ENCLOSURE 1

PROPOSED TECHNICAL SPECIFICATION CHANGE

SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

(TVA-SQN-TS-93-09)

LIST OF AFFECTED PAGES

Unit 1

3/4 3-20
3/4 3-21
3/4 3-22
3/4 3-23
3/4 3-23a
3/4 3-27a
3/4 3-27b
3/4 3-32
3/4 3-33a
3/4 3-37
3/4 3-37a
3/4 3-38
B 3/4 7-2a

Unit 2

3/4 3-20
3/4 3-21
3/4 3-22
3/4 3-23
3/4 3-23a
3/4 3-27a
3/4 3-27b
3/4 3-32
3/4 3-33a
3/4 3-37
3/4 3-38
3/4 3-39
B 3/4 7-2a

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. Loss Of Power 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*
1. Voltage Sensors	3/Shutdown Board**	2/Shutdown Board**	3/Shutdown Board**	1, 2, 3	35
2. Load Shed Timer	2/Shutdown Board**	1/Shutdown Board**	2/Shutdown Board**	1, 2, 3	35

** Unit 1 Shutdown Boards Only

R133

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						R145
a. 6.9 kv Shutdown Board ~~Loss of Voltage~~ VOLTAGE SENSORS		2/SHUTDOWN BOARD				
1. ~~Start Diesel Generators~~	3 ~~2~~/shutdown board	~~1 loss of voltage on any shutdown board~~	3 ~~2~~/shutdown board	1, 2, 3, 4, 5****, 6****	34 ~~35*~~	R164
DIESEL GENERATOR START AND LOAD SHED TIMER						
2. ~~Load Shedding~~	2/shutdown board	1/shutdown board	2 ~~2~~/shutdown board	1, 2, 3, 4, 5****, 6****	34 ~~35*~~	R164
b. 6.9 kv Shutdown Board Degraded Voltage						
1. Voltage Sensors	3/shutdown board	2/shutdown board	3 ~~2~~/shutdown board	1, 2, 3, 4, 5****, 6****	34 ~~35*~~	R164
2. Diesel Generator Start and Load Shed~~ding~~ Timer	2/shutdown board	1/shutdown board	2 ~~1~~/shutdown board	1, 2, 3, 4, 5****, 6****	34 ~~35*~~	R164
3. SI/Degraded Voltage Enable Timer ← LOGIC	2/shutdown board	1/shutdown board	2 ~~1~~/shutdown board	1, 2, 3, 4	34 ~~35*~~	R164
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS						
a. Pressurizer Pressure - P-11/Not P-11	3	2	2	1, 2, 3	22a	R145
b. Deleted						
c. Steam Generator Level P-14	3/loop	2/loop any loop	3/loop	1, 2	22c	R145

TABLE 3.3-3 (Continued)

TABLE NOTATION

Trip function may be bypassed in this MODE below P-11 (Pressurizer Pressure Block of Safety Injection) setpoint.

Trip function automatically blocked above P-11 and may be blocked below when Safety Injection on Steam Line Pressure-Low is not blocked. R145

The channel(s) associated with the protective functions derived from the out of service Reactor Coolant Loop shall be placed in the tripped mode.

* The provisions of Specification 3.0.4 are not applicable.

WHEN ASSOCIATED DIESEL GENERATOR IS REQUIRED TO BE OPERABLE BY LCO 3.8.1.2, "AC SOURCES - SHUTDOWN". THE PROVISIONS OF SPECIFICATION 3.0.4 ARE NOT APPLICABLE.

ACTION STATEMENTS

ACTION 15 - With the number of OPERABLE Channels one less than the Total Number of Channels, be in at least HOT STANDBY within 12 hours and in COLD SHUTDOWN within the following 30 hours; however, one channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.2.1.1 provided the other channel is OPERABLE. R145

ACTION 16 - Deleted.

ACTION 17 - With the number of OPERABLE Channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied: R145

a. The inoperable channel is placed in the tripped condition within 6 hours.

b. The Minimum Channels OPERABLE requirements is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.2.1.1.

ACTION 18 - With the number of OPERABLE Channels one less than the Total Number of Channels, operation may proceed provided the inoperable channel is placed in the bypassed condition and the Minimum Channels OPERABLE requirement is met; one additional channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.2.1.1. R145

ACTION 19 - With less than the Minimum Channels OPERABLE, operation may continue provided the containment purge supply and exhaust valves are maintained closed. R17

ACTION 20 - 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 the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

TABLE 3.3-3 (Continued)

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
   Steam Line Pressure
   Negative Steam Line Pressure Rate

b. Deleted

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

R145

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 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.

ACTION 34 - a. With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within ~~48~~ 6 hours or ~~be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.~~

INSERT A →

b. With the number of OPERABLE channels less than the Total Number of Channels by more than one, ~~declare the associated 6,900-volt shutdown board inoperable, and comply with the action requirements of Specification 3.8.2.1 or 3.8.2.2 as applicable.~~

INSERT B →

R16

REPLACE WITH INSERT C

TABLE 3.3-3 (Continued)

~~ACTION 35 - With the number of OPERABLE channels less than the Total Number of Channels by one or more, declare the associated diesel generator set inoperable, and comply with the action requirements of Specification 3.8.1.1 or 3.8.1.2 as applicable.~~ R164

ACTION 36 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours.

b. For the affected protection set, the Trip Time Delay for one affected steam generator (T_S) is adjusted to match the Trip Time Delay for multiple affected steam generators (T_M) within 4 hours.

c. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.2.1.1.

R145

ACTION 37 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided that within 6 hours, for the affected protection set, the Trip Time Delays (T_S and T_M) threshold power level for zero seconds time delay is adjusted to 0% RTP.

ACTION 38 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided that within 6 hours, for the affected protection set, the Steam Generator Water Level - Low-Low (EAM) channels trip setpoint is adjusted to the same value as Steam Generator Water Level - Low-Low (Adverse).

INSERTS FOR TS TABLE 3.3-3
ACTIONS 34 AND 35

Insert A: enter applicable Limiting Condition(s) For Operation and Action(s) for the associated diesel generator set made inoperable by the channel.

Insert B: restore all but one channel to OPERABLE status within 1 hour or enter applicable Limiting Condition(s) For Operation and Action(s) for the associated diesel generator set made inoperable by the channels.

Insert C: Action 35 - a. With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 6 hours or enter applicable Limiting Condition(s) For Operation and Action(s) for the associated auxiliary feedwater pump made inoperable by the channel.

b. With the number of OPERABLE channels less than the Total Number of Channels by more than one, restore all but one channel to OPERABLE status within 1 hour or enter applicable Limiting Condition(s) For Operation and Action(s) for the associated auxiliary feedwater pump made inoperable by the channel.

