

March 1, 1996

Mr. Oliver D. Kingsley, Jr.  
President, TVA Nuclear and  
Chief Nuclear Officer  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

SUBJECT: ISSUANCE OF TECHNICAL SPECIFICATION AMENDMENTS FOR THE SEQUOYAH  
NUCLEAR PLANT, UNITS 1 AND 2 (TAC NOS. M94237 AND M94238)  
(TS 93-09)

Dear Mr. Kingsley:

The Commission has issued the enclosed Amendment No. 219 to Facility Operating License No. DPR-77 and Amendment No. 209 to Facility Operating License No. DPR-79 for the Sequoyah Nuclear Plant, Units 1 and 2, respectively. These amendments are in response to your application dated December 8, 1995.

The amendments revise the setpoints and time delays for the auxiliary feedwater loss-of-power and the 6.9-kilovolt shutdown board loss-of-voltage and degraded voltage instruments.

A copy of the Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

ORIGINAL SIGNED BY:

David E. LaBarge, Sr. Project Manager  
Project Directorate II-3  
Division of Reactor Projects - I/I  
Office of Nuclear Reactor Regulation

Docket Nos. 50-327 and 50-328

- Enclosures: 1. Amendment No. 219 to License No. DPR-77
- 2. Amendment No. 209 to License No. DPR-79
- 3. Safety Evaluation

cc w/enclosures: See next page

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AMENDMENT NO. 219 FOR SEQUOYAH UNIT NO. 1 - DOCKET NO. 50-327 and  
AMENDMENT NO. 209 FOR SEQUOYAH UNIT NO. 2 - DOCKET NO. 50-328  
DATED: ~~March~~ 1, 1996

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" "

Mr. Oliver D. Kingsley, Jr.  
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## SEQUOYAH NUCLEAR PLANT

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County Judge  
Hamilton County Courthouse  
Chattanooga, TN 37402-2801



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-327

SEQUOYAH NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 219  
License No. DPR-77

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Tennessee Valley Authority (the licensee) dated December 8, 1995, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

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2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-77 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 219, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance, to be implemented when the proper plant conditions can be established.

FOR THE NUCLEAR REGULATORY COMMISSION



Frederick J. Hebdorn, Director  
Project Directorate II-3  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications

Date of Issuance: ~~March~~ 1, 1996

ATTACHMENT TO LICENSE AMENDMENT NO. 219

FACILITY OPERATING LICENSE NO. DPR-77

DOCKET NO. 50-327

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change.

REMOVE

3/4 3-27a

3/4 3-27b

INSERT

3/4 3-27a

3/4 3-27b

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

<u>FUNCTIONAL UNIT</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUES</u>	
ii. RCS Loop $\Delta$ T Equivalent to Power > 50% RTP			R145
Coincident with Steam Generator Water Level--Low-Low (Adverse) and Containment Pressure (EAM) or Steam Generator Water Level--Low-Low (EAM)	$\geq 15.0\%$ of narrow range instrument span  $\leq 0.5$ psig  $\geq 10.7\%$ of narrow range instrument span	$\geq 14.4\%$ of narrow range instrument span  $\leq 0.6$ psig  $\geq 10.1\%$ of narrow range instrument span	R155   R145 R1(
d. S.I.	See 1 above (all SI Setpoints)		
e. Loss of Power Start			
1. Voltage Sensors	$\geq 5520$ volts	$\geq 5331$ volts	
2. Load Shed Timer	1.25 seconds	1.25 $\pm$ 0.25 seconds	
f. Trip of Main Feedwater Pumps	N.A.	N.A.	
g. Auxiliary Feedwater Suction Pressure-Low	$\geq 3.21$ psig (motor driven pump) $\geq 13.9$ psig (turbine driven pump)	$\geq 2.44$ psig (motor driven pump) $\geq 12$ psig (turbine driven pump)	R187
h. Auxiliary Feedwater Suction Transfer Time Delays	4 seconds (motor driven pump)  5.5 seconds (turbine driven pump)	4 seconds $\pm$ 0.4 seconds (motor driven pump)  5.5 seconds $\pm$ 0.55 seconds (turbine driven pump)	

