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

November 28, 1989

Docket Nos. 50-327
and 50-328

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

Dear Mr. Kingsley:

SUBJECT: LOGIC TIME DELAYS FOR THE AUTOMATIC AUXILIARY FEEDWATER PUMP SUCTION TRANSFER (TAC 73751/73752) (TS 89-03)- SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2

The Commission has issued the enclosed Amendment No. 129 to Facility Operating License No. DPR-77 and Amendment No. 116 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 May 25, 1989.

The amendments modify the Sequoyah Nuclear Plant, Units 1 and 2, Technical Specifications (TSs). The changes revise Tables 3.3-3, "Engineered Safety Feature Actuation System Instrumentation", 3.3-4, "Engineered Safety Feature Actuation System Instrumentation Trip Setpoints", and 4.3-2, "Engineered Safety Feature Actuation System Instrumentation Surveillance Requirements." The changes add requirements for the logic time delays associated with the motor-driven and turbine-driven auxiliary feedwater (AFW) pump automatic suction transfer from the condensate storage tanks to the essential raw cooling water system. Specifically, the new requirements are the following: (1) a "Functional Unit" 6.h is added to each of the above tables to include requirements for the AFW pump suction transfer time delays, (2) the current wording of Table 3.3-3, Action 21, is replaced with a new action appropriate for the AFW pump suction transfer pressure switches and time delays, and (3) the "Action" and "Minimum Channels Operable" columns for Table 3.3-3, Item 6.g, are revised to reflect the new Action 21. In addition, the wording of Table 4.3-2, "Functional Unit," Item 6.g, is revised to correct an inadvertent omission from a previous license amendment.

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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,

Jack N Donohew Jr for

Suzanne Black, Assistant Director
for Projects
TVA Projects Division
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 129 to License No. DPR-77
2. Amendment No. 116 to License No. DPR-79
3. Safety Evaluation

cc w/enclosures:
See next page

cc w/enclosure:
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Tennessee Valley Authority
Rockville Office
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Rockville, Maryland 20852

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,

Suzanne Black, Assistant Director
for Projects
TVA Projects Division
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 129 to License No. DPR-77
2. Amendment No. 116 to License No. DPR-79
3. Safety Evaluation

cc w/enclosures:
See next page

Document Name: TS 8903

OFC	NRR:TVA:PM	TVA:PSB/BC	TVA:AD/TP	OGC	TVA:AD/P		
NAME	JDonohew	GHubbard	RPierson	CBachman	SBlack		
DATE	10/25/89	10/13/89	10/31/89	11/8/89	11/22/89		

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,

Suzanne Black, Assistant Director
for Projects
TVA Projects Division
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 129 to License No. DPR-77
2. Amendment No. 116 to License No. DPR-79
3. Safety Evaluation

cc w/enclosures:
See next page

Document Name: TS 8903

OFC	NRR:TVA:PM	TVA:PSB/BC	TVA:AD/TP	OGC	TVA:AD/P		
NAME	JDonohew	GHubbard	RPierson	CBachmann	SBlack		
DATE	10/25/89	10/13/89	10/30/89	11/8/89	11/22/89		

AMENDMENT NO. 129 FOR SEQUOYAH UNIT NO. 1 - DOCKET NO. 50-327 and
AMENDMENT NO. 116 FOR SEQUOYAH UNIT NO. 2 - DOCKET NO. 50-328
DATED: November 28, 1988

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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. 129
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 May 25, 1989, 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. 129, 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

Jack N Donohew for
Suzanne Black, Assistant Director
for Projects
TVA Projects Division
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: November 28, 1989

ATTACHMENT TO LICENSE AMENDMENT NO. 129

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	INSERT
3/4 3-19	3/4 3-19*
3/4 3-20	3/4 3-20
3/4 3-21	3/4 3-21
3/4 3-23	3/4 3-23
3/4 3-24	3/4 3-24*
3/4 3-27	3/4 3-27
3/4 3-27a	3/4 3-27a
3/4 3-37	3/4 3-37
3/4 3-37a	3/4 3-37a

