



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

March 9, 1994

Docket Nos. 50-259, 50-260
and 50-296

Mr. Oliver D. Kingsley, Jr.
President, TVA Nuclear and
Chief Nuclear Officer
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Dear Dr. Medford:

SUBJECT: ISSUANCE OF TECHNICAL SPECIFICATION AMENDMENTS MODIFYING
EMERGENCY DIESEL GENERATOR OPERABILITY REQUIREMENTS FOR
PLANT SHARED SYSTEMS - BROWNS FERRY, UNITS 1, 2, AND 3
(TS 304) (TAC NOS. M82653, M82654 AND M82655)

The Commission has issued the enclosed Amendment Nos. 203, 222, and 176 to Facility Operating License Nos. DPR-33, DPR-52, and DPR-68 for the Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3. The amendments are in response to your application dated January 10, 1992, addressing emergency diesel generator (EDG) operability for the plant shared systems of Standby Gas Treatment and Control Room Emergency Ventilation.

Current Technical Specifications (TS) in this area are directed at operation of Unit 2 only. As such, they implicitly recognize a separate requirement for Units 1 and 2 EDG operability and only address the additional Unit 3 EDGs that supply emergency power to the shared systems. The subject TS amendments support Unit 3 restart by addressing all facility EDGs associated with the shared systems and by requiring those EDGs to be available whenever any unit's TS require operability of the shared systems.

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Mr. Oliver D. Kingsley

- 2 -

March 9, 1994

A copy of the NRC's Safety Evaluation is enclosed. A Notice of Issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,

ORIGINAL SIGNED BY
JOSEPH F. WILLIAMS

David C. Trimble, Project Manager
Project Directorate II-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Amendment No. 203 to License No. DPR-33
- 2. Amendment No. 222 to License No. DPR-52
- 3. Amendment No. 176 to License No. DPR-68
- 4. Safety Evaluation

cc w/enclosures:
See next page

*see previous concurrence

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DATE:	3/9/94	3/9/94	3/9/94	03/04/94	3/9/94

DOCUMENT NAME: G:\BFN\TS304.AMD

RST for 3/10/94

AMENDMENT NO. 203 FOR BROWNS FERRY UNIT 1 - DOCKET NO. 50-259
AMENDMENT NO. 222 FOR BROWNS FERRY UNIT 2 - DOCKET NO. 50-260
AMENDMENT NO. 176 FOR BROWNS FERRY UNIT 3 - DOCKET NO. 50-296
DATED: March 9, 1994

Distribution

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

TENNESSEE VALLEY AUTHORITY
DOCKET NO. 50-259
BROWNS FERRY NUCLEAR PLANT, UNIT 1
AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 203
License No. DPR-33

- I. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Tennessee Valley Authority (the licensee) dated January 10, 1992, 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.

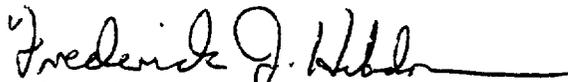
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-52 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 203, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Frederick J. Hebdon, Director
Project Directorate II-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: **March 9, 1994**

ATTACHMENT TO LICENSE AMENDMENT NO. 203

FACILITY OPERATING LICENSE NO. DPR-33

DOCKET NO. 50-259

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change. Spillover* page is provided to maintain document completeness.

