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July 21, 1997

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

10 CFR 2.201

Gentlemen:

In the Matter of )  
Tennessee Valley Authority )

Docket Nos. 50-327

**SEQUOYAH NUCLEAR PLANT (SQN) - NRC INTEGRATED INSPECTION  
REPORT NOS. 50-327,228/97-04 - REPLY TO NOTICE OF VIOLATIONS  
(NOVs) 50-327/97-04-02 AND 50-327/97-04-03**

This letter provides TVA's reply to NOVs 50-327/97-04-02 and 50-327/97-04-03 which are documented in the subject inspection report dated June 20, 1997. The NOV identified two violations that are characterized as: 1) failure to meet the technical specification (TS) surveillance requirements (SR) for performance of functional testing of nuclear instruments; and 2) failure to follow procedures during initial startup for power ramp rate increases.

In TVA's reply to the NOV, TVA is denying Violation A (50-327/97-04-02), "Failure to Meet the Surveillance Requirements of TS 4.10.3.2, For Performing Functional Testing of the Nuclear Instruments." The enclosure contains TVA's reply to the NOV.

If you have questions regarding this response, please contact me at (423) 843-7001 or Pedro Salas at (423) 843-7170.

Sincerely,

*M. Bajestani*  
Masoud Bajestani

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Enclosure

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ENCLOSURE

TENNESSEE VALLEY AUTHORITY  
SEQUOYAH NUCLEAR PLANT (SQN)  
UNITS 1 AND 2

INSPECTION REPORT NUMBER 50-327, 50-328/97-04  
REPLY TO NOTICE OF VIOLATION (NOV)

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I. RESTATEMENT OF VIOLATION A

"Technical Specification 4.10.3.2, Physics Tests Surveillance Requirements, requires that each Intermediate and Power Range Channel shall be subjected to a CHANNEL FUNCTIONAL TEST within 12 hours prior to initiating PHYSICS TESTS.

Contrary to the above, on May 11, 1997, each Intermediate and Power Range Channel was not subjected to a CHANNEL FUNCTIONAL TEST within 12 hours prior to initiating PHYSICS TESTING, in that the 12-hour channel functional test for Power Range Channel instrument NI-42 and Intermediate Power Range Channel instrument NI-36 expired prior to the initiation of Physics Testing.

This is a Severity Level IV Violation (Supplement 1)."

ANSWER TO THE VIOLATION

TVA respectfully disagrees with NRC that a violation of Technical Specification (TS) surveillance Requirement 4.10.3.2 exists.

The SQN procedure for conducting low power physics testing explicitly defines the start of physics tests as the time that permission from the Senior Reactor Operator (SRO) has been obtained to begin the first withdrawal of control bank A. The procedure also states that this time would stop the clock on Nuclear Instrumentation System (NIS) channel testing for startup. In accordance with the procedure, permission was obtained at 0213 EDT from the SRO to begin low power physics testing and to perform rod pulls to critical. Personnel began low power physics test activities which includes data collection to obtain average NIS baseline count rate before pulling control banks.

TVA believes that data collection activities are both necessary and essential from the standpoint of safety in order to measure the fundamental nuclear characteristics of the reactor core. TVA considers such activities well within the TS definition of PHYSICS TESTS.

It should be noted that discussions had taken place earlier in the shift, at approximately midnight, between the Shift Manager, the Reactor Engineer, and the individual responsible for Management Oversight regarding the remaining items necessary for Mode 2 entry and their status. Following the status review, the decision was made not to continue functional tests of the NIS instruments because it was felt that the other activities would be complete prior to the expiration of the surveillances for the NIS instruments, and therefore the additional tests would not be necessary. It was the deliberate completion of the necessary prerequisite activities for Mode 2 entry that allowed the SRO to give permission to start physics tests in accordance with the procedure.