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

<u>FUNCTIONAL UNIT</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUES</u>	
7. LOSS OF POWER			R145
a. 6.9 kv Shutdown Board Undervoltage			
Loss of Voltage			
1. Voltage Sensors	≥ 5520 volts	≥ 5331 volts	
2. Diesel Generator Start and Load Shed Timer	1.25 seconds	1.25 ±0.25 seconds	
b. 6.9 kv Shutdown Board-Degraded Voltage			
1. Voltage Sensors	6456 volts	≥ 6403.5 volts (dropout) ≤ 6595.5 volts (reset)	
2. Diesel Generator Start and Load Shed Timer	≤ 300 seconds	≤ 370 seconds	
3. SI/Degraded Voltage Logic Enable Timer	9.5 seconds	9.5 ± 2.0 seconds	
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS			
a. Pressurizer Pressure			
1. Not P-11, Automatic Unblock of Safety Injection on Increasing Pressure	≤1970 psig	≤1975.2 psig	
2. P-11, Enable Manual Block of Safety Injection on Decreasing Pressure	≥1962 psig	≥1956.8 psig	R145



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-328

SEQUOYAH NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 209  
License No. DPR-79

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Tennessee Valley Authority (the licensee) dated December 8, 1995, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-79 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 209, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance, to be implemented when proper plant conditions can be established.

FOR THE NUCLEAR REGULATORY COMMISSION



Frederick J. Hebdon, Director  
Project Directorate II-3  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications

Date of Issuance: March 1, 1996

ATTACHMENT TO LICENSE AMENDMENT NO. 209

FACILITY OPERATING LICENSE NO. DPR-79

DOCKET NO. 50-328

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change.

REMOVE

3/4 3-27a

3/4 3-27b

INSERT

3/4 3-27a

3/4 3-27b

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

<u>FUNCTIONAL UNIT</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUES</u>	
ii. RCS Loop ΔT Equivalent to Power > 50% RTP			
Coincident with Steam Generator Water Level--Low-Low (Adverse)	≥15.0% of narrow range instrument span	≥14.4% of narrow range instrument span	R132
and			
Containment Pressure (EAM)	≤0.5 psig	≤0.6 psig	
or			
Steam Generator Water Level--Low-Low (EAM)	≥10.7% of narrow range instrument span	≥10.1% of narrow range instrument span	(
d. S.I.	See 1 above (all SI Setpoints)		
e. Loss of Power Start			
1. Voltage Sensors	≥5520 volts	≥5331 volts	
2. Load Shed Timer	1.25 seconds	1.25 ±0.25 seconds	
f. Trip of Main Feedwater Pumps	N.A.	N.A.	
g. Auxiliary Feedwater Suction Pressure-Low	≥ 3.21 psig (motor driven pump) ≥ 13.9 psig (turbine driven pump)	≥ 2.44 psig (motor driven pump) ≥ 12 psig (turbine driven pump)	R175 R84
h. Auxiliary Feedwater Suction Transfer Time Delays	4 seconds (motor driven pump) 5.5 seconds (turbine driven pump)	4 seconds ±0.4 seconds (motor driven pump) 5.5 seconds ±0.55 seconds (turbine driven pump)	( R116

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

<u>FUNCTIONAL UNIT</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUES</u>	
7. LOSS OF POWER			R132
a. 6.9 kv Shutdown Board Undervoltage Loss of Voltage			
1. Voltage Sensors	≥ 5520 volts	≥ 5331 volts	
2. Diesel Generator Start and Load Shed Timer	1.25 seconds	1.25 ±0.25 seconds	
b. 6.9 kv Shutdown Board-Degraded Voltage			
1. Voltage Sensors	6456 volts	≥ 6403.5 volts (dropout) ≤ 6595.5 volts (reset)	
2. Diesel Generator Start and Load Shed Timer	≤300 seconds	≤ 370 seconds	
3. SI/Degraded Voltage Logic Enable Timer	9.5 seconds	9.5 ± 2.0 seconds	
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS			
a. Pressurizer Pressure			
1. Not P-11, Automatic Unblock of Safety Injection on Increasing Pressure	≤1970 psig	≤1975.2 psig	
2. P-11, Enable Manual Block of Safety Injection on Decreasing Pressure	≥1962 psig	≥1956.8 psig	R132



