

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

April 15, 1982 . 59

Mr. Richard C. DeYoung, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. DeYoung:

DOCKET NO. 50-328, LICENSE NO. DPR-79, EA 82-39

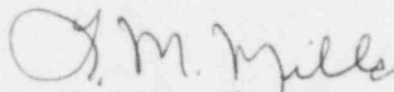
Enclosed is our response to your March 29, 1982 letter to H. G. Parris regarding enforcement actions as a result of violations involving the control rod withdrawal limits during startup of unit 2 of our Sequoyah Nuclear Plant. The enclosure provides a response, pursuant to 10 CFR Part 2.201, to each item of violation specified in the Appendix to your March 29, 1982 letter.

Accordingly, in response to the imposed civil penalties, fees in the amount of \$50,000 are being wired to the NRC, Attention: Office of Inspection and Enforcement.

To the best of my knowledge, I declare the statements contained herein are complete and true.

Very truly yours,

TENNESSEE VALLEY AUTHORITY



L. M. Mills, Manager
Nuclear Regulation and Safety

Enclosure

cc: U.S. Nuclear Regulatory Commission
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

ENCLOSURE
RESPONSE TO NRC SPECIAL INSPECTION
REPORT NO. 50-328/EA 82-39
R. C. DEYOUNG'S LETTER TO H. G. Parris
DATED MARCH 29, 1982

Item A

Technical Specification 3.1.1.3.a requires the licensee, for operation within modes 1 or 2 when the moderator temperature coefficient (MTC) is more positive than 0 delta k/k/oF (for the all rods withdrawn, beginning of cycle life, hot zero thermal power condition), to maintain the control rods within established withdrawal limits until a subsequent calculation verifies that the MTC has been restored to within its limit for all rods withdrawn condition.

Contrary to the above, between 7:00 p.m. on December 21 and 3:30 a.m. on December 22, 1981, the licensee operated within mode 2 when the MTC was more positive than 0 delta k/k/oF for the all rods withdrawn condition, but did not maintain the control rods within established withdrawal limits.

This is a Severity Level III violation (Supplement I). (Civil Penalty - \$15,000).

Response

1. Admission or Denial of the Alleged Violation

TVA admits the violation occurred as stated.

2. Reasons for the Violation if Admitted

The control rod withdrawal limits were established for unit 2 during low power physics testing on November 6, 1981 through November 10, 1981 and NRC was notified in accordance with the technical specification reporting requirements. It was also determined at this time that these limitations would only be in effect until a burnup of 1000 MWD/MTU had been achieved. Because of the fact that these control rod withdrawal limits would only be in effect for a short period of time (1000 MWD/MTU burnup), it was decided not to revise the General Operating Instructions. The withdrawal limit curve was placed in Technical Instruction (TI)-28 and further distributed to all appropriate shift operating and engineering personnel. Through this mechanism all appropriate personnel were made aware of these limitations. During unit 1 startup a positive moderator temperature coefficient (MTC) had been calculated and the withdrawal limits were handled in the same way and no problems were encountered. For a time period of approximately 5-1/2-weeks following this low power physics testing determination, the unit 2 generator exciter had to be disassembled for repair causing considerable delay between the completion of the low power physics testing and ascension to power. The unit was maintained in modes 4 and 5 during this 5-1/2-week period.

On December 21, 1981, following the return to service of the exciter, preparations were made for unit 2 startup and the reactor went critical at 1857 hours. At approximately 0330 hours on December 22, 1981, the reactor operator compared the current rod position against the established control rod withdrawal limits and discovered that the rods were withdrawn beyond the limits established during the startup tests.

The primary reason for this event was the failure to incorporate the rod withdrawal limitations into the appropriate operating procedures and surveillance instructions. The withdrawal limit curve was placed in TI-28 and distributed to all appropriate operating and engineering personnel in November 1981. The withdrawal limit was not, however, identified in General Operating Instructions (GOI)-2 and GOI-5 or Surveillance Instruction (SI)-38. As required by GOI-2, the shift technical advisor (STA) calculated the estimated critical condition but failed to consider the limitations in his calculation.

