January 9, 1991

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

Mr. Oliver D. Kingsley, Jr.
Senior Vice President, Nuclear Power
Tennessee Valley Authority
6N 38A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Dear Mr. Kingsley:

SUBJECT: ISSUANCE OF AMENDMENTS (TAC NOS. 77167 AND 77168) (TS 283)

The Commission has issued the enclosed Amendment Nos.186 , and 150 to Facility Operating Licenses Nos. DPR-52 and DPR-68 for the Browns Ferry Nuclear Plant, Units 2 and 3, respectively. These amendments are in response to your application dated July 13, 1990 pertaining to the revision of technical specifications for Auxiliary Electrical Systems.

A copy of the Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's bi-weekly Federal Register notice.

Sincerely,

Thierry M. Ross

Thierry M. Ross, Project Manager
Project Directorate II-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No.186 to License No. DPR-52
2. Amendment No.150 to License No. DPR-68
3. Safety Evaluation

cc w/enclosures:
See next page

9101150266 910109
PDR ADOCK 05000259
P PDR

OFC	:PDII-4/LA	:PDII-4/PE	:PDII-4/PM	:OGC	:PDII-4/DD	:PDII-4/D
NAME	:MKrebs	:DMoran:as	:TRoss	:w/ changes per SER	:SBTack	:FHebdon
DATE	:11/20/90	:11/26/90	:12/2/90	:1/3/91	:1/9/91	:1/9/91

OFFICIAL RECORD COPY
Document Name: TS 283

140091

cc:
Mr. Marvin Runyon, Chairman
Tennessee Valley Authority
ET 12A 7A
400 West Summit Hill Drive
Knoxville, Tennessee 37902

Mr. Edward G. Wallace
Manager, Nuclear Licensing
and Regulatory Affairs
Tennessee Valley Authority
5N 157B Lookout Place
Chattanooga, Tennessee 37402-2801

Mr. John B. Waters, Director
Tennessee Valley Authority
ET 12A 9A
400 West Summit Hill Drive
Knoxville, Tennessee 37902

Mr. W. F. Willis
Chief Operating Officer
ET 12B 16B
400 West Summit Hill Drive
Knoxville, Tennessee 37902

General Counsel
Tennessee Valley Authority
400 West Summit Hill Drive
ET 11B 33H
Knoxville, Tennessee 37902

Mr. Dwight Nunn
Vice President, Nuclear Projects
Tennessee Valley Authority
6N 38A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Dr. Mark O. Medford
Vice President, Nuclear Assurance,
Licensing and Fuels
Tennessee Valley Authority
6N 38A Lookout Place
Chattanooga, Tennessee 37402-2801

Mr. O. J. Zeringue, Site Director
Browns Ferry Nuclear Plant
Tennessee Valley Authority
P. O. Box 2000
Decatur, Alabama 35602

Mr. P. Carier, Site Licensing Manager
Browns Ferry Nuclear Plant
Tennessee Valley Authority
P. O. Box 2000
Decatur, Alabama 35602

Mr. L. W. Myers, Plant Manager
Browns Ferry Nuclear Plant
Tennessee Valley Authority
P. O. Box 2000
Decatur, Alabama 35602

Chairman, Limestone County Commission
P. O. Box 188
Athens, Alabama 35611

Claude Earl Fox, M.D.
State Health Officer
State Department of Public Health
State Office Building
Montgomery, Alabama 36130

Regional Administrator, Region II
U.S. Nuclear Regulatory Commission
101 Marietta Street, N.W.
Atlanta, Georgia 30323

Mr. Charles Patterson
Senior Resident Inspector
Browns Ferry Nuclear Plant
U.S. Nuclear Regulatory Commission
Route 12, Box 637
Athens, Alabama 35611

Tennessee Valley Authority
Rockville Office
11921 Rockville Pike
Suite 402
Rockville, Maryland 20852

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. 186
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 July 13, 1990, 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.

