UNITS 1 AND 2
PROPOSED CHANGES

LIMITI .G CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS

3.9 AUXILIARY ELECTRICAL SYSTEM

Applicability

Applies to all the auxiliary electrical power system.

Objective

To assure an adequate supply of electrical power for operation of those systems required for safety.

Specification

A. Auxiliary Electrical Equipment

A reactor shall not be started up (made critical) from the cold condition unless four units 1 and 2 diesel generators are operable, both 161-kV transmission lines, two common station service transformers

and the requirements of 3.9.A.4 through 3.9.A.7 are met.

A reactor shall not be started up (made critical) from the Hot Standby Condition unless all of the following conditions are satisfied:

1. At least one off-site 161-kV transmission line and its common transformer are available and capable of automatically supplying auxiliary power to the shutdown boards.

2. Three units 1 and 2 diesel generators shall be operable.

3. An additional source of power consisting of one of the following:

   a. A second 161-kV transmission line and its

4.9 AUXILIARY ELECTRICAL SYSTEM

Applicability

Applies to the periodic testing requirements of the auxiliary electrical systems.

Objective

Verify the operability of the auxiliary electrical system.

Specification

A. Auxiliary Electrical Equipment

1. Diesel Generators

   a. Each diesel generator shall be manually started and loaded once each month to demonstrate operational readiness. The test shall continue for at least a one-hour period at 75% of rated load or greater.

      During the monthly generator test the diesel generator starting air compressor shall be checked for operation and its ability to recharge air receivers. The operation of the diesel fuel oil transfer pumps shall be demonstrated, and the diesel starting time to reach rated voltage and speed shall be logged.

   b. Once per operating cycle a test will be conducted to demonstrate the emergency diesel generators will start and accept emergency load within