REMOVE

iii
iv
3.9/4.9-15
3.9/4.9-15a

3.9/4.9-21
3.9/4.9-22

INSERT

iii
iv*
3.9/4.9-15
3.9/4.9-15a
3.9/4.9-15b
3.9/4.9-15c
3.9/4.9-21
3.9/4-9-22

<u>Section</u>	<u>Page No.</u>
E. Jet Pumps	3.6/4.6-11
F. Recirculation Pump Operation	3.6/4.6-12
G. Structural Integrity	3.6/4.6-13
H. Snubbers	3.6/4.6-15
3.7/4.7 Containment Systems	3.7/4.7-1
A. Primary Containment.	3.7/4.7-1
B. Standby Gas Treatment System	3.7/4.7-13
C. Secondary Containment.	3.7/4.7-16
D. Primary Containment Isolation Valves	3.7/4.7-17
E. Control Room Emergency Ventilation	3.7/4.7-19
F. Primary Containment Purge System	3.7/4.7-21
G. Containment Atmosphere Dilution System (CAD)	3.7/4.7-22
H. Containment Atmosphere Monitoring (CAM) System H ₂ Analyzer	3.7/4.7-24
3.8/4.8 Radioactive Materials	3.8/4.8-1
A. Liquid Effluents	3.8/4.8-1
B. Airborne Effluents	3.8/4.8-3
C. (Deleted).	3.8/4.8-4
D. Mechanical Vacuum Pump	3.8/4.8-4
E. Miscellaneous Radioactive Materials Sources.	3.8/4.8-5
F. (Deleted).	3.8/4.8-6
3.9/4.9 Auxiliary Electrical System	3.9/4.9-1
A. Auxiliary Electrical Equipment	3.9/4.9-1
B. Operation with Inoperable Equipment.	3.9/4.9-8
C. Operation in Cold Shutdown	3.9/4.9-15
D. Diesel Generators Required For Units 1, 2, and 3 Shared Systems	3.9/4.9-15a

<u>Section</u>	<u>Page No.</u>
3.10/4.10 Core Alterations	3.10/4.10-1
A. Refueling Interlocks	3.10/4.10-1
B. Core Monitoring.	3.10/4.10-5
C. Spent Fuel Pool Water.	3.10/4.10-7
D. Reactor Building Crane	3.10/4.10-8
E. Spent Fuel Cask.	3.10/4.10-9
F. Spent Fuel Cask Handling-Refueling Floor	3.10/4.10-10
3.11/4.11 Deleted.	3.11/4.11-1
5.0 Major Design Features	5.0-1
5.1 Site Features.	5.0-1
5.2 Reactor.	5.0-1
5.3 Reactor Vessel	5.0-1
5.4 Containment.	5.0-1
5.5 Fuel Storage	5.0-1
5.6 Seismic Design	5.0-2

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.9.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.

4.9.C. Operation in Cold Shutdown

1. No additional surveillance is required.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.9.D. Diesel Generators Required for Units 1, 2, and 3 Shared Systems

1. Whenever standby gas treatment is required to be OPERABLE in accordance with Specification 3.7.B and/or control room emergency ventilation is required to be OPERABLE in accordance with Specification 3.7.E, the associated diesel generator aligned to supply emergency power to that equipment shall be OPERABLE.
 - a. Standby gas treatment train A and/or control room emergency ventilation train A - Diesel generator 1/2A or 1/2B.
 - b. Standby gas treatment train B - Diesel generator 1/2D or 1/2B.
 - c. Standby gas treatment train C - Diesel generator 3D.
 - d. Control room emergency ventilation train B - Diesel generator 3C or 3B.
2. When the diesel generator aligned to supply emergency power to the equipment in 3.9.D.1 is inoperable on a unit that is in cold shutdown, refueling, or is defueled, the equipment may be considered OPERABLE for the purpose of satisfying the corresponding technical specification during the succeeding 30 days, provided that the redundant train(s) of equipment and their normal and emergency power supplies are OPERABLE.

4.9.D. Diesel Generators Required for Units 1, 2, and 3 Shared Systems

Surveillance requirements are as specified in 4.9.A.1, 4.9.A.2, 4.9.A.3, and 4.9.A.4 with the following provisions:

1. The testing provisions of 4.9.A.1.b do not apply for a defueled unit.
2. The common accident signal testing required by 4.9.A.3 requires the signal to originate only from units that require OPERABILITY of the standby gas treatment system and/or the control room emergency ventilation system. This test will verify the automatic start of the diesel generators aligned to the standby gas treatment system and/or the control room emergency ventilation system.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.9.D. Diesel Generators Required for
Units 1, 2, and 3 Shared Systems

