May 2, 1985

Docket Nos. 50-259/260/296

Mr. Hugh G. Parris
Manager of Power
Tennessee Valley Authority
500A Chestnut Street, Tower II
Chattanooga, Tennessee 37401

Dear Mr. Parris:

The Commission has issued the enclosed Amendment Nos. 117 , 112 and 88 to Facility Operating License Nos. DPR-33, DPR-52 and DPR-68 for the Browns Ferry Nuclear Plant, Unit Nos. 1, 2 and 3. These amendments are in response to your application dated October 22, 1984 (TVA BFNP TS 203)

The amendments change the Technical Specifications (Auxiliary Electrical System section) to reflect the 161-kV offsite power system capability, incorporate changes in start bus utilization, and to clarify wording. The changes also delete unnecessary degraded voltage timer relay tolerances and provide settings which more realistically match relay characteristics.

A copy of the Safety Evaluation is also enclosed.

Sincerely,

Richard J. Clark, Project Manager
Operating Reactors Branch #2
Division of Licensing

Enclosures:
1. Amendment No. 117 to License No. DPR-33
2. Amendment No. 112 to License No. DPR-52
3. Amendment No. 88 to License No. DPR-68
4. Safety Evaluation

cc w/enclosures:
See next page

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w/changes to pp. 1, 2, 9 SER as agreed to.

Mr. Hugh G. Parris
Tennessee Valley Authority
Browns Ferry Nuclear Plant, Units 1, 2 and 3

cc:

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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-259

BROWNS FERRY NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 117
License No. DPR-33

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Tennessee Valley Authority (the licensee) dated October 22, 1984, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C(2) of Facility Operating License No. DPR-33 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 117, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: May 2, 1985

ATTACHMENT TO LICENSE AMENDMENT NO. 117

FACILITY OPERATING LICENSE NO. DPR-33

DOCKET NO. 50-259

Revise Appendix A as follows:

1. Remove the following pages and replace with identically numbered pages.

   292, 293, 293a, 294, 294a, 295, 296, 297, 297a, 298, 298a, 299, 300, 301

2. Insert new pages.

   292a, 295a, 296a

3. The marginal lines on these pages denote the area being changed.

4. Remove page.

   297b

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
Applicability	Applicability
Applies to all the auxiliary electrical power system.	Applies to the periodic testing requirements of the auxiliary electrical system.
Objective	Objective
To assure an adequate supply of electrical power for operation of those systems required for safety.	Verify the operability of the auxiliary electrical system.
Specification	Specification
A. Auxiliary Electrical Equipment	A. Auxiliary Electrical System
1. The reactor shall not be started up (made critical) from the cold condition unless the following are satisfied:	1. Diesel Generators
a. Diesel generators A, B, C, and D operable.	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 1-hour period at 75% of rated load or greater.
b. Requirements 3.9.A.3 through 3.9.A.6 are met.	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.
c. At least two of the following offsite power sources are available:	b. Once per operating cycle, a test will be conducted simulating a loss of
(1) The 500-kV system is available to the units 1 and 2 shutdown boards through the unit 1 station-service transformer TUSS 1B with no credit taken for the two 500-kV Trinity lines. If the unit 2 station-service transformer is the second source, a minimum of two 500-kV lines must be available.	

3.9 AUXILIARY ELECTRICAL SYSTEM

(2) The 500-kV system is available to the units 1 and 2 shutdown boards through the unit 2 station-service transformer TUSS 2B with no credit taken for the two 500-kV Trinity lines. If the unit 1 station-service transformer is the second source, a minimum of two 500-kV lines must be available.

(3) The Trinity 161-kV line is available to the units 1 and 2 shutdown boards through both common station-service transformers.

NOTES FOR (3):

(a) If unit 3 is claiming the Trinity line as an offsite source, see unit 3 technical specifications, section 3.9.A.1.c.2.

4.9 AUXILIARY ELECTRICAL SYSTEM

offsite power and similar conditions that would exist with the presence of an actual safety-injection signal to demonstrate the following:

(1) Deenergization of the emergency buses and load shedding from the emergency buses.

(2) The diesel starts from ambient condition on the auto-start signal, energizes the emergency buses with permanently connected loads, energizes the auto-connected emergency loads through load sequencing, and operates for greater than or equal to five minutes while its generator is loaded with the emergency loads.

(3) On diesel generator breaker trip, the loads are shed from the emergency buses and the diesel restarts on the auto-start signal, the emergency buses are energized with permanently

3.9 AUXILIARY ELECTRICAL SYSTEM

(b) If unit 2 is in cold shutdown, only one common station-service transformer is required.

(4) The Athens 161-kV line is available to the units 1 and 2 shutdown boards through a common station-service transformer when unit 2 is in cold shutdown and unit 3 is not claiming the Athens line as an offsite source.

NOTE FOR (3) AND (4): With no cooling tower pumps or fans running, a cooling tower transformer may be substituted for a common station-service transformer.

2. The reactor shall not be started up (made critical) from the hot standby condition unless all of the following conditions are satisfied:

a. At least one offsite power source is available as specified in 3.9.A.1.c.

