

April 4, 1988

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: TECHNICAL SPECIFICATION FOR RESIDUAL HEAT REMOVAL SPRAY  
(TAC 0044, 0045) (TS 87-03)

Re: Sequoyah Nuclear Plant, Units 1 and 2

The Commission has issued the enclosed Amendment No. 69 to Facility Operating License No. DPR-77 and Amendment No. 61 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 April 8, 1987.

The amendments revise the Technical Specifications to separately define the operability and surveillance requirements for the residual heat removal spray trains.

As discussed in the safety evaluation, the staff believes that the operating procedures associated with the residual heat removal spray need to be clarified to address flow balancing when only one residual heat removal pump is operating.

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 Rajender Auluck for

8804140081 880404  
PDR ADOCK 05000327  
P PDR

Gary G. Zech, Assistant Director  
for Projects  
TVA Projects Division  
Office of Special Projects

Enclosures:

1. Amendment No. 69 to License No. DPR-77
2. Amendment No. 61 to License No. DPR-79
3. Safety Evaluation

cc w/enclosures:  
See next page

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

April 4, 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: TECHNICAL SPECIFICATION FOR RESIDUAL HEAT REMOVAL SPRAY  
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The amendments revise the Technical Specifications to separately define the operability and surveillance requirements for the residual heat removal spray trains.

As discussed in the safety evaluation, the staff believes that the operating procedures associated with the residual heat removal spray need to be clarified to address flow balancing when only one residual heat removal pump is operating.

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,

*Rajender Ambekar*

for Gary G. Zech, Assistant Director  
for Projects  
TVA Projects Division  
Office of Special Projects

Enclosures:

1. Amendment No. 69 to License No. DPR-77
2. Amendment No. 61 to License No. DPR-79
3. Safety Evaluation

cc w/enclosures:  
See next page

Mr. S. A. White  
Tennessee Valley Authority

Sequoyah Nuclear Plant

cc:

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Tennessee Valley Authority  
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Hamilton County Courthouse  
Chattanooga, Tennessee 37402

Dr. Henry Myers, Science Advisor  
Committee on Interior  
and Insular Affairs  
U.S. House of Representatives  
Washington, D.C. 20515



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. 69  
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 April 8, 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.

BB04140097 BB0404  
PDR ADDCK 05000327  
P PDR

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. 69, 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

*Rajender Anilvelu*

*for*

Gary G. Zech, Assistant Director  
for Projects  
TVA Projects Division  
Office of Special Projects

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: April 4, 1988

ATTACHMENT TO LICENSE AMENDMENT NO. 69

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.

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## CONTAINMENT SYSTEMS

### CONTAINMENT VENTILATION SYSTEM

#### LIMITING CONDITION FOR OPERATION

---

3.6.1.9 One pair (one purge supply line and one purge exhaust line) of containment purge system lines may be open; the containment purge supply and exhaust isolation valves in all other containment purge lines shall be closed. Operation with purge supply or exhaust isolation valves open for either purging or venting shall be limited to less than or equal to 1000 hours per 365 days. The 365 day cumulative time period will begin every April 15.

APPLICABILITY: MODES 1, 2, 3, and 4.

#### ACTION:

With a purge supply or exhaust isolation valve open in excess of the above cumulative limit, or with more than one pair of containment purge system lines open, close the isolation valve(s) in the purge line(s) within one hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

#### SURVEILLANCE REQUIREMENTS

---

4.6.1.9.1 The position of the containment purge supply and exhaust isolation valves shall be determined at least once per 31 days.

4.6.1.9.2 The cumulative time that the purge supply and exhaust isolation valves are open over a 365 day period shall be determined at least once per 7 days.

