

December 5, 1988

Docket Nos. 50-327/328

Mr. S. A. White  
Manager of Nuclear Power  
Tennessee Valley Authority  
6N 38A Lookout Place  
1101 Market Street  
Chattanooga, Tennessee 37402-2801

Dear Mr. White:

SUBJECT: CRANE TRAVEL, SPENT FUEL PIT AREA (TAC R00211, R00212) (TS 87-41)

The Commission has issued the enclosed Amendment No. 91 to Facility Operating License No. DPR-77 and Amendment No. 81 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 September 16, 1987.

These amendments revise Section 3/4.9.7, Crane Travel - Spent Fuel Pit Area, of the Sequoyah, Units 1 and 2 Technical Specifications (TS). The revisions are to (1) revise the maximum load that may be transported over the fuel assemblies in the spent fuel storage pool from 2,000 pounds to 2,100 pounds and (2) allow for the fuel pool divider gate and the fuel transfer canal gate, which are each about 4,800 pounds, to be transported over fuel assemblies in the storage pool when following safe load paths.

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

*CP1*

Enclosures:

1. Amendment No. 91 to License No. DPR-77
2. Amendment No. 81 to License No. DPR-79
3. Safety Evaluation

cc w/enclosures:  
See next page

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Mr. S. A. White

-2- Sequoyah Nuclear Plant

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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. 91  
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 September 16, 1987, 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. 91, 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.

FOR THE NUCLEAR REGULATORY COMMISSION



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

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: December 5, 1988

ATTACHMENT TO LICENSE AMENDMENT NO. 91

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. Overleaf pages\* are provided to maintain document completeness.

REMOVE

3/4 9-7

3/4 9-8

INSERT

3/4 9-7

3/4 9-8\*

## REFUELING OPERATIONS

### 3/4.9.7 CRANE TRAVEL - SPENT FUEL PIT AREA

#### LIMITING CONDITION FOR OPERATION

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3.9.7 Loads in excess of 2100 pounds\* shall be prohibited from travel over fuel assemblies in the storage pool.

APPLICABILITY: With fuel assemblies in the storage pool.

ACTION:

With the requirements of the above specification not satisfied, place the crane load in a safe condition. The provisions of Specification 3.0.3 are not applicable.

#### SURVEILLANCE REQUIREMENTS

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4.9.7 Crane interlocks and physical stops which prevent crane travel with loads in excess of 2100 pounds over fuel assemblies shall be demonstrated OPERABLE within 7 days prior to crane use and at least once per 7 days thereafter during crane operation.

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\* The spent fuel pool transfer canal gate and the spent fuel pool divider gate may travel over fuel assemblies in the spent fuel pool.

## REFUELING OPERATIONS

### 3/4.9.8 RESIDUAL HEAT REMOVAL AND COOLANT CIRCULATION

#### ALL WATER LEVELS

#### LIMITING CONDITION FOR OPERATION

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3.9.8.1 At least one residual heat removal (RHR) loop shall be in operation.

APPLICABILITY: MODE 6.

#### ACTION:

- a. With less than one residual heat removal loop in operation, except as provided in b. below, suspend all operations involving an increase in the reactor decay heat load or a reduction in boron concentration of the Reactor Coolant System. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours.
- b. The residual heat removal loop may be removed from operation for up to 1 hour per 8 hour period during the performance of CORE ALTERATIONS in the vicinity of the reactor pressure vessel hot legs.
- c. The provisions of Specification 3.0.3 are not applicable.

#### SURVEILLANCE REQUIREMENTS

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4.9.8.1 At least one residual heat removal loop shall be verified to be in operation and circulating reactor coolant at a flow rate of greater than or equal to 2500 gpm at least once per 12 hours.



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. 81  
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 September 16, 1987, 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.



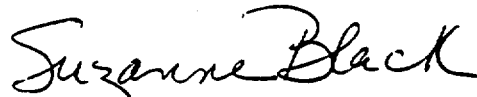
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-79 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 81, 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.

FOR THE NUCLEAR REGULATORY COMMISSION



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

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: December 5, 1988

ATTACHMENT TO LICENSE AMENDMENT NO. 81

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 9-8

INSERT

3/4 9-8

## REFUELING OPERATIONS

### 3/4.9.7 CRANE TRAVEL - SPENT FUEL PIT AREA

#### LIMITING CONDITION FOR OPERATION

---

3.9.7 Loads in excess of 2100 pounds\* shall be prohibited from travel over fuel assemblies in the storage pool.

APPLICABILITY: With fuel assemblies in the storage pool.

ACTION:

With the requirements of the above specification not satisfied, place the crane load in a safe condition. The provisions of Specification 3.0.3 are not applicable.

#### SURVEILLANCE REQUIREMENTS

---

4.0.7 Crane interlocks and physical stops which prevent crane travel with loads in excess of 2100 pounds over fuel assemblies shall be demonstrated OPERABLE within 7 days prior to crane use and at least once per 7 days thereafter during crane operation.

