November 2, 1995

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

SUBJECT: ISSUANCE OF TECHNICAL SPECIFICATION AMENDMENTS FOR THE BROWNS FERRY NUCLEAR PLANT UNITS 1, 2, AND 3 (TAC NOS. M91270, M91271, AND M91272) (TS 355)

Dear Mr. Kingsley:

The Commission has issued the enclosed Amendment Nos. 227, 242, and 201 to Facility Operating License Nos. DPR-33, DPR-52, and DPR-68 for the Browns Ferry Nuclear Plant (BFN) Units 1, 2, and 3, respectively. These amendments are in response to your application dated January 4, 1995. The amendments revise applicability and surveillance requirements for the intermediate power range monitor, average power range monitor (APRM), and APRM Inoperative Trip functions.

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, Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

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

Enclosures:
1. Amendment No. 227 to License No. DPR-33
2. Amendment No. 242 to License No. DPR-52
3. Amendment No. 201 to License No. DPR-68
4. Safety Evaluation

cc w/enclosures: See next page

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cc:

Mr. O. J. Zeringue, Sr. Vice President
Nuclear Operations
Tennessee Valley Authority
3B Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Dr. Mark O. Medford, Vice President
Engineering & Technical Services
Tennessee Valley Authority
3B Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Mr. D. E. Nunn, Vice President
New Plant Completion
Tennessee Valley Authority
3B Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Mr. R. D. Machon, Site Vice President
Browns Ferry Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Decatur, AL 35602

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

Mr. P. P. Carier, Manager
Corporate Licensing
Tennessee Valley Authority
4G Blue Ridge
1101 Market Street
Chattanooga, TN 37402-2801

Mr. T. D. Shriver
Nuclear Assurance and Licensing
Browns Ferry Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Decatur, AL 35602

Mr. Pedro Salas
Site Licensing Manager
Browns Ferry Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Decatur, AL 35602

TVA Representative
Tennessee Valley Authority
11921 Rockville Pike, Suite 402
Rockville, MD 20852

Regional Administrator
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW., Suite 2900
Atlanta, GA 30323

Mr. Leonard D. Wert
Senior Resident Inspector
Browns Ferry Nuclear Plant
U.S. Nuclear Regulatory Commission
10833 Shaw Road
Athens, AL 35611

Chairman
Limestone County Commission
310 West Washington Street
Athens, AL 35611

State Health Officer
Alabama Department of Public Health
434 Monroe Street
Montgomery, AL 36130-1701

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. 227
License No. DPR-33

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

   A. The application for amendment by Tennessee Valley Authority (the licensee) dated January 4, 1995, 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.

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

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 227, 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: November 2, 1995

ATTACHMENT TO LICENSE AMENDMENT NO. 227

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. *Overleaf pages are provided to maintain document completeness.

REMOVE	INSERT
3.1/4.1-3	3.1/4.1-3
3.1/4.1-4	3.1/4.1-4*
3.1/4.1-5	3.1/4.1-5*
3.1/4.1-6	3.1/4.1-6
3.1/4.1-7	3.1/4.1-7
3.1/4.1-8	3.1/4.1-8
3.1/4.1-9	3.1/4.1-9*
3.1/4.1-10	3.1/4.1-10
3.1/4.1-16	3.1/4.1-16
3.1/4.1-17	3.1/4.1-17
3.1/4.1-18	3.1/4.1-18*
3.1/4.1-19	3.1/4.1-19

TABLE 3.1.A
REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENTS

Min. No. of Operable Instr. Channels Per Trip System (1)(23)	Trip Function	Trip Level Setting	Modes in Which Function Must Be Operable: Shut-down	Refuel (7)	Startup/ Hot Standby	Run	Action (1)
1	Mode Switch in Shutdown		X	X	X	X	1.A
1	Manual Scram		X	X	X	X	1.A
	IRM (16)						
3	High Flux	≤120/125 Indicated on scale		X(22)	X	(5)	1.A
3	Inoperative			X(22)	X	(5)	1.A
	APRM (16)(24)(25)						
2	High Flux (Flow Biased)	See Spec. 2.1.A.1				X	1.A or 1.B
2	High Flux (Fixed Trip)	≤ 120%				X	1.A or 1.B
2	High Flux	≤ 15% rated power		X(21)	X(17)	(15)	1.A
2	Inoperative	(13)		X(21)	X(17)	X	1.A
2	Downscale	≥ 3 Indicated on Scale		(11)	(11)	X(12)	1.A or 1.B
2	High Reactor Pressure	≤ 1055 psig		X(10)	X	X	1.A
2	High Drywell Pressure (14)	≤ 2.5 psig		X(8)	X(8)	X	1.A
2	Reactor Low Water Level (14)	≥ 538" above vessel zero		X	X	X	1.A

