ENCLOSURE 2

PROPOSED TECHNICAL SPECIFICATION REVISIONS BROWNS FERRY NUCLEAR PLANT UNITS 1 AND 2 (TVA BFNP TS 156 SUPPLEMENT 1)

These revisions consist of the following:

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- 1. Removed reference to the start bus undervoltage relays which start the diesel generators.
- 2. Removed reference to the 4-kV shutdown board overvoltage relays which start the diesel generators.
- 3. Revised table 4.9.A.4.C to reflect new relay setpoints. Auxiliary timer setpoints were added to table 4.9.A.4.C.

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UNIT 1 PROPOSED TECHNICAL SPECIFICATIONS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE ALQUIREMENTS

3.9 AUXILIARY ELECTRICAL SYSTEM

- b. The units 1 and 2 4-kV shutdown boards are energized.
- c. The 480-V shutdown boards associated with the unit are energized.
- d. The units 1 and 2 diesel auxiliary boards are energized.
- e. Loss of voltage and degraded voltage relays operable on 4-kV shutdown boards A, B, C, and D.
- f. Shutdown busses 1 and 2 energized.
- g. The 480V Rx. MOV Boards D&E are energized with M-G Sets IDN, IDA, IEN, and IEA in service.
- 5. The 250-volt unit and shutdown board batteries and a battery charger for each battery boards are operable.
- 6. Logic Systems
 - a. Common accident signal logic system is operable.
 - b. 480-V load shedding logic system is operable.
- 7. There shall be a minimum of 103,300 gallons of diesel fuel in the standby diesel generator fuel tanks.

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with instructions based on the manufacturer's recommendations.

- e. Once a month a sample of diesel fuel shall be checked for quality. The quality shall be within acceptable limits specified in Table 1 of the latest revision to ASTM D975 and logged.
- 2. D. C. Power System Unit Batteries (250-Volt) Diesel Generator Batteries (125-Volt) and Shutdown Board Batteries (250-Volt)
 - a. Every week the specific , gravity and the voltage of the pilot cell, and temperature of an adjacent cell and overall battery voltage shall be measured and logged.
 - b. Every three months the measurement shall be made of voltage of each cell to nearest 0.1 volt, specific gravity of each cell, and temperature of every fifth cell. These measurements shall be logged.
 - c. A battery rated discharge (capacity) test shall be performed and the voltage, time, and output current measurements shall be logged at intervals not to exceed 24 hours.

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4.9 AUXILIARY ELECTRICAL SYSTEM

- 3. Logic Systems
 - a. Both divisions of the common accident signal logic system shall be tested every 6 months to

demonstrate that it will function on actuation of the core spray system of each reactor to provide an automatic start signal to all 4 units 1 and 2 diesel generators.

b. Once every 6 months, the condition under which the 480-Volt load shedding logic system is required shall be simulated using pendant test switches and/or pushbutton test switches to demonstrate that the load shedding logic system would initiate load shedding signals on the diesel auxiliary boards, reactor MOV boards, and the 480-Volt shutdown boards.

4. Undervoltage Relays

a. (deleted)

b. Once every 6 months, the conditions under which the loss of voltage and degraded voltage relays are required shall be simulated with an undervoltage on each shutdown board to

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4.9 AUXILIARY ELECTRICAL SYSTEM

demonstrate that the associated diesel generator will start.

- c. The loss of voltage and degraded voltage relays which start the diesel generators from the 4-kV shutdown boards shall be calibrated annually for trip and reset and the measurements logged. These relays shall be calibrated as specified in Table 4.9.A.4.c.
- d. 4-kV shutdown board voltages shall be recorded once every 12 hours.

5. 480-V RMOV boards D and E

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a. Once per operating cycle the automatic transfer feature for 480-V RMOV boards D and E shall be functionally tested to verify auto-transfer capability.

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any reason, continued reactor operation is permissible during the succeeding five days in accordance with 3.9.B.7.

- 9. When one division of the Logic System is inoperable, continued reactor operation is permissible under this condition for seven days. provided the CSCS requirements listed in specification 3.9.B.3 are satisfied. The NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an operable state.
- 10. (deleted)

- 11. The following limiting conditions for operation exists for the undervoltage relays which start the diesel generators on the 4-kV shutdown boards.
 - a. The loss of voltage relay channel which starts the diesel generator for a complete loss of voltage on
 a 4-kV shutdown board may be inoperable for 10 days provided the degraded voltage relay channel on that shutdown board is operable (within the surveillance schedule

of 4.9.A.4.b.)