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

4.9 AUXILARY ELECTRICAL SYSTEM

connected loads, the auto-connected emergency loads are energized through load sequencing, and the diesel operates for greater than or equal to five minutes while its generator is loaded with the emergency loads.

c. Once a month the quantity of diesel fuel available shall be logged.

d. Each diesel generator shall be given an annual inspection in accordance 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. DC Power System - Unit Batteries (250-V), Diesel-Generator Batteries (125-V) and Shutdown Board Batteries (250-V)

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
c. An additional source of power consisting of one of the following: (1) A second offsite power source available as specified in 3.9.A.1.c. (2) A fourth operable units 1 and 2 diesel generator.	a. Every week the specific gravity, voltage and temperature of the pilot cell and overall battery voltage shall be measured and logged.
d. Requirements 3.9.A.3 through 3.9.A.6 are met.	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.
3. Buses and Boards Available	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 months.
a. The respective start bus is energized for each common station-service transformer designated as an offsite power source.	3. Logic Systems
b. The 4-kV bus tie board is energized and capable of supplying power to the units 1 and 2 shutdown boards if a cooling tower transformer is designated as an offsite power source.	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.
c. The units 1 and 2 4-kV shutdown boards are energized.	
d. The 480-V shutdown boards 1A and 1B are energized.	
e. The units 1 and 2 diesel auxiliary boards are energized.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
f. Loss of voltage and degraded voltage relays operable on 4-kV shutdown boards A, B, C, and D.	
g. Shutdown busses 1 and 2 energized.	
h. The 480-V reactor motor-operated valve (RMOV) boards 1D & 1E are energized with motor-generator (mg) sets 1DN, 1DA, 1EN, and 1EA in service.	
4. The three 250-V unit batteries, the four shutdown board batteries, a battery charger for each battery, and associated battery boards are operable.	
5. Logic Systems	
a. Common accident signal logic system is operable.	
b. 480-V load shedding logic system is operable.	
6. There shall be a minimum of 103,300 gallons of diesel fuel in the standby diesel-generator fuel tanks.	
	b. Once every 6 months, the condition under which the 480-V load shedding logic system is required shall be simulated using pendant test switches and/or push-button test switches to demonstrate that the load shedding logic system would initiate load shedding signals on the diesel auxiliary boards, rmov boards, and the 480-V 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 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.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
	d. 4-kV shutdown board voltages shall be recorded once every 12 hours.
	5. 480-V RMOV Boards 1D and 1E
	a. Once per operating cycle the automatic transfer feature for 480-V RMOV boards 1D and 1E shall be functionally tested to verify auto-transfer capability.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
B. Operation with Inoperable Equipment	B. Operation with Inoperable Equipment
Whenever the 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 only one offsite power source is available, reactor operation is permissible for 7 days.	1. When only one offsite power source is operable, 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 4-kV bus tie board becomes inoperable, reactor operation is permissible indefinitely provided one of the required offsite power sources is not supplied from the 161-kV system through the bus tie board.	2. When a required offsite power source is unavailable to unit 1 because the 4-kV bus tie board or a start bus is inoperable, all unit 1 and 2 diesel generators and associated boards shall be demonstrated operable immediately and daily thereafter. The remaining offsite source and associated buses shall be checked 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 2 offsite power sources are available as specified in 3.9.A.1.c and all of the CS, RHR (LPCI and containment cooling) systems, and the remaining three units 1 and 2 diesel generators are operable. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be shut down and in the cold condition within 24 hours.	3. When one of the units 1 and 2 diesel generators 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.
	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 supplied by the remaining 4-kV shutdown boards shall be demonstrated to be operable immediately and daily thereafter.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
4. When one units 1 and 2 4-kV shutdown board is inoperable, continued reactor operation is permissible for a period of 5 days provided that 2 offsite power sources are available as specified in 3.9.A.1.c 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. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be shut down and in the cold condition within 24 hours.	5. When a shutdown bus is found to be inoperable, all 1 and 2 diesel generators shall be proven operable immediately and daily thereafter.
5. When one of the shutdown buses is inoperable, reactor operation is permissible for a period of 7 days.	6. When one units 1 and 2 diesel auxiliary board is found to be inoperable, the remaining diesel auxiliary board and each unit 1 and 2 diesel generator shall be proven operable immediately and daily thereafter.
6. When one of the 480-V diesel auxiliary 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-V unit batteries and/or its associated battery board is found to be inoperable for any reason, continued reactor operation is permissible during the succeeding 7 days. Except for routine surveillance testing, NRC shall be notified within 24	

3.9 AUXILIARY ELECTRICAL SYSTEM

4.9 AUXILIARY ELECTRICAL SYSTEM

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 250-V shutdown 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.

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 exist 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

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
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).	
b. The degraded voltage relay channel which starts the diesel generator for degraded 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-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 shutdown board are operable (within the surveillance schedule of 4.9.A.4.b).	

3.9 AUXILIARY ELECTRICAL SYSTEM

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 under-voltage relays are operable. (Within the surveillance schedule of 4.9.A.4.b).

12. When one 480-V 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 one 480-V RMOV board mg set is inoperable, the reactor may remain in operation for a period not to exceed seven days, provided the remaining 480-V RMOV board mg sets and their associated loads remain operable.

14. If any two 480-V RMOV board mg sets become inoperable, the reactor shall be placed in the cold shutdown condition within 24 hours.

4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
15. If the requirements for operating in the conditions specified by 3.9.B.1 through 3.9.B.14 cannot be met, an orderly shutdown shall be initiated and the reactor shall be shut down and in the cold condition within 24 hours.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM

C. Operation in Cold Shutdown

Whenever the reactor is in cold shutdown condition with irradiated fuel in the 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 energized and capable of supplying power to the units 1 and 2 shutdown boards consisting of at least one of the following:

   a. One of the offsite power sources specified in 3.9.A.1.c.

   b. A third operable diesel generator.

3. At least one 480-V shutdown board for each unit must be operable.

4. One 480-V RMOV board mg set is required for each RMOV board (1D or 1E) required to support operation of the RHR system in accordance with 3.5.B.9.

