

Docket Nos. 50-327/328

Mr. Oliver D. Kingsley, Jr.
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Dear Mr. Kingsley:

We have enclosed a copy of the Environmental Assessment associated with your June 21, 1988 amendment application. The proposed amendments would extend the license expiration dates from May 27, 2010 to September 17, 2020 for Sequoyah Unit 1, and to September 15, 2021 for Sequoyah Unit 2.

A copy of the Notice of Issuance of Environmental Assessment and Finding of No Significant Impact published in the Federal Register on December 29, 1988. is also enclosed.

Sincerely,

Original Signed by

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

Enclosures:
As stated

cc w/enclosures:
See next page

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Handwritten initials/signature

Mr. Oliver D. Kingsley, Jr.

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Sequoyah Nuclear Plant

cc:

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UNITED STATES NUCLEAR REGULATORY COMMISSION
TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2
DOCKET NOS. 50-327 AND 50-328
NOTICE OF ISSUANCE OF ENVIRONMENTAL ASSESSMENT
AND FINDING OF NO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (the Commission) is considering issuance of amendments to Facility Operating License Nos. DPR-77 and DPR-79, issued to Tennessee Valley Authority (TVA, the licensee), for operation of the Sequoyah Nuclear Plant (SQN), Units 1 and 2, located in Hamilton County, Tennessee.

Identification of Proposed Action:

The current license terms for the Sequoyah Nuclear Plant, Units 1 and 2 end on May 27, 2010. Accounting for the time that was required for plant construction, this represents an effective operating license of approximately 29 years and four months for Unit 1 and 28 years and eight months for Unit 2. The licensee's application dated June 21, 1988 requests an extension of the expiration dates so that the fixed period of the licenses would be 40 years from the date of the operating license issuance for both the units. The Commission's staff has prepared an Environmental Assessment of the Proposed Action, "Environmental Assessment by the Office of Special Projects Relating to the Change in Expiration Dates of Facility Operating Licenses Nos. DPR-77 and DPR-79, Tennessee Valley Authority, Units 1 and 2, Docket Nos. 50-327 and 50-328," dated December 22, 1988.

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Summary of Environmental Assessment:

The Commission's staff has reviewed the potential environmental impact of the proposed change in the expiration dates of the Operating Licenses for Sequoyah Nuclear Plant, Units 1 and 2. This evaluation considered all the previous environmental studies, including the "Final Environmental Statement (FES) Related to Operation of Sequoyah Nuclear Plant, Units 1 and 2," and the revision to the FES.

Radiological Impacts

In the FES, TVA has calculated the offsite population doses based on the population estimates for the year 2010. The radiological impacts to offsite individuals due to releases of radioactive liquid and gaseous waste from the plant remain well within all applicable regulatory limits. Computed gaseous offsite doses are typically less than 3 percent of the 10 CFR 50, Appendix I, guidelines (for a two-unit plant) of 20 millirad/year gamma and 40 millirad/year beta air dose and 30 millirem/year organ dose. Computed offsite liquid doses are typically less than 10 percent of the 10 CFR 50, Appendix I, guidelines of 6 millirem/year total body and 20 millirem/year organ dose. Radioactive effluent releases are controlled by the technical specifications specified in Section 3.11. These specifications implement the release limits specified in 10 CFR 20 and set performance goals based on 10 CFR 50, Appendix I. The Sequoyah Final Safety Analysis Report (FSAR) Section 2.1.3 provides the population density distribution around the site. Population projections are based on county projections by Tennessee, Georgia, Alabama, and North Carolina Social Sciences Advisory Committee. The population is estimated to increase from 45,740 in the year 2010 to 52,601 in the year 2021, an increase of approximately 15 percent. Doses calculated for offsite

population in the year 2021 would be less than 15 percent greater than those estimated for the 2010 population. However, population doses would remain less than 0.1 percent of the natural background dose to the offsite population. Therefore, the staff agrees with the licensee and concludes that the higher projected population for 2021 would not change the overall conclusions of the FES concerning radiological consequences following accidents.

With regard to normal plant operation, the licensee complies with Commission guidance and requirements for keeping radiation exposures "as low as is reasonably achievable" (ALARA) for occupational exposures and for radioactivity in effluents. The licensee would continue to comply with these requirements during any additional years of facility operation and also apply advanced technology when available and appropriate. Accordingly, radiological impacts on man, both onsite and offsite, are not significantly more severe than previously estimated in the FES and our previous conclusions remain valid.