As part of its examination of the circumstances and events surrounding this proposed violation, TVA baselined its definition of initiation of physics testing with respect to numerous other plants. This examination indicated there was a wide range of practices. Some facilities define the initiation of physics testing as the point at which shutdown bank withdrawal begins, others define it just prior to pulling control rods when the reactor trip breaker function is verified, and yet another facility defines it as the time the reactivity computer is connected. The varied positions among facilities in establishing the point at which physics testing starts is consistent with the lack of specific regulatory guidance on the issue. This conclusion is based upon a review of ANSI/ANS 19.6.1, 1985, "Reload Startup Physics Tests for Pressurized Water Reactors," and Regulatory Guide 1.68, Revision 2, 1978, "Initial Test Programs for Water-Cooled Nuclear Power Plants," which do not address what activities constitute the initiation of physics testing.

TVA is concerned with the negative impact that starting physics tests later would have on reactor safety. If physics tests were not started until the reactor is critical, then the 12-hour clock for functional testing of the NIS channels would not stop until the reactor was critical. Under this scenario, the NIS channels would be required to be removed from service to perform the functional tests at the same time that the control rods were being pulled to reach criticality. We believe that this practice is fundamentally unsound, would jeopardize the safe operation of the plant, and would otherwise represent a reduction in the margin of safety as defined in the TS Bases.

## **II. RESTATEMENT OF VIOLATION B**

"Technical Specifications 6.8.1.a requires, in part, that procedures shall be established, implemented, and maintained covering the activities recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978, 'Quality Assurance Program Requirements (Operation).' Appendix A of Regulatory Guide 1.33, Section 1, includes procedures for

'Authorities and Responsibilities for Safe Operation and Shutdown' and Section 2 includes procedures for 'Power Operation and Process Monitoring.'

General Operating Instruction (GO), 0-GO-5, Normal Power Operation, Revision 6, Section 5.1, requires that ramp load rate increases shall be within the limits stated in Technical Instruction (TI)-40.

TI-40, Determination of Preconditioned Reactor Power, Revision 8, Section 4.1, requires that for the initial startup after core reload, the ramp rate should be limited to 3 percent of full power in an hour between 20 percent and 100 percent of full power.

Site Standard Practice (SSP)-12.1, Conduct of Operations, Revision 17, Section 3.8.3 C, requires that unit status, load or significant reactivity changes, and initiation and completion of surveillance tests shall be recorded in at least one narrative log.

Site Standard Practice (SSP)-12.1, Conduct of Operations, Revision 17, Section 3.1.5 F, requires the Unit Supervisor (US) coordinate the activities of the Unit Operators (UOs) with other Operations and plant personnel to achieve safe, reliable, and efficient operation of the unit.

Contrary to the above, on May 15, 1997:

1. Operators exceeded 3 percent of full power in one-hour ramp rate.
2. Operators failed to record in the narrative log an Axial Flux Difference (AFD) alarm condition, a significant load and reactivity change, and the initiation of a surveillance test.
3. The unit supervisor did not coordinate the activities of the unit operators with other Operations and plant personnel when he failed to notify the Shift Manager (SM) of a significant load and reactivity change and of an Axial Flux Difference alarm condition.

This is a Severity Level IV Violation (Supplement 1)."

#### TVA's REPLY TO THE VIOLATION

##### 1. Background

Procedures impose restrictions on power level increases for initial startups following refueling. The power increase is limited to approximately 3 percent per hour between 20 percent and 100 percent of full power. The

procedure allows small deviations from the 3 percent rate with the stipulation that the power increase not exceed 3.5 percent in any one hour. Additionally, procedures establish a preconditioned power level which is the highest power level for which there is an accumulated time of operation of 72 hours during any 7-day operating period. There are no power level increase restrictions below the preconditioned power level.

Prior to the event in question, a reactor coolant system (RCS) water inventory test was aborted upon determination that the RCS average temperature (Tavg) could not be maintained within the one degree Fahrenheit test requirement. Axial Flux Difference (AFD) was also approaching the target band upper-limit due to increasing xenon.