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9.A Auxiliary Electrical Equipment	4.9.A Auxiliary Electrical Equipment
common transformer and cooling tower transformer capable of supplying power to the shutdown boards.	the specified time sequence.
b. A fourth operable units 1 and 2 diesel generator.	c. Once a month the quantity of diesel fuel available shall be logged.
4. Buses and Boards Available	d. Each diesel generator shall be given an annual inspection in accordance with instructions based on the manufacturer's recommendations.
a. Start buses 1A and 1B are energized.	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.
b. The units 1 and 2 4-kV shutdown boards are energized.	2. D. C Power System - Unit Batteries (250-Volt) Diesel Generator Batteries (125-Volt) and Shutdown Board Batteries (250-Volt)
c. The 480-kV shutdown boards associated with the unit are energized.	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.
d. The Units 1 & 2 Diesel Aux Boards are energized	
e. Undervoltage relays operable on start buses 1A and 1B and 4-kV shutdown boards, A, B, C, and D.	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.
f. Shutdown Busses 1 & 2 energized	
5. The 250-Volt unit and shutdown board batteries and a battery charger for each battery boards are operable.	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.
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.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9.B Operation with Inoperable Equipment	4.9.B Operation with Inoperable Equipment
Whenever a reactor is in Startup mode or Run mode and not in a cold condition, the availability of electric power shall be as specified in 3.9.A, except as specified herein.	
1. From and after the date that one 161-kV line or one common station transformer or one start bus becomes inoperable, reactor operation is permissible under this condition for seven days.	1. When one 161-kV line or one common station transformer or one start bus is found to be inoperable, all units 1 and 2 diesel generators and associated boards must be demonstrated to be operable immediately and daily thereafter.
2. From and after the date that the 4kV bus tie board becomes inoperable, reactor operation is permissible for 30 days provided both common station service transformers are energized.	2. When the 4kV bus tie board is inoperable both common station service transformers shall be shown to be energized daily.
3. When one of the units 1 and 2 diesel generator is inoperable, continued reactor operation is permissible during the succeeding 7 days provided that both offsite 161-kV transmission lines and both common station transformers or one common transformer and one cooling tower transformer (not parallel with the energized common transformer) and bus tie board and available, and all of the CS, RHR (LPCI and Containment Cooling) Systems, and the remaining three units 1 and 2 diesel generators are operable.	3. When one of the units 1 and 2 diesel generator is found to be inoperable, all of the CS, RHR (LPCI and Containment Cooling) Systems and the remaining diesel generators and associated boards shall be demonstrated to be operable immediately and daily thereafter.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9.B Operation with Inoperable Equipment	4.9.B Operation with Inoperable Equipment
4. When one units 1 and 2 4-kV shutdown board is inoperable, continued reactor operation is permissible for a period not to exceed 5 days, provided that both off-site 161-kV transmission lines and both common station transformers or one common transformer and one cooling tower transformer and 4-kV bus tie board are available and the remaining 4-kV shutdown boards and associated diesel generators, CS, RHR (LPCI and Containment Cooling) Systems, and all 480 V emergency power boards are operable.	4. When one 4-kV shutdown board is found to be inoperable, all remaining 4-kV shutdown boards and associated diesel generators, CS and RHR (LPCI and Containment Cooling) Systems supplies by the remaining 4-kV shutdown boards shall be demonstrated to be operable, immediately and daily thereafter.
5. When one of the shutdown busses is inoperable reactor operation is permissible for a period of 7 days.	5. When one shutdown bus is found to be inoperable all 1 & 2 diesel generators shall be proven operable immediately and daily thereafter.
6. When one of the 480V diesel Aux. boards becomes inoperable reactor operation is permissible for a period of 5 days.	
7. From and after the date that one of the three 250-Volt unit batteries and/or its associated battery board is found to be inoperable for any reason, continued reactor operation is permissible during the succeeding seven days. Except for routine surveillance testing 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.	
8. From and after the date that one of the four 250-volt shutdown	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9.B Operation with Inoperable Equipment	4.9.B Operation with Inoperable Equipment
board batteries and/or its associated battery board is found to be inoperable for any reason, continued reactor operation is permissible during the succeeding five days in accordance with 3.9.B.7.	6. When one units 1 & 2 diesel Aux board is found to be inoperable the remaining diesel Aux board and each unit 1 & 2 diesel generator shall be proven operable immediately and daily thereafter.
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. Undervoltage relays on 1A or 1B start bus may be inoperable for a period of 7 days provided the other start bus and undervoltage relay are operable (within surveillance schedule of 4.9.A.4a).	
11. Undervoltage relays on a shutdown board may be inoperable 5 days provided the other shutdown boards and undervoltage relays are operable (within surveillance schedule of 4.9.A.4.b)	
12. When one 480 volt shutdown board is found to be inoperable the reactor will be placed in hot standby within 12 hours and cold shutdown within 24 hours.	
13. If the requirements for operating in the conditions specified by 3.9.B.1 through 3.9.B12 cannot be met, an orderly shutdown shall be initiated and the reactor shall be shutdown and in the cold condition within 24 hours.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9.C Operation in Cold Shutdown Whenever both reactors are in cold shutdown condition with irradiated fuel in either reactor, the availability of electric power shall be as specified in section 3.9.A except as specified herein. 1. At least two units 1 and 2 diesel generators and their associated 4-kV shutdown boards shall be operable. 2. An additional source of power consisting of at least one of the following: a. One 161-kV transmission line and its associated common station transformer or either cooling tower transformer and a 4-kv bus tie board capable of supplying power to the Units 1 and 2 shutdown boards. b. A third operable diesel generator. 3. At least one 480-V shutdown board for each unit must be operable.	

3.9 BASES

The objective of this specification is to assure an adequate source of electrical power to operate facilities to cool the plant during shutdown and to operate the engineered safeguards following an accident. There are three sources of alternating current electrical energy available, namely, the 161-kV transmission system, the nuclear generating units, and the diesel generators.

The 161-kV offsite power supply consists of two lines which are fed from different sections of the TVA 161-kV grid. In the normal mode of operation, the 161-kV system is operating and four diesel generators are operational. If one diesel generator is out of service, there normally remain the 161-kV sources, the nuclear generating units, and the other three diesel generators. For a diesel generator to be considered operable its associated 125 V battery must be operable.

The minimum fuel oil requirement of 103,300 gallons is sufficient for 7 days of full load operation of 3 diesels and is conservatively based on availability of a replenishment supply.

Auxiliary power for Browns Ferry Nuclear Plant is supplied from two sources; either the unit station transformers or from the 161-kV transmission system through the common station transformers or the cooling tower transformers. If a common station transformer is lost, the units can continue to operate since the unit station transformers are in service, the other common station transformer and the cooling tower transformers are available, and four diesel generators are operational.

If a common station service transformer is out of service the shutdown busses can be fed through a cooling tower transformer and bus tie board. Both cooling tower transformers or 4kV bus tie board may remain out of service for 30 days as long as both common transformers are in service. This is allowed due to the standby service required of the cooling tower transformers and bus tie board and the high reliability of the offsite power circuits. The shutdown busses distribute power to the shutdown boards and allow for flexibility of access to the offsite circuits. A 480V diesel Aux board is allowed to be out of service for short periods of time for tests and maintenance.