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
5. TURBINE TRIP & FEEDWATER ISOLATION					
a. Steam Generator Water Level--High-High	3/loop	2/loop in any operating loop	2/loop in each operating loop	1, 2, 3	16*
b. Automatic Actuation Logic	2	1	2	1, 2, 3	23
6. AUXILIARY FEEDWATER					
a. Manual Initiation	2	1	2	1, 2, 3	24
b. Automatic Actuation Logic	2	1	2	1, 2, 3	23
c. Main Stm. Gen. Water Level-Low-Low					
i. Start Motor Driven Pumps	3/stm. gen.	2/stm. gen. any stm gen.	2/stm. gen.	1, 2, 3	16*
ii. Start Turbine-Driven Pump	3/stm. gen.	2/stm. gen. any 2 stm. gen.	2/stm. gen	1, 2, 3	16*
d. S.I. Start Motor-Driven Pumps and Turbine Driven Pump	See 1 above (all S.I. initiating functions and requirements)				

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
**7. LOSS OF POWER					
a. 6.9 kv Shutdown Board --Loss of Voltage					
1. Start Diesel Generators	2/shutdown board	1 loss of voltage on any shutdown board	2/shutdown board	1, 2, 3, 4	20*
2. Load Shedding	2/shutdown board	1/shutdown board	2/shutdown board	1, 2, 3, 4	20*
b. 6.9 kv Shutdown Board Degraded Voltage					
1. Voltage Sensors	3/shutdown board	2/shutdown board	2/shutdown board	1, 2, 3, 4	20*
2. Diesel Generator Start and Load Shedding Timer	2/shutdown board	1/shutdown board	1/shutdown board	1, 2, 3, 4	20*
3. SI/Degraded Voltage Enable Timer	2/shutdown board	1/shutdown board	1/shutdown board	1, 2, 3, 4	20*

**NOTE: This technical specification is to be implemented during the startup following the 2nd refueling outage or following completion of the modification, whichever is earlier.

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
e. Station Blackout Start Motor-Driven Pump associated with the shutdown board and Turbine Driven Pump	2/shutdown board	1/shutdown board	2/shutdown board	1, 2, 3	20
f. Trip of Main Feedwater Pumps Start Motor-Driven Pumps and Turbine Driven Pump	1/pump	1/pump	1/pump	1, 2	20*
g. Auxiliary Feedwater Suction Pressure-Low	3/pump	2/pump	3/pump	1, 2, 3	21*
h. Auxiliary Feedwater Suction Transfer Time Delays					
1. Motor-Driven Pump	1/pump	1/pump	1/pump	1, 2, 3	21*
2. Turbine-Driven Pump	2/pump	1/pump	2/pump	1, 2, 3	21*

ACTION 21 - With less than the Minimum Number of Channels OPERABLE, declare the associated auxiliary feedwater pump inoperable, and comply with the ACTION requirements of Specification 3.7.1.2.

ACTION 22 - With less than the Minimum Number of Channels OPERABLE, declare the interlock inoperable and verify that all affected channels of the functions listed below are OPERABLE or apply the appropriate ACTION statement(s) for those functions. Functions to be evaluated are:

a. Safety Injection
   Pressurizer Pressure

b. Safety Injection
   High Steam Line Flow
   Steam Line Isolation
   High Steam Line Flow
   Steam Dump

c. Turbine Trip
   Steam Generator Level High-High
   Feedwater Isolation
   Steam Generator Level High-High

ACTION 23 - With the number of OPERABLE channels one less than the Total Number of Channels, be in at least HOT STANDBY within 6 hours and in at least HOT SHUTDOWN within the following 6 hours; however, one channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3.2.1.

ACTION 24 - With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within 6 hours and in at least HOT SHUTDOWN within the following 6 hours.

ACTION 25 - With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or declare the associated valve inoperable and take the ACTION required by Specification 3.7.1.5.