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\* The spent fuel pool transfer canal gate and the spent fuel pool divider gate may travel over fuel assemblies in the spent fuel pool.



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

ENCLOSURE

SAFETY EVALUATION BY THE OFFICE OF SPECIAL PROJECTS

SUPPORTING AMENDMENT NO. 91 TO FACILITY OPERATING LICENSE NO. DPR-77

AND AMENDMENT NO. 81 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 letter dated September 16, 1987, the Tennessee Valley Authority (licensee) requested changes to the Sequoyah Nuclear Plant (SQN), Units 1 and 2 Technical Specifications (TS) to revise Section 3/4.9.7, "Cranes Travel - Spent Fuel Pit Area." The proposed changes are to (1) increase the maximum load that may be transported over the fuel assemblies in the spent fuel storage pool from 2,000 pounds to 2,100 pounds and (2) allow for the fuel pool divider gate and the fuel transfer canal gate, which are about 4,800 pounds each, to be transported over fuel assemblies in the storage pool when following safe load paths.

2.0 EVALUATION

Limiting Condition for Operation (LCO) 3.9.7 prohibits loads in excess of 2,000 pounds from travel over fuel assemblies in the storage pool. The basis for this weight limit is listed in the bases for the technical specification as the weight of a single spent fuel assembly, rod cluster control rod assembly (RCCA), and associated handling tool. The licensee stated that a review of the Westinghouse drawings of a SQN fuel assembly, RCCA, and spent fuel handling tool identified the total nominal weight to be 2,024 pounds. The proposed change will allow a 2,100-pound limit, which is the 2,024 pounds rounded to the next higher hundred pounds to allow for any extra weight of any minor equipment or fuel changes in future assemblies.

The fuel handling accident (FHA) analysis presented in Section 15.4.5 of the Final Safety Analysis Report (FSAR) was examined by the licensee to determine whether changing the load limit from 2,000 pounds to 2,100 pounds would invalidate the analysis. The accident is defined as dropping a spent fuel assembly onto the floor of the spent fuel pool and the dose consequences of that accident. The licensee stated that changing the maximum weight limit from 2,000 to 2,100 pounds transported over the assemblies will not affect or invalidate the FSAR fuel handling accident.

The FHA analysis in the FSAR conservatively assumes that the dropping of the fuel assembly results in the rupture of the cladding of all the fuel rods in the fuel assembly. The resultant offsite dose effects and consequences must be well within the dose guidelines of 10 CFR Part 100. The accident analysis is based on the maximum radioactivity in a spent fuel assembly and not on the specific weight of a fuel assembly; therefore, correcting the nominal weight limit to 2,100 pounds in the TS does not change the results of the FHA. The proposed change is not increasing the amount of radioactivity in a spent fuel assembly. The proposed 2,100-pound limit will not physically affect any normal plant operations but will allow the transport of a single fuel assembly, RCCA, and the handling tool over other fuel assemblies in the storage pool. Therefore, the licensee concluded that the proposed change is not detrimental to the health and safety of the public and is consistent with the basis for the TS.

The design basis FHA for the spent fuel pool for Sequoyah is discussed in Section 15.4.2, Fuel Handling Accident, of NUREG-0011 dated March 1979. This is the Safety Evaluation Report by the staff which licensed SQN, Units 1 and 2. The staff also assumes that all the fuel rods in one fuel assembly with the maximum amount of radioactivity were damaged. The conclusion of the staff in this report was that the FHA was well within the dose guidelines of 10 CFR Part 100. The assumptions and conclusion for the FHA still apply to SQN.

Another proposed change the licensee requested concerns the fuel pool divider gate and the fuel transfer canal gate. These gates have to be transported over the spent fuel storage pool approximately once a year when SQN performs a refueling operation. During refueling, the fuel pool divider gate and the fuel transfer canal gate are lifted with the main Auxiliary Building crane over the storage pool and must travel over the spent fuel storage racks in order to be placed in the gate storage racks. The proposed change will allow these gates to be transported over spent fuel in the storage pool following a safe load path. These gates are about 4,800 pounds each, which is more than twice the weight of a fuel assembly, RCCA and handling tool.

Spent fuel storage is shared by the two units and is described in Section 9.1.2 of the FSAR. The storage pool is a reinforced concrete structure which rests on the rock formation that underlies the SQN site. The pool is designed to withstand a 1/2 safe shutdown earthquake (SSE), full SSE forces and the maximum uplift force of the spent fuel bridge hoist without deformation, as is the Auxiliary Building in which the pool is located. The pool is lined with stainless steel plates to ensure water tightness. The normal depth of water in the pool is 39 feet 10 inches. A low level alarm is annunciated in the control room when the water level drops to two inches below normal pool level. The gates are shown in Figure 9.1-1 of the FSAR.