4.9.D. Diesel Generators Required for
Units 1, 2, and 3 Shared Systems

3. If Specification 3.9.D.2 cannot be met, the affected equipment shall be declared inoperable.

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3.9 BASES (Cont'd)

Specification 3.9.D provides the OPERABILITY requirements for emergency diesel generator power sources for the plant shared systems of standby gas treatment and control room emergency ventilation. This specification addresses the condition where one or more of the units is in cold shutdown, refueling, or is defueled, by requiring the diesel generators aligned to the shared systems to be OPERABLE when any of the BFN Units require OPERABILITY of the shared systems. The allowed out-of-service time of 30 days for the diesel generator aligned to the shared systems is commensurate with the importance of the affected systems when a unit is in cold shutdown, refueling, or is defueled; considers the low probability of a LOCA/Loss of offsite power in these conditions; and considers the availability of onsite power to redundant trains.

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 100 percent of its continuous rating (i.e., \geq 2600 KW) while engine and generator temperatures are stabilized (about one hour). A 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.

Diesel testing once per 18 months (i.e., at least once per fuel cycle) at a minimum load of 2800 KW for an interval of not less than 24 hours, assures that each diesel generator will be capable of supplying the maximum load during the first 2 hours of a loss of offsite power/loss of coolant accident. This test also demonstrates each diesel generator's long-term load carrying capability.

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 maintenance inspection will detect any signs of wear long before failure.

BFN tests the 7-day diesel generator fuel oil supplies in accordance with Table 1 of ASTM-D975-89. Each fuel oil supply is tested quarterly.

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.

4.9 BASES (Cont'd)

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.

Specification 4.9.D provides surveillance requirements for Units 1, 2, and 3 diesel generator emergency power sources for the purpose of satisfying Specification 3.9.D. Testing of these power sources is intended to ensure their OPERABILITY when required to support OPERABILITY of the standby gas treatment system and/or the control room emergency ventilation system.

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-V DC Power Supply and Distribution (BFNP FSAR Subsection 8.6)
4. Memorandum from Gene M. Wilhoite to H. J. Green dated December 4, 1981 (LOO 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. 20555-0001

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-260

BROWNS FERRY NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 222
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 January 10, 1992, 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.

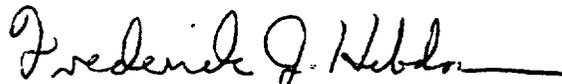
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-52 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 222, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Frederick J. Hebden, Director
Project Directorate II-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: **March 9, 1994**

ATTACHMENT TO LICENSE AMENDMENT NO. 222

FACILITY OPERATING LICENSE NO. DPR-52

DOCKET NO. 50-260

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change. Overleaf* pages are provided to maintain document completeness.

REMOVE

iii
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3.9/4.9-15
3.9/4.9-15a

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3.9/4.9-20
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3.9/4.9-15b
3.9/4.9-15c
3.9/4.9-19*
3.9/4.9-20
3.9/4.9-21
3.9/4.9-22

<u>Section</u>	<u>Page No.</u>
E. Jet Pumps	3.6/4.6-11
F. Recirculation Pump Operation	3.6/4.6-12
G. Structural Integrity	3.6/4.6-13
H. Snubbers	3.6/4.6-15
3.7/4.7 Containment Systems	3.7/4.7-1
A. Primary Containment.	3.7/4.7-1
B. Standby Gas Treatment System	3.7/4.7-13
C. Secondary Containment.	3.7/4.7-16
D. Primary Containment Isolation Valves	3.7/4.7-17
E. Control Room Emergency Ventilation	3.7/4.7-19
F. Primary Containment Purge System	3.7/4.7-21
G. Containment Atmosphere Dilution System (CAD)	3.7/4.7-22
H. Containment Atmosphere Monitoring (CAM) System H ₂ Analyzer	3.7/4.7-24
3.8/4.8 Radioactive Materials	3.8/4.8-1
A. Liquid Effluents	3.8/4.8-1
B. Airborne Effluents	3.8/4.8-3
C. (Deleted).	3.8/4.8-4
D. Mechanical Vacuum Pump	3.8/4.8-4
E. Miscellaneous Radioactive Materials Sources.	3.8/4.8-5
F. (Deleted).	3.8/4.8-6
3.9/4.9 Auxiliary Electrical System	3.9/4.9-1
A. Auxiliary Electrical Equipment	3.9/4.9-1
B. Operation with Inoperable Equipment.	3.9/4.9-8
C. Operation in Cold Shutdown	3.9/4.9-15
D. Diesel Generators Required for Units 1, 2, and 3 Shared Systems	3.9/4.9-15a