TABLE 3.3-4

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
1. SAFETY INJECTION, TURBINE TRIP AND FEEDWATER ISOLATION		
a. Manual Initiation	Not Applicable	Not Applicable
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Containment Pressure--High	$\leq$ 1.54 psig	$\leq$ 1.7 psig
d. Pressurizer Pressure--Low	$\geq$ 1870 psig	$\geq$ 1860 psig
e. Differential Pressure Between Steam Lines--High	$\leq$ 100 psi	$\leq$ 112 psi
f. Steam Flow in Two Steam Lines--High Coincident with T_{avg}--Low-Low or Steam Line Pressure--Low	$\leq$ A function defined as follows: A Δp corresponding to 40% of full steam flow between 0% and 20% load and then a Δp increasing linearly to a Δp corresponding to 110% of full steam flow at full load	$\leq$ A function defined as follows: A Δp corresponding to 44% of full steam flow between 0% and 20% load and then a Δp increasing linearly to a Δp corresponding to 111.5% of full steam flow at full load
	$T_{avg} \geq 540°F$ $\geq$ 600 psig steam line pressure	$T_{avg} \geq 538°F$ $\geq$ 580 psig steam line pressure

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
6. AUXILIARY FEEDWATER		
a. Manual	Not Applicable	Not Applicable
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Main Steam Generator Water Level-low-low	≥ 18% of narrow range instrument span each steam generator	≥ 17% of narrow range instrument span each steam generator
d. S.I.	See 1 above (all SI Setpoints)	
e. Station Blackout	0 volts with a 5.0 second time delay	0 volts with a 5.0 ± 1.0 second time delay
f. Trip of Main Feedwater Pumps	N.A.	N.A.
g. Auxiliary Feedwater Suction Pressure-Low	≥ 2 psig (motor driven pump) ≥ 13.9 psig (turbine driven pump)	≥ 1 psig (motor driven pump) ≥ 12 psig (turbine driven pump)
h. Auxiliary Feedwater Suction Transfer Time Delays	4 seconds (motor driven pump) 5.5 seconds (turbine driven pump)	4 seconds ± 0.4 seconds (motor driven pump) 5.5 seconds ± 0.55 seconds (turbine driven pump)

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
*7. LOSS OF POWER		
a. 6.9 kv Shutdown Board Undervoltage		
Loss of Voltage		
1. Start of Diesel Generators		
a. Nominal Voltage Setpoint	4860 volts	4860 volts ±97.2 volts
b. Relay Response Time for Loss of Voltage	0 volts with a 1.5 second time delay	0 volts with a 1.5 ±0.5 second time delay
2. Load Shedding		
a. Nominal Voltage Setpoint	4860 volts	4860 volts ± 97.2 volts
b. Relay Response Time for Loss of Voltage	0 volts with a 5.0 second time delay	0 volts with a 5.0 ±1.0 second time delay
b. 6.9 kv Shutdown Board-Degraded Voltage		
1. Voltage Sensors	6560 volts	6560 volts ± 33 volts
2. Diesel Generator Start and Load Shed Timer	300 seconds	300 seconds ± 30 seconds
3. SI/Degraded Voltage Logic Enable Timer	10 seconds	10 seconds ± 0.5 seconds
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS		
a. Pressurizer Pressure Manual Block of Safety Injection P-11	≤ 1970 psig	≤ 1980 psig

*NOTE: This technical specification is to be implemented at the startup following the 2nd refueling outage or following completion of the modification, whichever is earlier.

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
c. Main Steam Generator Water Level-Low-Low	S	R	Q	1, 2, 3
d. S.I.	See 1 above (all SI surveillance requirements)			
e. Station Blackout	N.A.	R	N.A.	1, 2, 3
f. Trip of Main Feedwater Pumps	N.A.	N.A.	R	1, 2
g. Auxiliary Feedwater Suction Pressure-Low	N.A.	R	M	1, 2, 3
h. Auxiliary Feedwater Suction Transfer Time Delays	N.A.	R	N.A.	1, 2, 3
*7. LOSS OF POWER				
a. 6.9 kv Shutdown Board - Loss of Voltage				
1. Start Diesel Generators	S	R	M	1, 2, 3, 4
2. Load Shedding	S	R	N.A.	1, 2, 3, 4

*NOTE: This technical specification to be implemented at the startup following the 2nd refueling outage or following completion of the modification, whichever is earlier.