9101150272 910109
PDR ADOCK 05000259
P PDR

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. 186 , 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

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: January 9, 1991

ATTACHMENT TO LICENSE AMENDMENT NO.186

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	INSERT
iii	iii
iv	iv*
3.9/4.9-15	3.9/4.9-15
--	3.9/4.9-15a
3.9/4.9-19	3.9/4.9-19*
3.9/4.9-20	3.9/4.9-20
3.9/4.9-21	3.9/4.9-21
3.9/4.9-22	3.9/4.9-22*

Section		Page No.
	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. Radioactive Effluents - Dose	3.8/4.8-6
	D. Mechanical Vacuum Pump	3.8/4.8-6
	E. Miscellaneous Radioactive Materials Sources	3.8/4.8-7
	F. Solid Radwaste	3.8/4.8-9
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. Unit 3 Diesel Generators Required for Unit 2 Operation	3.9/4.9-15a

Section		Page No.
3.10/4.10	Core Alterations	3.10/4.10-1
	A. Refueling Interlocks	3.10/4.10-1
	B. Core Monitoring	3.10/4.10-4
	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	Fire Protection Systems	3.11/4.11-1
	A. Fire Detection Instrumentation	3.11/4.11-1
	B. Fire Pumps and Water Distribution Mains	3.11/4.11-2
	C. Spray and/or Sprinkler Systems	3.11/4.11-7
	D. CO_2 Systems	3.11/4.11-8
	E. Fire Hose Stations	3.11/4.11-9
	F. Yard Fire Hydrants and Hose Houses	3.11/4.11-11
	G. Fire-Rated Assemblies	3.11/4.11-12
	H. Open Flames, Welding and Burning in the Cable Spreading Room	3.11/4.11-13
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

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 (2D or 2E) 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.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9.D Unit 3 Diesel Generators Required for Unit 2 Operation	4.9.D Unit 3 Diesel Generators Required for Unit 2 Operation
1. Whenever any of the following equipment is required to be OPERABLE in accordance with the corresponding section of these technical specifications, the Unit 3 diesel generator aligned to supply emergency power to that equipment shall be OPERABLE.	1.a Diesel Generators Surveillance requirements are as specified in T.S. 4.9.A.1.a, 4.9.A.1.c, 4.9.A.1.d and 4.9.A.1.e.
a. Standby gas treatment train C in accordance with T.S. 3.7.B (diesel generator 3D).	1.b DC Power System Surveillance requirements are as specified in T.S. 4.9.A.2.
b. Control room emergency ventilation train B in accordance with T.S. 3.7.E (diesel generator 3B or 3C).	1.c Logic Systems 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 the reactor to provide an automatic start signal to each diesel generator.
2. When the diesel generator aligned to supply emergency power to the equipment in 3.9.D.1.a or b is inoperable, 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.	1.d Undervoltage Relays Surveillance requirements are as specified in T.S. 4.9.A.4.
3. If Specification 3.9.D.2 cannot be met, the affected equipment shall be declared inoperable.	2. No surveillance required. 3. No surveillance required.

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 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-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 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. 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.

Specification 3.9.D provides the operability requirements for the Unit 3 diesel generators when they serve as emergency power supplies to standby gas treatment train C and control room emergency ventilation train B when they are being considered operable for Unit 2 technical specifications. The allowable out of service time of 30 days is commensurate with the importance of the affected systems when Unit 3 is in cold shutdown, the low probability of a LOCA/Loss of offsite power and availability of onsite power to redundant trains.

ATTACHMENT TO LICENSE AMENDMENT NO.150

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 pages* are provided to maintain document completeness.

REMOVE	INSERT
iii	iii
iv	iv*
3.9/4.9-13	3.9/4.9-13*
3.9/4.9-14	3.9/4.9-14
--	3.9/4.9-14a
--	3.9/4.9-14b
3.9/4.9-18	3.9/4.9-18*
3.9/4.9-19	3.9/4.9-19
3.9/4.9-20	3.9/4.9-20
3.9/4.9-21	3.9/4.9-21*

Section		Page No.
	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	3.7/4.7-23
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. Radioactive Effluents - Dose	3.8/4.8-6
	D. Mechanical Vacuum Pump	3.8/4.8-6
	E. Miscellaneous Radioactive Materials Sources	3.8/4.8-7
	F. Solid Radwaste	3.8/4.8-9
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. Unit 3 Diesel Generators Required for Unit 2 Operation	3.9/4.9-14a

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. 150
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 July 13, 1990, 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. 150, 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

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: January 9, 1991

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, 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 were the only source of electrical power.

Specification 4.9.D provides surveillance requirements for Unit 3 diesel generators for the purpose of satisfying Specification 3.9.D. It contains less stringent testing requirements for the Unit 3 diesel generators when they are only being used to support Unit 2 equipment.