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 219 TO FACILITY OPERATING LICENSE NO. DPR-77  
AND AMENDMENT NO. 209 TO FACILITY OPERATING LICENSE NO. DPR-79

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

1.0 BACKGROUND

At the Sequoyah Nuclear Plant (SQN), Units 1 and 2, loss-of-voltage protection and degraded-voltage protection are provided to the 6.9 kilo-volt (kV) shutdown boards to ensure that adequate voltage is available to the safety-related loads. A loss of voltage or a sustained degraded-voltage condition will start the emergency diesel generator (EDG) that will be connected to the shutdown board after tripping normal and alternate feeders and shedding the major loads. The loss-of-voltage relays will provide the load-shedding functions and subsequently resequence the loads onto the EDG after the EDG has been tied to the shutdown board.

After the EDG has been connected to the shutdown board and the load-sequencing interval has been achieved, the loss-of-voltage, load-shedding function on the 6.9-kV shutdown board initiates a motor-driven auxiliary feedwater (AFW) pump start. Also, the load-shedding actuation immediately activates a turbine-driven AFW pump start. The reactor coolant pumps would not be available to provide forced coolant flow in the event of loss of voltage, but the early turbine-driven AFW pump start initiates natural circulation and heat removal in the reactor coolant system. The AFW pumps provide sufficient heat-removal capabilities to prevent the pressurizer from filling during design-basis accidents.

Tennessee Valley Authority (TVA) has been working with the Electrical Distribution System (EDS) Clearinghouse to establish guidelines for degraded-voltage analyses. These guidelines were developed by the EDS based on the review of all inspection findings and enforcement actions from the electrical distribution system functional inspections that were conducted by the NRC at most of the operating plants. The guidelines established by this effort have been applied to the SQN loss-of-power and degraded-voltage analysis and have led to changes of loss-of-power and degraded-voltage instrumentation. These changes will ensure that adequate voltage is available to the safety-related loads.

ENCLOSURE 3

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## 2.0 INTRODUCTION

By letter dated October 1, 1993, TVA initially proposed changing the SQN technical specification (TS) to incorporate revised setpoints and time delays for the AFW loss of power and the 6.9-kV shutdown board's loss of voltage and degraded-voltage instrumentation. These changes required a revision to the description, the total number of channels, the channels to trip, the minimum channels operable, the actions, the trip setpoints, the allowable values, the channel checks, and the channel functional test requirements for loss-of-power instrumentation. NRC approved the changes as Amendment Nos. 182 and 174 for SQN Units 1 and 2, respectively, by letter dated May 24, 1994. Subsequently, by letter dated August 19, 1994, the staff issued Amendment Nos. 188 and 180, for SQN Units 1 and 2, respectively, that allowed delay of the implementation date. This implementation date was again revised as Amendment Nos. 207 and 197, for SQN Units 1 and 2, respectively, by letter dated August 22, 1995. No changes, other than the implementation date, was addressed by these latter amendments. Even though the amendments were approved, the design changes have not yet been implemented.

Subsequent detailed evaluations by TVA involving implementation of these modifications, indicated that a significant impact on the TS allowed outage times (AOTs) for the EDG existed, since they would require that the safety functions to be taken out of service longer than desired. Therefore, in a letter to NRC dated December 8, 1995, TVA submitted additional modifications to the design and further changed the setpoints and the time delays for the AFW loss of power and the 6.9-kV shutdown board's loss of voltage and degraded-voltage instrumentation in Items 6 and 7 of TS Table 3.3-4, respectively.

## 3.0 EVALUATION

The following proposed changes pertain to the TS of both Unit 1 and 2 unless otherwise stated.

