

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

6N 38A Lookout Place

MOV 15 1990

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) - NRC INSPECTION REPORT NOS. 50-327, 328/90-29 -  
RESPONSE TO NOTICE OF VIOLATIONS 50-327, 328/90-29-01, AND 50-327, 328/90-29-02

Enclosed is TVA's reply to B. A. Wilson's letter to O. D. Kingsley, Jr., dated  
October 11, 1990, which transmitted the subject notice of violations.

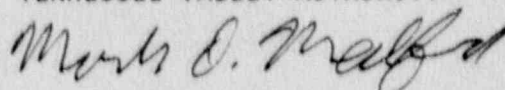
In the inspection report, NRC expressed concern on the staffing and experience  
of the Reactor Engineering unit. TVA has likewise been concerned on the loss  
of experience in the section. In response to this concern, TVA has focused  
attention on obtaining personnel who can meet the high performance standards  
required of these positions. The new Reactor Engineering supervisor, though an  
electrical engineer rather than a nuclear engineer, recently completed the  
seven-week Westinghouse Electric Corporation Station Nuclear Engineer program.  
The new supervisor also has approximately ten years of experience in  
supervising engineers in previous Preoperational Test, Modifications,  
Maintenance, and Technical Support supervisory roles. This individual was  
specifically selected for his management skills in providing oversight of  
critical functions. The three engineer positions in the section are now  
permanently filled by a former SQN reactor engineer and shift technical advisor  
and two former TVA nuclear fuels engineers. Management will continue to assess  
the effectiveness of these changes to ensure quality performance of the Reactor  
Engineering duties.

No commitments beyond those identified in Licensee Event Report 50-327/90011,  
Revision 1, are made in this letter.

If you have any questions concerning this submittal, please telephone  
M. A. Cooper at (615) 843-6422.

Very truly yours,

TENNESSEE VALLEY AUTHORITY



Mark O. Medford, Vice President  
Nuclear Assurance, Licensing  
& Fuels

Enclosure  
cc: See page 2

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U.S. Nuclear Regulatory Commission

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## ENCLOSURE 1

RESPONSE TO NRC INSPECTION REPORT  
NOS. 50-327/90-29 AND 50-328/90-29  
B. A. WILSON'S LETTER TO O. D. KINGSLEY, JR.,  
DATED OCTOBER 11, 1990

### Violation 50-327, 328/90-29-01

Technical Specification (TS) 2.2.1 (Table 2.2-1, Item 2) requires that the Limiting Safety System Setting (LSSS) for the power range neutron flux low trip setpoint be less than or equal to 26 percent of Rated Thermal Power and that the LSSS for the power range neutron flux high trip setpoint be less than or equal to 110 percent of Rated Thermal Power.

TS 6.8.1.c requires that written procedures shall be provided for surveillance and test activities.

Contrary to the above, procedure Technical Instruction (TI)-81 (used for both units), when first issued in 1984, and when subsequently reissued as procedures 1/2-PI-NXX-092-001.0, was not correct and did not properly follow vendor recommendations to adjust power range instrument channels to account for reduced neutron flux leakage to the detectors. Consequently, when Unit 1 was started up on May 31, 1990, the low power trip setpoint and the high power trip setpoint were each about 20 percent higher than the respective limiting safety system settings, and that situation persisted until June 5, 1990.

This is a Severity Level IV violation (Supplement I).

### Admission or Denial of the Alleged Violation

TVA admits the violation.

### Reason for the Violation

The technical inadequacy of 1-PI-NXX-092-001.0, "Prestartup NIS Calibration Following Core Load," that led to the nonconservative calibration of the power range nuclear instrumentation system (NIS) channels during start-up from the Unit 1 Cycle 4 refueling outage, was the result of a technical interpretation error during the development and subsequent revisions of the pre-start-up detector current prediction procedure. A review of the power range calibration procedure (1-PI-NXX-092-001.0, formerly TI 81) identified that the procedure has been in error since originally issued on November 1, 1984. As described in Licensee Event Report (LER) 50-327/90011, Revision 1, the pre-start-up calibration procedure incorrectly utilized beginning-of-life (BOL) power distribution from the previous cycle (PR old), BOL power distributions for the current cycle (PR new), and end-of-life (EOL) detector currents from the previous cycle (I old) to calculate the new preliminary detector currents for the current cycle ( $I_{old} \times PR_{new}/PR_{old} = I_{new}$ ). This calculation methodology was thought to be in accordance with the Westinghouse Electric Corporation recommendations. As a result of the investigation of nonconservative calibration event, it was identified that EOL power distributions from the previous cycle should be utilized for the calculation.

It is concluded that the error contained in the pre-start-up calibration was the result of an incorrect technical decision during the review process. The validity of the equation was evaluated by several nuclear engineers during the evolution of the procedure, and most recently by a senior level reactor engineer and the previous Reactor Engineering supervisor. The conclusions of these reviews and evaluations incorrectly interpreted the Westinghouse information, leading to the technical inadequacy.

Although they do not appear to substantially affect the conclusions drawn, several errors were noted during TVA's review of the inspection report. First, the notice of violation (NOV) identifies the low and high power range neutron flux LSSSs to be less than or equal to 26 percent and 110 percent, respectively. The Unit 1 LSSSs for these trip functions are 27.4 percent and 111.4 percent. The NOV also indicates that the nonconservative condition existed until June 5, 1990. The nonconservative condition of the power range channels existed until June 6, 1990.