<u>Section</u>	<u>Page No.</u>
3.10/4.10 Core Alterations	3.10/4.10-1
A. Refueling Interlocks	3.10/4.10-1
B. Core Monitoring	3.10/4.10-5
C. Spent Fuel Pool Water	3.10/4.10-7
D. Reactor Building Crane	3.10/4.10-8
E. Spent Fuel Cask	3.10/4.10-9
F. Spent Fuel Cask Handling-Refueling Floor . . .	3.10/4.10-10
3.11/4.11 Deleted.	3.11/4.11-1
5.0 Major Design Features	5.0-1
5.1 Site Features	5.0-1
5.2 Reactor	5.0-1
5.3 Reactor Vessel	5.0-1
5.4 Containment	5.0-1
5.5 Fuel Storage.	5.0-1
5.6 Seismic Design	5.0-2

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.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.

SURVEILLANCE REQUIREMENTS

4.9.C Operation in Cold Shutdown

1. No additional surveillance is required.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.9.D Diesel Generators Required for Units 1, 2, and 3 Shared Systems

1. Whenever standby gas treatment is required to be OPERABLE in accordance with Specification 3.7.B and/or control room emergency ventilation is required to be OPERABLE in accordance with Specification 3.7.E, the associated diesel generator aligned to supply emergency power to that equipment shall be OPERABLE.
 - a. Standby gas treatment train A and/or control room emergency ventilation train A - Diesel generator 1/2A or 1/2B.
 - b. Standby gas treatment train B - Diesel generator 1/2D or 1/2B.
 - c. Standby gas treatment train C - Diesel generator 3D.
 - d. Control room emergency ventilation train B - Diesel generator 3C or 3B.
2. When the diesel generator aligned to supply emergency power to the equipment in 3.9.D.1 is inoperable on a unit that is in cold shutdown, refueling, or is defueled, the equipment may be considered OPERABLE for the purpose of satisfying the corresponding technical specification during the succeeding 30 days, provided that the redundant train(s) of equipment and their normal and emergency power supplies are OPERABLE.

4.9.D Diesel Generators Required for Units 1, 2, and 3 Shared Systems

Surveillance requirements are as specified in 4.9.A.1, 4.9.A.2, 4.9.A.3, and 4.9.A.4 with the following provisions:

1. The testing provisions of 4.9.A.1.b do not apply for a defueled unit.
2. The common accident signal testing required by 4.9.A.3 requires the signal to originate only from units that require OPERABILITY of the standby gas treatment system and/or the control room emergency ventilation system. This test will verify the automatic start of the diesel generators aligned to the standby gas treatment system and/or the control room emergency ventilation system.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.9.D. Diesel Generators Required for Units 1, 2, and 3 Shared Systems

3. If Specification 3.9.D.2 cannot be met, the affected equipment shall be declared inoperable.

4.9.D. Diesel Generators Required for Units 1, 2, and 3 Shared Systems

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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 35,280 gallons for each diesel generator fuel tank assembly is sufficient for seven days of full load operation of each diesel and is conservatively based on availability of a replenishment supply. Each diesel generator has its own independent 7-day fuel oil storage tank assembly.

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.