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)

Section		Page No.
3.10/4.10	Core Alterations	3.10/4.10-1
	A. Refueling Interlocks	3.10/4.10-1
	B. Core Monitoring	3.10/4.10-4
	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	Fire Protection Systems	3.11/4.11-1
	A. Fire Detection Instrumentation	3.11/4.11-1
	B. Fire Pumps and Water Distribution Mains	3.11/4.11-2
	C. Spray and/or Sprinkler Systems	3.11/4.11-7
	D. CO_2 System	3.11/4.11-8
	E. Fire Hose Stations	3.11/4.11-9
	F. Yard Fire Hydrants and Hose Houses	3.11/4.11-11
	G. Fire-Rated Assemblies	3.11/4.11-12
	H. Open Flames, Welding and Burning in the Cable Spreading Room	3.11/4.11-13
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

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9.B Operation With Inoperable Equipment	
10. When one 480-V shutdown board is found to be inoperable, the reactor will be placed in HOT STANDBY CONDITION within 12 hours and COLD SHUTDOWN CONDITION within 24 hours.	
11. If one 480-V RMOV board mg set is inoperable, REACTOR POWER OPERATION may continue 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 in the COLD SHUTDOWN CONDITION within 24 hours.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9.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.	4.9.C Operation in COLD SHUTDOWN CONDITION 1. No additional surveillance is required.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9.D Unit 3 Diesel Generators Required for Unit 2 Operation	4.9.D Unit 3 Diesel Generators Required for Unit 2 Operation
1. Whenever any of the following equipment is required to be OPERABLE in accordance with the corresponding section of any units technical specifications, the Unit 3 diesel generator aligned to supply emergency power to that equipment shall be OPERABLE.	1.a Diesel Generators Surveillance requirements are as specified in T.S. 4.9.A.1.a, 4.9.A.1.c, 4.9.A.1.d and 4.9.A.1.e.
a. Standby gas treatment train C in accordance with T.S. 3.7.B (diesel generator 3D).	1.b DC Power System Surveillance requirements are as specified in T.S. 4.9.A.2.
b. Control room emergency ventilation train B in accordance with T.S. 3.7.E (diesel generator 3B or 3C).	1.c Logic Systems 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 the Unit 2 reactor to provide an automatic start signal to each diesel generator.
2. When the diesel generator aligned to supply emergency power to the equipment in 3.9.D.1.a or b is inoperable, 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.	1.d Undervoltage Relays Surveillance requirements are as specified in T.S. 4.9.A.4.
3. If Specification 3.9.D.2 cannot be met, the affected equipment shall be declared inoperable.	2. No surveillance required. 3. No surveillance required.

THIS PAGE INTENTIONALLY LEFT BLANK

AUG 19 1988

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 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.

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 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 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 circuits is annunciated in the main control room of the unit affected.

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

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 the Unit 3 diesel generators when they serve as emergency power supplies to standby gas treatment train C and control room emergency ventilation train B when they are being considered operable for Unit 2 technical specifications. The allowable out of service time of 30 days is commensurate with the importance of the affected systems when Unit 3 is in cold shutdown, the low probability of a LOCA/Loss of offsite power and 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 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 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.

Specification 4.9.D provides surveillance requirements for Unit 3 diesel generators for the purpose of satisfying Specification 3.9.D. It contains less stringent testing requirements for the Unit 3 diesel generators when they are only being used to support Unit 2 equipment.

4.9 BASES (Cont'd)

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 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)

AMENDMENT NO. 124

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

ENCLOSURE 3

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 186 TO FACILITY OPERATING LICENSE NO. DPR-52

AMENDMENT NO. 150 TO FACILITY OPERATING LICENSE NO. DPR-68

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNITS 2 AND 3

DOCKET NOS. 50-260 AND 50-296

1.0 INTRODUCTION

Browns Ferry Units 2 and 3 share certain plant systems including the emergency diesel generators (EDG). Specifically, the three Unit 3 EDG's are required to support Unit 2 by providing a source of emergency power. The technical specifications for Units 2 and 3 are required to be changed to reflect the plant configuration wherein some trains and subsystems of specific systems that are shared by all three units are provided standby power by the Unit 3 EDGs.

By letter dated December 21, 1989, the staff requested TVA to revise Unit 2 Technical Specifications prior to restart to specifically include operability requirements for the Unit 3 EDGs to support Unit 2.

2.0 EVALUATION

Analysis

The change to the Unit 2 and Unit 3 Technical Specifications reflects the requirement that the Unit 3 EDGs must be operable to support equipment for Unit 2 operation. EDG 3C provides emergency power to the Control Room Emergency Ventilation System (CREVS), Train B. Electrical alignment can also be made to supply power from EDG 3B. EDG 3D provides emergency power to the Standby Gas Treatment System (SGTS), Train C. This change does not affect the EDG requirements for Residual Heat Removal Service Water (RHRSW), Pumps A3 and C3, because their function is only required as an alternative to the Unit 1 and 2 pumps for Emergency Equipment Cooling Water (EECW) service.