The environmental impacts attributable to transportation of fuel and waste to and from the Sequoyah Nuclear Plant, with respect to normal conditions of transport and possible accidents in transport, would be bounded as set forth in Summary Table S-4 of 10 CFR Part 51.52, and the values in Table S-4 would continue to represent the contribution of transportation to the environmental costs associated with the reactor.

Non-Radiological Impacts

The Commission has concluded that the proposed extension will not cause a significant increase in the impacts to the environment and will not change any conclusions reached previously by the Commission.

FINDING OF NO SIGNIFICANT IMPACT:

The Commission's staff has reviewed the proposed change to the expiration dates of the Sequoyah Nuclear Plant, Units 1 and 2, Facility Operating Licenses relative to the requirements set forth in 10 CFR Part 51. Based upon the environmental assessment, the staff concluded that there are no significant radiological or non-radiological impacts associated with the proposed action and that the proposed license amendments will not have a significant effect on the quality of the human environment. Therefore, the Commission has determined, pursuant to 10 CFR 51.31, not to prepare an environmental impact statement for the proposed amendments.

For further details with respect to this action, see (1) the application for amendments dated June 21, 1988, (2) the Final Environmental Statement Related to Sequoyah Nuclear Plant, Units 1 and 2, issued February 21, 1974 and as updated on October 30, 1978, and (3) the Environmental Assessment dated December 28, 1988. These documents are available for public inspection at the Commission's Public Document Room, Gelman Building, 2120 L Street, Washington, D.C. 20555 and at the Chattanooga-Hamilton County Library, 1001 Broad Street, Chattanooga, Tennessee 37402.

Dated at Rockville, Maryland, this 29th day of December, 1989.

FOR THE NUCLEAR REGULATORY COMMISSION

Suzanne C. Black

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

ENVIRONMENTAL ASSESSMENT
BY THE OFFICE OF SPECIAL PROJECTS
RELATING TO THE CHANGE IN EXPIRATION DATES OF
FACILITY OPERATING LICENSE NOS. DPR-77 AND DPR-79
TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2
DOCKET NOS 50-327 AND 50-328
DATED: December 22, 1988

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1.0 INTRODUCTION

The United States Nuclear Regulatory Commission (the staff) is considering the issuance of a proposed amendment which would extend the expiration dates of the Sequoyah Nuclear Plant facility operating license DPR-77 (Unit 1) from May 27, 2010 to September 17, 2020 and for the facility operating license DPR-79 (Unit 2) from May 27, 2010 to September 15, 2121. The Sequoyah Nuclear Plant, Units 1 and 2 are operated by the Tennessee Valley Authority (the licensee) and are located in Hamilton County, Tennessee.

2.0 IDENTIFICATION OF THE PROPOSED ACTION

The current license terms for the Sequoyah Nuclear Plant, Units 1 and 2 end on May 27, 2010. Accounting for the time that was required for plant construction, this represents an effective operating license of approximately 29 years and four months for Unit 1 and 28 years and eight months for Unit 2. The licensee's application dated June 21, 1988 requests an extension of the expiration dates so that the fixed period of the licenses would be 40 years from the date of the operating license issuance for both the units.

3.0 THE NEED FOR THE PROPOSED ACTION

The granting of the proposed license amendment would allow the licensee to operate the units for approximately 10 additional years beyond the currently approved expiration dates. Without issuance of the proposed license

amendments, Sequoyah Nuclear Plants, Units 1 and 2 would be shutdown after the currently approved license durations.

4.0 ENVIRONMENTAL IMPACT OF THE PROPOSED ACTION

The environmental review for the combined construction and operation phase of Sequoyah Nuclear Plant (SQN) was initially conducted by TVA pursuant to the lead agency agreement with AEC. On February 21, 1974, TVA issued the "Final Environmental Statement (FES) Related to Operation of the Sequoyah Nuclear Plant, Units 1 and 2."

On July 30-31, 1974, a hearing was held in Chattanooga, Tennessee, to decide whether, in accordance with the applicable requirements of Appendix D of 10 CFR Part 50, the operating license should be issued. The conclusions of the Atomic Safety and Licensing Board were as follows: (1) That TVA's environmental review pursuant to NEPA (1969) was adequate and (2) that Section 102(C) and (D) of NEPA (1969) and Appendix D of 10 CFR 50, Section B have been complied with.