Following the aborted test, operators prepared to dilute the RCS to allow repositioning of control rods which had been withdrawn while the test was underway. Operators diluted approximately 1,200 gallons to raise power and RCS Tavg, while allowing rods to step in and restore AFD to program band. The UO and US had anticipated the power rise from the current 64 percent but had incorrectly determined that because the core had previously reached 67 percent, an increase to 70 percent would not violate the 3 percent per hour limit. This determination was incorrect because the unit had not been at the 67 percent power level for 72 hours in seven days of operation and therefore was not preconditioned for a 67 percent power level. Therefore, the 3 percent per hour limit should have been applied from the 64 percent power level instead of applying it to increases above the 70 percent level.

## **2. Reason For The Violation B**

The reason for the violation was inadequate knowledge of the preconditioned power level limits by the US and the UO.

An additional instance occurred during the earlier shift on May 15, 1997, from 10:03 a.m. to 11:03 a.m. when the power increased 3.55 percent.

Operations personnel also failed to adhere to procedural requirements for logging the above sequence of events. This failure was caused by a lack of sensitivity for properly maintaining logs. A contributing factor was that procedures did not allow a simple and quick method for capturing shift events other than immediately entering a narrative log entry into the computer-based log system.

During this sequence of events, the SM was not aware of the difficulties being experienced by the Unit 1 operators, (specifically, the AFD alarm and the need for a 1,200 gallon dilution). This was caused by a failure to follow procedural requirements when the US did not coordinate with the SM on changing plant conditions and the SM did not adequately monitor crew activities.

3. Corrective Steps Taken And Results Achieved

TVA immediately evaluated the consequences of the excessive nuclear instrumentation ramp power change. The indicated reactor power change (which was about 6 percent in 47 minutes) did not challenge any safety limits - the actual core power change was significantly less than this because a portion of the increase in the indicated level was due to increased flux leakage as RCS temperature increased. Framatome Cogema Fuels was contacted to assess impact on the new Framatome Cogema fuel loaded in the Unit 1 Cycle 8 (U1C8) refueling outage; an existing Westinghouse memorandum was referred to in order to assess the likely effect on cladding of the older Westinghouse fuel. It was concluded that this relatively modest power change was unlikely to cause fuel cladding damage, nor any concern with new fuel integrity.

4. Corrective Steps That Have Been Taken To Prevent Recurrence

Management expectations were discussed with the UO and US concerning the 3 percent per hour limit for power level increase.

Interviews were conducted with nine licensed operators and four instructors regarding the procedural requirements for reactor power ramp rate and preconditioned power level limits. As a result of these interviews, it was concluded that the extent of this knowledge based error was limited to a few individuals.

Shift Managers reviewed the event with the operating crews through the Operations Directive Manual 0.7, "Error Awareness Program."

Appropriate disciplinary action was taken for the involved personnel.

The on-shift managers have been making formal observations of the logs of the previous shift. Discrepancies are then turned over to the following shift for feedback and correction, and the observation is forwarded to the Operations Manager for review.

Periodic QA observations of control room logs are being used in an ongoing effort to assess the effectiveness of actions taken to improve logkeeping.

Procedures were revised to permit the use of temporary handwritten logs, provided that such informal notes are transferred to the official computerized narrative log in a timely manner.

5. Corrective Steps That Will Be Taken To Prevent Recurrence

A standdown will be conducted for Operations department personnel prior to the Unit 2 Cycle 8 (U2C8) refueling outage addressing lessons learned from U1C8 events. This action will be completed by September 30, 1997.<sup>1</sup>

Two other changes will be instituted to provide additional barriers to this type of occurrence. Revisions to the appropriate procedures are planned to clarify expectations for proper communication of information through the chain of command from the UO up through site management. This action is scheduled for completion by September 5, 1997.<sup>2</sup> Also a method of using the ICS computer features to assist operators in tracking the reactor power rate limit is planned. The appropriate procedures are scheduled to be revised to specify trending of reactor power. This action is scheduled for completion by September 26, 1997.<sup>3</sup>

6. Date When Full Compliance Will Be Achieved

With respect to the cited violation, TVA is in full compliance.

<sup>1,2,3</sup> TVA does not consider this corrective action a Regulatory Commitment. TVA's corrective action program will track completion of the action.