



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

March 18, 1991

Docket Nos. 50-327  
and 50-328

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

Dear Mr. Nauman:

SUBJECT: CONTAINMENT SPRAY SUBSYSTEMS (TAC NOS. 79117/79118) (TS 90-16) -  
SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2

The Commission has issued the enclosed Amendment No. 150 to Facility Operating License No. DPR-77 and Amendment No. 140 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 November 20, 1990.

The amendments modify Section 3/4.6.2, Depressurization and Cooling Systems, of the Sequoyah Nuclear Plant, Units 1 and 2, Technical Specifications (TSs). The changes revise the Limiting Condition for Operation (LCO) 3.6.2.1 for the containment spray system to clarify the operability requirements for containment spray (CS) and residual heat removal (RHR) spray. This clarification is to ensure that an entire train of CS and RHR spray (i.e., all Train A or all Train B CS and RHR spray components) is operable when in the action statement for LCO 3.6.2.1. The action statement associated with this LCO is revised to a subsystem approach (similar to TS 3.5.1 for emergency core cooling system) that requires two independent subsystems comprised of a pump, heat exchanger, and flow path for both CS and RHR spray. In addition, the index and bases have also been revised to reflect the new title of "Containment Spray Subsystems" for LCO 3.6.2.1.

9103220206 910318  
PDR ADOCK 05000327  
P PDR

426100

*DFD*  
*11*

Mr. Dan A. Nauman

-2-

March 18, 1991

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

Sincerely,

Jack N. Donohew, Project Manager  
Project Directorate II-4  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Amendment No.150 to License No. DPR-77
- 2. Amendment No.140 to License No. DPR-79
- 3. Safety Evaluation

cc w/enclosures:  
See next page

OFC	: PDII-4/LA	: PDII-4/PM	: OGC	: SPLB/BG	: PDII-4/D
NAME	: MKrebs <i>mk</i>	: JDonohew:as	: <i>CPW</i>	: CMcCracken	: SBlack
DATE	: 2/14/91	: 2/1/91	: 2/28/91	: 2/22/91	: 3/15/91

OFC	: PDII-4/D	:	:	:	:
NAME	: FHebdon	:	:	:	:
DATE	: 3/15/91	:	:	:	:

AMENDMENT NO. 150 FOR SEQUOYAH UNIT NO. 1 - DOCKET NO. 50-327 and  
AMENDMENT NO. 140 FOR SEQUOYAH UNIT NO. 2 - DOCKET NO. 50-328  
DATED: March 18, 1991

---

Docket File

NRC PDR

Local PDR

SNR Reading File

S. Varga 14-E-4

G. Lainas 14-H-3

F. Hebdon

S. Black

M. Krebs

JDonohew(2)

OGC 15-B-13

D. Hagan MNBB-3302

E. Jordan MNBB-3302

G. Hill P1-130

Wanda Jones MNBB-7103

J. Calvo 11-F-22

ACRS(10)

GPA/PA 2-G-5

CC/LFMB MNBB-9112

C. McCracken

Mr. Dan A. Nauman

-2-

March 18, 1991

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

Sincerely,



Jack N. Donohew, Project Manager  
Project Directorate II-4  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No.150 to  
License No. DPR-77
2. Amendment No.140 to  
License No. DPR-79
3. Safety Evaluation

cc w/enclosures:  
See next page

Mr. Dan A. Nauman

CC:

Mr. Marvin Runyon, Chairman  
Tennessee Valley Authority  
ET 12A 7A  
400 West Summit Hill Drive  
Knoxville, Tennessee 37902

Mr. Edward G. Wallace  
Manager, Nuclear Licensing  
and Regulatory Affairs  
Tennessee Valley Authority  
5N 157B Lookout Place  
Chattanooga, Tennessee 37402-2801

Mr. John B. Waters, Director  
Tennessee Valley Authority  
ET 12A 9A  
400 West Summit Hill Drive  
Knoxville, Tennessee 37902

Mr. W. F. Willis  
Chief Operating Officer  
ET 12B 16B  
400 West Summit Hill Drive  
Knoxville, Tennessee 37902

General Counsel  
Tennessee Valley Authority  
400 West Summit Hill Drive  
ET 11B 33H  
Knoxville, Tennessee 37902