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES	
ii. RCS Loop ΔT Equivalent to Power > 50% RTP			R145
Coincident with Steam Generator Water Level--Low-Low (Adverse)	>15.0% of narrow range instrument span	≥14.4% of narrow range instrument span	R155
and			R145
Containment Pressure (EAM)	≤0.5 psig	≤0.6 psig	
or			
Steam Generator Water Level--Low-Low (EAM)	>10.7% of narrow range instrument span	>10.1% of narrow range instrument span	R155
d. S.I.	See 1 above (all SI Setpoints)		
e. ~~Station Blackout~~ LOSS OF POWER START	~~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)	4 seconds ±0.4 seconds (motor driven pump)	
	5.5 seconds (turbine driven pump)	5.5 seconds ±0.55 seconds (turbine driven pump)	
1. VOLTAGE SENSORS	≥ 5520 VOLTS	≥ 5472 VOLTS	
2. LOAD SHED TIMER	1.25 SECONDS	1.25 ± 0.09 SECONDS	

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~~ VOLTAGE SENSORS	≥5520 VOLTS	≥ 5472 VOLTS
~~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~~ DIESEL GENERATOR START AND LOAD SHED TIMER	1.25 SECONDS	1.25 ± 0.09 SECONDS
~~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	6456 ~~6560~~ volts	≥6403.5 (DROPOUT) ~~6560~~ volts ~~± 33 volts~~ ≤6626.5 VOLTS (RESET)
2. Diesel Generator Start and Load Shed Timer	≤300 seconds	≤321 ~~300~~ seconds ~~± 30 seconds~~
3. SI/Degraded Voltage Logic Enable Timer	10 seconds	10 seconds ± 0.8 .75 seconds
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS		
a. Pressurizer Pressure		
1. Not P-11, Automatic Unblock of Safety Injection on Increasing Pressure	≤ 1970 psig	≤ 1975.2 psig
2. P-11, Enable Manual Block of Safety Injection on Decreasing Pressure	≥ 1962 psig	≥ 1956.8 psig

R145

R145

Amendment No. 33, 129, 141

MAY 16 1990

TABLE 3.3-5 (Continued)

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INITIATING SIGNAL AND FUNCTION	RESPONSE TIME IN SECONDS	
10. Loss Of Power Start ~~Station Blackout~~		
a. Auxiliary Feedwater Pumps	$\leq 60^{(11)}$	R81
11. Trip of Main Feedwater Pumps		
a. Auxiliary Feedwater Pumps	$\leq 60^{(11)}$	R81
12. Loss of Power		
a. 6.9 kv Shutdown Board - Degraded Voltage or Loss of Voltage	$\leq 10^{(10)}$	R81
13. RWST Level-Low Coincident with Containment Sump Level-High and Safety Injection		
a. Automatic Switchover to Containment Sump	≤ 250	
14. Containment Purge Air Exhaust Radioactivity - High		
a. Containment Ventilation Isolation	$\leq 10^{(6)}$	R172

TABLE 3.3-5 (Continued)

TABLE NOTATION

(7) Diesel generator starting and sequence loading delays not included. Offsite power available. Response time limit includes opening and closing of valves to establish SI path and attainment of discharge pressure for centrifugal charging pumps. R59

(8) Diesel generator starting and sequence loading delays not included. Response time limit includes operating time of valves.

(9) Diesel generator starting and sequence loading delays included. Response time limit includes operating time of valves.

(10) The response time for loss of voltage is measured from the time ~~voltage is lost~~ until the time full voltage is restored by the diesel. The response time for degraded voltage is measured from the time the load shedding signal is generated, either from the degraded voltage or the SI enable timer, to the time full voltage is restored by the diesel. The response time of the timers is covered by the requirements on their setpoints.

(11) The provisions of Specification 4.0.4 are not applicable for entry into MODE 3 for the turbine-driven Auxiliary Feedwater Pump.

(12) The following valves are exceptions to the response times shown in the Table and will have the values listed in seconds for the initiating signals and the function indicated:

Valves: FCV-67-89, -90, -105, -106
Response times: 7.b, $75^{(8)}/85^{(9)}$

Valve: FCV-70-141
Response times: 7.b, $70^{(8)}/80^{(9)}$

(13) Containment purge valves only. Containment radiation monitor valves have a response time of 6.5 seconds or less.

(14) Does not include Trip Time Delays. Response times noted include the transmitters, Eagle-21 process protection cabinets, solid state protection cabinets, and actuation devices (up to and including pumps). This reflects the response times necessary for THERMAL POWER in excess of 50% RTP. R145

THE LOAD SHEDDING AND DIESEL GENERATOR START SIGNAL IS GENERATED FROM THE LOSS OF VOLTAGE TIMER

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				
1. Steam Generator Water Level -- Low-Low (Adverse)	S	R	Q	1, 2, 3
2. Steam Generator Water Level -- Low-Low (EAM)	S	R	Q	1, 2, 3
3. RCS Loop ΔT	S	R	Q	1, 2, 3
4. Containment Pressure (EAM)	S	R	Q	1, 2, 3
d. S.I.	See 1 above (all SI surveillance requirements)			
e. ~~Station Blackout~~ LOSS OF POWER START (INSERT D →)	~~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~~ VOLTAGE SENSORS				
1. ~~Start Diesel Generators~~	& N.A.	R	M	1, 2, 3, 4, 5#, 6#
2. ~~Load Shedding~~ DIESEL GENERATOR START AND LOAD SHED TIMER	& N.A.	R	N.A.	1, 2, 3, 4, 5#, 6#

R145

R145

R145

Amendment No. 29, 129, 141
MAY 16 1990

INSERT FOR TABLE 4.3-2
ITEM 6.e

Insert D:	1.	Voltage Sensors	N.A.	R	M	1, 2, 3
	2.	Load Shed Timer	N.A.	R	N.A.	1, 2, 3

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					R145
1. Voltage sensors	~~S~~ N.A.	R	M	1, 2, 3, 4, 5*, 6*	
2. Diesel Generators Start and Load Shedding Timer	N.A.	R	N.A.	1, 2, 3, 4, 5*, 6*	
3. SI/Degraded Voltage Logic/Timer ENABLE	N.A.	R	N.A.	1, 2, 3, 4	
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS					
a. Pressurizer Pressure, P-11/Not P-11	N.A.	R(2)	N.A.	1, 2, 3	R145
b. Deleted					
c. Steam Generator Level, P-14	N.A.	R(2)	N.A.	1, 2	
9. AUTOMATIC SWITCHOVER TO CONTAINMENT SUMP					
a. RSWT Level - Low COINCIDENT WITH Containment Sump Level - High AND Safety Injection	S S	R R	Q Q	1, 2, 3, 4 1, 2, 3, 4	R145
	(See 1 above for all Safety Injection Surveillance Requirements)				
b. Automatic Actuation Logic	N.A.	N.A.	M(1)	1, 2, 3, 4	R145

MAY 16 1990

TABLE 4.3-2 (Continued)

TABLE NOTATION

(1) Each train or logic channel shall be tested at least every 62 days on a STAGGERED TEST BASIS.

(2) The total interlock function shall be demonstrated OPERABLE during CHANNEL CALIBRATION testing of each channel affected by interlock operation. R51

WHEN ASSOCIATED DIESEL GENERATOR IS REQUIRED TO BE OPERABLE BY LCO 3.8.1.2, "AC SOURCES - SHUTDOWN".

because of a main steam line or feedwater line break and a single failure of the B-train motor driven AFW pump. The two redundant sources must be aligned such that No. 1 steam generator source is open and operable and the No. 4 steam generator source is closed and operable.