## CONTAINMENT SYSTEMS

### 3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

#### CONTAINMENT SPRAY SYSTEM

#### LIMITING CONDITION FOR OPERATION

---

3.6.2.1 Two independent trains of both the containment spray and residual heat removal spray shall be OPERABLE with each train comprised of:

- a. A Containment Spray train with:
  1. One OPERABLE Containment Spray pump.
  2. One OPERABLE Containment Spray heat exchanger.
  3. An OPERABLE flow path capable of taking suction from the refueling water storage tank and transferring suction to the containment sump, and
- b. A RHR Spray train with:
  1. One OPERABLE residual heat removal pump,
  2. One OPERABLE residual heat removal heat exchanger, and
  3. An OPERABLE flow path capable of taking suction from the containment sump.

APPLICABILITY: MODES 1, 2, 3 and 4.\*

#### ACTION:

With one train of containment spray or residual heat removal spray inoperable, restore the inoperable spray train to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours; restore the inoperable spray train to OPERABLE status within the next 48 hours or be in COLD SHUTDOWN within the next 30 hours.

#### SURVEILLANCE REQUIREMENTS

---

4.6.2.1.1 Each Containment Spray train shall be demonstrated OPERABLE:

- a. At least once per 31 days by verifying that each valve (manual, power operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

\*OPERABILITY of RHR Spray trains is not required in MODE 4.

## CONTAINMENT SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

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- b. By verifying, that on recirculation flow, each pump develops a discharge pressure of greater than or equal to 140 psig when tested pursuant to Specification 4.0.5.
  - c. At least once per 18 months during shutdown, by:
    - 1. Verifying that each automatic valve in the flow path actuates to its correct position on a Containment Pressure High-High test signal.
    - 2. Verifying that each spray pump starts automatically on a Containment Pressure High-High test signal.
  - d. At least once per 5 years by performing an air or smoke flow test through each spray header and verifying each spray nozzle is unobstructed.
- 4.6.2.1.2 Each RHR spray train shall be demonstrated OPERABLE:
- a. Per surveillance requirements 4.5.2.b.2 and 4.5.2.f.3;
  - b. At least once per 5 years by performing an air or smoke flow test through each spray header and verifying each spray nozzle is unobstructed.

## CONTAINMENT SYSTEMS

### 3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

#### LOWER CONTAINMENT VENT COOLERS

#### LIMITING CONDITION FOR OPERATION

---

3.6.2.2 Two independent trains of lower containment vent coolers shall be OPERABLE with two coolers to each train.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- a. With one of the above required lower containment vent coolers inoperable, restore to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With two lower containment vent coolers of the same train inoperable, restore to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

#### SURVEILLANCE REQUIREMENTS

---

4.6.2.2 Each lower containment vent cooler shall be demonstrated OPERABLE:

- a. At least once per 31 days by verifying that each fan operates for at least 15 minutes.
- b. At least once per 18 months by:
  1. Verifying from the control room that each fan starts.
  2. Verifying a cooling water flow rate of greater than or equal to 200 gpm to each cooler.



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. 61  
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 April 8, 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. 61, 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

*Rajender Anand*

for

Gary G. Zech, Assistant Director  
for Projects  
TVA Projects Division  
Office of Special Projects

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: April 4, 1988

ATTACHMENT TO LICENSE AMENDMENT NO. 61

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

REMOVE

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VIII

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INSERT

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## CONTAINMENT SYSTEMS

### CONTAINMENT VENTILATION SYSTEM

#### LIMITING CONDITION FOR OPERATION

---

3.6.1.9 One pair (one purge supply line and one purge exhaust line) of containment purge system lines may be open; the containment purge supply and exhaust isolation valves in all other containment purge lines shall be closed. Operation with purge supply or exhaust isolation valves open for either purging or venting shall be limited to less than or equal to 1000 hours per 365 days. The 365 day cumulative time period will begin every January 1.

APPLICABILITY: MODES 1, 2, 3, and 4.