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

There is a safety related 250-V dc unit battery located in each unit. Each 250-V dc unit battery system consists of a battery, a battery charger, and a distribution panel. There is also a backup charger which can be assigned to any one of the three unit batteries. The 250-V dc unit battery systems provide power for unit control functions, unit DC motor loads and alternate control power to the 4160 and 480-V ac shutdown boards. The primary control power supplies to the 3A, 3C and 3D 4160-V ac shutdown boards and the Unit 3 480-V ac shutdown boards are also provided by unit batteries. There are five safety related 250-V dc shutdown battery systems assigned as primary control power supplies to

3.9 BASES (Cont'd)

4160-V ac shutdown boards A, B, C, D, and 3EB. Each of these shutdown battery systems has a 250-V dc battery, a charger, and a distribution panel. A portable spare charger can be used to supply any one of the five shutdown battery systems.

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 for the 480-V and 4,160-V shutdown boards which it supplies.

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.

Specification 3.9.D provides the OPERABILITY requirements for emergency diesel generator power sources for the plant shared systems of standby gas treatment and control room emergency ventilation. This specification addresses the condition where one or more of the units is in cold shutdown, refueling, or is defueled, by requiring the diesel generators aligned to the shared systems to be OPERABLE when any of the BFN Units

3.9 BASES (Cont'd)

require OPERABILITY of the shared systems. The allowed out-of-service time of 30 days for the diesel generator aligned to the shared systems is commensurate with the importance of the affected systems when a unit is in cold shutdown, refueling, or is defueled; considers the low probability of a LOCA/Loss of offsite power in these conditions; and considers the availability of onsite power to redundant trains.

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 100 percent of its continuous rating (i.e., \geq 2600 KW) while engine and generator temperatures are stabilized (about one hour). A 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.

Diesel testing once per 18 months (i.e., at least once per fuel cycle) at a minimum load of 2800 KW for an interval of not less than 24 hours assures that each diesel generator will be capable of supplying the maximum load during the first 2 hours of a loss of offsite power/loss of coolant accident. This test also demonstrates each diesel generator's long-term load carrying capability.

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 maintenance inspection will detect any signs of wear long before failure.

BFN tests the 7-day diesel generator fuel oil supplies in accordance with Table 1 of ASTM-D975-89. Each fuel oil supply is tested quarterly.

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.

4.9 BASES (Cont'd)

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 were the only source of electrical power.

Specification 4.9.D provides surveillance requirements for Units 1, 2, and 3 diesel generator emergency power sources for the purpose of satisfying Specification 3.9.D. Testing of these power sources is intended to ensure their OPERABILITY when required to support OPERABILITY of the standby gas treatment system and/or the control room emergency ventilation system.

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-V DC Power Supply and Distribution (BFNP FSAR Subsection 8.6)
4. Memorandum from Gene M. Wilhoite to H. J. Green dated December 4, 1981 (LOO 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. 20555-0001

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-296

BROWNS FERRY NUCLEAR PLANT, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 176
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 January 10, 1992, 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.

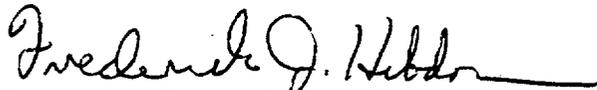
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-68 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 176, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Frederick J. Hebdon, Director
Project Directorate II-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: ~~March~~ 9, 1994

ATTACHMENT TO LICENSE AMENDMENT NO. 176

FACILITY OPERATING LICENSE NO. DPR-68

DOCKET NO. 50-296

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change. Overleaf* page is provided to maintain document completeness.