For instances where one train of emergency raw cooling water (ERCW) is declared inoperable in accordance with technical specifications, the AFW turbine-driven pump is considered operable since it is supplied by both trains of ERCW. This position is consistent with American National Standards Institute/ANS 58.9 requirements (i.e., postulation of the failure of the opposite train is not required while relying on the TS limiting condition for operation). R159

3/4.7.1.3 CONDENSATE STORAGE TANK

The OPERABILITY of the condensate storage tank with the minimum water volume ensures that sufficient water is available to maintain the RCS at HOT STANDBY conditions for 2 hours with steam discharge to the atmosphere concurrent with total loss of off-site power. The contained water volume limit includes an allowance for water not useable because of tank discharge line location or other physical characteristics.

SIMILARLY, THE AFW TURBINE-DRIVEN PUMP IS CONSIDERED OPERABLE WHEN ONE TRAIN OF THE AFW LOSS OF POWER START FUNCTION IS DECLARED INOPERABLE IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS BECAUSE BOTH 6.9 KILOVOLT SHUTDOWN BOARD LOGIC TRAINS SUPPLY THIS FUNCTION.

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. Loss of Power ~~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*
1. VOLTAGE SENSORS	3/SHUTDOWN BOARD **	2/SHUTDOWN BOARD **	3/SHUTDOWN BOARD **	1, 2, 3	35
2. LOAD SHED TIMER	2/SHUTDOWN BOARD **	1/SHUTDOWN BOARD **	2/SHUTDOWN BOARD **	1, 2, 3	35

** UNIT 2 SHUTDOWN BOARDS ONLY

R116

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						R132
a. 6.9 kv Shutdown Board -Loss of Voltage						R18
1. ~~Start Diesel Generators~~ VOLTAGE SENSORS	3 ~~2~~/shutdown board	2/SHUTDOWN BOARD ~~1 loss of voltage on any shutdown board~~	3 ~~2~~/shutdown board	1, 2, 3, 4, 5####, 6####	34 ~~38#~~	R150
2. ~~And~~ Load Shed~~ding~~ DIESEL GENERATOR START AND TIMER	2/shutdown board	1/shutdown board	2 ~~2~~/shutdown board	1, 2, 3, 4, 5####, 6####	34	R150
b. 6.9 kv Shutdown Board Degraded Voltage						R18
1. Voltage Sensors	3/shutdown board	2/shutdown board	3 ~~2~~/shutdown board	1, 2, 3, 4, 5####, 6####	34	R150
2. Diesel Generator Start and Load Shed~~ding~~ Timer	2/shutdown board	1/shutdown board	2 ~~1~~/shutdown board	1, 2, 3, 4, 5####, 6####	34	R150
3. SI/Degraded Voltage Enable Timer (LOGIC)	2/shutdown board	1/shutdown board	2 ~~1~~/shutdown board	1, 2, 3, 4	34	R150
						R132

TABLE NOTATION

Trip function may be bypassed in this MODE below P-11 (Pressurizer Pressure Block of Safety Injection) setpoint.
Trip function automatically blocked above P-11 and may be blocked below P-11 when Safety Injection on Steam Line Pressure-Low is not blocked. R132
The channel(s) associated with the protective functions derived from the out of service Reactor Coolant Loop shall be placed in the tripped mode.
~~The provisions of Specification 3.0.4 are not applicable.~~
WHEN ASSOCIATED DIESEL GENERATOR IS REQUIRED TO BE OPERABLE BY LCO 3.8.1.2, "AC SOURCES - SHUTDOWN". THE PROVISIONS OF SPECIFICATION 3.0.4 ARE NOT APPLICABLE.

ACTION STATEMENTS

ACTION 15 - With the number of OPERABLE Channels one less than the Total Number of Channels, be in HOT STANDBY within 12 hours and in COLD SHUTDOWN within the following 30 hours; however, one channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.2.1.1 provided the other channel is OPERABLE. R132 R132

ACTION 16 - Deleted. R132

ACTION 17 - With the number of OPERABLE Channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours.

b. The Minimum Channels OPERABLE requirements is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.2.1.1.

ACTION 18 - With the number of OPERABLE Channels one less than the Total Number of Channels, operation may proceed provided the inoperable channel is placed in the bypassed condition and the Minimum Channels OPERABLE requirement is met; one additional channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.2.1.1. R132

ACTION 19 - With less than the Minimum Channels OPERABLE, operation may continue provided the containment purge supply and exhaust valves are maintained closed. R158

ACTION 20 - 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 the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

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
   Steam Line Pressure
   Negative Steam Line Pressure Rate

b. Deleted

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. R55

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.

ACTION 34 - a. 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 the next 6 hours and in COLD SHUTDOWN within the following 30 hours.~~

INSERT A →

b. With the number of OPERABLE channels less than the Total Number of Channels by more than one, ~~declare the associated 6,900-volt shutdown board inoperable, and comply with the action requirements of Specification 3.8.2.1 or 3.8.2.2 as applicable.~~ R15

INSERT B →

REPLACE WITH INSERT C ↓

~~ACTION 35 - With the number of OPERABLE channels less than the Total Number of Channels by one or more, declare the associated diesel generator set inoperable, and comply with the action requirements of Specification 3.8.1.1 or 3.8.1.2 as applicable.~~ R150

ACTION 36 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours.

b. For the affected protection set, the Trip Time Delay for one affected steam generator (T_S) is adjusted to match the Trip Time Delay for multiple affected steam generators (T_M) within 4 hours.

c. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1.1. R132

ACTION 37 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided that within 6 hours, for the affected protection set, the Trip Time Delays (T_S and T_M) threshold power level for zero seconds time delay is adjusted to 0% RTP.

ACTION 38 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided that within 6 hours, for the affected protection set, the Steam Generator Water Level - Low-Low (EAM) channels trip setpoint is adjusted to the same value as Steam Generator Water Level - Low-Low (Adverse).

INSERTS FOR TS TABLE 3.3-3
ACTIONS 34 AND 35

Insert A: enter applicable Limiting Condition(s) For Operation and Action(s) for the associated diesel generator set made inoperable by the channel.

Insert B: restore all but one channel to OPERABLE status within 1 hour or enter applicable Limiting Condition(s) For Operation and Action(s) for the associated diesel generator set made inoperable by the channels.

Insert C: Action 35 - a. With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 6 hours or enter applicable Limiting Condition(s) For Operation and Action(s) for the associated auxiliary feedwater pump made inoperable by the channel.

b. With the number of OPERABLE channels less than the Total Number of Channels by more than one, restore all but one channel to OPERABLE status within 1 hour or enter applicable Limiting Condition(s) For Operation and Action(s) for the associated auxiliary feedwater pump made inoperable by the channel.