TABLE 3.1.A
REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENTS

Min. No. of Operable Instr. Channels Per Trip System (1)(23)	Trip Function	Trip Level Setting	Modes in Which Function Must Be Operable: Shut-down	Refuel (7)	Startup/ Hot Standby	Run	Action (1)
2	High Water Level in West Scram Discharge Tank (LS-85-45A-D)	≤ 50 Gallons	X(2)	X(2)	X	X	1.A
2	High Water Level in East Scram Discharge Tank (LS-85-45E-H)	≤ 50 Gallons	X(2)	X(2)	X	X	1.A
4	Main Steam Line Isolation Valve Closure	≤10% Valve Closure		X(3)(6)	X(3)(6)	X(6)	1.A or 1.C
2	Turbine Control Valve Fast Closure or Turbine Trip	≥550 psig				X(4)	1.A or 1.D
4	Turbine Stop Valve Closure	≤10% Valve Closure				X(4)	1.A or 1.D
2	Turbine First Stage Pressure Permissive	not ≥154 psig		X(18)	X(18)	X(18)	1.A or 1.D (19)

NOTES FOR TABLE 3.1.A

1. There shall be two OPERABLE or tripped trip systems for each function. If the minimum number of OPERABLE instrument channels per trip system cannot be met for one trip system, trip the inoperable channels or entire trip system within one hour, or, alternatively, take the below listed action for that trip function. If the minimum number of OPERABLE instrument channels cannot be met by either trip system, the appropriate action listed below (refer to right-hand column of Table) shall be taken. An inoperable channel need not be placed in the tripped condition where this would cause the trip function to occur. In these cases, the inoperable channel shall be restored to OPERABLE status within two hours, or take the action listed below for that trip function.

   A. Initiate insertion of OPERABLE rods and complete insertion of all OPERABLE rods within four hours. In refueling mode, suspend all operations involving core alterations and fully insert all OPERABLE control rods within one hour.

   B. Reduce power level to IRM range and place mode switch in the STARTUP/HOT Standby position within 8 hours.

   C. Reduce turbine load and close main steam line isolation valves within 8 hours.

   D. Reduce power to less than 30 percent of rated.

2. The scram discharge volume high water level bypass may be used in SHUTDOWN or REFUEL to bypass the scram discharge volume high-high water level scram signal in order to reset the reactor protection system trip. A control rod withdraw block is present when this scram signal is bypassed.

3. Bypassed if reactor pressure is less than 1055 psig and mode switch not in RUN.

4. Bypassed when turbine first stage pressure is less than 154 psig.

5. IRMs are bypassed when APRMs are onscale and the reactor mode switch is in the RUN position.

6. The design permits closure of any two lines without a scram being initiated.

7. When the reactor is subcritical and the reactor water temperature is less than 212°F, only the following trip functions need to be OPERABLE:

   A. Mode switch in shutdown

   B. Manual scram

   C. High flux IRM

AMENDMENT NO. 223

D. Scram discharge volume high level

E. APRM 15 percent scram

8. Not required to be OPERABLE when primary containment integrity is not required.

9. (Deleted)

10. Not required to be OPERABLE when the reactor pressure vessel head is not bolted to the vessel.

11. The APRM downscale trip function is only active when the reactor mode switch is in RUN.

12. The APRM downscale trip is automatically bypassed when the IRM instrumentation is OPERABLE and not high.

13. Less than 14 OPERABLE LPRMs will cause a trip system trip.

14. Channel shared by Reactor Protection System and Primary Containment and Reactor Vessel Isolation Control System. A channel failure may be a channel failure in each system.

15. The APRM 15 percent scram is bypassed in the RUN Mode.

16. Channel shared by Reactor Protection System and Reactor Manual Control System (Rod Block Portion). A channel failure may be a channel failure in each system. If a channel is allowed to be inoperable per Table 3.1.A, the corresponding function in that same channel may be inoperable in the Reactor Manual Control System (Rod Block).

17. Not required while performing low power physics tests at atmospheric pressure during or after refueling at power levels not to exceed 5 MW(t).

18. This function must inhibit the automatic bypassing of turbine control valve fast closure or turbine trip scram and turbine stop valve closure scram whenever turbine first state pressure is greater than or equal to 154 psig.

19. Action 1.A or 1.D shall be taken only if the permissive fails in such a manner to prevent the affected RPS logic from performing its intended function. Otherwise, no action is required.

20. (Deleted)

21. Only required with any control rod withdrawn from a core cell containing one or more fuel assemblies. The APRM High Flux and Inoperative Trips do not have to be OPERABLE if the Source Range Monitors are connected to give a noncoincidence, High Flux scram, at 5×10^5 cps. The SRMs shall be OPERABLE per Specification 3.10.B.1. The removal of eight (8) shorting links is required to provide noncoincidence high-flux scram protection from the Source Range Monitors.