Mr. Dwight Nunn  
Vice President, Nuclear Projects  
Tennessee Valley Authority  
6N 38A Lookout Place  
1101 Market Street  
Chattanooga, Tennessee 37402-2801

Dr. Mark O. Medford  
Vice President, Nuclear Assurance,  
Licensing and Fuels  
Tennessee Valley Authority  
6N 38A Lookout Place  
Chattanooga, Tennessee 37402-2801

Mr. Joseph Bynum, Acting Site Director  
Sequoyah Nuclear Plant  
Tennessee Valley Authority  
P. O. Box 2000  
Soddy Daisy, Tennessee 37379

Ms. Marci Cooper  
Site Licensing Manager  
Sequoyah Nuclear Plant  
P. O. Box 2000  
Soddy Daisy, Tennessee 37379

County Judge  
Hamilton County Courthouse  
Chattanooga, Tennessee 37402

Regional Administrator, Region II  
U.S. Nuclear Regulatory Commission  
101 Marietta Street, N.W.  
Atlanta, Georgia 30323

Mr. Paul E. Harmon  
Senior Resident Inspector  
Sequoyah Nuclear Plant  
U.S. Nuclear Regulatory Commission  
2600 Igou Ferry Road  
Soddy Daisy, Tennessee 37379

Mr. Michael H. Mobley, Director  
Division of Radiological Health  
T.E.R.R.A. Building, 6th Floor  
150 9th Avenue North  
Nashville, Tennessee 37219-5404

Tennessee Valley Authority  
Rockville Office  
11921 Rockville Pike  
Suite 402  
Rockville, Maryland 20852



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. 150  
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 November 20, 1990, 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-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. 150, 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



Frederick J. Hebdon, Director  
Project Directorate II-4  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: March 18, 1991

ATTACHMENT TO LICENSE AMENDMENT NO. 150

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

VII

3/4 6-16

B3/4 6-3

INSERT

VII

3/4 6-16

B3/4 6-3

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

<u>SECTION</u>	<u>PAGE</u>
<u>3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)</u>	
3/4.5.1 ACCUMULATORS	
Cold Leg Injection Accumulators.....	3/4 5-1
Deleted.....	3/4 5-3
3/4.5.2 ECCS SUBSYSTEMS - $T_{avg}$ greater than or equal to 350°F.....	3/4 5-4
3/4.5.3 ECCS SUBSYSTEMS - $T_{avg}$ less than 350°F.....	3/4 5-8
3/4.5.4 DELETED.....	3/4 5-10
3/4.5.5 REFUELING WATER STORAGE TANK.....	3/4 5-11
<u>3/4.6 CONTAINMENT SYSTEMS</u>	
3/4.6.1 PRIMARY CONTAINMENT	
Containment Integrity.....	3/4 6-1
Containment Leakage.....	3/4 6-2
Containment Air Locks.....	3/4 6-7
Internal Pressure.....	3/4 6-9
Air Temperature.....	3/4 6-10
Containment Vessel Structural Integrity.....	3/4 6-11
Shield Building Structural Integrity.....	3/4 6-12
Emergency Gas Treatment System (Cleanup Subsystem).....	3/4 6-13
Containment Ventilation System.....	3/4 6-15
3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS	
Containment Spray Subsystems.....	3/4 6-16
Lower Containment Vent Coolers.....	3/4 6-16b

## CONTAINMENT SYSTEMS

### 3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

#### CONTAINMENT SPRAY SUBSYSTEMS

#### LIMITING CONDITION FOR OPERATION

---

3.6.2.1 Two independent containment spray subsystems shall be OPERABLE with each subsystem comprised of:

- a. A Containment Spray train with:
  1. One OPERABLE Containment Spray pump.
  2. One OPERABLE Containment Spray heat exchanger.
  3. An OPERABLE Containment Spray pump 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 residual heat removal pump flow path capable of taking suction from the containment sump and supplying flow to the spray header.

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

#### ACTION:

With one containment spray subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours; restore the inoperable subsystem 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

### BASES

---

---

#### 3/4.6.1.8 EMERGENCY GAS TREATMENT SYSTEM (EGTS)

The OPERABILITY of the EGTS cleanup subsystem ensures that during LOCA conditions, containment vessel leakage into the annulus will be filtered through the HEPA filters and charcoal adsorber trains prior to discharge to the atmosphere. This requirement is necessary to meet the assumptions used in the accident analyses and limit the site boundary radiation doses to within the limits of 10 CFR 100 during LOCA conditions. Cumulative operation of the system with the heaters on for 10 hours over a 31 day period is sufficient to reduce the buildup of moisture on the absorbers and HEPA filters. ANSI N510-1975 will be used as a procedural guide for surveillance testing.