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES	
ii. RCS Loop ΔT Equivalent to Power > 50% RTP			
Coincident with Steam Generator Water Level--Low-Low (Adverse)	>15.0% of narrow range instrument span	≥14.4% of narrow range instrument span	R132
and			
Containment Pressure (EAM)	≤0.5 psig	≤0.6 psig	R132
or			
Steam Generator Water Level--Low-Low (EAM)	>10.7% of narrow range instrument span	>10.1% of narrow range instrument span	R132
d. S.I.	See 1 above (all SI Setpoints)		
e. ~~Station Blackout~~ LOSS OF POWER START	~~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 (pump turbine driven)	R84
h. Auxiliary Feedwater Suction Transfer Time Delays	4 seconds (motor driven pump)	4 seconds ±0.4 seconds (motor driven pump)	R116
	5.5 seconds (turbine driven pump)	5.5 seconds ±0.55 seconds (turbine driven pump)	R116
1. VOLTAGE SENSORS	≥ 5520 VOLTS	≥ 5472 VOLTS	
2. LOAD SHED TIMER	1.25 SECONDS	1.25 ± 0.09 SECONDS	

TABLE 3.3-4 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES	
7. LOSS OF POWER			R132
a. 6.9 kv Shutdown Board Undervoltage Loss of Voltage ~~Loss of Voltage~~			
1. ~~Start of Diesel Generators~~ VOLTAGE SENSORS	≥ 5520 VOLTS ~~4860 volts~~	≥ 5472 VOLTS ~~4860 volts ±97.2 volts~~	R18
~~a. Nominal Voltage Setpoint~~	~~0 volts with a 1.5 second time delay~~	~~0 volts with a 1.5 ±0.5 second time delay~~	
~~b. Relay Response Time for loss of Voltage~~			
2. ~~Load Shedding~~ DIESEL GENERATOR START AND LOAD SHED TIMER	1.25 SECONDS ~~4860 volts~~	1.25 ± 0.09 SECONDS ~~4860 volts ±97.2 volts~~	
~~a. Nominal Voltage Setpoint~~	~~0 volts with a 5.0 second time delay~~	~~0 volts with a 5.0 ±1.0 second time delay~~	
~~b. Relay Response Time for loss of Voltage~~			
b. 6.9 kv Shutdown Board-Degraded Voltage			
1. Voltage Sensors	6456 ~~6560~~ volts	≥ 6403.5 (DROPOUT) ~~6560~~ volts ~~± 33 volts~~ ≤ 6626.5 VOLTS (RESET)	
2. Diesel Generator Start and Load Shed Timer	≤ 300 seconds	≤ 321 ~~300~~ seconds ~~± 30 seconds~~	R25
3. SI/Degraded Voltage Logic Enable Timer	10 seconds	10 seconds ± 0.75 ~~0.5~~ seconds	
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS			
a. Pressurizer Pressure			
1. Not P-11, Automatic Unblock of Safety Injection on Increasing Pressure	≤1970 psig	≤1975.2 psig	
2. P-11, Enable Manual Block of Safety Injection on Decreasing Pressure	≥1962 psig	≥1956.8 psig	R132

TABLE 3.3-5 (Continued)

ENGINEERED SAFETY FEATURES RESPONSE TIMES

INITIATING SIGNAL AND FUNCTION	RESPONSE TIME IN SECONDS	
10. Loss Of Power Start ~~Station Blackout~~		
a. Auxiliary Feedwater Pumps	$\leq 60^{(11)}$	R68
11. Trip of Main Feedwater Pumps		
a. Auxiliary Feedwater Pumps	$\leq 60^{(11)}$	R68
12. Loss of Power		
a. 6.9 kv Shutdown Board - Degraded Voltage or Loss of Voltage	$\leq 10^{(10)}$	R68
13. RWST Level-Low Coincident with Containment Sump Level-High and Safety Injection		
a. Automatic Switchover to Containment Sump	≤ 250	
14. Containment Purge Air Exhaust Radioactivity - High		
a. Containment Ventilation Isolation	$\leq 10^{(6)}$	

R158

TABLE 3.3-5 (Continued)

TABLE NOTATION

(7) Diesel generator starting and sequence loading delays not included. Offsite power available. Response time limit includes opening and closing of valves to establish SI path and attainment of discharge pressure for centrifugal charging pumps. R47

(8) Diesel generator starting and sequence loading delays not included. Response time limit includes operating time of valves.

(9) Diesel generator starting and sequence loading delays included. Response time limit includes operating time of valves.

(10) The response time for loss of voltage is measured from the time ~~voltage is lost~~ until the time full voltage is restored by the diesel. The response time for degraded voltage is measured from the time the load shedding signal is generated, either from the degraded voltage or the SI enable timer, to the time full voltage is restored by the diesel. The response time of the timers is covered by the requirements on their setpoints. R68

(11) The provisions of Specification 4.0.4 are not applicable for entry into MODE 3 for the turbine-driven Auxiliary Feedwater Pump. R68

(12) The following valves are exceptions to the response times shown in the table and will have the values listed in seconds for the initiating signals and the function indicated: R73

Valves: FCV-67-89, -90, -105, -106

Response times: 7.b, $75^{(8)}/85^{(9)}$

Valve: FCV-70-141
Response times: 7.b, $70^{(8)}/80^{(9)}$

(13) Containment purge valves only. Containment radiation monitor valves have a response time of 6.5 seconds or less. R96

(14) Does not include Trip Time Delays. Response times noted include the transmitters, Eagle-21 process protection cabinets, solid state protection cabinets, and actuation devices (up to and including pumps). This reflects the response times necessary for THERMAL POWER in excess of 50% RTP. R132

THE LOAD SHEDDING AND DIESEL GENERATOR START SIGNAL IS GENERATED FROM THE LOSS OF VOLTAGE TIMER

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				
1. Steam Generator Water Level--Low-Low (Adverse)	S	R	Q	1, 2, 3
2. Steam Generator Water Level--Low-Low	S	R	Q	1, 2, 3
3. RCS Loop ΔT	S	R	Q	1, 2, 3
4. Containment Pressure (EAM)	S	R	Q	1, 2, 3
d. S.I.	See 1 above (all SI surveillance requirements)			
e. ~~Station Blackout~~ LOSS OF POWER START INSERT D →	~~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~~ VOLTAGE SENSORS				
1. ~~Start Diesel Generators~~	~~N.A.~~ N.A.	R	M	1, 2, 3, 4, 5*, 6*
2. ~~Load Shedding~~ DIESEL GENERATOR START AND LOAD SHED TIMER	~~N.A.~~ N.A.	R	N.A.	1, 2, 3, 4, 5*, 6*

R132 R132 R116 R18 R132

INSERT FOR TABLE 4.3-2
ITEM 6.e

Insert D:	1.	Voltage Sensors	N.A.	R	M	1, 2, 3
	2.	Load Shed Timer	N.A.	R	N.A.	1, 2, 3

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					R132
1. Voltage sensors	~~S~~ N.A.	R	M	1, 2, 3, 4, 5*, 6*	
2. Diesel Generators Start and Load Shedding Timer	N.A.	R	N.A.	1, 2, 3, 4, 5*, 6*	R18
3. SI/Degraded Voltage Logic Timer ENABLE	N.A.	R	N.A.	1, 2, 3, 4	
8. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS					
a. Pressurizer Pressure, P-11/Not P-11	N.A.	R(2)	N.A.	1, 2, 3	
b. Deleted					R132
c. Steam Generator Level, P-14	N.A.	R(2)	N.A.	1, 2	R39
9. AUTOMATIC SWITCHOVER TO CONTAINMENT SUMP					
a. RSWT Level - Low COINCIDENT WITH	S	R	Q	1, 2, 3, 4	R132
Containment Sump Level - High AND	S	R	Q	1, 2, 3, 4	
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	R55

R132

TABLE 4.3-2 (Continued)

TABLE NOTATION

(1) Each train or logic channel shall be tested at least every 62 days on a STAGGERED TEST BASIS.