#### ACTION:

With a purge supply or exhaust isolation valve open in excess of the above cumulative limit, or with more than one pair of containment purge system lines open, close the isolation valve(s), in the purge line(s) within one hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

#### SURVEILLANCE REQUIREMENTS

---

4.6.1.9.1 The position of the containment purge supply and exhaust isolation valves shall be determined at least once per 31 days.

4.6.1.9.2 The cumulative time that the purge supply and exhaust isolation valves are open over a 365 day period shall be determined at least once per 7 days.

## CONTAINMENT SYSTEMS

### 3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

#### CONTAINMENT SPRAY SYSTEM

#### LIMITING CONDITION FOR OPERATION

---

3.6.2.1 Two independent trains of both the containment spray and residual heat removal spray shall be OPERABLE with each train comprised of:

- a. A Containment Spray train with:
  1. One OPERABLE Containment Spray pump.
  2. One OPERABLE Containment Spray heat exchanger.
  3. An OPERABLE flow path capable of taking suction from the refueling water storage tank and transferring suction to the containment sump, and
- b. A RHR Spray train with:
  1. One OPERABLE residual heat removal pump.
  2. One OPERABLE residual heat removal heat exchanger, and
  3. An OPERABLE flow path capable of taking suction from the containment sump.

APPLICABILITY: MODES 1, 2, 3 and 4.\*

#### ACTION:

With one train of containment spray or residual heat removal spray inoperable, restore the inoperable spray train to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours, restore the inoperable spray train to OPERABLE status within the next 48 hours or be in COLD SHUTDOWN within the following 30 hours.

#### SURVEILLANCE REQUIREMENTS

---

4.6.2.1.1 Each Containment Spray train shall be demonstrated OPERABLE:

- a. At least once per 31 days by verifying that each valve (manual, power operated or automatic) in the flow path that is not locked sealed, or otherwise secured in position, is in its correct position.

\*OPERABILITY of RHR Spray trains is not required in MODE 4.

## CONTAINMENT SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

---

- b. By verifying that on recirculation flow, each pump develops a discharge pressure of greater than or equal to 140 psig when tested pursuant to Specification 4.0.5.
  - c. At least once per 18 months during shutdown, by:
    - 1. Verifying that each automatic valve in the flow path actuates to its correct position on a Containment Pressure High-High test signal.
    - 2. Verifying that each spray pump starts automatically on a Containment Pressure High-High test signal.
  - d. At least once per 5 years by performing an air or smoke flow test through each spray header and verifying each spray nozzle is unobstructed.
- 4.6.2.1.2 Each RHR Spray train shall be demonstrated OPERABLE:
- a. Per surveillance requirements 4.5.2.b.2 and 4.5.2.f.3;
  - b. At least once per 5 years by performing an air or smoke flow test through each spray header and verifying each spray nozzle is unobstructed.

## CONTAINMENT SYSTEMS

### 3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

#### LOWER CONTAINMENT VENT COOLERS

#### LIMITING CONDITION FOR OPERATION

---

3.6.2.2 Two independent trains of lower containment vent coolers shall be OPERABLE with two coolers to each train.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- a. With one of the above required lower containment vent coolers inoperable, restore to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With two lower containment vent coolers of the same train inoperable, restore to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

#### SURVEILLANCE REQUIREMENTS

---

4.6.2.2 Each lower containment vent cooler shall be demonstrated OPERABLE:

- a. At least once per 31 days by verifying that each fan operates for at least 15 minutes.
- b. At least once per 18 months by:
  1. Verifying from the control room that each fan starts.
  2. Verifying a cooling water flow rate of greater than or equal to 200 gpm to each cooler.