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
*b. 6.9 kv Shutdown Board - Degraded Voltage				
1. Voltage sensors	S	R	M	1, 2, 3, 4
2. Diesel Generators Start and Load Shedding Timer	N.A.	R	N.A.	1, 2, 3, 4
3. SI/Degraded Voltage Logic Timer	N.A.	R	N.A.	1, 2, 3, 4
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS				
a. Pressurizer Pressure, P-11	N.A.	R(2)	N.A.	1, 2, 3
b. T_{avg}, P-12	N.A.	R(2)	N.A.	1, 2, 3
c. Steam Generator Level, P-14	N.A.	R(2)	N.A.	1, 2
9. AUTOMATIC SWITCHOVER TO CONTAINMENT SUMP				
a. RSWT Level - Low	S	R	M	1, 2, 3, 4
COINCIDENT WITH				
Containment Sump Level - High	S	R	M	1, 2, 3, 4
AND				
Safety Injection	(See 1 above for all Safety Injection Surveillance Requirements)			
b. Automatic Actuation Logic	N.A.	N.A.	M(1)	1, 2, 3, 4

*NOTE: This technical specification to be implemented at the startup following the 2nd refueling outage or following completion of the modification, whichever is earlier.

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. 116
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 May 25, 1989, 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. 116 , 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

Jack N Donohew for
Suzanne Black, Assistant Director
for Projects
TVA Projects Division
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: November 28, 1989

ATTACHMENT TO LICENSE AMENDMENT NO. 116

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	INSERT
3/4 3-19	3/4 3-19
3/4 3-20	3/4 3-20
3/4 3-23	3/4 3-23
3/4 3-24	3/4 3-24*
3/4 3-27	3/4 3-27
3/4 3-27a	3/4 3-27a
3/4 3-37	3/4 3-37
3/4 3-38	3/4 3-38

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
COINCIDENT WITH EITHER					
T_{avg} --Low-Low				1, 2, 3	
Four Loops Operating	1 T_{avg}/loop	2 T_{avg} any loop	1 T_{avg} any 3 loops		16*
OR, COINCIDENT WITH					
Steam Line Pressure-Low				1, 2, 3	
Four Loops Operating	1 pressure/loop	2 pressures any loops	1 pressure any 3 loops		16*
5. TURBINE TRIP & FEEDWATER ISOLATION					
a. Steam Generator Water Level--High-High	3/loop	2/loop in any operating loop	2/loop in each operating loop	1, 2, 3	16*
b. Automatic Actuation Logic	2	1	2	1, 2, 3	23
6. AUXILIARY FEEDWATER					
a. Manual Initiation	2	1	2	1, 2, 3	24
b. Automatic Actuation Logic	2	1	2	1, 2, 3	23

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
c. Main Stm. Gen. Water Level-Low-Low					
i. Start Motor Driven Pumps	3/stm. gen.	2/stm. gen. any stm gen.	2/stm. gen.	1, 2, 3	16*
ii. Start Turbine-Driven Pump	3/stm. gen.	2/stm. gen. any 2 stm. gen.	2/stm. gen	1, 2, 3	16*
d. S.I. Start Motor-Driven Pumps and Turbine Driven Pump	See 1 above (all S.I. initiating functions and requirements)				
e. Station Blackout Start Motor-Driven Pump associated with the shutdown board and Turbine Driven Pump	2/shutdown board	1/shutdown board	2/shutdown board	1, 2, 3	20
f. Trip of Main Feedwater Pumps Start Motor-Driven Pumps and Turbine Driven Pump	1/pump	1/pump	1/pump	1, 2	20*
g. Auxiliary Feedwater Suction Pressure-Low	3/pump	2/pump	3/pump	1, 2, 3	21*
h. Auxiliary Feedwater Suction Transfer Time Delays					
1. Motor-Driven Pump	1/pump	1/pump	1/pump	1, 2, 3	21*
2. Turbine-Driven Pump	2/pump	1/pump	2/pump	1, 2, 3	21*

ACTION 21 - With less than the Minimum Number of Channels OPERABLE, declare the associated auxiliary feedwater pump inoperable, and comply with the ACTION requirements of Specification 3.7.1.2.

