiate 6.9-kV shutdown board load shedding and loading to the D/G because of the longer time delay for degraded voltage conditions without an SI signal activated. Based on the above discussion, it is TVA's position that the revised results of SQN-APS-002 do not pose any significant findings.

No commitments are contained in this letter.

Please direct questions concerning this issue to K. C. Weller at (615) 843-7527.

Sincerely,

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Enclosures
cc: See page 2

cc: (Enclosures):

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