REMOVE

iii
iv
3.9/4.9-14a
3.9/4.9-14b
3.9/4.9-18
3.9/4.9-19
3.9/4.9-20
3.9/4.9-21

INSERT

iii
iv*
3.9/4.9-14a
3.9/4.9-14b
3.9/4.9-18*
3.9/4.9-19
3.9/4.9-20*
3.9/4.9-21

<u>Section</u>	<u>Page No.</u>
F. Recirculation Pump Operation	3.6/4.6-12
G. Structural Integrity	3.6/4.6-13
H. Snubbers	3.6/4.6-15
3.7/4.7 Containment Systems	3.7/4.7-1
A. Primary Containment.	3.7/4.7-1
B. Standby Gas Treatment System	3.7/4.7-13
C. Secondary Containment.	3.7/4.7-16
D. Primary Containment Isolation Valves	3.7/4.7-17
E. Control Room Emergency Ventilation	3.7/4.7-19
F. Primary Containment Purge System	3.7/4.7-21
G. Containment Atmosphere Dilution System (CAD)	3.7/4.7-22
H. Containment Atmosphere Monitoring (CAM) System H ₂ Analyzer	3.7/4.7-23a
3.8/4.8 Radioactive Materials	3.8/4.8-1
A. Liquid Effluents	3.8/4.8-1
B. Airborne Effluents	3.8/4.8-3
C. (Deleted).	3.8/4.8-4
D. Mechanical Vacuum Pump	3.8/4.8-4
E. Miscellaneous Radioactive Materials Sources	3.8/4.8-5
F. (Deleted).	3.8/4.8-6
3.9/4.9 Auxiliary Electrical System	3.9/4.9-1
A. Auxiliary Electrical Equipment	3.9/4.9-1
B. Operation with Inoperable Equipment.	3.9/4.9-8
C. Operation in Cold Shutdown Condition	3.9/4.9-14
D. Diesel Generators Required for Units 1, 2, and 3 Shared Systems	3.9/4.9-14a

<u>Section</u>	<u>Page No.</u>
3.10/4.10 Core Alterations	3.10/4.10-1
A. Refueling Interlocks	3.10/4.10-1
B. Core Monitoring	3.10/4.10-5
C. Spent Fuel Pool Water	3.10/4.10-7
D. Reactor Building Crane	3.10/4.10-8
E. Spent Fuel Cask	3.10/4.10-9
F. Spent Fuel Cask Handling-Refueling Floor.	3.10/4.10-9
 3.11/4.11 Deleted.	 3.11/4.11-1
 5.0 Major Design Features	 5.0-1
5.1 Site Features	5.0-1
5.2 Reactor	5.0-1
5.3 Reactor Vessel	5.0-1
5.4 Containment	5.0-1
5.5 Fuel Storage	5.0-1
5.6 Seismic Design	5.0-2

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.9.D. Diesel Generators Required for Units 1, 2, and 3 Shared Systems

1. Whenever standby gas treatment is required to be OPERABLE in accordance with Specification 3.7.B and/or control room emergency ventilation is required to be OPERABLE in accordance with Specification 3.7.E, the associated diesel generator aligned to supply emergency power to that equipment shall be OPERABLE.
 - a. Standby gas treatment train A and/or control room emergency ventilation train A - Diesel generator 1/2A or 1/2B.
 - b. Standby gas treatment train B - Diesel generator 1/2D or 1/2B.
 - c. Standby gas treatment train C - Diesel generator 3D.
 - d. Control room emergency ventilation train B - Diesel generator 3C or 3B.
2. When the diesel generator aligned to supply emergency power to the equipment in 3.9.D.1 is inoperable on a unit that is in cold shutdown, refueling, or is defueled, the equipment may be considered OPERABLE for the purpose of satisfying the corresponding technical specification during the succeeding 30 days, provided that the redundant train(s) of equipment and their normal and emergency power supplies are OPERABLE.

4.9.D. Diesel Generators Required for Units 1, 2, and 3 Shared Systems

Surveillance requirements are as specified in 4.9.A.1, 4.9.A.2, 4.9.A.3, and 4.9.A.4 with the following provisions:

1. The testing provisions of 4.9.A.1.b do not apply for a defueled unit.
2. The common accident signal testing required by 4.9.A.3 requires the signal to originate only from units that require OPERABILITY of the standby gas treatment system and/or the control room emergency ventilation system. This test will verify the automatic start of the diesel generators aligned to the standby gas treatment system and/or the control room emergency ventilation system.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.9.D. Diesel Generators Required for Units 1, 2, and 3 Shared Systems

4.9.D. Diesel Generators Required for Units 1, 2, and 3 Shared Systems

3. If Specification 3.9.D.2 cannot be met, the affected equipment shall be declared inoperable.

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 35,280 gallons for each diesel generator fuel tank assembly is sufficient for seven days of full load operation of each diesel and is conservatively based on availability of a replenishment supply. Each diesel generator has its own independent 7-day fuel oil storage tank assembly.