By a letter dated October 30, 1978, TVA provided the reassessment of the environmental aspects of the changes to the Sequoyah Units and indicated that the environmental impact of operation of SQN, as modified since 1974, would be somewhat less but approximately the same as described in the FES. The NRC staff prepared an "Environmental Impact Appraisal" addressing the environmental impact of the changes described in the October 30, 1978 letter. Based on the review, the staff concluded that all previously unreviewed issues of potential environmental consequence had been addressed satisfactorily and that no additional environmental impact statement for the issuance of operating licenses

need be prepared. The Commission's staff has reviewed this document to determine if any significant environmental impacts, other than those previously considered, would be associated with the proposed license extensions. The results of our review are set out below.

4.1 Radiological Impacts

The staff has considered potential radiological impacts for the general public in residence in the vicinity of the Sequoyah Nuclear Plant, Units 1 and 2; these impacts include potential accidents and normal radiological releases. In addition, the staff has considered the impacts of radiation exposure to workers at Sequoyah.

4.1.1 Environmental Impacts - General Public

In the Final Environmental Statement (FES), the licensee calculated dose commitments to the population residing around the Sequoyah nuclear power reactor to assess the impact on people from radioactive material released from the reactors. The FES does not generally use or discuss a specific period of plant operation in the evaluation, however, offsite population doses are based on the population estimates for the year 2010. According to TVA, radiological impacts to offsite individuals due to releases of radioactive liquid and gaseous wastes from the plant remain well within all applicable regulatory limits. Computed gaseous offsite doses are typically less than 3 percent of the 10 CFR 50, Appendix I, guidelines (for a two-unit plant) of 20 millirad/year gamma and 40 millirad/year beta air dose and 30 millirem/year organ dose. Computed offsite liquid doses are typically less than 10 percent

of the 10 CFR 50, Appendix I, guidelines of 6 millirem/year total body and 20 millirem/year organ dose. Radioactive effluent releases are controlled by the technical specifications in Section 3.11. These specifications implement the release limits specified in 10 CFR 20 and set performance goals based on 10 CFR 50, Appendix I. The Sequoyah Final Safety Analysis Report (FSAR) Section 2.1.3 provides the population density distribution around the site. Population projections are based on county projections by Tennessee, Georgia, Alabama, and North Carolina Social Sciences Advisory Committee. The population is estimated to increase from 45,740 in the year 2010 to 52,601 in the year 2021, an increase of approximately 15 percent. According to the licensee, doses calculated for offsite population in the year 2021 would be less than 15 percent greater than those estimated for the 2010 population. However, population doses would remain less than 0.1 percent of the natural background dose to the offsite population. Therefore, the staff concludes that the higher projected population for 2021 would not change the overall conclusions of the FES concerning radiological consequences following accidents.

The staff has assessed the public risks from reactor accidents per year of operation at other reactors of comparable design and power level (and larger). In all cases, the estimated reactor accident risks of early and latent cancer fatality per year of operation have been small compared to the background cancer fatality risks to which the public is exposed and did not increase with longer periods of operation. If similar risks were estimated for the Sequoyah Nuclear Plant, Units 1 and 2, we would expect a similar comparison. Therefore, the staff concludes that the proposed additional years of operation would not increase the annual public risk from reactor accidents.

4.1.2 Environmental Impacts - Occupational Exposures

The staff has evaluated the licensee's dose assessment for the years 2010 to 2020 and 2021 (the additional years during which Sequoyah, Unit 1 and Unit 2 respectively would operate), and compared it with the current Sequoyah and overall industry occupational dose experience.

The average dose for Sequoyah over the recent five-year period covering 1982-1987 has been approximately 350 person-rems per unit per year compared to the average yearly exposure of 500 person-rems per unit for U.S. PWRs. It should be noted that the Sequoyah units were not operating for about half of the covered period. According to TVA, this lower than average exposure is attributed to an excellent history of fuel integrity and management commitment to as low as reasonably achievable (ALARA) exposures. Exposure goals have been established for station person-rem to minimize collective doses. ALARA reviews and analyses are conducted for workplans for proposed jobs which are projected to exceed one person-rem. Steps are incorporated into the jobs to reduce dose. All proposed facility modifications receive similar reviews. Pre-job briefings are held with workers to cover dose savings measures and mock-ups are used as appropriate to train workers. Spent fuel will be stored in the spent fuel pool in lieu of shipment offsite, and in accordance with current national policy. Any expansion of onsite spent fuel storage capacity will be evaluated for radiological environmental effects by the staff at the time it is proposed.

The staff concludes that the licensee's occupational dose assessment is acceptable, and their radiation protection program is adequate to ensure that occupational radiation exposures will be maintained ALARA and in continued

compliance with the requirements of 10 CFR Part 20. Therefore, the staff concludes that the environmental impacts associated with a 40-year operating license duration are not significantly different from those previously assessed.