(2) The total interlock function shall be demonstrated OPERABLE during CHANNEL CALIBRATION testing of each channel affected by interlock operation. R39

When Associated Diesel Generator Is Required To Be Operable By LCO 3.8.1.2, "AC Sources - Shutdown".

AUXILIARY FEEDWATER SYSTEM (continued)

because of a main steam line or feedwater line break and a single failure of the B-train motor driven AFW pump. The two redundant sources must be aligned such that No. 1 steam generator source is open and operable and the No. 4 steam generator source is closed and operable. BR-

For instances where one train of emergency raw cooling water (ERCW) is declared inoperable in accordance with technical specifications, the AFW turbine-driven pump is considered operable since it is supplied by both trains of ERCW. This position is consistent with American National Standards Institute/ANS 58.9 requirements (i.e., postulation of the failure of the opposite train is not required while relying on the TS limiting condition for operation).

3/4.7.1.3 CONDENSATE STORAGE TANK

The OPERABILITY of the condensate storage tank with the minimum water volume ensures that sufficient water is available to maintain the RCS at HOT STANDBY conditions for 2 hours with steam discharge to the atmosphere concurrent with total loss of off-site power. The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

SIMILARLY, THE AFW TURBINE-DRIVEN PUMP IS CONSIDERED OPERABLE WHEN ONE TRAIN OF THE AFW LOSS OF POWER START FUNCTION IS DECLARED INOPERABLE IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS BECAUSE BOTH 6.9 KILOVOLT SHUTDOWN BOARD LOGIC TRAINS SUPPLY THIS FUNCTION.

ENCLOSURE 2

PROPOSED TECHNICAL SPECIFICATION CHANGE

SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

(TVA-SQN-TS-93-09)

DESCRIPTION AND JUSTIFICATION FOR

REVISED SETPOINTS AND TIME DELAYS

FOR THE LOSS-OF-POWER INSTRUMENTATION

Description of Change

TVA, after participating with an adhoc committee of the Electrical Distribution System Clearinghouse, has determined that physical changes to the plant's 6.9-kilovolt (kV) shutdown board relays and logic for loss of voltage and degraded voltage should be implemented. Therefore, TVA proposes to modify the Sequoyah Nuclear Plant (SQN) Units 1 and 2 technical specifications (TSs) to revise the requirements for loss-of-power instrumentation found in Section 3.3.2.1 for Unit 1 and Section 3.3.2 for Unit 2. The specific changes are as follows:

- Item 6.e of TS Table 3.3-3 has been revised to reflect the use of a two-out-of-three voltage sensor logic for loss-of-power detection. These sensors provide load-shedding initiation and subsequent auxiliary feedwater (AFW) pump start through two separate timing relays with a one-out-of-two logic scheme. The functional unit description has been changed to "Loss of Power Start" to avoid confusion with the "station blackout" terminology associated with the 10 CFR 50.63 requirements. A new action requirement has been incorporated and a footnote has been added to clarify that this requirement only applies to shutdown board instrumentation on the same unit.

- Item 7.a of TS Table 3.3-3 has been revised to reflect the use of a two-out-of-three voltage sensor logic for loss-of-voltage detection. These sensors provide both diesel generator (D/G) start and load-shedding initiation through two separate timing relays with a one-out-of-two logic scheme. This design change is accommodated by having one requirement for the voltage sensors and another requirement for the timers. The applicable modes have been expanded to include Modes 5 and 6 when the associated D/G is required to be operable. The applicable action requirement has been revised to correspond with this design change. The exclusion to the provisions of TS 3.0.4 has been deleted.

- Items 7.b.1 and 7.b.2 of TS Table 3.3-3 have been revised to include Modes 5 and 6 as applicable modes when the associated D/G is required to be operable. Items 7.b.2 and 7.b.3 have been revised to reflect consistent instrumentation descriptions. The minimum channels operable have been revised to be consistent with action requirements.

- Table notation footnotes for TS Table 3.3-3 have been updated to reflect the conditions when the loss-of-power instrumentation is required to be operable in Modes 5 and 6. An exclusion to the provisions of TS 3.0.4 has been included.

- Action 34 of TS Table 3.3-3 has been revised to provide an interval that has a low probability for requiring a D/G start and will allow for repairs. Action 34 requires entry into the actions for an inoperable D/G if instrumentation is not restored within this interval.

- Action 35 has been revised to provide the same basis and time intervals for loss-of-power instrumentation inoperability associated with AFW pump start as required for load-shedding and D/G start in Action 34. Action 35 requires entry into the actions for an inoperable AFW pump if instrumentation is not restored within this interval.

- Item 6.e of TS Table 3.3-4 has been revised to reflect the design changes and functional unit description change described above for Item 6.e of TS Table 3.3-3. The revised trip setpoints and allowable values have been included.

- Item 7.a of TS Table 3.3-4 has been revised to reflect the design changes described above for Item 7.a of TS Table 3.3-3. The revised trip setpoints and allowable values have been included.

- Item 7.b of TS Table 3.3-4 has been revised to reflect the trip setpoints and allowable values for the design changes to the degraded-voltage instrumentation.

- Item 10 of TS Table 3.3-5 has been revised to incorporate the functional unit description change described for Item 6.e of TS Table 3.3-3.

- Table Notation 10 of TS Table 3.3-5 has been clarified to reflect the starting point of the response time measurement for the loss-of-voltage conditions.

- Item 6.e of TS Table 4.3-2 has been revised to reflect the design changes and functional unit description change described above for Item 6.e of TS Table 3.3-3. The applicable surveillance requirements (SRs) have been included.

- Item 7.a of TS Table 4.3-2 has been revised to reflect the design changes described above for Item 7.a of TS Table 3.3-3. The applicable modes for loss-of-voltage instrumentation SRs have been expanded to include Modes 5 and 6 when the associated D/G is required to be operable. The channel check requirements have been removed.

- Items 7.b.2 and 7.b.3 of TS Table 4.3-2 have been revised to reflect consistent instrumentation descriptions and Items 7.b.1 and 7.b.2 have been revised to expand the applicable modes as described above for Item 7.a of this table. The channel-check requirement has been removed for Item 7.b.1.

- Table notation footnotes for TS Table 4.3-2 have been updated to reflect the conditions when the loss-of-power instrumentation SRs must be complied with in Modes 5 and 6.

- Bases Section 3/4.7.1.2, "Auxiliary Feedwater System," has been revised to add information regarding AFW turbine-driven pump operability when a single train of the AFW loss-of-power start instrumentation is inoperable.

Reason for Change

TVA, along with other participating industry members, has been working with the Electrical Distribution System Clearinghouse to establish guidelines for degraded-voltage analyses and the process required to establish proper degraded-voltage setpoints and time delays. The guidelines established by this effort have been applied to the SQN degraded-voltage design through detailed TVA analysis and have resulted in the need to modify the loss-of-power instrumentation functions. This analysis is documented in TVA Calculations SQN-EEB-MS-TI06-0008, 27DAT, and DS-1-2 and is available for NRC review at the SQN site. The proposed TS changes and modifications will provide the ability to utilize the alternate feeder breakers to supply the 6.9-kV shutdown boards and incorporate all loss-of-power instrumentation functions into the TSs.