Table 4.9.A.4.C

VOLTAGE RELAY SETPOINTS/DIESEL GENERATOR START

Relay Location	Trip Level Setting		Remarks
1. 4-kV Shutdown Boards	Trip Setpoint:	0 volts with a 1.5-second time delay	Start diesel generators on loss of offsite power.
	Allowable Values:	± .1 second	
	Trip Range:	1.4 to 1.6 seconds	
	Reset Setpoint:	2870-V	
	Allowable Values:	± 2% of 2870-V	
	Reset Range:	2813-V to 2927-V	
	Undervoltage		
2. 4-kV Shutdown Boards	Trip Setpoint:	3920	Second level undervoltage sensing relays - start diesel generator on degraded voltage.
	Allowable Values:	3900-3940	
	Reset Setpoint:	Reset at ≤ 1.5% above trip value	

	Timer	Setpoint (seconds)	Critical Time (seconds)	
3. 4-kV Shutdown Boards (Timers shown for 4-kV shutdown board A. 4-kV shutdown boards B, C, and D, similar, except for change of suffix.	2-211-1A	0.3 ± 10%	N/A	Auxiliary timers for second level undervoltage sensing relays.
	2-211-2A	4.0 ± 10%	N/A	
	2-211-3A	6.9 ± 10%	8.2	
	2-211-4A	1.3 ± 10%	1.5	The setpoint ranges specified assure that the operating times will be below the critical times specified. These ranges are based on timer repeatability of ± 5% as specified by the manufacturer.

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 500-kV transmission system, and the diesel generators.

The unit station-service transformer B for unit 1 or the unit station-service transformer B for unit 2 provide noninterruptible sources of offsite power from the 500-kV transmission system to the units 1 and 2 shutdown boards. Auxiliary power can also be supplied from the 161-kV transmission system through the common station-service transformers or through the cooling tower transformers by way of the bus tie board. The 4-kV bus tie board may remain out of service indefinitely provided one of the required offsite power sources is not supplied from the 161-kV system through the bus tie board.

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

The degraded voltage sensing relays provide a start signal to the diesel generators in the event that a deteriorated voltage condition exists on a 4-kV shutdown boards. This starting signal is independent of the starting signal generated by the complete loss of voltage relays and will continue to function and start the diesel generators on complete loss of voltage should the loss of voltage relays become inoperable. The 15-day inoperable time limit specified when one of the three phase-to-phase degraded voltage relays is inoperable is justified based on the two out of three permissive logic scheme provided with these relays.

A 4-kV shutdown board is allowed to be out of operation for a brief period to allow for maintenance and testing, provided 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-V dc 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-V ac unit-preferred mg set. One 250-V dc system provides power for common plant and transmission system control functions, drive power for a 115-V ac plant-preferred mg set, and emergency drive power for certain unit large motor loads. The four remaining systems deliver control power to the 4,160-V shutdown boards.

Each 250-V dc shutdown board control power supply can receive power from its own battery, battery charger, or from a spare charger. The chargers are powered from normal plant auxiliary power or from the standby diesel-driven generator system. Zero resistance short circuits between the control power supply and the shutdown board are cleared by fuses located in the respective control power supply. Each power supply is located in the reactor building near the shutdown board it supplies. Each battery is located in its own independently ventilated battery room.

The 250-V dc system is so arranged, and the battereies sized so 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 circuits is annunciated in the main control room of the unit affected. The loss of one 250-V shutdown board battery affects normal control power only for the 4,160-V shutdown board which it supplies. 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.

There are two 480-V ac RMOV boards that contain mg sets in their feeder lines. These 480-V ac RMOV boards have an automatic transfer from their normal to alternate power source (480-V ac shutdown boards). The mg sets act as electrical isolators to prevent a fault from propagating between electrical divisions due to an automatic transfer. The 480-V ac RMOV boards involved provide motive power to valves associated with the LPCI mode of the RHR system. Having an mg set out of service reduces the assurance that full RHR (LPCI) capacity will be available when required. Since sufficient equipment is available to maintain the minimum complement required for RHR (LPCI) operation, a 7-day servicing period is justified. Having two mg sets out of service can considerably reduce equipment availability; therefore, the affected unit shall be placed in cold shutdown within 24 hours.

The offsite power source requirements are based on the capacity of the respective lines. The Trinity line is limited to supplying two operating units because of the load limitations of CSST's A and B. The Athens line is limited to supplying one operating unit because of the load limitations of the Athens line. The limiting conditions are intended to prevent the 161-kV system from supplying more than two units in the event of a single failure in the offsite power system.

4.9 BASES

The monthly test of the diesel generators is 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 overheating 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 wear long before failure.

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-V load shedding logic system to sequentially shed and restart 480-V loads if an accident signal were present and diesel-generator voltage was the only source of electrical power.

REFERENCES

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

2. Standby AC Power Supply and Distribution (BFNP FSAR Subsection 8.5)

3. 250-Volt DC Power Supply and Distribution (BFNP FSAR Subsection 8.6)

4. Memorandum from Gene M. Wilhoite to H. J. Green dated December 4, 1981 (L00 811208 664) and memorandum from C. E. Winn to H. J. Green dated January 10, 1983 (G02 830112 002)

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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-260

BROWNS FERRY NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 112
License No. DPR-52

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Tennessee Valley Authority (the licensee) dated October 22, 1984, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C(2) of Facility Operating License No. DPR-52 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 112, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: May 2, 1985

ATTACHMENT TO LICENSE AMENDMENT NO. 112

FACILITY OPERATING LICENSE NO. DPR-52

DOCKET NO. 50-260

Revise Appendix A as follows:

1. Remove the following pages and replace with identically numbered pages.

   292, 293, 293a, 294, 294a, 295, 296, 297, 297a, 298, 298a, 299, 300, 301

2. Insert new pages.

   292a, 295a, 296a

3. The marginal lines on these pages denote the area being changed.

4. Delete page.

   297b

LIMITING CONDITIONS FOR OPERATION

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

1. The reactor shall not be started up (made critical) from the cold condition unless the following are satisfied:

   a. Diesel generators A, B, C, and D operable.

   b. Requirements 3.9.A.3 through 3.9.A.6 are met.

   c. At least two of the following offsite power sources are available:

      (1) The 500-kV system is available to the units 1 and 2 shutdown boards through the unit 1 station-service transformer TUSS 1B with no credit taken for the two 500-kV Trinity lines. If the unit 2 station-service transformer is the second source, a minimum of two 500-kV lines must be available.