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.

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

There is a safety related 250-V dc unit battery located in each unit. Each 250-V dc unit battery system consists of a battery, a battery charger, and a distribution panel. There is also a backup charger which can be assigned to any one of the three unit batteries. The 250-V dc unit battery systems provide power for unit control functions, unit DC motor loads and alternate control power to the 4160 and 480-V ac shutdown boards. The primary control power supplies to the 3A, 3C and

3.9 BASES (Cont'd)

3D 4160-V ac shutdown boards and the Unit 3 480-V ac shutdown boards are also provided by unit batteries. There are five safety related 250-V dc shutdown battery systems assigned as primary control power supplies to 4160-V ac shutdown boards A, B, C, D, and 3EB. Each of these shutdown battery systems has a 250-V dc battery, a charger, and a distribution panel. A portable spare charger can be used to supply any one of the five shutdown battery systems.

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.

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.

Specification 3.9.D provides the OPERABILITY requirements for emergency diesel generator power sources for the plant shared systems of standby gas treatment and control room emergency ventilation. This specification addresses the condition where one or more of the units is in cold shutdown, refueling, or is defueled, by requiring the diesel generators aligned to the shared systems to be OPERABLE when any of the BFN Units require OPERABILITY of the shared systems. The allowed out-of-service time of 30 days for the diesel generator aligned to the shared systems is commensurate with the importance of the affected systems when a unit is in cold shutdown, refueling, or is defueled; considers the low probability of a LOCA/Loss of offsite power in these conditions; and considers the availability of onsite power to redundant trains.

4.9 BASES (Cont'd)

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 100 percent of its continuous rating (i.e. \geq 2600 KW) while engine and generator temperatures are stabilized (about one hour). A 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.

Diesel testing once per 18 months (i.e., at least once per fuel cycle) at a minimum load of 2800 KW for an interval of not less than 24 hours assures that each diesel generator will be capable of supplying the maximum load during the first 2 hours of a loss of offsite power/loss of coolant accident. This test also demonstrates each diesel generator's long-term load carrying capability.

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 maintenance inspection will detect any signs of wear long before failure.

BFN tests the 7-day diesel generator fuel oil supplies in accordance with Table 1 of ASTM-D975-89. Each fuel oil supply is tested quarterly.

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

4.9 BASES (Cont'd)

Specification 4.9.D provides surveillance requirements for Units 1, 2, and 3 diesel generator emergency power sources for the purpose of satisfying Specification 3.9.D. Testing of these power sources is intended to ensure their OPERABILITY when required to support OPERABILITY of the standby gas treatment system and/or the control room emergency ventilation system.

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-V DC Power Supply and Distribution (BFNP FSAR Subsection 8.6)
4. Memorandum from G. M. Wilhoite to H. J. Green dated December 4, 1981 (LOO 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. 20555-0001

ENCLOSURE 1

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

PROPOSED TECHNICAL SPECIFICATIONS

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR UNITS 1, 2, and 3

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

1.0 INTRODUCTION

The Browns Ferry Nuclear Plant (BFN) Units 1, 2 and 3 share certain plant systems such as the Standby Gas Treatment System (SGTS), Control Room Emergency Ventilation System (CREVS), and the emergency diesel generators (EDGs). Specifically, three Unit 3 EDGs are required to support Units 1 and 2 by providing a source of emergency power. The present Technical Specifications (TS) only address the condition where Unit 3 EDGs are required to be operable to support equipment for Unit 2 operation and were written to specifically address the present condition where Unit 3 is de-fueled and Unit 2 requires operability of SGTS and/or CREVS.