Justification for the proposed change was based on the licensee's evaluation which demonstrated that SQN complies with the criteria in NUREG-0612, Control of Heavy Loads at Nuclear Power Plants, dated July 1980, and the Technical Evaluation Report (TER-C5506-393/411) prepared by Franklin Research Center (FRC). This TER was sent to the licensee in the staff's Safety Evaluation Report (SER) issued on March 26, 1985. The TER reviewed SQN against the staff's guidelines in NUREG-0612.

In NUREG-0612, the staff established seven general guidelines for handling heavy loads. Six of those guidelines pertain to criteria applicable to lifting the spent fuel pool divider gate and the fuel transfer canal gate by the main Auxiliary Building crane. The licensee stated that SQN meets the criteria for the main Auxiliary Building crane, including operator training, crane testing, inspection, maintenance, and the crane design standards of the American National Standards Institute (ANSI). In accordance with the NUREG-0612 guidelines on lifting devices, SQN uses properly inspected and tested slings that meet the requirements of ANSI B30.9-1971.

In its application, the licensee stated that safe load paths are designated in Maintenance Instruction (MI)-6.22, "Control of Heavy Loads in Critical Lifting Zones - NUREG-0612." The safe load path defines the area where if the gate should be dropped the structure is more likely to withstand the impact. The definition in NUREG-0612 of the safe load path is "A path defined for transport of a heavy load that will minimize adverse effects, if the load is dropped, in terms of releases of radioactive material and damage to safety systems." The licensee's safe load paths were reviewed against this definition in the staff's SER dated March 26, 1985. Maintenance Instruction 6.22 requires a cognizant person to supervise the lift to ensure the safe load path is followed.

In its TER, FRC explained that the safe load paths for SQN which had been developed by the licensee were in SQN Standard Practice (SQM) 65. SQM 65 defined the spent fuel pool critical lifting zone, a region within 15 feet of the pool, where the gates would be lifted. The safe load paths, established by the licensee, were considered to meet the staff criteria by FRC in its TER and were determined acceptable by the staff in its SER dated March 26, 1985. The licensee explained in a telephone conference call November 9, 1988 that SQM 65 has been replaced by MI 6.22. The safe load paths for the gates involve lifting the gates, moving them a few feet in over the pool and then moving them away from the pool and the spent fuel.

The licensee stated further that guideline requirements for load handling procedures are met. MI-6.22 defines required equipment to be used, inspections required and the safe load paths. Surveillance Instruction 104 ensures electrical/mechanical interlocks associated with the Auxiliary Building crane function properly in accordance with Surveillance Requirement (SR) 4.9.7.

The licensee stated that the staff also established interim measures to be implemented to provide assurance that heavy loads will be handled safely and reduce the potential for accidental load drops. The Interim Protection Measure 1 for TS, discussed in the TER, has been met since TS 3/4.9.7 exists to prohibit heavy loads over fuel in the storage pool without a single-failure-proof crane.

NUREG-0612 provides guidelines on handling heavy loads over the spent fuel storage pool that apply to plants such as SQN that do not have a single-failure proof crane. It is stated in the NUREG that meeting these guidelines assures that the potential for a load drop is extremely small and the

consequences are less than the guidelines of 10 CFR Part 100. Consequences of dropping a heavy load are addressed in the NUREG. The SQN plant has met the guidelines of the NUREG applicable to the plant. Therefore, the TS may be revised to permit lifts that have been evaluated by the staff; i.e., by the SER dated March 26, 1985. The staff concludes that SQN can lift the spent fuel pool divider gate and the fuel transfer canal gate over the fuel in the storage pool provided the main Auxiliary Building crane is used, approved procedures are used, and the safe load path is followed.

The staff is in agreement with the licensee's evaluation discussed above and concludes that the proposed TS changes are acceptable.

The licensee stated that an MI will be written to give detailed instructions for the removal and installation of the spent fuel pool divider gate and the fuel transfer canal gate. This procedure will list tools and rigging devices required for safe movement of the gates, including special requirements such as a load cell or scales to be used to detect binding that might occur while removing or installing the gates. The instruction will also include inflation, deflation, and inspection of the seals. The staff concludes that it does not need to review this MI to approve the proposed TS changes.

### 3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes to the surveillance requirements. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change 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 individuals or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comments on such findings.

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 nor environmental assessment need be prepared in connection with the issuance of the amendment.

### 4.0 CONCLUSION

The Commission published a proposed determination that the amendments involve no significant hazards consideration in the Federal Register (53 FR 13022) on April 20, 1988 and consulted with the State of Tennessee. No public comments were received and the State of Tennessee did not have any comments.

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 amendment will not be inimical to the common defense and security nor to the health and safety of the public.

Principal Contributor: S. B. Kim

Dated: December 5, 1988