SURVEILLANCE REQUIREMENTS

4.9 AUXILIARY ELECTRICAL SYSTEM

Applicability

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

Objective

Verify the operability of the auxiliary electrical system.

Specification

A. Auxiliary Electrical System

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 1-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 simulating a loss of

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
(2) The 500-kV system is available to the units 1 and 2 shutdown boards through the unit 2 station-service transformer TUSS 2B with no credit taken for the two 500-kV Trinity lines. If the unit 1 station-service transformer is the second source, a minimum of two 500-kV lines must be available.	offsite power and similar conditions that would exist with the presence of an actual safety-injection signal to demonstrate the following:
(3) The Trinity 161-kV line is available to the units 1 and 2 shutdown boards through both common station-service transformers.	(1) Deenergization of the emergency buses and load shedding from the emergency buses.
NOTES FOR (3):	(2) The diesel starts from ambient condition on the auto-start signal, energizes the emergency buses with permanently connected loads, energizes the auto-connected emergency loads through load sequencing, and operates for greater than or equal to five minutes while its generator is loaded with the emergency loads.
(a) If unit 3 is claiming the Trinity line as an offsite source, see unit 3 technical specifications, section 3.9.A.1.c.2.	(3) On diesel generator breaker trip, the loads are shed from the emergency buses and the diesel restarts on the auto-start signal, the emergency buses are energized with permanently

3.9 AUXILIARY ELECTRICAL SYSTEM

(b) If unit 1 is in cold shutdown, only one common station-service transformer is required.

(4) The Athens 161-kV line is available to the units 1 and 2 shutdown boards through a common station-service transformer when unit 1 is in cold shutdown and unit 3 is not claiming the Athens line as an offsite source.

NOTE FOR (3) AND (4): With no cooling tower pumps or fans running, a cooling tower transformer may be substituted for a common station-service transformer.

2. The reactor shall not be started up (made critical) from the hot standby condition unless all of the following conditions are satisfied:

a. At least one offsite power source is available as specified in 3.9.A.1.c.

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

4.9 AUXILARY ELECTRICAL SYSTEM

connected loads, the auto-connected emergency loads are energized through load sequencing, and the diesel operates for greater than or equal to five minutes while its generator is loaded with the emergency loads.

c. Once a month the quantity of diesel fuel available shall be logged.

d. Each diesel generator shall be given an annual inspection in accordance 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. DC Power System - Unit Batteries (250-V), Diesel-Generator Batteries (125-V) and Shutdown Board Batteries (250-V)

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
c. An additional source of power consisting of one of the following: (1) A second offsite power source available as specified in 3.9.A.1.c. (2) A fourth operable units 1 and 2 diesel generator. d. Requirements 3.9.A.3 through 3.9.A.6 are met. 3. Buses and Boards Available a. The respective start bus is energized for each common station-service transformer designated as an offsite power source. b. The 4-kV bus tie board is energized and capable of supplying power to the units 1 and 2 shutdown boards if a cooling tower transformer is designated as an offsite power source. c. The units 1 and 2 4-kV shutdown boards are energized. d. The 480-V shutdown boards 2A and 2B are energized. e. The units 1 and 2 diesel auxiliary boards are energized.	a. Every week the specific gravity, voltage, and temperature of the pilot 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 months. 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.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
f. Loss of voltage and degraded voltage relays operable on 4-kV shutdown boards A, B, C, and D.	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 push-button test switches to demonstrate that the load shedding logic system would initiate load shedding signals on the diesel auxiliary boards, rmov boards, and the 480-V shut-down boards.
g. Shutdown busses 1 and 2 energized.	
h. The 480V reactor motor-operated valve (RMOV) boards 2D & 2E are energized with motor-generator (mg) sets 2DN, 2DA, 2EN, and 2EA in service.	
4. The three 250-V unit batteries, the four shut-down board batteries, a battery charger for each battery, and associated battery boards are operable.	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 demonstrate that the associated diesel generator will start.
5. Logic Systems a. Common accident signal logic system is operable. b. 480-V load shedding logic system is operable.	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.
6. 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 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
	d. 4-kV shutdown board voltages shall be recorded once every 12 hours.
	5. 480V RMOV Boards 2D and 2E
	a. Once per operating cycle the automatic transfer feature for 480V RMOV boards 2D and 2E shall be functionally tested to verify auto-transfer capability.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
B. Operation with Inoperable Equipment	B. Operation with Inoperable Equipment
Whenever the 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 only one offsite power source is available, reactor operation is permissible for 7 days.	1. When only one offsite power source is operable, 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 4-kV bus tie board becomes inoperable, reactor operation is permissible indefinitely provided one of the required offsite power sources is not supplied from the 161-kV system through the bus tie board.	2. When a required offsite power source is unavailable to unit 1 because the 4-kV bus tie board or a start bus is inoperable, all unit 1 and 2 diesel generators and associated boards shall be demonstrated operable immediately and daily thereafter. The remaining offsite source and associated buses shall be checked 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 2 offsite power sources are available as specified in 3.9.A.1.c and all of the CS, RHR (LPCI and containment cooling) systems, and the remaining three units 1 and 2 diesel generators are operable. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be shut down and in the cold condition within 24 hours.	3. When one of the units 1 and 2 diesel generators 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.
	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 supplied by the remaining 4-kV shutdown boards shall be demonstrated to be operable immediately and daily thereafter.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
4. When one units 1 and 2 4-kV shutdown board is inoperable, continued reactor operation is permissible for a period of 5 days provided that 2 offsite power sources are available as specified in 3.9.A.1.c 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. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be shut down and in the cold condition within 24 hours.	5. When a shutdown bus is found to be inoperable, all 1 and 2 diesel generators shall be proven operable immediately and daily thereafter.
5. When one of the shutdown buses is inoperable, reactor operation is permissible for a period of 7 days.	6. When one units 1 and 2 diesel auxiliary board is found to be inoperable, the remaining diesel auxiliary board and each unit 1 and 2 diesel generator shall be proven operable immediately and daily thereafter.
6. When one of the 480-V diesel auxiliary 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-V unit batteries and/or its associated battery board is found to be inoperable for any reason, continued reactor operation is permissible during the succeeding 7 days. Except for routine surveillance testing, NRC shall be notified within 24 hours of the situation,	

3.9 AUXILIARY ELECTRICAL SYSTEM

4.9 AUXILIARY ELECTRICAL SYSTEM

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 250-V shutdown 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

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 plan to return the failed component to an operable state.