#### 3/4.6.1.9 CONTAINMENT VENTILATION SYSTEM

Use of the containment purge lines is restricted to only one pair (one supply line and one exhaust line) of purge system lines at a time to ensure that the site boundary dose guidelines of 10 CFR Part 100 would not be exceeded in the event of a loss of coolant accident during purging operations. The analysis of this accident assumed purging through the largest pair of lines (a 24 inch inlet line and a 24 inch outlet line), a pre-existing iodine spike in the reactor coolant and four second valve closure times.

#### 3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

##### 3/4.6.2.1 CONTAINMENT SPRAY SUBSYSTEMS

The OPERABILITY of the containment spray subsystems ensures that containment depressurization and cooling capability will be available in the event of a LOCA. The pressure reduction and resultant lower containment leakage rate are consistent with the assumptions used in the accident analyses.

##### 3/4.6.2.2 CONTAINMENT COOLING FANS

The OPERABILITY of the lower containment vent coolers ensures that adequate heat removal capacity is available to provide long-term cooling following a non-LOCA event. Postaccident use of these coolers ensures containment temperatures remain within environmental qualification limits for all safety-related equipment required to remain functional.

##### 3/4.6.3 CONTAINMENT ISOLATION VALVES

The OPERABILITY of the containment isolation valves ensures that the containment atmosphere will be isolated from the outside environment in the event of a release of radioactive material to the containment atmosphere or pressurization of the containment. Containment isolation within the time limits specified ensures that the release of radioactive material to the environment will be consistent with the assumptions used in the analyses for a LOCA. By letters dated March 3, 1981, and April 2, 1981, TVA will submit a report on the operating experience of the plant no later than startup after the first refueling. This information will be used to provide a basis to re-evaluate the adequacy of the purge and vent time limits.



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. 140  
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 November 20, 1990, 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. 140, 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



Frederick J. Hebdon, Director  
Project Directorate II-4  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Attachment:  
Charges to the Technical  
Specifications

Date of Issuance: March 18, 1991

ATTACHMENT TO LICENSE AMENDMENT NO. 140

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

VII

VIII

3/4 6-16

B3/4 6-3

INSERT

VII

VIII\*

3/4 6-16

B3/4 6-3

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

<u>SECTION</u>	<u>PAGE</u>
<u>3/4.5 EMERGENCY CORE COOLING SYSTEMS</u>	
3/4.5.1 ACCUMULATORS	
Cold Leg Injection Accumulators.....	3/4 5-1
Deleted.....	3/4 5-3
3/4.5.2 ECCS SUBSYSTEMS - $T_{avg}$ greater than or equal to 350°F.....	3/4 5-4
3/4.5.3 ECCS SUBSYSTEMS - $T_{avg}$ less than 350°F.....	3/4 5-8
3/4.5.4 DELETED.....	3/4 5-10
3/4.5.5 REFUELING WATER STORAGE TANK.....	3/4 5-11
<u>3/4.6 CONTAINMENT SYSTEMS</u>	
3/4.6.1 PRIMARY CONTAINMENT	
Containment Integrity.....	3/4 6-1
Containment Leakage.....	3/4 6-2
Containment Air Locks.....	3/4 6-7
Internal Pressure.....	3/4 6-9
Air Temperature.....	3/4 6-10
Containment Vessel Structural Integrity.....	3/4 6-11
Shield Building Structural Integrity.....	3/4 6-12
Emergency Gas Treatment System (Cleanup Subsystem).....	3/4 6-13
Containment Ventilation System.....	3/4 6-15
3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS	
Containment Spray Subsystems.....	3/4 6-16
Lower Containment Vent Coolers.....	3/4 6-16b