The major change was to remove the normal feeder loss-of-voltage relays on the 6.9-kV shutdown board and to modify the load-shedding and D/G start relays on the 6.9-kV shutdown board to a two-out-of-three logic scheme. This requires installing three new solid-state voltage sensors on the shutdown board bus and two electronic-timing relays to provide actuation of load-shedding and D/G start for loss-of-voltage conditions. Associated with this revised logic was the development of new relay settings and time delays for loss-of-voltage and degraded-voltage functions to ensure adequate voltage is available to safety-related loads thereby enhancing their operability for accident mitigation. Additionally, the loss-of-power start requirements for the AFW pumps have been altered because the same instrumentation for load shedding provides this function. These changes have required a revision to the descriptions, total number of channels, channels to trip, minimum channels operable, actions, trip setpoints, allowable values, channel check, and channel functional test requirements for loss-of-power instrumentation in TS Section 3.3.2.1 for Unit 1 and Section 3.3.2 for Unit 2.

In addition, other enhancements have been incorporated into this change. The addition of Modes 5 and 6 to the applicable modes for operability and SR portions of the loss-of-power instrumentation requirements was implemented to appropriately specify the conditions when these functions are required to support safety functions. The footnote addition to the Modes 5 and 6 requirement clarifies that the loss-of-power instrumentation associated with a 6.9-kV shutdown board is required to be operable when the affected D/G is required to be operable. The TS 3.0.4 exclusion has been included to allow changes between Modes 5 and 6 when the action does not require a shutdown and provides indefinite operation in these modes. For the "SI/Degraded Voltage Logic Enable Timer," the Modes 5 and 6 requirements are not added because the safety-injection function is only required in Modes 1 through 4.

The modification of the "minimum channels operable" column to be the same as "total number of channels" column has been incorporated to clarify that all channels are required for continued power operation. This will minimize the potential for misunderstanding the operating requirements for loss-of-power instrumentation. The TS 3.0.4 deletion has been implemented to limit mode changes without the operability of the

loss-of-power instrumentation. Since the action for these functions may require a unit shutdown, an exclusion to allow mode changes with the potential for a subsequent forced shutdown in accordance with TSs would not be appropriate. The table notation for the response time of a loss-of-voltage condition was clarified to indicate that timing starts when the instrumentation actuates a D/G start and load-shedding signal. Presently, the note implies that this timing would start when the shutdown board loses voltage and does not consider the present 1.5-second or proposed 1.25-second relay time delay. This time delay is already included in the accident analysis response separate from, and in addition to, the 10-second D/G start and load response. By implementing this clarification, the response time start and stop points for a loss-of-voltage condition are more accurately described.

For the AFW loss-of-power instrumentation, two additional changes have been implemented to clarify the requirements. The first change adds a footnote to the required channels in TS Table 3.3-3 for the AFW loss-of-power start. This footnote clarifies that only the conditions for the shutdown boards associated with the same unit apply to the operability of this instrumentation. This clarification removes the potential to declare the AFW loss-of-power start instrumentation inoperable for a given unit when only the opposite unit's instrumentation is inoperable. The second change adds a clarification to the AFW system bases to describe the operability impact to the turbine-driven AFW pump when only one train of loss-of-power start instrumentation is inoperable. This provides the appropriate operability conditions for the turbine-driven AFW pump in regard to the loss-of-power start instrumentation.

Justification for Change

The 6.9-kV shutdown boards are provided with loss-of-voltage and degraded-voltage protection to ensure adequate voltage is available to safety-related loads. In the event of a loss-of-voltage or a sustained degraded-voltage condition, the emergency D/Gs will be started and will be connected to the shutdown boards after tripping normal and alternate feeders, as well as shedding the major loads. After the D/G has been tied to the shutdown board, the loss-of-voltage relays will continue to provide load-shed functions and subsequent resequencing of loads onto the D/G if necessary. This instrumentation is described in Section 8.3 of the Updated Final Safety Analysis Report (UFSAR).

The loss-of-voltage, load-shed function on the 6.9-kV shutdown board provides the initiation of a motor-driven AFW pump start after the D/G has tied to the board and the load sequencing interval has been achieved. In addition, the load-shed actuation immediately initiates a turbine-driven AFW pump start. This feature provides early AFW flow to the steam generators that enhances the heat sink capabilities. For a loss-of-voltage event, the reactor coolant pumps would not be available to provide forced coolant flow, and this early turbine-driven AFW pump start helps initiate reactor coolant system natural circulation and heat removal. The AFW pumps provide sufficient heat removal capabilities to prevent the filling of the pressurizer during design basis accidents. The AFW system is described in Section 10.4.7 of the UFSAR.

The present design utilizes two undervoltage relays set at 70 percent of nominal voltage to initiate D/G start after 1.5 seconds and two additional relays also set at 70 percent of nominal voltage to initiate load shedding after 5 seconds for loss-of-voltage protection. Both sets of relays work on a one-out-of-two logic for actuations and will provide these functions regardless of whether the board is fed from the normal, alternate, or emergency supply. Degraded-voltage protection is provided by three voltage sensors set at 95 percent of nominal voltage in a two-out-of-three logic arrangement that feeds two 5-minute, two 10-second, and two 30-second timers. These timer sets are arranged in a one-out-of-two logic with the 5-minute timers providing D/G start and load-shed initiation, the 10-second timers providing load shedding if a safety-injection signal is active, and the 30-second timers providing a degraded-voltage annunciation in the main control room. These functions will also operate regardless of the power feed (normal, alternate, or emergency) to the shutdown board.

An additional undervoltage scheme is presently provided on the supply side of the normal-feeder breaker to the 6.9-kV shutdown board. This scheme utilizes three voltage sensors set at 80 percent of nominal voltage in a two-out-of-three logic arrangement and feeds two 0.5-second timers in a one-out-of-two logic. This relaying trips the normal feeder breaker to the shutdown board and will only function if the normal feeder is closed.

The new SQN design for loss-of-voltage and degraded-voltage protection is based on recommendations from the Electrical Distribution System Clearinghouse. For the degraded-voltage scheme, the number of and the actuation logic for the relays have remained unchanged; however, interlocks have been added, outputs have been revised, and the voltage-sensor setpoint has been reduced from 95 percent to approximately 93.5 percent of nominal voltage. The load-shedding function, resulting from a degraded-voltage condition, will be disabled when the D/G is tied to the shutdown board without the normal or alternate feeder connected. The tripping function for the normal and alternate feeders during a degraded-voltage condition is still generated by the load-shedding instrumentation, but no longer includes the additional trip actuation directly from the degraded voltage relay outputs. In addition, the degraded-voltage electro-pneumatic timers have been converted to an electronic type.

The normal feeder undervoltage relaying has been deleted from the design to support the use of the alternate feeder breakers and because the existing function has been incorporated into the revised loss-of-power instrumentation scheme.