The reactor operators rely on the STA to perform this calculation and, therefore, did not verify the calculation before pulling rods.

Another contributing factor was the 5-1/2-week period of inactivity between low power physics testing and normal unit startup on unit 2. Operations personnel and the STAs were routinely accomplishing unit 1 startups by pulling rods to maintain operations within acceptable axial flux difference values per Technical Specification 3.2.1 during this period. The reactor operators were aware that upon entering mode 2, the action statement in Technical Specification 3.1.1.3 would be reentered. However, when the estimated critical condition calculation was received from the STA they did not think to compare the calculated rod position with the rod limitation curves that had been distributed previously.

3. Corrective Steps Which Have Been Taken and the Results Achieved

- a. The reactor coolant system boron concentration was immediately diluted in order to reestablish the appropriate control rod withdrawal limitations.
- b. NRC was notified in accordance with technical specification reporting requirements by telephone and telecopy on December 22, 1981. A special management committee was promptly formed to investigate this incident. A subsequent LER with an attached special report was sent to NRC on December 31, 1981, containing background information, event sequence, probable causes, and corrective actions.
- c. The MTC was recalculated to determine if during this occurrence the MTC was indeed positive. Based on these calculations, it is concluded that the reactor was not operated with a positive MTC. At criticality, the MTC value was approximately -0.7 pcm per degree F.

4. Corrective Steps Which Will Be Taken to Avoid Further Violations

- a. GOI-2, GOI-5, and SI-38 were revised by December 24, 1981, to incorporate appropriate precautions to ensure that rod withdrawal limitations were not violated again.
- b. The Operations Supervisor issued a memorandum on December 28, 1981, to all appropriate operations personnel including STAs to ensure that they were aware of this occurrence and the rod withdrawal limitations.
- c. All startup test instructions were reviewed to ensure that all predefined test results were adequately factored into plant instructions. This review was completed by engineering and operations personnel and verified by quality assurance personnel on January 28, 1982. No unexpected findings or test deficiencies were found.

5. Date When Full Compliance Will Be Achieved

Full compliance was achieved on December 22, 1981.

Item B

Technical Specification 6.4.1 requires the licensee to maintain a unit staff retraining program that meets the requirements of Section 5.5 of ANSI N18.1-1971.

Contrary to the above, the licensee did not maintain a unit staff retraining program that met certain requirements of Section 5.5. Section 5.5 specifies that training shall include operational limitations. The licensee did not train unit 2 reactor operators on the operational limitations established for control rod withdrawal, which were necessary to meet Technical Specification 3.1.1.3.a.

This is a Severity Level III violation (Supplement I). (Civil Penalty - \$15,000).

Response

1. Admission or Denial of the Alleged Violation

TVA admits the violation occurred as stated.

2. Reasons for the Violation if Admitted

There was no special training given to the unit 2 reactor operators on the operational limitations established for control rod withdrawal. However, the rod withdrawal limitation curve was distributed to all appropriate shift operating and engineering personnel. Through this mechanism all appropriate personnel were made aware of these limitations. This was based on the fact that during unit 1 startup, a positive MTC had been calculated and the withdrawal limits were handled in the same way and no

problems were encountered. Following the event, interviews were held with operating personnel, and it was concluded that all but one of the operations personnel were aware of the withdrawal limitation curve and the Technical Specification 3.1.1.3 action. However, when the estimated critical condition calculation was received from the STA, they did not think to compare the calculated rod position with the rod limitation curves that had been previously distributed. Later, an operator discovered the situation and took immediate appropriate corrective action.