This change establishes the specific requirements for Unit 3 EDGs for the condition where Unit 3 is in cold shutdown condition or defueled and specific CREVS or SGTS trains are required to support Unit 2. Technical Specification Definition E currently requires operability of the emergency power supply 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 refuel) which allows the limiting condition for operation for EDGs to govern required actions. These definitions do not explicitly address

9101150274 910109
PDR ADOCK 05000259
P PDR

the situation where the unit being served (i.e., Unit 2) is not in cold shutdown but Unit 3 is in cold shutdown or defueled. The limiting condition for operation for Unit 3 EDGs is not specified in this case and is determined by prudent judgment and administrative controls. The effect of this change is to impose an explicit 30-day limit in the technical specifications for the diesel generators which supply power to SGTS Train C and CREVS Train B. These are common subsystems which are required by technical specifications for unit operation and fuel handling. Therefore, this change results in a more limiting technical specification requirement than is currently specified.

The 30-day allowed out-of-service time is justified based upon the decreased reliance on Unit 3 EDGs when Unit 3 is in cold shutdown or defueled. Under these conditions the remaining equipment (Train B CREVS and Train C SGTS) and Unit 3 EDGs are capable of responding to an accident and/or loss of offsite power. Technical Specification 3.9.D serves to enforce conservative actions in the event that the Unit 3 EDGs supplying emergency power to SGTS Train C or CREVS Train B become inoperable, because the existing Unit 2 Technical Specifications are based upon these trains being considered operable with no requirement for the operability of Unit 3 EDGs. The existing Unit 2 technical specifications in Definition 1.C.2 allow continuous operation with no restriction whereas the proposed Section 3.9.D limits the condition to 30 days. Because it is more restrictive, this change does not adversely affect safety.

Surveillance requirements are specified for the Unit 3 EDGs, D.C. batteries, diesel generator logic, and under voltage detection relays, to assure continued operability. All of the testing currently required for EDGs associated with a fully operational unit will be implemented with the exception of the following. Tests associated with the loss of offsite power/ LOCA response of the system to a Unit 3 accident are not required when Unit 3 is defueled. Surveillance requirements therefore exclude this condition. All of the testing requirements for diesel generator logic, D.C. batteries which support the required EDGs, and under voltage detection relays that would be required for a fully operational unit will be applicable. Surveillance testing required for Unit 3 by T.S. 4.9.D.1.c, Logic Systems, verifies auto start of the Unit 3 DG from the Unit 2 accident signal.

The bases for Unit 2 Specification 3.9 are also modified to reflect changes resulting from the implementation of an engineering change. The revision to the bases reflects the fact that loss of a 250-V shut down board battery affects the control power for both 480-V and 4160-V shutdown boards.

The bases for Unit 2 Specification 4.9 are changed to delete reference to the use of Unit 1 loads to demonstrate the capability of the Units 1 and 2 EDGs to accept emergency loads. Unit 1 is presently shut down and defueled. Accordingly, TVA has tested the EDGs as part of its Unit 2 restart test program which included EDG response to the Unit 2 loss of offsite power (LOP/Loss of Coolant Accident (LOCA) loads) application. Voltage and frequency responses were analyzed for acceptability based on transient and steady state voltage and frequencies not exceeding the electrical equipment design. NRC review of this Unit 2 Emergency Diesel Generator Loading Analysis has been documented in a safety evaluation dated December 21, 1989.

3.0 ENVIRONMENTAL CONSIDERATION

The amendments involve a change to a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes to the 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 these 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 nor environmental assessment need be prepared in connection with the issuance of these amendments.

4.0 CONCLUSION

The staff 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, and (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 nor to the health and safety of the public.

Principal Contributor: D. H. Moran

Dated: January 9, 1991

AMENDMENT NO.186 FOR BROWNS FERRY UNIT 2 - DOCKET NO. 50-260, and
AMENDMENT NO.150 FOR BROWNS FERRY UNIT 3 - DOCKET NO. 50-296
DATED: January 9, 1991

DISTRIBUTION:

Docket File
NRC PDR
Local PDR
BFN Reading File
S. Varga
G. Lainas
M. Krebs
T. Ross
D. Moran
OGC
D. Hagan
E. Jordan
G. Hill (8)
Wanda Jones
J. Calvo
ACRS(10)
GPA/PA
OC/LFMB