TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

October 1, 1979

Director of Nuclear Reactor Regulation
Attention: Mr. L. S. Rubenstein, Acting Chief
Light Water Reactors Branch No. 4
Division of Project Management
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Rubenstein:

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

On September 10, 1979, a telephone conference call was held with TVA, Lambros Lois of the NRC Reactor Systems Branch, and Stan Bruske, an NRC consultant from Idaho National Laboratories. The topic of discussion was NRC concern with TVA compliance with IEEE-279 for interlocks for Reactor Coolant System (RCS) Pressure Control during low temperature operation. As a result of this discussion, TVA agreed to provide the following information.

1. Logic and wiring diagrams

2. Expanded general description of the RCS overpressure mitigation system and its operation

3. An amended Final Safety Analysis Report (FSAR) section 7.6.7

4. An evaluation of a design problem which occurred at North Anna Nuclear Plant where a failure in a power supply could cause both an overpressure transient and partially disable the RCS mitigation system

Enclosed is one copy each of the following logic and wiring diagrams.

47W610-68-1 through 6
47W611-68-1 through 3
45N668
45N765-10 and 13

Two copies of each of these drawings are being sent concurrently with this letter to Lambros Lois.

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Also enclosed is the information requested in item 2.

Section 7.6.7.1 of the FSAR will be revised to accurately reflect the degree of TVA's compliance with IEEE-279. This revision will be provided by October 12, 1979.

With respect to item 4, TVA has reviewed the power supply to the letdown portion of the Chemical and Volume Control System (CVCS) and the Power Operated Relief Valves (PORV). The power supply arrangement at Sequoyah Nuclear Plant is designed so that a single event cannot initiate an over-pressurization transient, disable part of the mitigation system, or make the system vulnerable to a single consequential failure.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Regulation and Safety

Enclosure

SEQUOYAH AND WATTS BAR NUCLEAR PLANTS
COLD OVERPRESSURE PROTECTION SYSTEM

The cold overpressure protection system for SQN and WBN is designed to ensure mitigation capability for RCS pressure transients for the full range of RCS operating temperatures. The RCS safety valves provide overpressure protection (i.e., they will maintain RCS pressure below the Appendix G limits) for all RCS operating conditions with temperatures above 350° F (this was determined from the technical specification pressure-temperature limitation curves). During normal power operation, the pressurizer power-operated relief valves (PORV's) provide additional protection as discussed in FSAR section 5.2.2. The cold overpressure protection system will use the PORV's to ensure redundant trained relief paths for pressure transients which occur below approximately 450° F (note that the exact value of this permissive interlock has not been finalized). For each train, the system will (1) monitor actual RCS temperature and pressure; (2) generate a temperature dependent pressure setpoint for each PORV; (3) compare the actual pressure to the setpoint pressure; (4) alarm when the actual pressure approaches the setpoint; and (5) actuate the PORV when the actual pressure is greater than or equal to the setpoint pressure. Additionally, the system will include temperature interlocks to automatically arm the system as RCS temperature decreases. A discussion of the protection system components and their operation is provided below:

1. RCS Temperature - The RCS wide range temperature instruments will provide input to the train A PORV (PCV-68-340A) actuation logic. The four hot leg instruments will provide input to the train B PORV (PCV-68-334). For each case, the four temperature signals will be auctioneered low (i.e., the lowest indicate value will be selected) to provide a conservative input to the setpoint generator. Additionally, these auctioneered temperatures will be used to provide interlocks to automatically arm the PORV's on decreasing RCS temperature (see item 5 below).

2. Function Generator

   The Westinghouse-supplied function generator is preprogrammed to take the auctioneered temperature input (from 1) and generate a pressure setpoint for the associated PORV. The programmed setpoint curve is sufficiently less than the technical specification limit to allow for overshoot above the setpoint without exceeding the limit.

3. RCS Pressure

The trained RCS wide range pressure instruments (0-3000 psig) provide pressure input to their associated comparator. (Note that the actuation signals for the PORV's during normal power operation are taken from the pressurizer narrow range pressure instruments.)

4. Comparator

The comparator receives signals from the function generator (setpoint pressure) and the RCS wide range pressure instruments (actual pressure). If the actual pressure approaches within 3. psi (note that this value is not yet finalized) of the setpoint pressure, an annunciator and alarm will alert the operator. If the actual pressure is greater than or equal to this setpoint pressure, an actuation signal will be sent to the PORV.

Temperature Interlock

Each PORV actuation circuit is provided with a temperature interlock from the opposite trained auctioneered temperature signal. When the RCS temperature is above this permissive interlock, the cold overpressure actuation logic for that PORV is not functional. This interlock is included to minimize the potential for a spurious signal operating the PORV during normal operation. An annunciator in the main control room alarms when the interlock is made up to indicate that the overpressure logic is functional.

Note that the temperature instruments, auctioneering circuits, function generators, wide range pressure instruments, and comparators provide independent actuation signals to their associated PORV. The alarm and annunciator output of the two comparators are wired to a common alarm in the main control room. These circuits are tied together through separation (or buffer) relays to ensure the independence of the two trains are not violated. The permissive temperature interlocks between trains, and their associated annunciation circuits, also use separation relays. Thus, the cold overpressure actuation circuits for the PORV's are independent and single failure proof. However, since the system uses some control grade instrumentation (due to the fact that existing instruments were used to implement this backfit), TVA cannot state full compliance with IEEE-279.