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

SAFETY EVALUATION BY THE OFFICE OF SPECIAL PROJECTS

SUPPORTING AMENDMENT NO. 69 TO FACILITY OPERATING LICENSE NO. DPR-77

AND AMENDMENT NO. 61 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 April 8, 1987, Tennessee Valley Authority (TVA), submitted a proposed change to the Technical Specifications (TS) for Sequoyah, Units 1 and 2. The proposed change to Section 3/4.6.2 would specifically require the operability of residual heat removal (RHR) spray and clearly specify the surveillance requirements for both the RHR and containment spray trains. The applicability statement would be revised to exempt the operability requirements for RHR spray in Mode 4 (hot shutdown). In addition, two minor typographical errors in the Unit 1 TS would be corrected.

2.0 DISCUSSION

The spray system at each unit of Sequoyah has four headers; two of these are used for containment spray (each with a dedicated pump and heat exchanger) which is automatically initiated on high-high containment pressure. The other two headers are for the RHR spray system; this system is initiated by manual valve manipulations. The RHR system is an emergency core cooling system (ECCS) and is also used for shutdown decay heat removal in Modes 4 and 5. As discussed in the Final Safety Analysis Report (FSAR), one train of RHR spray is needed to mitigate a loss-of-coolant accident (LOCA) if only one train of containment spray is available. TS 3.5.2 requires operability of both trains of RHR (as an ECCS) during Modes 1, 2 and 3. TS also address RHR requirements for decay heat removal in Modes 4, 5 and 6. Operability of the containment spray system is required for Modes 1 through 4 by TS 3.6.2.1. However, specific requirements on the RHR spray are not identified in the TS. TVA proposes to subdivide TS 3.6.2.1 to address containment spray and RHR spray explicitly.

3.0 EVALUATION

The revised limiting condition for operation for TS 3.6.2.1 would require two independent trains of both containment spray and RHR spray and defines what a train consists of. In particular, a train comprises an OPERABLE pump, an OPERABLE heat exchanger and an OPERABLE flow path. The containment spray flow path must be capable of suction from the refueling water storage tank and then from the sump; the RHR spray path is from the sump only. These requirements are consistent with necessary functions of these system as discussed in the safety analysis. The action statement for an inoperable RHR spray train or a

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containment spray train would remain as presently in the TS. A surveillance requirement for RHR spray train is added. The type and frequency of testing of the RHR spray is consistent with that required for other RHR (ECCS) and containment spray trains. Therefore, the staff finds these TS changes acceptable.

TVA also proposes that operability of the RHR spray trains not be required for Mode 4. The basis for this is discussed below.

General Operating Instruction (GOI)-3, "Plant Shutdown from Minimum Load to Cold Shutdown," stipulates a cooldown rate of 50°F per hour. Thus, it would take four hours to get from a shutdown from normal temperature (Mode 1) to Mode 4. The Function Restoration Guidelines, which establish the basis for emergency operating instructions, prohibit the use of RHR spray for at least one hour after initiation of a LOCA.

Thus, the earliest time that RHR spray could be called upon following plant shutdown for a LOCA in Mode 4 would be 5 hours. At that time, the decay heat rate is only 61% of the decay heat rate at 1 hour. Since a containment spray train alone has 70% of the capacity of the combined flow of one containment spray train and one RHR spray train, the RHR spray train would not be needed. Further, the blowdown energy released to containment for a LOCA in Mode 4 would be significantly less than for a design basis LOCA from full power and temperature. Therefore, the staff concludes that operability of RHR spray is not required in Mode 4 and that the proposed TS are acceptable.

In the course of our review of this proposed change, the staff reviewed the emergency operating procedure (FR-Z.1) associated with operation of RHR spray. The procedures do not clearly address the situation when only one RHR pump is operable and providing flow to both the safety injection pump suction and to the RHR spray header. The staff believes that as part of your implementation of this TS change, TVA should clarify the procedures regarding verification of proper flow balance.

#### 4.0 ENVIRONMENTAL CONSIDERATION

These amendments involve 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 amendments involve 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 these amendments involve no significant hazards consideration and there has been no public comment on such finding. Accordingly, the amendments meet 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 these amendments.

## 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: E. McKenna

Dated: April 4, 1988