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

<u>SECTION</u>	<u>PAGE</u>
3/4.6.3 CONTAINMENT ISOLATION VALVES.....	3/4 6-17
3/4.6.4 COMBUSTIBLE GAS CONTROL	
Hydrogen Analyzers .....	3/4 6-24
Electric Hydrogen Recombiners.....	3/4 6-25
3/4.6.5 ICE CONDENSER	
Ice Bed.....	3/4 6-26
Ice Bed Temperature Monitoring System.....	3/4 6-28
Ice Condenser Doors.....	3/4 6-29
Inlet Door Position Monitoring System.....	3/4 6-31
Divider Barrier Personnel Access Doors and Equipment Hatches.....	3/4 6-32
Containment Air Return Fans.....	3/4 6-33
Floor Drains.....	3/4 6-34
Refueling Canal Drains.....	3/4 6-35
Divider Barrier Seal.....	3/4 6-36
3/4.6.6 VACUUM RELIEF VALVES.....	3/4 6-38
<u>3/4.7 PLANT SYSTEMS</u>	
3/4.7.1 TURBINE CYCLE	
Safety Valves.....	3/4 7-1
Auxiliary Feedwater System.....	3/4 7-5
Condensate Storage Tank.....	3/4 7-7
Activity.....	3/4 7-8
Main Steam Line Isolation Valves.....	3/4 7-10
3/4.7.2 STEAM GENERATOR PRESSURE/TEMPERATURE LIMITATION.....	3/4 7-11
3/4.7.3 COMPONENT COOLING WATER SYSTEM.....	3/4 7-12
3/4.7.4 ESSENTIAL RAW COOLING WATER SYSTEM	
Essential Raw Cooling Water System.....	3/4 7-13

## CONTAINMENT SYSTEMS

### 3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

#### CONTAINMENT SPRAY SUBSYSTEMS

#### LIMITING CONDITION FOR OPERATION

---

3.6.2.1 Two independent containment spray subsystems shall be OPERABLE with each subsystem comprised of:

- a. A Containment Spray train with:
  1. One OPERABLE Containment Spray pump.
  2. One OPERABLE Containment Spray heat exchanger.
  3. An OPERABLE Containment Spray Pump 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 residual heat removal pump flow path capable of taking suction from the containment sump and supplying flow to the spray header.

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

#### ACTION:

With one containment spray subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours, restore the inoperable subsystem 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

### BASES

---

#### 3/4.6.1.8 EMERGENCY GAS TREATMENT SYSTEM (EGTS)

The OPERABILITY of the EGTS cleanup subsystem ensures that during LOCA conditions, containment vessel leakage into the annulus will be filtered through the HEPA filters and charcoal adsorber trains prior to discharge to the atmosphere. This requirement is necessary to meet the assumptions used in the accident analyses and limit the site boundary radiation doses to within the limits of 10 CFR 100 during LOCA conditions. Cumulative operation of the system with the heaters on for 10 hours over a 31 day period is sufficient to reduce the buildup of moisture on the absorbers and HEPA filters. ANSI N510-1975 will be used as a procedural guide for surveillance testing.

#### 3/4.6.1.9 CONTAINMENT VENTILATION SYSTEM

Use of the containment purge lines is restricted to only one pair (one supply line and one exhaust line) of purge system lines at a time to ensure that the site boundary dose guidelines of 10 CFR Part 100 would not be exceeded in the event of a loss of coolant accident during purging operations. The analysis of this accident assumed purging through the largest pair of lines (a 24 inch inlet line and a 24 inch outlet line), a pre-existing iodine spike in the reactor coolant and four second valve closure times.

#### 3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

##### 3/4.6.2.1 CONTAINMENT SPRAY SUBSYSTEMS

The OPERABILITY of the containment spray subsystems ensures that containment depressurization and cooling capability will be available in the event of a LOCA. The pressure reduction and resultant lower containment leakage rate are consistent with the assumptions used in the accident analyses.

##### 3/4.6.2.2 CONTAINMENT COOLING FANS

The OPERABILITY of the lower containment vent coolers ensures that adequate heat removal capacity is available to provide long-term cooling following a non-LOCA event. Postaccident use of these coolers ensures containment temperatures remain within environmental qualification limits for all safety-related equipment required to remain functional.

##### 3/4.6.3 CONTAINMENT ISOLATION VALVES

The OPERABILITY of the containment isolation valves ensures that the containment atmosphere will be isolated from the outside environment in the event of a release of radioactive material to the containment atmosphere or pressurization of the containment. Containment isolation within the time limits specified ensures that the release of radioactive material to the environment will be consistent with the assumptions used in the analyses for a LOCA.