10. (deleted)

11. The following limiting conditions for operation exist for the undervoltage relays which start the diesel generators on the 4-kV shutdown boards.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
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).	
b. The degraded voltage relay channel which starts the diesel generator for degraded voltage on a 4-kV shutdown board may be in operable 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-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.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
1. The other two phase-to-phase 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 surveillance schedule of 4.9.A.4.b).	
12. When one 480-V 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 one 480-V RMOV board mg set is inoperable, the reactor may remain in operation for a period not to exceed seven days, provided the remaining 480-V RMOV board mg sets and their associated loads remain operable.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
14. If any two 480-V RMOV board mg sets become inoperable, the reactor shall be placed in the cold shutdown condition within 24 hours.	
15. If the requirements for operating in the conditions specified by 3.9.B.1 through 3.9.B.14 cannot be met, an orderly shutdown shall be initiated and the reactor shall be shut down and in the cold condition within 24 hours.	

3.9 AUXILIARY ELECTRICAL SYSTEM

C. Operation in Cold Shutdown

Whenever the reactor is in cold shutdown condition with irradiated fuel in the 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 energized and capable of supplying power to the units 1 and 2 shutdown boards consisting of at least one of the following:

   a. One of the offsite power sources specified in 3.9.A.1.c.

   b. A third operable diesel generator.

3. At least one 480-V shutdown board for each unit must be operable.

4. One 480-V RMOV board mg set is required for each RMOV board (2D or 2E) required to support operation of the RHR system in accordance with 3.5.B.9.

4.9 AUXILIARY ELECTRICAL SYSTEM

Table 4.9.A.4.C

VOLTAGE RELAY SETPOINTS/DIESEL GENERATOR START

Relay Location	Trip Level Setting		Remarks
1. 4-kV Shutdown Boards	Trip Setpoint:	0 volts with a 1.5-second time delay	Start diesel generators on loss of offsite power.
	Allowable Values:	± .1 second	
	Trip Range:	1.4 to 1.6 seconds	
	Reset Setpoint:	2870-V	
	Allowable Values:	± 2% of 2870-V	
	Reset Range:	2813-V to 2927-V	
	Undervoltage		
2. 4-kV Shutdown Boards	Trip Setpoint:	3920	Second level undervoltage sensing relays - start diesel generator on degraded voltage.
	Allowable Values:	3900-3940	
	Reset Setpoint:	Reset at ≤ 1.5% above trip value	

	Timer	Setpoint (seconds)	Critical Time (seconds)	
3. 4-kV Shutdown Boards (Timers shown for 4-kV shutdown board A. 4-kV shutdown boards B, C, and D, similar, except for change of suffix.)	2-211-1A	0.3 ± 10%	N/A	Auxiliary timers for second level undervoltage sensing relays.
	2-211-2A	4.0 ± 10%	N/A	
	2-211-3A	6.9 ± 10%	8.2	The setpoint ranges specified assure that the operating times will be below the critical times specified. These ranges are based on timer repeatability of ± 5% as specified by the manufacturer.
	2-211-4A	1.3 ± 10%	1.5	

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 500-kV transmission system and the diesel generators.

The unit station-service transformer B for unit 1 or the unit station-service transformer B for unit 2 provide noninterruptible sources of offsite power from the 500-kV transmission system to the units 1 and 2 shutdown boards. Auxiliary power can also be supplied from the 161-kV transmission system through the common station-service transformers or through the cooling tower transformers by way of the bus tie board. The 4-kV bus tie board may remain out of service indefinitely provided ore of the required offsite power sources is not supplied from the 161-kV system through the bus tie board.

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

The degraded voltage sensing relays provide a start signal to the diesel generators in the event that a deteriorated voltage condition exists on a 4-kV shutdown board. This starting signal is independent of the starting signal generated by the complete loss of voltage relays and will continue to function and start the diesel generators on complete loss of voltage should the loss of voltage relays become inoperable. The 15-day inoperable time limit specified when one of the three phase-to-phase degraded voltage relays is inoperable is justified based on the two out of three permissive logic scheme provided with these relays.

A 4-kV shutdown board is allowed to be out of operation for a brief period to allow for maintenance and testing, provided 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-V dc 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-V ac unit-preferred mg set. One 250-V dc system provides power for common plant and transmission system control functions, drive power for a 115-volt ac plant preferred mg set, and emergency drive power for certain unit large motor loads. The four remaining system deliver control power to the 4,160-V shutdown boards.

Each 250-V dc shutdown board control power supply can receive power from its own battery, battery charger, or from a spare charger. The chargers are powered from normal plant auxiliary power or from the standby diesel-driven generator system. Zero resistance short circuits between the control power supply and the shutdown board are cleared by fuses located in the respective control power supply. Each power supply is located in the reactor building near the shutdown board it supplies. Each battery is located in its own independently ventilated battery room.

The 250-V dc system is so arranged, and the batteries sized so 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 circuits is annunciated in the main control room of the unit affected. The loss of one 250-V shutdown board battery affects normal control power only for the 4,160-V shutdown board which it supplies. 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.