ACTION 22 With less than the Minimum Number of Channels OPERABLE, declare the interlock inoperable and verify that all affected channels of the functions listed below are OPERABLE or apply the appropriate ACTION statement(s) for those functions. Functions to be evaluated are:

a. Safety Injection
   Pressurizer Pressure

b. Safety Injection
   High Steam Line Flow
   Steam Line Isolation
   High Steam Line Flow
   Steam Dump

c. Turbine Trip
   Steam Generator Level High-High
   Feedwater Isolation
   Steam Generator Level High-High

ACTION 23 - With the number of OPERABLE channels one less than the Total Number of Channels, be in at least HOT STANDBY within 6 hours and in at least HOT SHUTDOWN within the following 6 hours; however, one channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3.2.1.1.

ACTION 24 - With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within 6 hours and in at least HOT SHUTDOWN within the following 6 hours.

ACTION 25 - With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or declare the associated valve inoperable and take the ACTION required by Specification 3.7.1.5.

TABLE 3.3-4

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
1. SAFETY INJECTION, TURBINE TRIP AND FEEDWATER ISOLATION		
a. Manual Initiation	Not Applicable	Not Applicable
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Containment Pressure--High	$\leq$1.54 psig	$\leq$1.7 psig
d. Pressurizer Pressure--Low	$\geq$1870 psig	$\geq$1860 psig
e. Differential Pressure Between Steam Lines--High	$\leq$100 psi	$\leq$112 psi
f. Steam Flow in Two Steam Lines--High Coincident with T_{avg}--Low-Low or Steam Line Pressure--Low	$\leq$A function defined as follows: A Δp corresponding to 40% of full steam flow between 0% and 20% load and then a Δp increasing linearly to a Δp corresponding to 110% of full steam flow at full load	$\leq$A function defined as follows: A Δp corresponding to 44% of full steam flow between 0% and 20% load and then a Δp increasing linearly to a Δp corresponding to 111.5% of full steam flow at full load
	T_{avg} $\geq$540°F $\geq$600 psig steam line pressure	T_{avg} $\geq$538°F $\geq$580 psig steam line pressure

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
6. AUXILIARY FEEDWATER		
a. Manual	Not Applicable	Not Applicable
b. Automatic Actuation Logic	Not Applicable	Not Applicable
c. Main Steam Generator Water Level-low-low	≥18% of narrow range instrument span each steam generator	≥17% of narrow range instrument span each steam generator
d. S.I.	See 1 above (all SI Setpoints)	
e. Station Blackout	0 volts with a 5.0 second time delay	0 volts with a 5.0 ± 1.0 second time delay
f. Trip of Main Feedwater Pumps	N.A.	N.A.
g. Auxiliary Feedwater Suction Pressure-Low	≥ 2 psig (motor driven pump) ≥ 13.9 psig (turbine driven (pump)	≥ 1 psig (motor driven pump) ≥ 12 (turbine driven pump)
h. Auxiliary Feedwater Suction Transfer Time Delays	4 seconds (motor driven pump)	4 seconds ±0.4 seconds (motor driven pump)
	5.5 seconds (turbine driven pump)	5.5 seconds ±0.55 seconds (turbine driven pump)

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
*7. LOSS OF POWER		
a. 6.9 kv Shutdown Board Undervoltage Loss of Voltage		
1. Start of Diesel Generators		
a. Nominal Voltage Setpoint	4860 volts	4860 volts ±97.2 volts
b. Relay Response Time for Loss of Voltage	0 volts with a 1.5 second time delay	0 volts with a 1.5 ±0.5 second time delay
2. Load Shedding		
a. Nominal Voltage Setpoint	4860 volts	4860 volts ±97.2 volts
b. Relay Response Time for Loss of Voltage	0 volts with a 5.0 second time delay	0 volts with a 5.0 ±1.0 second time delay
b. 6.9 kv Shutdown Board-Degraded Voltage		
1. Voltage Sensors	6560 volts	6560 volts ± 33 volts
2. Diesel Generator Start and Load Shed Timer	300 seconds	300 seconds ± 30 seconds
3. SI/Degraded Voltage Logic Enable Timer	10 seconds	10 seconds ± 0.5 seconds
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS		
a. Pressurizer Pressure Manual Block of Safety Injection P-11	≤1970 psig	≤1980 psig

*NOTE: This technical specification is to be implemented during the startup following the 1st refueling outage.