4.9 AUXILIARY ELECTRICAL SYSTEM

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Ⴆ.	The degraded voltage relay channel which starts the diesel generator for degrad-
	ed voltage on a 4-kV shutdown
	board may be inoperable for
	10 days provided the loss of
	voltage relay channel on that
	shutdown board is operable
	(within the surveillance
	schedule of 4.9.A.4.b).

c. One of the three phase-tophase degraded voltage relays provided to detect a degraded voltage on a 4-kV shutdown board may be inoperable for 15 days provided both of the following conditions are satisfied.

- The other two phase-tophase degraded voltage relays on that 4-kV shutdown board are operable (within the surveillance schedule of 4.9.A.4.b).
- 2. The loss of voltage relay channel on that shutdown board is operable (within the surveillance schedule of 4.9.A.4.b).
- d. The degraded voltage relay channel and the loss of voltage relay channel on a 4-kV shutdown board may be inoperable for 5 days provided the other shutdown boards and undervoltage relays are operable. (Within the

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Table 4.9.A.4.c

VOLTAGE RELAY SETPOINTS/DIESEL GENERATOR START

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Relay Location		Trip Level Setting		Remarks	
1. 4-kV Shutdown Boards		Trip Setpoint: Allowable Values Trip Range: Reset Setpoint: Allowable Values Reset Range:	0 volts with delay 4 .1 second 1.4 to 1.6 se 2870-V 5: + 2% of 2870- 2813-V to 292	a 1.5-second time conds V 7-V	Start diesel genera- tors on loss of off- site power.
		-	Undervoltage		
2.	4-kV Shutdown Boards	Trip Setpoint:	3920		Second level under- voltage sensing re-
		Allowable Yalues Manufacturers guaranteed	3900-3940		lays - start diesel generator on degrad- ed voltage.
		repeatability specification: Reset Setpoint: Allowable Values	$3920V \pm 1/2\% 3955 3935-3995 $		-
•		Timer	Setpoint (seconds)	Critical Time (seconds)	
3.	4-kV Shutdown Boards (Timers shown for 4-kV shutdown board A. 4-kV shutdown	2-211-1A	0.27 <u>+</u> 5%	· (0.3)	Auxiliary timers for
		2-211-2A	1.36 <u>+</u> 5%	. (1.5)	second level under- voltage sensing
		2-211-3A	7.43 <u>+</u> 5%	(8.2)	relays. The setpoint ranges specified assure that the operating times will be below the critical times speci- fied. These ranges are based on timer repeatability of + 5% as specified by the manufacturer.
	boards B, C, and D, similiar, except for change of suffix)	2-211-4A	1.36 <u>+</u> 5%	. (1.5)	

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The monthly tests of the diesel generators are primarily to check for failuren and deterioration in the system since last use. The diesels will be loaded to at lenst 75 percent of rated power while engine and generator temperatures are stabilized (about one hour). The minimum 75 percent load vill prevent noot formation in the cylinders and injection nozzles. Operation up to an equilibrium temperature ensures that there is no overheat problem. The tests also provide an engine and generator operating history to be compared with subsequent engine-generator test data to identify and to correct any mechanical or electrical deficiency before it can result in a system failure.

The test during refueling outages is more comprehensive, including procedures that are most effectively conducted at that time. These include automatic actuation and functional capability tests to verify that the generators can start and be ready to assume load in 10 seconds. The annual inspection will detect any signs of year long before failure.

Battery maintenance with regard to the floating charge, equilizing charge, and electrolyte level will be based on the manufacturer's instruction and sound maintenance practices. In addition, written records will be maintained of the battery performance. The plant batteries will deteriorate with time but precipitous failure is unlikely. The type of surveillance colled for in this specification is that which has been demonstrated through experience to provide an indication of a cell becoming irregular or unservicesble long before it becomes a failure.

The equalizing charge, as recommended by the manufacturer, is vital to maintaining the Ampere-hour capacity of the battery, and will be applied as recommended.

The testing of the logic systems will verify the ability of the logic systems to bring the auxiliary electrical system to running standby readiness with the presence of an accident signal from any reactor or an undervoltage signal on the 4-kV shutdown boards.