There are two 480-V ac RMOV boards that contain mg sets in their feeder lines. These 480-V ac RMOV boards have an automatic transfer from their normal to alternate power source (480-V ac shutdown boards). The mg sets act as electrical isolators to prevent a fault from propagating between electrical divisions due to an automatic transfer. The 480-V ac RMOV boards involved provide motive power to valves associated with the LPCI mode of the RHR system. Having an mg set out of service reduces the assurance that full RHR (LPCI) capacity will be available when required. Since sufficient equipment is available to maintain the minimum complement required for RHR (LPCI) operation, a 7-day servicing period is justified. Having two mg sets out of service can considerably reduce equipment availability; therefore, the affected unit shall be placed in cold shutdown within 24 hours.

The offsite power source requirements are based on the capacity of the respective lines. The Trinity line is limited to supplying two operating units because of the load limitations of CSST's A and B. The Athens line is limited to supplying one operating unit because of the load limitations of the Athens line. The limiting conditions are intended to prevent the 161-kV system from supplying more than two units in the event of a single failure in the offsite power system.

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 tempreature ensures that there is no overheating 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 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, 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 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 AC Power Supply and Distribution (BFNP FSAR Subsection 8.5)

3. 250-Volt DC Power Supply and Distribution (BFNP FSAR Subsection 8.6)

4. Memorandum from Gene M. Wilhoite to H. J. Green dated December 4, 1981 (L00 811208 664) and memorandum from C. E. Winn to H. J. Green dated January 10, 1983 (G02 830112 002)

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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-296

BROWNS FERRY NUCLEAR PLANT, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 88
License No. DPR-68

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Tennessee Valley Authority (the licensee) dated October 22, 1984, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C(2) of Facility Operating License No. DPR-68 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 88 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: May 2, 1985

ATTACHMENT TO LICENSE AMENDMENT NO. 88

FACILITY OPERATING LICENSE NO. DPR-68

DOCKET NO. 50-296

Revise Appendix A as follows:

1. Remove the following pages and replace with identically numbered pages.

   vii, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325,

   326, 327, 328, 329, 330

2. The marginal lines on these pages denote the area being changed.

3. Delete pages.

   325b, 326a

LIMITING CONDITIONS FOR OPERATION

3.9 AUXILIARY ELECTRICAL SYSTEM

Applicability

Applies to 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

1. The reactor shall not be started up (made critical) from the cold condition unless the following are satisfied:

   a. Diesel generators 3A, 3B, 3C, and 3D operable.

   b. Requirements 3.9.A.3 through 3.9.A.6 are met.

   c. At least two of the following offsite power sources are available:

      (1) The 500-kV system is available to the unit 3 shutdown boards through the unit 3 station-service transformer TUSS 3B with no credit taken for the two 500-kV Trinity lines.

SURVEILLANCE REQUIREMENTS

4.9 AUXILIARY ELECTRICAL SYSTEM

Applicability

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

Objective

Verify the operability of the auxiliary electrical system.

Specification

A. Auxiliary Electrical Equipment

1. Diesel Generators

   a. Each unit 3 diesel generator shall be manually started and loaded once each month to demonstrate operational readiness. The test shall continue for at least a 1-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.

3.9 AUXILIARY ELECTRICAL SYSTEM

(2) The Trinity 161-kV line is available to the unit 3 shutdown boards through a common station-service or cooling tower transformer.

NOTE FOR (2):.. If units 1 and 2 are both in operation and claiming the Trinity line as an offsite source, TUSS 3B must be claimed as the other offsite source for unit 3.

(3) The Athens 161-kV line is available to the unit 3 shutdown boards through a common station-service or cooling tower transformer.

NOTE FOR (3): If either unit 1 or unit 2 is claiming the Athens line as an offsite source, it may not be claimed as an offsite source for unit 3.

NOTE FOR (2)AND (3): If both Athens and Trinity lines are claimed as the two offsite sources for unit 3, no credit may be taken for the Athens-Trinity line tie breaker. Specifically, the Athens line supplies unit 3 through common station-service transformer A or cooling tower transformer 1,

AUXILIARY ELECTRICAL SYSTEM

b. Once per operating cycle, a test will be conducted simulating a loss of offsite power and similar conditions that would exist with the presence of an actual safety-injection signal to demonstrate the following:

(1) Deenergization of the emergency buses and load shedding from the emergency buses.

(2) The diesel starts from ambient condition on the auto-start signal, energizes the emergency buses with permanently connected loads, energizes the auto-connected emergency loads through load sequencing and operates for greater than or equal to five minutes while its generator is loaded with the emergency loads.

(3) On diesel generator breaker trip, the loads are shed from

LIMITING CONDITIONS FOR OPERATION

3.9 AUXILIARY ELECTRICAL SYSTEM

NOTE: (Continued) and the Trinity line must supply unit 3 through common station-service transformer B or cooling tower transformer 2.

2. The reactor shall not be started up (made critical) from the hot standby condition unless all of the following conditions are satisfied:

a. At least one offsite power source is available as specified in 3.9.A.1.c.

b. Three unit 3 diesel generators shall be operable.

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

(1) A second offsite power source available as specified in 3.9.A.1.c.

(2) A fourth unit 3 diesel generator operable.

d. Requirements 3.9.A.3 through 3.9.A.6 are met.

SURVEILLANCE REQUIREMENTS

4.9 AUXILIARY ELECTRICAL SYSTEM

the emergency buses and the diesel restarts on the auto-start signal, the emergency buses are energized with permanently connected loads, the auto-connected emergency loads are energized through load sequencing, and the diesel operates for greater than or equal to five minutes while its generator is loaded with the emergency loads.

c. Once a month the quantity of diesel fuel available shall be logged.