A 4-kV shutdown board is allowed to be out of operation for a brief period to allow for maintenance and testing, providing all remaining 4-kV shutdown boards and associated diesel generators CS, RHR, (LPCI and Containment Cooling) Systems supplied by the remaining 4-kV shutdown boards, and all emergency 480 V power boards are operable.

There are eight 250-volt d-c battery systems each of which consists of a battery, battery charger, and distribution equipment. Three of these systems provide power for unit control functions, operative power for unit motor loads, and alternative drive power for a 115-volt a-c unit preferred motor-generator set. One 250-volt d-c system provides power for common plant and transmission system control functions, drive power for a 115-volt a-c plant preferred motor-generator set, and emergency drive power for certain unit large motor loads. The four remaining systems deliver control power to the 4160-volt shutdown boards.

UNIT 3
PROPOSED CHANGES

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
b. The fourth operable unit 3 diesel generator.	
4. Buses and Boards Available	4. Undervoltage Relays
a. Both start buses to unit 3 are energized.	a. Once every 6 months, the condition under which the undervoltage relays are required shall be simulated with an undervoltage on start buses 1A and 1B to demonstrate that the diesel generators will start.
b. The 4-kV bus tie board and shutdown boards (3EA, 3EB, 3EC, 3ED) are energized.	
c. The 480-V shutdown boards associated with the unit are energized.	
d. Undervoltage relays operable on start buses 1A or 1B and 4-kV shutdown boards, 3EA, 3EB, 3EC, and 3ED.	b. Once every 6 months, the conditions under which the undervoltage relays are required shall be simulated with an undervoltage on each shutdown board to demonstrate that the associated diesel generator will start.
e. The 480V diesel Aux Boards are energized.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
2. When one unit 3 diesel generator (3A, 3B, 3C, or 3D) is inoperable, continued reactor operation is permissible during the succeeding 7 days, provided that both offsite 161-kV transmission lines, and both cooling tower transformers are available and capable of supplying power to the Unit 3 shutdown boards, and all of the CS, RHR (LPCI and Containment Cooling Systems, and the regaining three unit 3 diesel generators are operable.	2. When one unit 3 diesel generator is found to be inoperable, all of the CS, RHR (LPCI and Containment Cooling) Systems and the remaining unit 3 diesel generators and associated boards shall be demonstrated to be operable immediately and daily thereafter.
3. When the 4kV bus tie or a unit 3 start bus is inoperable or not capable of being supplied from the cooling tower transformers operation is permissible for 7 days provided that both 161-kV lines and both cooling tower transformers and the unit 3 diesel generators are operable.	3. When the 4kV bus tie or a unit 3 start bus is found to be inoperable all unit 3 diesel generators and associated boards shall be demonstrated operable immediately and daily thereafter. The cooling tower transformers and start busses shall be shown to be energized daily.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
4. When one unit 3 4-kV shutdown board is inoperable, continued reactor operation is permissible for a period not to exceed 5 days, provided that both offsite 161-kV transmission lines and both cooling tower transformers are available and the remaining unit 3 4-kV shutdown boards and associated diesel generators, CS, RHR (LPCI and Containment Cooling) Systems, and all unit 3 480-V emergency power boards are operable. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be shutdown and in the cold condition within 24 hours.	4. When one unit 3 4-kV shutdown board is found to be inoperable, all remaining unit 3 4-kV shutdown boards and associated diesel generators, CS and RHR (LPCI and Containment Cooling) Systems supplied by the remaining 4-kV shutdown boards shall be demonstrated to be operable, immediately and daily thereafter.
5. From and after the date that one of the 480 volt diesel Aux boards becomes inoperable, reactor operation is permissible for a period of 5 days.	5. When one 480 Volt diesel auxiliary board is found inoperable, the remaining diesel auxiliary board and each unit 3 diesel shall be verified operable immediately and daily thereafter.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
6. From and after the date that the 250-Volt Shutdown board batteries or one of the three 250-Volt unit batteries and/or its associated battery board is found to be inoperable for any reason, continued reactor operation is permissible during the succeeding seven days. Except for routine surveillance testing, 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 tc an operable state.	
7. 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.2 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.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	
8. Undervoltage relays on 1A or 1B start bus may be inoperable for a period of 7 days provided the other start bus and undervoltage relay are operable (within surveillance schedule or 4.9.A.4.a).	
9. Undervoltage relays on a shutdown board may be inoperable 5 days provided the other shutdown boards and undervoltage relays are operable (within surveillance schedule of 4.9.A.4.b).	
10. When one 480 volt shutdown board is found to be inoperable, the reactor will be placed in hot standby within 12 hours and cold shutdown within 24 hours.	
11. If the requirements for operating in the conditions specified by 3.9.B.1 through 3.9.B.12 cannot be met, an orderly shutdown shall be initiated and the reactor shall be shutdown and in the cold condition within 24 hours.	