The periodic simulation of accident signals in conjunction with diesel generator voltage available signals will confirm the ability of the 480-volt load shedding logic system to sequentially shed and resport 480-volt loads if an accident signal were present and diesel generator voltage were the only source of electrical power.

REFERENCES

- 1. Normal Auxiliary Power System: (BENP ESAR subsection 8.4)
- 2. Standby A.C. Power Supply and Distribution (BFNP FSAR subsection 3.5)
- 3. 250-volt D.C. Power Supply and Distribution (BFNP FSAR subsection $\delta.6$)

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. UNIT 2 PROPOSED TECHNICAL SPECIFICATIONS

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- b. The units 1 and 2 4-kV shutdown boards are energized.
- c. The 480-V shutdown boards associated with the unit are energized.
- d. The units 1 and 3 diesel auxiliary board, are energized.
- e. Loss of voltage and degraded voltage relays operable on 4-kV shutdown boards. A, B,
 C, and D.
- f. Shutdown busses 1 and 2 energized.
- The 250-volt unit and shutdown board batteries and
 a battery charger for each battery boards are operable.
- δ. Logic Systems
 - a. Common accident signal logic system is operable.
 - b. 480-V load shedding logic system is operable.
- 7. There shall be a minimum of 103,300 gallons of diesel fuel in the standby diesel generator fuel tanks.

4.9 AUXILIARY ELECTRICAL SYSTEM

with instructions based on the manufacturer's recommendations.

- e. Once a month a sample of diesel fuel shall be checked for quality. The quality shall be within acceptable limits specified in Table 1 of the latest revision to ASTM D975 and logged.
- 2. D. C. Power System Unit Batteries (250-Volt) Diesel Generator Batteries (125-Volt) and Shutdown Board Batteries (250-Volt)
 - a. Every week the specific gravity and the voltage of the pilot cell, and temperature of an adjacent cell and overall battery voltage shall be measured and logged.
 - b. Every three months the measurements shall be made of voltage of each cell to nearest 0.1 volt, specific gravity of each cell, and temperature of every fifth cell. These measurements shall be logged.
 - c. A battery rated discharge (capacity) test shall be performed and the voltage, time, and output current measurements shall be logged at intervals not to exceed 24 hours.

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4.9 AUXILIARY ELECTRICAL SYSTEM

- 3. Logic Systems
 - a. Both divisions of the common accident signal logic system shall be tested every 6 months to demonstrate that it will function on actuation of the core spray system of each reactor to provide an automatic start signal to all 4 units 1 and 2 diesel generators.
 - b. Once every 6 months, the condition under which the 480-Volt load shedding logic system is required shall be simulated using pendant test switches and/or pushbutton test switches to demonstrate that the load shedding logic system would initiate load shedding signals on the diesel auxiliary boards, reactor MOV boards, and the 480-Volt shutdown boards.

4. Undervoltage Relays

a. (deleted)

b. Once every 6 months, the conditions under which the loss of voltage and degraded voltage relays are required shall be simulated with an undervoltage on each shutdown board to

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demonstrate that the associated diesel generator will start.

- c. The loss of voltage and degraded voltage relays which start the diesel generators from the 4-kV shutdown boards shall be calibrated annually for trip and reset and the measurements logged. These relays shall be calibrated as specified in Table 4.9.A.4.c.
- d. 4-kV shutdown board voltages shall be recorded once every 12 hours.

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any reason, continued reactor operation is permissible during the succeeding five days in accordance with 3.9.B.7.

- 9. When one division of the Logic System is inoperable, continued reactor operation is permissible under this condition for seven days. provided the CSCS requirements listed in specification 3.9.B.3 are satisfied. The NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an operable state.
- 10. (deleted)

- 11. The following limiting conditions for operation exists for the undervoltage relays which start the diesel generators on the 4-kV shutdown boards.
 - a. The loss of voltage relay channel which starts the diesel generator for a complete loss of voltage on a 4-kV shutdown board may be inoperable for 10 days provided the degraded voltage relay channel on