Additional details concerning this event were provided in LER 50-327/90011, Revision 1.

#### Corrective Steps That Have Been Taken and Results Achieved

The power range NIS channels were adjusted on June 6, 1990, as part of the normal power escalation process. The power range channels were recalibrated on June 8, 1990, to reflect the new 100 percent power detector currents.

LER 50-327/90011 and this violation have been reviewed with the Reactor Engineering staff. This review addressed the specific impacts of the nonconservative calibration and the generic impacts of misinterpreting vendor information.

Additionally, Westinghouse, Corporate Nuclear Fuel, and Institute of Nuclear Power Operations (INPO) personnel have performed an independent review of Reactor Engineering procedures for technical adequacy. The results of this review were incorporated into the Unit 2 procedures before use during restart from the Unit 2 Cycle 4 refueling outage.

#### Corrective Steps That Will be Taken to Avoid Further Violations

As committed in LER 50-327/90011, Revision 1, Procedure 2-PI-NXX-092-001.0 (Unit 2) was revised before use during start-up from the Unit 2 Cycle 4 refueling outage to require the use of EOL NIS detector currents and fuel assembly power fractions from the previous cycle and the corresponding BOL fuel assembly power fractions for the current cycle. A conservative factor of 0.8 was used to account for prediction uncertainties associated with fuel element power factors and detector current measurement. This factor is consistent with conservatisms used at other Westinghouse facilities. Procedure 1-PI-NXX-092-001.0 (Unit 1) will be similarly revised before use during start-up from the Unit 1 Cycle 5 refueling outage.

Date When Full Compliance Will be Achieved

TVA will be in full compliance by restart from the Unit 1 Cycle 5 refueling outage when the Unit 1 procedures are revised.

Violation 50-327, 328/90-29-02

TS 6.8.1.c requires that written procedures shall be implemented for surveillance and test activities.

(1) Procedure O-PI-NXX-092-001.0, Incore-Excore Detector Calibration, indicates, by example, that three full-core flux maps and eight quarter-core flux maps be obtained for analysis, but does allow the number of maps to be reduced at the discretion of the test director. The procedure also requires that the maps be obtained at power levels above 70 percent Rated Thermal Power.

Contrary to the above:

(a) Procedure performed for Unit 1 in the period June 7 to July 26, 1990 and August 4, 1990, used only two maps, both full core. Licensee personnel acknowledged that this had become common practice on both units. Two maps are insufficient to demonstrate that a linear relationship exists between the incore and excore axial power distributions, the point of the test.

(b) The procedure performed in the period from June 7 to July 26, 1990, was performed at about 30 percent Rated Thermal Power, and a procedure was not performed at the required power level until August 4, 1990, after extended operation above 70 percent rated thermal power.

(2) Procedure O-SI-NXX-092-079.0 requires independent verification of test results in step 7.0(2).

Contrary to the above, the independent verification step was not signed off for Unit 1 procedures performed on June 8, 1990, and June 15-20, 1990.

This is a Severity Level IV violation (Supplement I).

Admission or Denial of the Alleged Violation

TVA admits the violation.

### Reason for the Violation

The examples of failing to follow procedure cited above are the result of a lack of attention to detail on the part of the responsible reactor engineer at that time and a lack of management attention and oversight in Reactor Engineering.

TVA agrees that, as a contributing cause to Example 1, Procedure O-PI-NXX-092-001.0 contained excessive latitude that allowed the responsible reactor engineer, at his discretion, to routinely perform only two flux maps. This latitude, in combination with a general lack of attention to detail, led to the cited violation.

### Corrective Steps That Have Been Taken and Results Achieved

Since the time of the cited examples of failure to follow procedures, staffing changes have occurred in the Reactor Engineering section such that the Reactor Engineering personnel involved with the events are no longer employed by TVA. The importance of procedural compliance has been reviewed and stressed with the current Reactor Engineering staff. Additionally, a new Reactor Engineering supervisor is in place and was specifically selected for his management skills in providing oversight of critical functions.

Each of the examples of failure to follow procedure were reviewed to ensure no technical consequence exists, i.e., administrative noncompliance only. O-PI-NXX-092.001.0 was reviewed and revised appropriately to eliminate the excessive latitude previously given the test director. The intent will still allow for test director discretion, but within established workable bounds. A minimum of four flux maps are now required, with guidance on whether full core or quarter core maps are required.

### Corrective Steps That Will be Taken to Avoid Further Violation

Quality Assurance Services (Operations & Technical Support) conducted an audit of Reactor Engineering activities to assess administrative and technical compliance. The audit encompassed the restart testing associated with the Unit 1 Cycle 4 and Unit 2 Cycle 3 refueling outage restarts and surveillance conducted by Reactor Engineering for the last six months. A 100 percent administrative and 10 percent technical review was conducted. The audit identified additional administrative noncompliances and minor calculation errors. None of the calculation errors affected the surveillance test acceptance criteria. Reactor Engineering is evaluating the findings and will be taking the appropriate corrective actions as required for these findings.

### Date When Full Compliance Will be Achieved

TVA is in full compliance. Additional enhancements from the audit findings will be identified and scheduled as required.