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

ENCLOSURE 3

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO.150 TO FACILITY OPERATING LICENSE NO. DPR-77

AND AMENDMENT NO.140 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

In its letter dated November 20, 1990, the Tennessee Valley Authority (TVA) proposed to modify Section 3/4.6.2, Depressurization and Cooling Systems, of the Sequoyah Nuclear Plant (SQN), Units 1 and 2, Technical Specifications (TSs). The proposed changes are to revise the Limiting Condition for Operation (LCO) 3.6.2.1 for the containment spray system to clarify the operability requirements for containment spray (CS) and residual heat removal (RHR) spray. TVA stated that this clarification is to ensure that an entire train of CS and RHR spray (i.e., all Train A or all Train B CS and RHR spray components) is operable when in the action statement for LCO 3.6.2.1. The action statement associated with this LCO would also be revised to a subsystem approach (similar to TS 3.5.1 for emergency core cooling system) that requires two independent subsystems comprised of a pump, heat exchanger, and flow path for both CS and RHR spray. In addition, the index and bases would also be revised. This is TVA TS Change Request 90-16.

2.0 EVALUATION

Containment heat removal during accidents is discussed in Section 6.2.2 of the Sequoyah Final Safety Analysis Report (FSAR). This heat removal is provided by the ice condenser, the air return fans, and the two separate systems that provide containment spray. These containment spray systems are the above listed CS system and RHR spray system. The RHR spray system is a portion of the RHR system. Each of these spray systems consist of two trains of redundant spray equipment (i.e., pumps, heat exchangers, control valves, spray headers) for each unit. There are four spray headers per unit: two headers supplied from separate trains of the CS system and the other two headers supplied from separate trains of the RHR spray system.

The CS system initially operates independently of the RHR spray system and other engineered safety features. The CS pumps operate first from the refueling water storage tank and then from the containment sump. For extended operation, water is supplied to the RHR spray headers from the RHR pumps and heat exchangers. The RHR spray system is for long-term containment spray.

9103220216 910318  
PDR ADOCK 05000327  
PDR

The RHR spray trains are not considered redundant to the CS trains in responding to an accident because the CS trains are for initial containment spray and the RHR spray trains are for long-term containment spray. Therefore, both the CS train and the RHR spray train which are powered from the same vital bus (i.e., Train A or Train B) must be operable for that train of containment spray capability to be considered operable.

In its application for amendments to the TSs, TVA stated that the current LCO 3.6.2.1 referring to the separate trains of CS and RHR spray has led to confusion as to which pumps are allowed to be inoperable and be within the action statement requirements of the LCO and has caused Operations' personnel to be unsure of when TS 3.0.3 would be applicable. TVA has proposed to classify the trains of the CS and RHR spray as subsystems of an overall containment spray system and to revise the TSs accordingly. TVA stated that this revision to the TSs will resolve this confusion because there will be assurance that an entire containment spray subsystem is available when in the action statement for LCO 3.6.2.1 and the requirements of TS 3.0.3 will be complied with when there is loss of equipment in both subsystems. A subsystem would be Train A or Train B of both CS and RHR spray. This clarification would ensure that at least one train of containment spray system components are available as assumed in the accident analysis to supply a minimum spray flow of 6,750 gallons per minute (gal/min). This flow is achieved by having at least one complete subsystem with a CS pump capable of delivering 4,750 gal/min of spray and an RHR pump capable of delivering 2,000 gal/min of spray. The title changes in the index and bases have been proposed to provide consistency with the LCO. TVA stated that these changes do not alter the operation, testing, or maintenance of the containment spray system or RHR system.

The current LCO 3.6.2.1 treats the two trains of CS and the two trains of RHR spray as separate systems, as described in FSAR Section 6.2.2. Each train in the LCO is a pump, heat exchanger, and a flow path from a source to the spray header. In the current action statement for LCO 3.6.2.1, if one train of CS or RHR spray is inoperable, the inoperable spray train is returned to operable status within 72 hours or the unit is put into at least hot standby within the next six hours. The action statement does not explain what to do if more than one train is inoperable. This means that if one CS train and one RHR spray train are inoperable, the situation is outside the action statement for LCO 3.6.2.1 and, therefore, LCO 3.0.3 would apply. LCO 3.0.3 would require that one train be made operable within one hour or the unit be in at least hot standby within the next 6 hours. If the two trains are powered off different vital buses, it could be appropriate to enter LCO 3.0.3 but, if the two trains were powered off the same vital bus, it would not be appropriate to enter the more restrictive LCO 3.0.3.