The loss-of-voltage relaying on the 6.9-kV shutdown board has been converted from two pairs of undervoltage relays to three solid-state voltage sensors. They are set at 80 percent of nominal voltage in a two-out-of-three logic arrangement instead of the previous one-out-of-two logic. These sensors feed two pairs of electronic timers with each pair using a one-out-of-two logic scheme. One pair initiates D/G start and load shedding at 1.25 seconds. This load-shedding function is active

when the shutdown board is connected to the normal or alternate supply breaker and is maintained until D/G breaker closure. The D/G start function is always active. The other pair initiates load shedding at 10 seconds when the D/G breaker is closed, and provides the only load-shedding function when the D/G is the sole power supply to the board. The later pair of timers are not included in the TS because they are not required to fulfill safety-function actuation even though they should enhance the availability of safety-related components by shedding loads during prolonged D/G low-voltage conditions. Under this low-voltage condition, these timers would minimize the need to manually reset protection circuits for safety-related components. The safety-related components are provided with individual protection devices to ensure they would be available for accident mitigation when an adequate power supply is reestablished.

The modification of the minimum channels operable has been implemented to provide clarification of the conditions that require compliance with action requirements. For the loss-of-power instrumentation, an inoperable channel requires an action to shut down or to restrict potential reactivity changes if repairs cannot be implemented within the specified time periods. This change enhances the understanding of the action requirement applicability associated with the inoperability of this instrumentation.

The proposed TS change implements the setpoints associated with these design changes. For the loss-of-voltage relaying, a setpoint of greater than or equal to 5520 volts with an allowable value of greater than or equal to 5472 volts was assigned to the voltage sensors. However, for the degraded-voltage sensors, a 6456-volt (V) setpoint is assigned with a minimum dropout voltage of 6403.5 and a maximum reset voltage of 6626.5.

Where the loss-of-voltage relaying is designed to protect against significant or total loss-of-voltage conditions and is required to react quickly, the degraded-voltage relays monitor smaller voltage decreases and provide actuations less rapidly. For these reasons, the loss-of-voltage relay protects against conditions that are not expected to provide voltage recovery and therefore the upper side of the voltage setpoint is not specified. However, the degraded-voltage relaying is designed to utilize a limited reset value (less than 6626.5 V) to ensure the offsite power supply recovers voltage within 10 seconds after block starting of safety-injection loads. The safety-injection event analysis, without blackout for shutdown board voltage response, shows that voltage will recover to greater than 6626.5 V before the 10-second timer expires. For this event, the voltage will initially drop below 6456 V and initiate the 10-second timer and must recover above the degraded-voltage relay reset value within 10 seconds to prevent transfer to the D/G. For this reason, the reset value for the degraded-voltage sensors is critical and TVA has proposed to include this value in TSs to enhance control of the setting that ensures load shedding only occurs when necessary.

The timer settings proposed in this change utilize a setpoint with a high and low limit based on the accuracy of the timer and maximum or minimum allowable time delay. The five-minute, degraded-voltage timer setting is designed to allow operator action and only uses a maximum limit to ensure safety-related loads are not damaged by sustained degraded-voltage

conditions. The minimum setting is not specified because safety functions would not be affected and only the allowed time for possible operator action would be impacted if time delays were less. Premature degraded-voltage actuation is not a concern for this time delay because of the significant margin provided. For the loss-of-voltage and 10-second degraded-voltage timers, upper and lower limits are used to prevent inadvertent load shedding on momentary voltage disturbances, to maintain the analysis assumptions, and to ensure sufficient voltage recovery time for designed 6.9-kV shutdown board loading transients.

The SRs for the loss-of-power instrumentation channel check have been removed. This is based on the instrumentation being solid state and not having an indication of system parameters. This prevents the ability to compare channel indications by observation to provide a qualitative assessment of channel behavior. Since this determination is not possible, the requirement for a channel check is not applicable and does not need to be performed.

The addition of Modes 5 and 6 requirements for operability and SRs of the loss-of-power instrumentation when the associated D/G is required operable provides a more conservative and clearer requirement. Previously, this instrumentation was treated as attendant equipment in Modes 5 and 6 for the shutdown boards. This change will clarify the requirements such that their operability for applicable modes will be clearly understood and will provide additional assurance that loss-of-power instrumentation will be maintained operable for required plant conditions. The TS 3.0.4 exclusion is consistent with Generic Letter (GL) 87-09 for Modes 5 and 6 because this requirement would unduly restrict facility operation when conformance with action requirements provides an acceptable level of safety for continued operation. This is based on the action requirements permitting continued operation for an unlimited period of time in Modes 5 and 6. This mode requirement addition for the "SI/Degraded Voltage Logic Enable Timer" is not incorporated because this timer only provides loss-of-power functions if a safety-injection signal is active. Since the safety injection instrumentation is only required for Modes 1, 2, 3, and 4, there would be no benefit to require this timer to be operable in Modes 5 and 6.

The revision of Action 34 to TS Table 3.3-3 is proposed to provide appropriate actions considering that the loss-of-power instrumentation initiates D/G start and 6.9-kV shutdown board alignment to accommodate D/G connection to the board and subsequent load sequencing. The loss of this instrumentation is no more significant than the loss of the associated D/G. Presently, Action 35 applies a requirement to enter a 72-hour D/G TS action for one or more inoperable channels and Action 34 imposes a 48-hour instrumentation TS action for one inoperable channel and an 8-hour shutdown board TS action for more than one inoperable channel. Since Action 34 is more restrictive than the actions associated with the inoperability of the D/G itself, it has been revised to apply the appropriate actions to take for loss-of-power instrumentation inoperability. The proposed Action 34 allows 6 hours to repair one inoperable channel and 1 hour to repair more than one inoperable channel

after which the associated D/G actions for inoperability must be entered. This action allows ample time to repair most failures and takes into account the low probability of an event requiring a D/G start occurring during this interval. For one inoperable channel, the loss-of-power instrumentation functions remain fully operable to further justify the 6-hour interval proposed. The TS 3.0.4 exclusion for the loss-of-power instrumentation has been in place since initial licensing of SQN. However, it is not known why this exclusion was incorporated for Modes 1 through 4 when power escalation without the instrumentation being operable could result in a forced shutdown of the unit. Deleting this exclusion is consistent with the guidance in GL 87-09. These actions, for the loss-of-power instrumentation, are consistent with the latest version of the improved TSs (NUREG 1431).

Action 35 of TS Table 3.3-3 has been revised for the AFW loss-of-power start function. This action is the same as Action 34 described above with the exception that the associated AFW pump is declared inoperable instead of the D/G. The loss of the load-shed function is not worse than the loss of the associated AFW pump; therefore, a more restrictive action than for the pump is not appropriate. The present action for the AFW loss-of-power instrumentation allows 48 hours to repair a single inoperable channel; however, no provision exists for more than one channel being inoperable. This would require unnecessary entries into TS 3.0.3 and possible unit shutdown for some maintenance activities and would not be consistent with the actions associated with load-shed functions that utilize the same relays. Therefore, the proposed Action 35 provides reasonable durations to repair most failures and subsequent actions that are appropriate for the affected safety functions.