Change 1: Item 6.e of TS Table 3.3-4 would be revised to change the allowable values for the voltage sensor to  $\geq 5331$  volts. The allowable value for the EDG start and load-shedding timer would be changed to  $1.25 \pm 0.25$  seconds.

Change 2: Item 7.a of TS Table 3.3-4 would be revised to change the allowable value for the voltage sensor to  $\geq 5331$  volts. The allowable value for the EDG start and load-shedding timer would be changed to  $1.25 \pm 0.25$  seconds.

Change 3: Item 7.b of TS Table 3.3-4 would be revised to change the allowable value for the voltage sensor to  $\leq 6595.5$  volts. The allowable value for the EDG start and the load-shedding timer would be changed to  $\leq 370$  seconds. The trip setpoints for the safety injection/degraded voltage logic enable timer would be changed to 9.5 seconds. The allowable value for the safety injection/degraded voltage logic enable timer would be changed to  $9.5 \pm 2.0$  seconds.

These design changes for the proposed voltage protection scheme have been revised from the original submittal. The design changes are being made to

minimize the impact of AOTs on operating equipment and safety functions, and reduce the length of time the equipment is removed from service during the implementation process. The following changes were made to the original amendment.

In the original design, the degraded voltage load-shedding function was disabled after the EDG was tied to the shutdown board as the sole supply. The revised design will maintain the current design logic that will initiate load shedding on a degraded voltage condition only if the EDG voltage level drops below the 70-percent voltage limit of the auxiliary relay for the emergency supply breaker or if this breaker trips. The new design will include a 1.25 second delay prior to load shedding at the 70 percent voltage level as a result of the delay associated with 80 percent voltage level loss-of-voltage relays. At the 70 percent voltage level, motor heating could be a problem for continued operability and allowing the EDG to re-establish its safety function through load shedding at this voltage level may enhance long-term operability requirements for some accidents.

The timers remain the electro-pneumatic type instead of the electronic version previously proposed. This requirement applies to both degraded-voltage and loss-of-voltage timers.

The voltage sensing for the loss-of-voltage relays will be moved to the shutdown board as previously proposed; however, the relays will actuate only one pair of timers, utilizing a one-out-of-two logic scheme, to initiate EDG start and load shedding, thus eliminating a second pair of timers. The second pair of timers, which was previously designed to provide a 10 second time delay for loss-of-voltage conditions when the EDG is the sole supply to the shutdown board, was removed from the voltage protection scheme. As previously discussed, the loss-of-voltage function will only operate if the EDG voltage level drops below the 70 percent limit of the auxiliary relay for the emergency supply breaker, or if this breaker trips.

TVA is proposing these setpoint revisions and the revised design for the voltage protection scheme to support an implementation plan that will not adversely affect safety functions or require significant extensions of the AOT for TS-required equipment.

The staff has reviewed the licensee's calculations to determine if at the proposed trip values and allowable values for the undervoltage relay settings adequate voltage can be provided at the terminals of all engineered safety features equipment. Adequate voltage is necessary to perform safety functions and to ensure that the time delay would not exceed the maximum time delay that is assumed in the accident analyses in the final safety analysis report. The staff has concluded that the proposed trip values and time delays for the undervoltage relays will protect the Class 1E equipment from sustained degraded voltages under accident and other conditions and that the proposed scheme conforms to the Branch Technical Position PSB-1. These changes are, therefore, acceptable.

#### 4.0 CONCLUSION

The revised design and setpoints will continue to provide for a voltage protection scheme that will ensure adequate voltage for accident mitigation functions. The revisions proposed in this submittal do not adversely affect the plant responses for postulated accidents from those proposed in the previous change request. The equipment reliability, capability, and functionality have not been affected by these revisions. By incorporating these setpoint revisions and the revised design for the voltage protection scheme, TVA supports an implementation plan that will not adversely affect safety functions or require significant extensions of the AOT for TS-required equipment. We find the proposed revised setpoints and time delays for the loss-of-power instrumentation acceptable.

#### 3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Tennessee State official was notified of the proposed issuance of the amendment. The State official had no comments.

#### 4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (61 FR 181). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

#### 5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: S.K. Mitra

Dated: March 1, 1996