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
c. Main Steam Generator Water Level-Low-Low	S	R	Q	1, 2, 3
d. S.I.	See 1 above (all SI surveillance requirements)			
e. Station Blackout	N.A.	R	N.A.	1, 2, 3
f. Trip of Main Feedwater Pumps	N.A.	N.A.	R	1, 2
g. Auxiliary Feedwater Suction Pressure-Low	N.A.	R	M	1, 2, 3
h. Auxiliary Feedwater Suction Transfer Time Delays	N.A.	R	N.A.	1, 2, 3
*7. LOSS OF POWER				
a. 6.9 kv Shutdown Board - Loss of Voltage				
1. Start Diesel Generators	S	R	M	1, 2, 3, 4
2. Load Shedding	S	R	N.A.	1, 2, 3, 4

*NOTE: This technical specification is to be implemented during the startup following the 1st refueling outage.

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
*b. 6.9 kv Shutdown Board - Degraded Voltage				
1. Voltage sensors	S	R	M	1, 2, 3, 4
2. Diesel Generators Start and Load Shedding Timer	N.A.	R	N.A.	1, 2, 3, 4
3. SI/Degraded Voltage Logic Timer	N.A.	R	N.A.	1, 2, 3, 4
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS				
a. Pressurizer Pressure, P-11	N.A.	R(2)	N.A.	1, 2, 3
b. T_{avg}, P-12	N.A	R(2)	N.A.	1, 2, 3
c. Steam Generator Level, P-14	N.A.	R(2)	N.A.	1, 2
9. AUTOMATIC SWITCHOVER TO CONTAINMENT SUMP				
a. RSWT Level - Low	S	R	M	1, 2, 3, 4
COINCIDENT WITH Containment Sump Level - High	S	R	M	1, 2, 3, 4
AND Safety Injection	(See 1 above for all Safety Injection Surveillance Requirements)			
b. Automatic Actuation Logic	N.A.	N.A.	M(1)	1, 2, 3, 4

*Note: This technical specification is to be implemented during the startup following the 1st refueling outage.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 129 TO FACILITY OPERATING LICENSE NO. DPR-77

AND AMENDMENT NO. 116 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 May 25, 1989, the Tennessee Valley Authority (TVA) proposed to modify the Sequoyah Nuclear Plant (SQN), Units 1 and 2, Technical Specifications (TSs). The proposed changes would revise Tables 3.3-3, "Engineered Safety Feature Actuation System Instrumentation", 3.3-4, "Engineered Safety Feature Actuation System Instrumentation Trip Setpoints", and 4.3-2, "Engineered Safety Feature Actuation System Instrumentation Surveillance Requirements." The proposed changes would add requirements for the logic time delays associated with the motor-driven and turbine-driven auxiliary feedwater (AFW) pump automatic suction transfer. Specifically, the following changes are proposed: (1) a "Functional Unit" 6.h is added to each of the above tables to include requirements for the AFW pump suction transfer time delays, (2) the current wording of Table 3.3-3, Action 21, is replaced with a new action appropriate for the AFW pump suction transfer pressure switches and time delays, and (3) the "Action" and "Minimum Channels Operable" columns for Table 3.3-3, Item 6.g, are revised to reflect the new Action 21 described above. In addition, the wording of Table 4.3-2, "Functional Unit," Item 6.g, is revised to correct an inadvertent omission from a previous license amendment.

In its letter dated December 30, 1988, the staff approved amendments to the TSs which increased, in the conservative direction, the AFW pump suction pressure-low trip setpoint and the allowable value of Table 3.3-4, Item 6.g, for both units for the turbine-driven AFW pump. In the letter, the staff discussed the appropriateness of including the time delay circuitry in the switchover logic that transfers the pump suction from the condensate storage tank to the Emergency Raw Cooling Water (ERCW) System. Currently, there is no mention of this time delay feature in the TSs even though it is an integral part of the actuation sequence for the AFW pump switchover to the ERCW system. The staff's interpretation of the NRC policy statement on technical specification content (as published in the February 6, 1987 edition of the Federal Register) was that the time delay circuitry does meet the policy statement criteria and should be included in TSs. In its letter dated November 23, 1988, TVA committed to submit these additional TSs by June 1, 1989.

