

December 29, 1988

Docket Nos. 50-327/328

Mr. Oliver D. Kingsley, Jr.  
Senior Vice President, Nuclear Power  
Tennessee Valley Authority  
6N 38A Lookout Place  
1101 Market Street  
Chattanooga, Tennessee 37402-2801

Dear Mr. Kingsley:

SUBJECT: ISSUANCE OF AMENDMENTS (TAC R00443 AND R00444), SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2

The Commission has issued the enclosed Amendment No. 93 to Facility Operating License No. DPR-77 and Amendment No. 83 to Facility Operating License No. DPR-79 for the Sequoyah Nuclear Plant (SQN), Units 1 and 2, respectively. These amendments are in response to your application dated June 21, 1988.

The amendments change the expiration date for SQN, Unit 1, Facility Operating License, DPR-77 from May 27, 2010 to September 17, 2020 and Facility Operating License, DPR-79 from May 27, 2010 to September 15, 2021.

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

Sincerely,

Original signed by

Suzanne Black, Assistant Director  
for Projects  
TVA Projects Division  
Office of Special Projects

Enclosures:

1. Amendment No. 93 to License No. DPR-77
2. Amendment No. 83 to License No. DPR-79
3. Safety Evaluation

cc w/enclosures:  
See next page

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*DFD*

Mr. Oliver D. Kingsley, Jr.

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Sequoyah Nuclear Plant

cc:

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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-327

SEQUOYAH NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 93  
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 June 21, 1988, 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, paragraph 2.K of Facility Operating License No. DPR-77 is hereby amended to read as follows:

K. This amended license is effective as of the date of issuance and shall expire September 17, 2020.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Suzanne Black, Assistant Director  
for Projects  
TVA Projects Division  
Office of Special Projects

Date of Issuance: December 29, 1988



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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-328

SEQUOYAH NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No.83  
License No. DPR-79

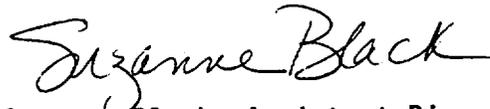
1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Tennessee Valley Authority (the licensee) dated June 21, 1988, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules 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, paragraph 2.K of Facility Operating License No. DPR-79 is hereby amended to read as follows:

K. This amended license is effective as of the date of issuance and shall expire September 15, 2021.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Suzanne Black, Assistant Director  
for Projects  
TVA Projects Division  
Office of Special Projects

Date of Issuance:



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

SAFETY EVALUATION BY THE OFFICE OF SPECIAL PROJECTS

SUPPORTING AMENDMENT NO. 93 TO FACILITY OPERATING LICENSE NO. DPR-77

AND AMENDMENT NO. 83 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 INTRODUCTION

By application for license amendments dated June 21, 1988, Tennessee Valley Authority (TVA or the licensee) requested a change in the expiration dates for Operating License DPR-77 (Unit 1) from May 27, 2010 to September 17, 2020 and for Operating License DPR-79 (Unit 2) from May 27, 2010 to September 15, 2021.

2.0 DISCUSSION

Section 103.c of the Atomic Energy Act of 1954 states that a license is to be issued for a specified period not to exceed 40 years. Title 10 CFR 50.51 specifies that each license will be issued for a fixed period of time not to exceed 40 years from the date of issuance. The currently licensed terms for the Sequoyah Nuclear Plant, Units 1 and 2 are 40 years commencing with the issuance of the construction permits which was on May 27, 1970 for both units. Accounting for the time that was required for plant construction, this represents effective operating license terms of 29 years and 8 months for Unit 1, and 28 years and 8 months for Unit 2. Consistent with Section 103.c of the Atomic Energy Act and Section 50.51 of the Commission's regulations, the licensee, by the June 21, 1988 application, seeks an extension of the operating license terms for the Sequoyah Nuclear Plant, Units 1 and 2 so that the fixed period of the licenses would be 40 years from the date of the operating license issuance for both units.

3.0 EVALUATION

The NRC staff has evaluated the safety issues associated with issuance of the proposed license amendment which would allow approximately ten additional years of operation. The issues addressed consist of additional radiation exposure to the licensee's operating staff, impacts on the off-site population, and the general aging of the plant structures and equipment. The impact of additional radiation exposure to the facility operating staff and the impact on the general population in the vicinity of Sequoyah Nuclear Plant, Units 1 and 2 are addressed in the NRC staff's Environmental Assessment dated December 28, 1988.

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### 3.1 Plant Structures and Systems

The licensee's request for extension of the operating license is based, in part, on the determination that a 40-year service life was considered during the design and construction of the plant. This does not mean that some components will not wear out during the plant lifetime. Rather, design features were incorporated which provide for inspectability of structures, systems and equipment. In addition, structures, systems and components are required by the Technical Specifications (TS) to undergo routine surveillance to assure that there is a high degree of confidence that they will perform their safety functions when required.