The proposed AFW loss-of-power start change to TS Table 3.3-3 adds a footnote that clarifies the shutdown boards that affect this function. Since each unit's AFW pumps only get loss-of-power start signals from their associated shutdown boards, the instrumentation of the opposite unit should not be considered for operability. This is a clarification that has not been previously identified as a potential problem in applying the TS requirements. The mode requirements for the AFW loss-of-power instrumentation have not changed and remain consistent with the required modes for AFW pump operability. The AFW system bases revision implements information regarding the impact on the turbine-driven AFW pump by the loss-of-power instrumentation. The turbine-driven AFW pump receives two start signals for a loss-of-power condition through the load-shed relaying. Each train of instrumentation for the associated units' shutdown boards provides one of these signals. The loss of either instrumentation train will result in the turbine-driven AFW pump having an independent and redundant train of instrumentation available for start initiation; therefore, the turbine-driven AFW pump should not be considered inoperable as long as one complete train of loss-of-power instrumentation is available.

The remaining change that clarifies the table notation for loss-of-power response time is included to eliminate confusion on how the time is monitored for loss-of-voltage testing. The present wording can be misleading in that it does not clearly indicate that the time delay for

the loss-of-voltage D/G start relays is not applicable to this measurement. The relay time delay is accounted for in safety analyses separate from the D/G start response requirement of less than or equal to 10 seconds. This relay time delay is not intended to be included in the D/G response and is verified by the setpoint requirements for the timer. This application of the relay time delay for loss-of-voltage is the same consideration given to the degraded-voltage relay time delay in the same note. Therefore, the proposed note change clarifies the intent of the D/G response time test measurements and does not alter timing measurement requirements for loss-of-voltage or degraded-voltage timers.

The changes described and discussed above provide more appropriate loss-of-power instrumentation requirements for setpoints, actions, applicable modes, response time measurements, and SRs considering the conservative methodology developed by the Electrical Distribution System Clearinghouse and applied through detailed TVA analyses to the SQN design. In addition, changes to the instrumentation logic have been made to reflect the new relay design configuration that supports this methodology. The addition of Mode 5 and 6 requirements and deletion of the TS 3.0.4 exclusion for Modes 1 through 4 are conservative positions that will enhance the understanding of when loss-of-power instrumentation is required to be operable and when mode changes can be made. The footnote and bases revision for the AFW loss-of-power start instrumentation implements reasonable criteria for the operability of this instrumentation and the AFW pumps based on the system design. The response time measurement note change is a clarification to the present wording and does not reflect a requirement change. For these reasons, the proposed changes are acceptable from a nuclear-safety standpoint.

Environmental Impact Evaluation

The proposed change request does not involve an unreviewed environmental question because operation of SQN Units 1 and 2 in accordance with this change would not:

1. Result in a significant increase in any adverse environmental impact previously evaluated in the Final Environmental Statement (FES) as modified by the staff's testimony to the Atomic Safety and Licensing Board, supplements to the FES, environmental impact appraisals, or decisions of the Atomic Safety and Licensing Board.

2. Result in a significant change in effluents or power levels.

3. Result in matters not previously reviewed in the licensing basis for SQN that may have a significant environmental impact.

Enclosure 3

PROPOSED TECHNICAL SPECIFICATION CHANGE

SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

(TVA-SQN-TS-93-09)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

Significant Hazards Evaluation

TVA has evaluated the proposed technical specification (TS) change and has determined that it does not represent a significant hazards consideration based on criteria established in 10 CFR 50.92(c). Operation of Sequoyah Nuclear Plant (SQN) in accordance with the proposed amendment will not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated.

   The proposed revision supports the implementation of design logic and setpoint changes to the loss-of-power relaying. This relaying is designed to ensure adequate voltage is available to safety-related loads in order to enhance their operability and support accident mitigation functions and to provide for auxiliary feedwater (AFW) pump starts. The design changes alter relay logic and delete unnecessary relaying, but do not change the diesel generator (D/G) start and load-shedding actuations that result from loss-of-power conditions. Therefore, no new actuations or functions have been created; and because the existing and proposed functions provide for accident mitigation considerations that are not the source of an accident, the probability of an accident is not increased. The deletion of the 6.9-kilovolt shutdown board normal-feeder undervoltage relays actually reduces the potential for inadvertent shutdown board blackouts as a result of short-duration voltage transients or instrument failures.

   The setpoints and time delays for loss-of-power functions have been modified based on the guidelines developed by the Electrical Distribution System Clearinghouse as evaluated and determined through detailed analysis by TVA. This design is documented in TVA Calculations SQN-EEB-MS-TI06-0008, 27DAT, and DS-1-2 and is available for NRC review at the SQN site. The assigned values are conservative settings that will ensure adequate voltage is supplied to safety-related loads for accident mitigation and safety functions under normal, degraded, and loss-of-offsite-power voltage conditions with appropriate time delays to prevent damage to electrical loads and minimize premature or unnecessary actuations. The identification of loss-of-voltage conditions is enhanced by the design changes to ensure the timely sequencing of loads onto the D/G and the initiation of AFW pump starts for accident mitigation. Because there are no reductions in safety functions resulting from the design logic, setpoint, and time-delay changes to the loss-of-power instrumentation and offsite dose levels for postulated accidents will not be increased, the consequences of an accident are not increased.

   The applicable mode addition, TS 3.0.4 exclusion deletion, and response time measurement clarification incorporated in the proposed change do not affect plant functions. These changes reflect the requirements that SQN has been maintaining and serve to clarify

the requirements to provide consistency of application and easier understanding. The AFW footnote addition and bases revision only clarify operability conditions that are consistent with the plant design for the AFW pump and loss-of-power instrumentation. Because there are no changes to plant functions or operations, these revisions have no impact on accident probabilities or consequences.

2. Create the possibility of a new or different kind of accident from any previously analyzed.

   As described above, the loss-of-power instrumentation ensures adequate voltage to safety-related loads by initiating D/G starts and load shedding and provides for AFW pump starting, but is not considered to be the source of an accident. Although the design logic, setpoint, and time-delay actuation criteria have changed, the output functions to various plant systems that actuate for load shedding and D/G starts remain the same. Therefore, actuation criteria have been affected, but not safety functions, and the TVA evaluation has confirmed that the new design enhances the ability to maintain adequate voltage to support safety functions. Since safety functions have not changed and the new loss-of-power instrumentation design continues to support operability of safety-related equipment, no new or different accident is created.

   The applicable mode addition, TS 3.0.4 exclusion deletion, and response time measurement clarification, as well as the AFW operability clarifications, do not affect plant functions and will not create a new accident.

3. Involve a significant reduction in a margin of safety.

   The proposed loss-of-power TS changes support design logic, setpoint, and time-delay requirements that have been verified by TVA analysis to provide acceptable voltage levels for safety-related components. In determining the acceptability of these voltage levels, the minimum voltage for operation as well as detrimental component heating resulting from sustained degraded-voltage conditions were considered. This design ensures that safety-related loads will be available and operable for normal and accident plant conditions. The applicable mode addition, TS 3.0.4 exclusion deletion, response time measurement clarification, and AFW operability clarifications provide enhancements to TS requirements and do not affect plant functions. Therefore, no safety functions are reduced by these changes and there is no reduction in the margin of safety.