3.9 BASES

The objective of this specification is to assure an adequate source of electrical power to operate facilities to cool the unit during shutdown and to operate the engineered safeguards following an accident. There are three sources of alternating current electrical energy available, namely, the 161-kV transmission system, the nuclear generating units, and the diesel generators.

The 161-kV offsite power supply consists of two lines which are fed from different sections of the TVA 161-kV grid. In the normal mode of operation, the 161-kV system is operating and four diesel generators are operational. If one diesel generator is out of service, there normally remain the 161-kV sources, and the other three diesel generators. For a diesel generator to be considered operable its associated 125 V battery must be operable.

The minimum fuel oil requirement of 103,300 gallons is sufficient for 7 days of full load operation of 3 diesels and is conservatively based on availability of a replenishment supply.

Offsite auxiliary power for Browns Ferry Nuclear Plant Unit 3 is supplied from two sources: the unit station transformers from the main generator or the 161-kV transmission system through the cooling tower transformers. If a cooling tower transformer is lost, the unit can continue to operate since the station transformer is in service, the other cooling tower transformer is available, and four diesel generators are operational.

The 4-kV bus tie board provides the shutdown boards with backup access to the offsite power system through either cooling tower transformer.

A 4-kV shutdown board is allowed to be out of operation for a brief period to allow for maintenance and testing, providing all remaining 4-kV shutdown boards and associated diesel generators CS, RHR, (LPCI and Containment Cooling) Systems supplied by the remaining 4-kV shutdown boards, and all emergency 480 V power boards are operable.

The 480V diesel Aux board may be out of service for short periods for tests and maintenance.

There are five 250-Volt d-c battery systems each of which consists of a battery, battery charger, and distribution equipment. Three of these systems provide power for unit control functions, operative power for unit motor loads, and alternative drive power for a 115-volt a-c unit preferred motor-generator set. One 250-Volt d-c system provides power for common plant and transmission system control functions, drive power for a 115-Volt a-c plant preferred motor-generator set, and emergency drive power for certain unit large motor loads. The fifth battery system delivers control power to a 4-kV shutdown board.

The 250-Volt d-c system is so arranged, and the batteries sized such, that the loss of any one unit battery will not prevent the safe shutdown and cooldown of all three units in the event of the loss of offsite power and a design basis accident in any one unit. Loss of control power to any engineered safeguard control circuit is annunciated in the main control room of the unit affected.

The station battery supplies loads that are not essential for safe shutdown and cooldown of the nuclear system. This battery was not considered in the accident load calculations.

ENCLOSURE 2

JUSTIFICATION

BROWNS FERRY NUCLEAR PLANT
PROPOSED APPENDIX-A TECHNICAL SPECIFICATION CHANGES
(TVA BFNP TS 141)

Description of Change

1. Delete requirement for cooling tower transformers.

2. Add conditions for the shutdown busses and diesel auxiliary boards to be energized.

3. Specify a limit for operation with the bus tie board out of service.

4. Specify a limit for operation with a 4-kV shutdown bus out of service.

5. Specify a limit for operation with a 480-volt diesel auxiliary board out of service.

6. Specify a limit for operation with a 480-volt shutdown board out of service.

7. Specify a limit for operation with undervoltage relays on a 4-kV start bus out of service.

8. Specify a limit for operation with undervoltage relays on a 4-kV shutdown board out of service.

Reason for Change

1. The cooling tower transformers are not needed for unit operation except in degraded conditions.

2. Shutdown busses and diesel auxiliary boards are necessary for operation of the onsite and offsite power system.

3. The bus tie board is needed in the event a common transformer is removed from service.

4. Specifies a time limit that a 4-kV shutdown bus can be removed from service for maintenance and testing.

5. Specifies a time limit that a 480-volt diesel auxiliary board can be removed from service for maintenance and testing.

6. Specifies a time limit that a 480-volt shutdown board can be removed from service for maintenance and testing.

7. Specifies a time limit that undervoltage relays on a 4-kV start bus can be removed from service for maintenance and testing.

8. Specifies a time limit that undervoltage relays on a 4-kV shutdown board can be removed from service for maintenance and testing.

The proposed changes are intended to resolve ambiguities which exist in the auxiliary electrical system technical specifications. A brief description and reason for each proposed change is attached.