d. Each diesel generator shall be given an annual inspection in accordance 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.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
A. 3. Buses and Boards Available	
a. The respective start bus is energized for each common station-service transformer designated as an offsite power source.	
b. The 4-kV bus tie board is energized if a cooling tower transformer is designated as an offsite power source.	
c. The 4-kV shutdown boards (3EA, 3EB, 3EC, 3ED) are energized.	
d. The 480-V shutdown boards 3A and 3B are energized.	
e. Loss of voltage and degraded voltage relays operable on 4-kV shutdown boards, 3EA, 3EB, 3EC, and 3ED.	
f. The 480-V diesel auxiliary boards 3EA and 3EB are energized.	
g. The 480-V RMOV boards 3D and 3E are energized with mg sets 3DN, 3DA, 3EN, and 3EA in service.	
4. The 250-V shutdown board 3EB battery, all three unit batteries, a battery charger for each battery, and associated battery boards are operable.	
5. Accident signal logic system is operable.	
	2. DC Power System - Unit Batteries (250-V), Diesel-Generator Batteries (125-V) and Shutdown Board Battery (250-V)
	a. Every week the specific gravity, voltage, and temperature of the pilot 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 months.
	3. Logic Systems
	a. Both divisions of the accident signal logic system shall be tested every 6 months to demonstrate that it will function on actuation of the core spray system of the reactor to provide an automatic start signal to all 4 diesel generators.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
6. There shall be a minimum of 103,300 gallons of diesel fuel in the unit 3 standby diesel-generator fuel tanks.	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 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 3D and 3E a. Once per operating cycle, the automatic transfer feature for 480-V RMOV boards 3D and 3E shall be functionally tested to verify auto-transfer capability.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
B. Operation with Inoperable Equipment	B. Operation with Inoperable Equipment
Whenever the 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 only one offsite power source is available, reactor operation is permissible under this condition for seven days.	1. When only one offsite power source is operable, all unit 3 diesel generators and associated boards must be demonstrated to be operable immediately and daily thereafter.
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 two offsite power sources are available as specified in 3.9.A.1.c and all of the CS, RHR (LPCI and containment cooling) systems, and the remaining three unit 3 diesel generators are operable. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be shut down and in the cold condition within 24 hours.	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. From and after the date that the 4-kV bus tie board becomes inoperable, reactor operation is permissible indefinitely provided one of the required offsite power sources is not supplied from the 161-kV system through the bus tie board.	3. When a required offsite power source is unavailable because the 4-kV bus tie board or a start bus is inoperable, all unit 3 diesel generators and associated boards shall be demonstrated operable immediately and daily thereafter. The remaining offsite source and associated buses shall be checked to be energized daily.
	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.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 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 of 5 days, provided that two offsite power sources are available, as specified in 3.9.A.1.c 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 shut down and in the cold condition within 24 hours.	5. When one 480-V diesel auxiliary board is found inoperable, the remaining diesel auxiliary board and each unit 3 diesel shall be verified operable immediately and daily thereafter.
5. From and after the date that one of the 480-V diesel auxiliary boards becomes inoperable, reactor operation is permissible for a period of 5 days.	
6. From and after the date that the 250-V shutdown board 3EB battery or one of the three 250-V 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.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
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.	
8. (deleted)	
9. The following limiting conditions for operation exists for the undervoltage relays which start the diesel generator 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).	
b. The degraded voltage relay channel which starts the diesel generator for degraded voltage on a 4-kV shutdown board may be	

3.9 AUXILIARY ELECTRICAL SYSTEM

4.9 AUXILIARY ELECTRICAL SYSTEM

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-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 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

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
boards and under-voltage relays are operable. (Within the surveillance schedule of 4.9.A.4.b).	
10. When one 480-V 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 one 480-V RMOV board mg set is inoperable, the reactor may remain in operation for a period not to exceed seven days, provided the remaining 480-V RMOV board mg sets and their associated loads remain operable.	
12. If any two 480-V RMOV board mg sets become inoperable, the reactor shall be placed in the cold shutdown condition within 24 hours.	
13. If the requirements for operation 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 shut down and in the cold condition within 24 hours.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
C. Operation in Cold Shutdown Condition Whenever the reactor is in the cold shutdown condition with irradiated fuel in the reactor, the availability of electric power shall be as specified in Section 3.9.A except as specified herein. 1. At least two unit 3 diesel generators and their associated 4-kV shutdown boards shall be operable. 2. An additional source of power energized and capable of supplying power to the unit 3 shutdown boards consisting of at least one of the following: a. One of the offsite power sources specified in 3.9.A.1.c. b. A third operable diesel generator. 3. At least one unit 3 480-V shutdown board must be operable. 4. One 480-V RMOV board motor generator(mg) set is required for each rmov board (3D or 3E) required to support operation of the RHR system in accordance with 3.5.B.9.	

Table 4.9.A.4.C

VOLTAGE RELAY SETPOINTS/DIESEL GENERATOR START

Relay Location	Trip Level Setting		Remarks
1. 4-kV Shutdown Boards	Trip Setpoint:	0 volts with a 1.5-second time delay	Start diesel generators on loss of offsite power.
	Allowable Values:	± .1 second	
	Trip Range:	1.4 to 1.6 seconds	
	Reset Setpoint:	2870-V	
	Allowable Values:	± 2% of 2870-V	
	Reset Range:	2813-V to 2927-V	
	Undervoltage		
2. 4-kV Shutdown Boards	Trip Setpoint:	3920	Second level undervoltage sensing relays - start diesel generator on degraded voltage.
	Allowable Values:	3900-3940	
	Reset Setpoint:	Reset at ≤ 1.5% above trip value	

	Timer	Setpoint (seconds)	Critical Time (seconds)	
3. 4-kV Shutdown Boards (Timers shown for 4-kV shutdown board 3EA. 4-kV shutdown boards 3EB, 3EC, and 3ED, similar, except for change of suffix.)	2-211-1A	0.3 ± 10%	N/A	Auxiliary timers for second level undervoltage sensing relays.
	2-211-2A	4.0 ± 10%	N/A	
	2-211-3A	6.9 ± 10%	8.2	The setpoint ranges specified assure that the operating times will be below the critical times specified. These ranges are based on timer repeatability of ± 5% as specified by the manufacturer.
	2-211-4A	1.3 ± 10%	1.5	

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 500-kV transmission system, and the diesel generators.