Again, the 5-1/2-week period between low power physics testing and normal unit startup on unit 2 was a factor. The STA was aware of control rod limitations, but in the anticipation of unit 2 criticality and power ascension after about six weeks of inactivity, he did not think to include the limitations in his calculation. The assistant shift engineer and reactor operator at the unit 2 controls were also aware of the limitations, but they rely on the STA to perform this calculation and, therefore, did not verify the calculation before pulling rods.

3. Corrective Steps Which Have Been Taken and the Results Achieved

The Operations Supervisor issued a memorandum on December 28, 1981, to operations personnel including STAs to ensure they were aware of this occurrence.

Based on the interviews described above, it is concluded that no additional control rod withdrawal limits training is necessary.

4. Corrective Steps Which Will Be Taken to Avoid Further Violations

- a. The instruction on estimated critical condition calculation was revised on January 28, 1982 to require a licensed operator (RO or SRO) to confirm the STA's calculation.
- b. All revisions to any operating instruction will be evaluated for the need to conduct immediate operator training and/or have the changes reviewed before the assumption of the shift. This has been implemented by an issued Operations Section instruction letter.
- c. Instructions were prepared on January 19, 1982, to formalize the use of the Operations Supervisor's Night Order Book. This included who is to review entries, how the book is to be used, and the type of entries to be made. This will aid in informing and training operations personnel.
- d. Remaining preoperational and startup tests were revised on January 28, 1982, to include provisions for ensuring that the test results are evaluated for any needed instruction changes and/or additional operator training.

5. Date When Full Compliance Will Be Achieved

Full compliance was achieved on January 28, 1982.

Item C

Technical Specification 6.8.1.a requires the licensee to implement established procedures covering activities identified in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978. Section 2 of the Appendix identifies procedures for startup and operation of the reactor.

Contrary to the above, on December 21 and 22, 1981, the licensee did not implement Technical Instruction 28 which is an established procedure for startup and operation of the reactor.

This is a Severity Level III violation (Supplement I). (Civil Penalty - \$20,000)

Response

1. Admission or Denial of the Alleged Violation

TVA admits the violation occurred as stated.

2. Reasons for the Violation if Admitted

The STA did not include the control rod limitations curve in TI-28 in his estimated critical point calculation. The STA performed the estimated critical point (ECP) calculation using SI-38 and TI-21 without referring to TI-28. SI-38 and TI-21 did not refer to the control rod limitations curve in TI-28. The 5-1/2-week period between low power physics testing and normal unit 2 startup was a factor.

During this period, operations personnel and the STAs were routinely accomplishing unit 1 startups to maintain operations within acceptable axial flux difference values per Technical Specification 3.2.1. The estimated critical point calculation for unit 1 did not include control rod withdrawal limitations per Technical Specification 3.1.1.3.

3. Corrective Steps Which Have Been Taken and the Results Achieved

The STA and operations personnel were interviewed and reminded of the importance of following all startup procedures for both units.

4. Corrective Steps Which Will Be Taken to Avoid Further Violations

- a. GOI-2, GOI-5, and SI-38 were revised by December 24, 1981 to incorporate appropriate precautions to ensure that rod withdrawal limitations were not violated again.
- b. The Operations Supervisor issued a memorandum on December 28, 1981, to all appropriate operations personnel including STAs to ensure that they were aware of this occurrence and the rod withdrawal limitations.

- c. The instruction on estimated critical condition calculation was revised on January 28, 1982, to require a licensed operator (RO or SRO) to confirm the STA's calculation.
- d. All revisions to any operating instruction will be evaluated for the need to conduct immediate operator training and/or have the changes reviewed before the assumption of the shift. This has been implemented by an issued Operations Section instruction letter.
- e. Instructions were prepared on January 19, 1982, to formalize the use of the Operations Supervisor's Night Order Book. This included who is to review entries, how the book is to be used, and the type of entries to be made. This will aid in informing and training operations personnel.

5. Date When Full Compliance Will Be Achieved

Full compliance was achieved on December 22, 1981 when the reactor operator reestablished appropriate rod withdrawal limits.