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This was acceptable to the staff. In the interim, the staff expected TVA to maintain assurance, through periodic testing, that the time delay circuitry complies with the analytical results (4.0 seconds for the motor-driven AFW pumps and 5.5 seconds for the turbine-driven AFW pumps) contained in TVA's letter dated November 17, 1987.

The application dated May 25, 1989, fulfills TVA's commitment to propose, to be included in the TSs, the time delay values for the time delay circuitry in the switchover logic for the AFW pumps.

2.0 EVALUATION

As described in SQN Final Safety Analysis Report (FSAR), Section 10.4.7.2, the AFW system supplies feedwater to the steam generators to remove primary system stored and residual core energy in the event of a loss of the main feedwater supply. The two units have separate AFW systems composed of two motor-driven pumps (440 gpm) and one turbine-driven pump (880 gpm). Each of the two motor-driven pumps serves two steam generators and the single turbine-driven pump serves all four steam generators. The preferred source of water for the AFW pumps is the two non-seismic condensate storage tanks (CSTs). A train of ERCW is also available to each motor-driven AFW pump as a seismic and unlimited backup water supply. The turbine-driven AFW pump has both trains of ERCW available as a backup water supply.

Assuming the worst single active failure, the AFW pumps can be supplied indefinitely from the ERCW system. Because the ERCW (i.e. Tennessee river water) is poor quality water, it is not used except in emergencies when the water in the CST is not available.

As explained in the submittal for TS change 87-40 dated November 17, 1987, TVA evaluated the pressure switch setpoints and the logic time delays for the AFW pump suction switchover in an engineering calculation entitled "Auxiliary Feedwater System Pressure Switch Setpoints" (provided in enclosure 2 of the TS 87-40 submittal). The calculation was to ensure that adequate net positive suction head (NPSH) for the AFW pumps was maintained during the pump suction transfer sequence.

TVA stated that, for the motor-driven AFW pumps, the combination of a 4-second time delay and an analytical pressure switch setpoint limit of 0.0 pounds per square inch gage (psig) was shown to ensure adequate NPSH. Similarly for the turbine-driven pump, the combination of a 5.5-second time delay (for each timer) and an analytical pressure switch setpoint limit of 10.93 psig was shown to ensure adequate NPSH. These time delays were accepted by the NRC in the safety evaluation dated December 30, 1988 which approved TS change 87-40. Therefore, TVA is proposing to add the 4.0 and 5.5-second values to Table 3.3-4 as the trip setpoint values for the motor-driven and turbine-driven AFW pumps, respectively.

TVA applied a 10 percent tolerance to the trip setpoints to obtain the allowable values for Table 3.3-4 to ensure adequate NPSH for the AFW pumps. Any negative tolerance is acceptable from a safety standpoint because this would initiate suction transfer earlier. TVA stated that the positive tolerance was acceptable by quantifying the conservatism in the calculated available NPSH for the pumps.

TVA stated that the available NPSH for the motor-driven pumps is calculated assuming a water level in the supply header that would not be reached until 7.9 seconds. Therefore, over 3 seconds of margin exists for the motor-driven AFW pump time delay of 4.0 seconds. Similarly, the available NPSH for the turbine-driven AFW pump was calculated by TVA assuming a water level that would not be reached until 15.8 seconds. Therefore, over 4 seconds of margin exists for the turbine-driven AFW pump time delay of 5.5 seconds when accounting for the two timers in series. The turbine-driven AFW pump has two timers because this pump can be switched to either of the two trains in the ERCW system: one timer is for the transfer to one of the two trains. The timers operate in sequence to assure that the turbine-driven AFW pump is transferred to one of the ERCW trains. The Sequoyah AFW system will provide the required flow of 440 gpm to at least two steam generators regardless of any single failure.