The unit station-service transformer B for unit 3 provides a noninterruptible source of offsite power from the 500-kV transmission system to the unit 3 shutdown boards. Auxiliary power can also be supplied from the 161-kV transmission system through the common station-service transformers or through the cooling tower transformers by way of the bus tie board. The 4-kV bus tie board may remain out of service indefinitely provided one of the required offsite power sources is not supplied from the 161-kV system through the bus tie board.

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.

The degraded voltage sensing relays provide a start signal to the diesel generators in the event that a deteriorated voltage condition exists on a 4-kV shutdown board. This starting signal is independent of the starting signal generated by the complete loss of voltage relays and will continue to function and start the diesel generators on complete loss of voltage should the loss of voltage relays become inoperable. The 15-day inoperable time limit specified when one of the three phhase-to-phase degraded voltage relays is inoperable is justified based on the two out of three permissive logic scheme provided with these relays.

A 4-kV shutdown board is allowed to be out of operation for a brief period to allow for maintenance and testing, provided 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 480-V diesel auxiliary board may be out of service for short periods for tests and maintenance.

There are five 250-V dc battery systems associated with unit 3, each of which consist 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-V ac unit-preferred mg set. One 250-V dc system provides power for common plant and transmission system control functions, drive power for a 115-V ac plant-preferred mg 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-V dc system is so arranged and the batteries sized so 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 accidnet load calculations.

There are two 480-V ac RMOV boards that contain mg sets in their feeder lines. These 480-V ac RMOV boards have an automatic transfer from their normal to alternate power source (480-V ac shutdown boards). The mg sets act as electrical isolators to prevent a fault from propagating between electrical divisions due tc an automatic transfer. The 480-V ac RMOV boards involved provide motive power to valves associated with the LPCI mode of the RHR system. Having an mg set out of service reduces the assurance that full RHR (LPCI) capacity will be available when required. Since sufficient equipment is available to maintain the minimum complement required for RHR (LPCI) operation, a 7-day servicing period is justified. Having two mg sets out of service can considerably reduce equipment availability; therefore, the affected unit shall be placed in cold shutdown within 24 hours.

The offsite power source requirements are based on the capacity of the respective lines. The Trinity line is limited to supplying two operating units because of the load limitations of CSST's A and B. The Athens line is limited to supplying one operating unit because of the load limitations of the Athens line. The limiting conditions are intended to prevent the 161-kV system from supplying more than two units in the event of a single failure in the offsite power system.

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 overheating 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 wear 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 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 system 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 start buses or 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)

4. Memorandum from G. M. Wilhoite to H. J. Green dated December 4, 1981 (L00 811208 664) and memorandum from C. E. Winn to H. J. Green dated January 10, 1983 (G02 830112 002)

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 117 TO FACILITY OPERATING LICENSE NO. DPR-33, AMENDMENT NO. 112 TO FACILITY OPERATING LICENSE NO. DPR-52, AND AMENDMENT NO. 88 TO FACILITY OPERATING LICENSE NO. DPR-68

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2 AND 3

DOCKET NOS. 50-259, 50-260 AND 50-296

1.0 Introduction

By letter dated October 22, 1984 (TS 203) the Tennessee Valley Authority (the licensee or TVA) requested amendments to Facility Operating License Nos. DPR-33, DPR-52 and DPR-68 for the Browns Ferry Nuclear Plant, Units 1, 2 and 3.

The proposed specifications would revise the Technical Specifications (TS) Auxiliary Electrical System section to reflect the 161-kV offsite power system capability, incorporate changes in start bus utilization, and to clarify wording. The proposed changes would also delete unnecessary degraded voltage timer relay tolerances and provide settings which more realistically match relay characteristics.

2.0 Discussion and Evaluation

The staff has reviewed the proposed TS changes and supporting bases and concluded that the following changes are acceptable:

A. For Units 1 and 2, the 161kV Athens and Trinity lines to Browns Ferry, previously credited as one offsite power source, may, for no more than two units in operation, be considered as two distinct offsite power sources. This will simplify the requirements for the offsite power sources, even though the system design has not changed. This change increases availability of offsite sources to individual units and results in reducing the potential for a unit shutdown.

B. Surveillance requirements for the bus-tie board, for Units 1 and 2, are reinstated to assure a power path to shutdown buses of Units 1 and 2 from the 161 kV lines, the third offsite source. (This requirement already exists for Unit 3.)

C. In Table 4.9.A.4.c of Units 1 and 2, the value for timer uncertainty for the undervoltage relay on the 4 kV shutdown boards was revised to reflect more practical values commensurate with that for Unit 3 which were approved March 29, 1982, in Amendment No. 52.

D. The following revisions apply to all three units.

(1) The descriptive language throughout TS 3.9.A was simplified to eliminate ambiguity of offsite source selection.

(2) TS 4.9.A.1, rewords a surveillance requirement relating to automatic load sequencing on diesel generators, to clarify that there is no load sequencer. (Load sequencing is accomplished by timers and relays.)

(3) The complete text of TS 3.9 and TS 4.9 are revised to identify specific transformers and to state when (and how) substitution is allowed.

(4) In TS 4.9.A.2a, the requirement to record the temperature of the cell adjacent to the pilot cell for the unit batteries, diesel generator batteries and shutdown board batteries on a seven-day basis is removed. However, the temperature for the pilot cell will be monitored weekly. The temperature of each cell will still be measured and recorded every three months in accordance with 4.9.A.2.b. These changes more clearly reflect the surveillance described in the BWR Standard Technical Specification (NUREG-0123).

In summary, the changes clarify the text to eliminate ambiguity, reinstate the bus-tie board operability requirements, and bring Units 1 and 2 offsite power source requirements into accord with Unit 3 Technical Specifications. Based on the above, we find these changes acceptable.

3.0 Environmental Considerations

The amendments involve a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes in surveillance requirements. The staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration and there has been no public comment on such finding. Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

4.0 Conclusion

We have concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's

regulations, and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: S. Rhow

Dated: May 2, 1985