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3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
that shutdown board is oper- able (within the surveillance schedule of 4.9.A.4.b).	- · · ·
b. The degraded voltage relay channel which starts the diesel generator for degrad- ed voltage on a 4-kV shut- down board may be inoperable for 10 days provided the loss of voltage relay channel on that shutdown board is oper- able (within the surveillance schedule of 4.9.A.4.b).	
c. One of the three phase-to- phase degraded voltage relays provided to detect a degraded voltage on a 4-kV shutdown board may be inoperable for 15 days provided both of the following conditions are satisfied.	
1. The other two phase-to- phase degraded voltage relays on that 4-kV shut- down board are operable (within the surveillance schedule of 4.9.A.4.b).	
2. The loss of voltage relay channel on that shutdown board is operable (within the surveillance schedule of 4.9.A.4.b).	
d. The degraded voltage relay channel and the loss of voltage relay channel on a 4-kV shutdown board may be inoperable for 5 days pro- vided the other	
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VOLTAGE RELAY SETPOINTS/DIESEL GENERATOR START

Relay Location	Tri	Remarks	
1. 4-kV Shutdown Boards	Trip Setpoint; Allowable Values Trip Range: Reset Setpoint: Allowable Values: Reset Range;	O volts with a 1.5-second time delay + .1 second 1.4 to 1.6 seconds 2870-V + 2% of 2870-V 2813-V to 2927-V	Start diesel genera- tors on loss of off- site power.
2. 4-kV Shutdown Boards	Trip Setpoint: Allowable Values: Manufacturers guaranteed repeatability specification: Reset Setpoint: Allowable Values:	<u>Undervoltage</u> 3920 3900-3940 3920V <u>+</u> 1/2% 3955 3935-3995	Second level under- voltage sensing re- lays - start diesel generator on degrad- ed voltage.
 4-kV Shutdown Boards (Timers shown for 4-kV shutdown board A. 4-kV shutdown boards B, C, and D, similiar, except for change of suffix) 	Timer 2-211-1A 2-211-2A 2-211-3A 2-211-4A	Setpoint (seconds) Critical Time (seconds) $0.27 \pm 5\%$ (0.3) $1.36 \pm 5\%$ (1.5) $7.43 \pm 5\%$ (8.2) $1.36 \pm 5\%$ (1.5)	Auxiliary timers for second level under- voltage sensing relays. The setpoint ranges specified assure that the operating times will be below the critical times speci- fied. These ranges are based on timer repeatability of \pm 5% as specified by the manufacturer.

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4.9 BASES

The monthly tests of the diesel generators are primarily to check for failures and deterioration in the system since last use. The diesels will be loaded to at least 75 percent of rated power while engine and generator temperatures are stabilized (about one hour). The minimum 75 percent load will prevent soot formation in the cylinders and injection nozzles. Operation up to an equilibrium temperature ensures that there is no overheat problem. The test also provides an engine and generator operating history to be compared with subsequent engine-generator test data to identify and to correct any mechanical or electrical deficiency before it can result in a system failure.

The test during refueling outages is more comprehensive, including procedures that are most effectively conducted at that time. These include automatic actuation and functional capability tests to verify that the generators can start and be ready to assume load in 10 seconds. The annual inspection will detect any signs of wear long before failure. The diesel generators are shared by units 1 and 2. Therefore, the capability for the units 1 and 2 diesel generators to accept the emergency loads will be performed during the unit 1 operating cycle using the unit 1 loads.

Battery maintenance with regard to the floating charge, equalizing charge, and electrolyte level will be based on the manufacturer's instruction and sound maintenance practices. In addition, written records will be maintained of the battery performance. The plant batteries will deteriorate with time but precipitous failure is unlikely. The type of surveillance called for in this specification is that which has been demonstrated through experience to provide an indication of a cell becoming irregular or unserviceable long before it becomes a failure.

The equalizing charge, as recommended by the manufacturer, is vital to maintaining the Ampere-hour capacity of the battery, and will be applied as recommended.

The testing of the logic systems will verify the ability of the logic systems to bring the auxiliary electrical system to running standby readiness with the presence of an accident signal from any reactor or an undervoltage signal on the 4-kV shutdown boards.

The periodic simulation of accident signals in conjunction with diesel generator voltage available signals will confirm the ability of the 480-volt load shedding logic system to sequentially shed and restart 480-volt loads if an accident signal were present and diesel generator voltage were the only source of electrical power.

REFERENCES

1. Normal Auxiliary Power System (BFNP FSAR subsection 8.4)

2. Standby A. C. Power Supply and Distribution (BFNP FSAR subsection 8.5)

3. 250-volt D. C. Power Supply and Distribution (BFNP FSAR subsection 8.6

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