By letter dated January 10, 1992, the licensee requested a change to the BFN TS for Units 1, 2, and 3 which addresses EDG availability for the plant shared systems of SGTS and CREVS. The proposed change addresses not only the Unit 3 EDGs required for Unit 2 operation, but also the Units 1 and 2 EDGs required for Unit 3 operation and the Unit 3 EDGs required for Unit 1 operation.

2.0 EVALUATION

The proposed TS changes specify each Unit's emergency power supply operability requirement when the SGTS and/or CREVS are required to be operable by one or more of the three BFN Unit TS. Unit 1/2 EDG A provides emergency power to the SGTS A train and the CREVS A train. Unit 1/2 EDG D provides emergency power to the SGTS B train. Electrical alignment can also be made to supply emergency power from Unit 1/2 EDG B for SGTS trains A and B, and for CREVS train A. Unit 3 EDG 3C provides emergency power to CREVS train B while Unit 3 EDG 3D supplies SGTS train C. Electrical alignment can also be made to supply emergency power from Unit 3 EDG 3B for CREVS train B. This change does not affect the EDG requirements for Residual Heat Removal Service Water (RHRSW) pumps A3 and C3.

The TS change establishes the requirement of BFN Units 1, 2, and 3 EDGs for the plant shared systems of SGTS and CREVS. TS Definition E currently requires operability of the normal and emergency power supplies in order to consider a piece of equipment operable. Definition 1.C.2 contains an exception to this requirement (that applies only when the Unit is not in cold shutdown or refueling) which allows the limiting condition for operation for EDGs to govern the required actions. These definitions do not explicitly address the situation where the unit(s) requiring operability of the SGTS

and/or CREVS is not in cold shutdown or refueling but one or more units are in cold shutdown, refuel, or de-fueled. Present Unit 2 and 3 TS address this condition by imposing an explicit 30-day allowed out-of-service limit for EDGs on Unit 3 required for SGTS and CREVS operability for Unit 2. The proposed TS change will address this condition for all three BFN units and will adopt the present Units 2 and 3, 30-day allowed out-of-service interval for an emergency power source that is inoperable on a unit(s) that is in cold shutdown, refuel, or is de-fueled when one or more units require operability of SGTS and/or CREVS. The proposed Limiting Conditions for Operation, Section 3.9.D, allows the EDG power source to be inoperable for 30 days provided the redundant train(s) of equipment and their normal and emergency power supplies are operable. If the required operability of the EDGs and corresponding off-site power sources for SGTS and/or CREVS is not met, proposed Specification 3.9.D requires the affected equipment to be declared inoperable. The proposed changes are consistent with current requirements and are, therefore, acceptable.

The proposed Surveillance Requirement 4.9.D implements testing provisions of the present 4.9.D in Units 2 and 3 TS with a clarification to the common accident signal testing requirement. The clarification will require the common accident signal for the test to originate only from units that require operability of SGTS and/or CREVS. This clarification meets the intent of present Surveillance Requirement 4.9.D.1.c which requires the test signal to originate from Unit 2 for testing of the automatic start feature of the Unit 3 EDGs while Unit 3 is de-fueled and does not require operability of SGTS or CREVS. The present provision in the Units 2 and 3 TS, that does not require the loss of off-site power/loss of coolant accident loads test for de-fueled units, is retained in the proposed change. These changes enact appropriate surveillance requirements to ensure diesel generators required for SGTS and CREVS are operable, and are therefore acceptable.

The proposed changes to Bases 3.9 and 4.9 are made to describe the changes to the affected specifications 3.9.D and 4.9.D.

3.0 CONCLUSION

The staff concludes that the proposed change addresses not only the Unit 3 EDGs required for Unit 2 operation but also the Unit 1/2 EDGs required for Unit 3 operation and Unit 3 EDGs required for Unit 1 operation. Therefore, the proposed changes to the Units 1, 2, and 3 TS to address the concern of EDG operability for the shared plant systems of SGTS and CREVS are acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Alabama State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and change the Surveillance Requirements. The NRC 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 (57 FR 48827). 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.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: A. N. Pal

Dated: March 9, 1994