Based on the NRC letter dated December 30, 1988 and the NPSH calculations made by TVA, the staff concludes that the proposed changes adding the AFW pump suction transfer trip setpoints to Table 3.3-4 are acceptable.

The proposed changes to Table 3.3-3 and 4.3-2 are made for completeness of the TS requirements on the logic time delays. The engineered safety feature actuation system instrumentation (ESFASI) trip setpoints given in Table 3.3-4 are for the ESFASI given in Table 3.3-3 and Table 4.3-2. Table 3.3-3 lists the required number of ESFASI channels and the actions to be taken if any are inoperable and Table 4.3-2 lists the surveillance requirements on these channels.

TVA stated that the proposed entries in Table 3.3-3 reflect that there is one timer for each motor-driven pump and two timers for the turbine-driven pump. The "Applicable Modes" are consistent with the suction pressure switches of Item 6.g. The additions to Table 4.3-2 are consistent with surveillance intervals for other timers of similar quality in the TSs. Again, modes in which the surveillance is required are consistent with Item 6.g.

The proposed changes to Tables 3.3-3 and 4.3-2, except for the proposed action statement for Table 3.3-3, are consistent with the NRC Standard Technical Specifications for Westinghouse Pressurized Water Reactors (WSTS), Revision 4a, which are applicable to Sequoyah. The proposed changes reflect the equipment in the plant and are consistent with the Sequoyah TS for similar equipment. The proposed minimum number of channels required to be operable is the total number of channels. Therefore, the staff concludes that these changes are acceptable.

TVA is proposing to replace Action 21 for Table 3.3-3 by an action to provide an appropriate response to the inoperability of an AFW pump suction transfer pressure switch or logic timer. The inoperability of just one pressure switch or logic timer requires the licensee to enter the proposed action statement. Currently, the TSs require that an inoperable AFW suction transfer pressure switch be returned to operable status within 48 hours or a plant shutdown must be initiated. This is the current Action 20 of

Table 3.3-3. TVA states that the inoperability of a given pressure switch or logic timer affects only its associated AFW pump, not the entire AFW system. TVA concluded that the inoperability of a piece of equipment that is attendant to one AFW pump does not warrant a forced shutdown of the plant. TVA states that it is more prudent to declare the affected AFW pump inoperable and comply with the associated actions of Specification 3.7.1.2. This type of action is consistent with Table 3.3-3, Action 25, for the main steam line isolation valves; Table 3.3-6, Action 27, for reactor coolant system leakage detection; and Table 3.3-6, Action 28, for the containment purge isolation system.

There is no instrumentation listed in Table 3.3-3 that uses Action 21. Therefore, replacing the existing Action 21 by an action statement for inoperable AFW pump suction transfer instrumentation is acceptable. The proposed action statement requires that with less than the minimum number of instrumentation channels operable, the associated AFW pump is declared inoperable and the requirements of Specification 3.7.1.2, Auxiliary Feedwater Systems, are followed. The action to be taken for Specification 3.7.1.2 when any of the three AFW pumps and associated flow paths are inoperable should apply if the instrumentation channels for switchover is the reason that the AFW pump is inoperable. Therefore, the staff concludes that the proposed action statement for Table 3.3-3 is acceptable.

The remaining proposed changes are administrative in nature. The first two revise the action and minimum channels operable of Table 3.3-3, Item 6.g, AFW suction pressure-low, to implement the new action statement discussed above. The new action statement applies to this item. The other corrects an inadvertent omission made in an earlier license amendment. License amendments 29 (Unit 1) and 18 (Unit 2) dated May 3, 1983 incorrectly deleted "Pressure-Low" from the description of Item 6.g in Table 4.3-2. The phrase "Pressure-Low" is in the description of Item 6.g in Tables 3.3-3 and 3.3-4. Therefore, the staff concludes that these administrative changes to Tables 3.3-3 and 4.3-2 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 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.

4.0 CONCLUSION

The Commission made a proposed determination that the amendment involves no significant hazards consideration which was published in the Federal Register (54 FR 32717) on August 9, 1989, 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, 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: J. Donohew

Dated: November 28, 1989