For a CS train and a RHR spray train powered off the same vital bus (i.e. Train A or Train B), it does not matter whether the CS train or the RHR spray train or both trains are inoperable. In all cases, the current action statement for LCO 3.6.2.1 is appropriate. The train(s) should be made operable within 72 hours or the unit should be in at least hot standby within the next 6 hours. This is true because the CS and RHR trains are powered from the same vital bus. If that bus was lost in a single active failure, both the CS and RHR spray trains powered from that bus would be inoperable but there would remain an operable CS train and RHR spray train powered from the other vital bus. Therefore, the current requirements in the action statement for LCO 3.6.2.1 would be acceptable for the loss of one train of CS and RHR spray (i.e., Train A or Train B).

For a CS train and a RHR spray train that are not powered from the same vital bus to be inoperable, the current action statement for LCO 3.6.2.1 is not appropriate. This situation is outside the action statement because if a vital bus were lost there would remain only one operable CS train or RHR spray train and both trains would be needed for there to be an operable train of containment spray.

The current wording in the LCO.3.6.2.1 in terms of containment spray trains is too restrictive in that it may require an unnecessary rapid shutdown if both a CS train and a RHR spray train which are powered from the same vital bus are inoperable. TVA has proposed to revise the LCO in terms of containment spray subsystems with a subsystem being a CS train and a RHR spray train powered off the same vital bus. Therefore, if one "subsystem" is inoperable, TVA should restore the inoperable subsystem to operable status within 72 hours or place the unit in at least hot standby within the next 6 hours.

If both subsystems are inoperable, the situation is clearly outside the action statement and TVA would enter LCO 3.0.3.

Based on the above, the staff concludes that the TSs should be written in terms of containment spray subsystems instead of CS trains and RHR spray trains. This is consistent with the description of containment spray in the FSAR. The staff has reviewed the proposed changes to add the phrase "subsystem" to LCO 3.6.2.1 and agrees that they are consistent with the concept of containment spray subsystems where one CS train and one RHR spray train powered off the same vital bus is a subsystem. The proposed action statement is consistent with the current requirements in the action statement being followed if a subsystem is inoperable and with LCO 3.0.3 being followed if both subsystems are inoperable. Both the CS train and the RHR spray train must be operable for the subsystem to be considered operable, as required by LCO 3.6.2.1. The staff concludes that these proposed changes are acceptable.

TVA has also proposed adding the phrases "containment spray pump" and "residual heat removal pump" to LCO 3.6.2.1 to describe the two flow paths in the containment spray. These flow paths are through the containment spray pump (i.e., CS train) and the residual heat removal pump (i.e., RHR spray train). Therefore, the proposed descriptive wording is correct. The staff concludes that these proposed changes are acceptable.

TVA also proposed to add the phrase "and supplying flow to the spray header" to assure that the entire flow path from the source to the spray header is operable for the RHR spray train to be considered operable. The RHR system uses the same RHR pumps for its primary function to pump water directly into the core to cool it under low pressure conditions. Switching RHR pump flow to the RHR spray headers means realigning valves to a new configuration and pumping water to the spray headers. This flow path to the headers must be operable for the RHR spray train to be operable. The staff concludes that this additional descriptive information for LCO 3.6.2.1 is necessary and the proposed change is acceptable. This additional descriptive information is not needed for the CS train because the containment spray pumps only pump water to the CS headers. Finally, TVA proposed to change the title of LCO 3.6.2.1 to "containment spray systems." This involves changes to the index and TS Bases for LCO 3.6.2.1. This new title is consistent with the revisions to LCO 3.6.2.1 which were discussed above and the new LCO 3.6.2.1 which is in terms of containment spray subsystems. Therefore, the staff concludes that these changes are acceptable.

Based on the above, the staff concludes that the TS changes proposed by TVA in its application dated November 20, 1990 are acceptable.

### 3.0 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. 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.

### 4.0 CONCLUSION

The Commission made a proposed determination that the amendment involves no significant hazards consideration which was published in the Federal Register (55 FR 51187) on December 12, 1990 and consulted with the State of Tennessee. No public comments were received and the State of Tennessee did not have any comments.

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

Principal Contributor: J. Donohew

Dated: March 18, 1991