4.1.3 Environmental Impacts - Transportation of Fuel and Waste

The staff has reviewed the environmental impacts attributable to the transportation of fuel and waste to and from the Sequoyah site including information submitted by the licensee's letter dated June 21, 1988. With respect to the normal conditions of transport and possible accidents in transport, the staff concludes that the environmental impacts are bounded by those identified in Table S-4, "Environmental Impact of Transportation of Fuel and Waste To and From One Light Water-Cooled Nuclear Power Reactor" of 10 CFR Part 51.52. The transportation of radioactive material is governed by the regulations which provide protection of the public and transport workers from radiation. This protection is achieved by a combination of standards and requirements applicable to packaging, limitations on the contents of packages and radiation levels from packages, and procedures to limit the exposure of persons under normal and accident conditions.

The additional amount of nuclear fuel and waste resulting from an extended operating period will continue to be within the limits assumed for the original licensing basis. Because of improved fuel cycle designs and longer operation between refueling outages, the total amount of spent fuel produced over a 40-year operating lifetime will be less than that originally projected by the Final Safety Analysis Report (FSAR) for SQN.

4.2 Non-Radiological Impacts

The staff has re-evaluated the non-radiological impacts associated with operation of the Sequoyah units to include the approximately ten additional years of operation associated with the change in expiration of the Operating Licenses. Since Sequoyah's FES was issued, a number of modifications have been made to Sequoyah and surrounding site and facilities. These modifications, in general, had the effect of improving the reliability and safety of the plant or reducing the environmental impact of plant operation. They include:

- A. Facilities - Many modifications to the plant have been made since the original operating licenses were issued. Significant modifications are described in Sequoyah updated Final Safety Analysis Report. Modifications made without prior NRC approval, in accordance with the provisions of 10 CFR 50.59, were reported on an annual basis to the Commission. Modifications requiring prior NRC approval were made following receipt of an NRC Safety Evaluation Report. No modification was found to affect the conclusions of the Sequoyah FES.
- B. Land Use - Additional site buildings have been constructed and existing buildings have been expanded. The actual land area occupied by site buildings has not significantly increased, however.
- C. Thermal Effects - Thermal discharges from Sequoyah are regulated through the National Pollutant Discharge Elimination System (NPDES) Permit. Data collected to date has indicated that the water quality and indigenous

biota of Chickamauga Reservoir are protected by the thermal limits specified in the NPDES Permit. Operation of Sequoyah will continue to be governed by the NPDES Permit with no different or greater impact.

The staff's review concludes that the proposed extensions would not cause a significant increase in the impacts to the environment and would not change any conclusions previously reached by the Commission.

5.0 ALTERNATIVES TO THE PROPOSED ACTION

The principal alternative to issuance of the proposed license extensions would be to deny the applications. In this case, Sequoyah Nuclear Plant, Units 1 and 2, would shut down upon expiration of the present operating licenses.

In Section 8 of the FES, a cost-benefit analysis is presented for Sequoyah. Included in the analysis is comparison among various options for producing an equivalent electrical power capacity. Even considering significant changes in economics of the alternatives, operation of Sequoyah, Units 1 and 2 for an additional ten to eleven years would only require incremental yearly costs. These costs would be substantially less than the purchase of replacement power or the installation of new electrical generating capacity. Moreover, the overall cost per year of the facility would decrease since the large initial capital outlay would be averaged over a greater number of years. In summary, the cost-benefit advantage of Sequoyah compared to alternative electrical power generating capacity improves with the extended plant lifetime.

6.0 ALTERNATIVE USE OF RESOURCES

This action does not involve the use of resources not previously considered in connection with the "Final Environmental Statement Related to Operation of Sequoyah Nuclear Plant, Units 1 and 2," dated February 21, 1974 and as updated on October 30, 1978.

7.0 AGENCIES AND PERSONS CONSULTED

The Commission's staff reviewed the licensee's request and did not consult other agencies or persons.

8.0 BASIS AND CONCLUSIONS FOR NOT PREPARING AN ENVIRONMENTAL IMPACT STATEMENT

The Commission has determined not to prepare an environmental impact statement for the proposed action. The staff has reviewed the proposed license amendments relative to the requirements set forth in 10 CFR Part 51. Based on this assessment, the staff concludes that there are no significant radiological or non-radiological impacts associated with the proposed action and will not change any conclusions previously reached by the Commission. Therefore, pursuant to 10 CFR 51.31, an environmental impact statement need not be prepared for this action. Based upon this environmental assessment, the Commission concludes that the proposed action will not have a significant effect on the quality of the human environment.