The environmental qualification (EQ) program for electrical equipment operating in a harsh environment is described in Section III.1 of the Sequoyah Nuclear Performance Plan (NPP). The program ensures that EQ is maintained for electrical equipment necessary to ensure reactor coolant pressure boundary integrity, to shut down the reactor and maintain it in a safe shutdown condition, and to prevent or mitigate the consequences of accidents that could result in offsite exposures comparable to the 10 CFR 100 guidelines. Non-safety-related electrical equipment whose failure under postulated harsh environmental conditions could prevent satisfactory accomplishment of safety functions by safety-related equipment was also included in the program.

The licensee has performed aging analyses for all safety-related electrical equipment within the scope of 10 CFR 50.49. The qualified life of the equipment or component is incorporated within Sequoyah's maintenance and replacement practices to ensure that this safety-related electrical equipment remains qualified and available to perform its safety function regardless of the overall age of the plant. The NRC staff evaluated the program and found it acceptable. The evaluation is documented in the Sequoyah NPP (NUREG-1232, Volume 2). This evaluation also addresses the ongoing programs on extending the qualified life of the silicone rubber cable and the containment analysis for main steam line break involving superheat.

Sequoyah TS 4.0.5 requires that the licensee maintain an inservice inspection (ISI) program for ASME Code Class 1, 2 and 3 components and an inservice test (IST) program for ASME Code Class 1, 2, and 3 pumps and valves. These programs are necessary to assure the continued operability and integrity of systems important to plant safety. TS 4.0.5 requirements further specify that the above programs comply with the applicable Code and addenda as required by 10 CFR 50, Section 50.55a(g) except where the NRC staff provides written relief per 10 CFR 50.55a(g)(6)(i).

In addition to the ISI and IST programs, the following Sequoyah TS also provide additional requirements for monitoring component aging and the cumulative effects of power operation over the life of the plant.

a. TS 3/4.4.5 - Steam Generators

In addition to the requirements of Specification 4.0.5, TVA has an augmented ISI program for ensuring operability of the Sequoyah steam generators. The results of these augmented inspections are submitted by report to NRC and include:

1. Number of steam generator tubes inspected.
2. Location and percent of wall thickness penetration for each indication and imperfection.
3. Identification of tubes plugged.

b. TS 3/4.4.9 - Reactor Coolant System Pressure/Temperature Limits

Temperature and pressure changes during heatup, cooldown, and normal operation of the reactor coolant system are limited to protect against non-ductile failure of the reactor coolant system. These limits are calculated using the methods derived from Appendix G in Section III of the ASME Boiler and Pressure Vessel Code as required by Appendix G to 10 CFR 50.

The above specification also includes a reactor vessel material surveillance program that monitors reactor vessel embrittlement over the 40-year design life in accordance with 10 CFR 50, Appendix H. Reactor vessel irradiation specimens are removed and examined at specific intervals to determine changes in material properties. The results of the examinations are used to update the pressure and temperature limits.

c. TS 3/4.4.10 - Reactor Coolant System Structures and Components

The ISI and IST programs for ASME Code Class 1, 2, and 3 components ensure that the structural integrity and operational readiness of these components will be maintained at an acceptable level throughout the life of the plant.

In addition to the ISI and IST programs, additional special inspections are specified for the Reactor Coolant Pump flywheels and reactor vessel nozzles.

d. TS 5.7.1 - Component Cyclic or Transient Limit

This requirement ensures that certain components within the reactor coolant and secondary systems are maintained within their cyclic or transient limits over the life of the plant. These limits are monitored, recorded, and evaluated for component fatigue to provide confidence that each component will perform its intended function over a 40-year design life.

### 3.2 Reactor Pressure Vessel

By letter dated January 21, 1986, TVA provided an assessment of the fracture toughness requirements for protection against pressurized thermal shock (PTS) as required by 10 CFR 50.61. That assessment concluded that the screening values would not be exceeded for the Sequoyah reactor pressure vessels through at least 32 effective full-power years (EFPY). This time is consistent with the design life of 40 years for the reactor pressure vessels as presented in FSAR, Table 5.1-1, with a projected capacity factor of 80 percent.

The NRC staff has evaluated the licensee's submittal concerning the PTS requirements of 10 CFR 50.61. In our letter and safety evaluation dated May 5, 1988, we concluded that the Sequoyah Nuclear Plant, Units 1 and 2 RPV's satisfy the fracture toughness requirements of 10 CFR 50.61 for protection against PTS for 32 EFPY.

### 3.3 Summary of Findings

Based upon the above, we find that extensions of the operating licenses for Sequoyah Nuclear Plant, Units 1 and 2 to allow a 40-year service life is consistent with the safety analyses for Sequoyah Nuclear Plant, Units 1 and 2 and that the Commission's previous safety findings are not changed. All issues associated with plant systems and equipment, including aging and changes in RPV fracture toughness properties, have been addressed and are acceptable for 40 years of operation.

## 4.0 ENVIRONMENTAL CONSIDERATION

A Notice of Environmental Assessment and Finding of No Significant Impact relating to the proposed extension of the Facility Operating License termination date for Sequoyah Nuclear Plant, Units 1 and 2 was published in the Federal Register (53 FR 52530) on December 28, 1988. No public comments were received and the State of Tennessee did not have comments.

## 5.0 CONCLUSION

We have 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, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendments will not be inimical to the common defense and security nor to the health and safety of the public.

Principal Contributor: R. Auluck

Dated: December 29, 1988