NOTES FOR TABLE 3.1.A (Cont'd)

22. Only required with any control rod withdrawn from a core cell containing one or more fuel assemblies. For the IRM High Flux Trip Function, the three required IRMs per trip channel is not required if at least four IRMs (one in each core quadrant) are connected to give a noncoincidence, High Flux scram. The removal of four (4) shorting links is required to provide noncoincidence high-flux scram protection from the IRMs.

23. A channel may be placed in an inoperable status for up to 4 hours for required surveillance without placing the trip system in the tripped condition provided at least one OPERABLE channel in the same trip system is monitoring that parameter.

24. The Average Power Range Monitor scram function is varied (Reference Figure 2.1-1) as a function of recirculation loop flow (W). The trip setting of this function must be maintained in accordance with 2.1.A.

25. The APRM flow-biased neutron flux signal is fed through a time constant circuit of approximately 6 seconds. This time constant may be lowered or equivalently removed (no time delay) without affecting the operability of the flow-biased neutron flux trip channels. The APRM fixed high neutron flux signal does not incorporate the time constant but responds directly to instantaneous neutron flux.

TABLE 4.1.A
REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION FUNCTIONAL TESTS
MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTR. AND CONTROL CIRCUITS

	Group (2)	Functional Test	Minimum Frequency(3)
Mode Switch in Shutdown	A	Place Mode Switch in Shutdown	Each Refueling Outage
Manual Scram	A	Trip Channel and Alarm	Every 3 Months
IRM			
High Flux	C	Trip Channel and Alarm (4)	Once/Week (9)
Inoperative	C	Trip Channel and Alarm (4)	Once/Week (9)
APRM			
High Flux (15% Scram)	C	Trip Output Relays (4)	Once/Week (9)
High Flux (Flow Biased)	B	Trip Output Relays (4)	Once/Week
High Flux (Fixed Trip)	B	Trip Output Relays (4)	Once/Week
Inoperative	B	Trip Output Relays (4)	Once/Week
Downscale	B	Trip Output Relays (4)	Once/Week
Flow Bias	B	(6)	(6)
High Reactor Pressure	A	Trip Channel and Alarm	Once/Month (1)
High Drywell Pressure	A	Trip Channel and Alarm	Once/Month (1)
Reactor Low Water Level	A	Trip Channel and Alarm	Once/Month (1)

TABLE 4.1.A (Continued)

	Group (2)	Functional Test	Minimum Frequency(3)
High Water Level in Scram Discharge Tank Float Switches (LS-85-45C-F)	A	Trip Channel and Alarm	Once/Month
Electronic Level Switches (LS-85-45A, B, G, H)	A	Trip Channel and Alarm	Once/Month
Main Steam Line Isolation Valve Closure	A	Trip Channel and Alarm	Once/3 Months (8)
Turbine Control Valve Fast Closure or turbine trip	A	Trip Channel and Alarm	Once/Month (1)
Turbine First Stage Pressure Permissive (PT-1-81A and B, PT-1-91A and B)	B	Trip Channel and Alarm (7)	Every three months
Turbine Stop Valve Closure	A	Trip Channel and Alarm	Once/Month (1)

NOTES FOR TABLE 4.1.A

1. Initially the minimum frequency for the indicated tests shall be once per month.

2. A description of the three groups is included in the Bases of this specification.

3. Functional tests are not required when the systems are not required to be operable or are operating (i.e., already tripped). If tests are missed, they shall be performed prior to returning the systems to an operable status.

4. This instrumentation is exempted from the instrument channel test definition. This instrument channel functional test will consist of injecting a simulated electrical signal into the measurement channels.

5. (Deleted)

6. The functional test of the flow bias network is performed in accordance with Table 4.2.C.

7. Functional test consists of the injection of a simulated signal into the electronic trip circuitry in place of the sensor signal to verify operability of the trip end alarm functions.

8. The functional test frequency decreased to once/3 months to reduce challenges to relief valves per NUREG 0737, Item II.K.3.16.

9. Not required to be performed when entering the STARTUP/HOT STANDBY Mode from RUN Mode until 12 hours after entering the STARTUP/HOT STANDBY Mode.

be accommodated which would result in slow scram times or partial control rod insertion. To preclude this occurrence, level switches have been provided in the instrument volume which alarm and scram the reactor when the volume of water reaches 50 gallons. As indicated above, there is sufficient volume in the piping to accommodate the scram without impairment of the scram times or amount of insertion of the control rods. This function shuts the reactor down while sufficient volume remains to accommodate the discharge water and precludes the situation in which a scram would be required but not be able to perform its function adequately.

A source range monitor (SRM) system is also provided to supply additional neutron level information during startup but has no scram functions. Reference Section 7.5.4 FSAR. Thus, the IRM is required in the REFUEL (with any control rod withdrawn from a core cell containing one or more fuel assemblies) and STARTUP Modes. In the power range the APRM system provides required protection. Reference Section 7.5.7 FSAR. Thus, the IRM System is not required in the RUN mode. The APRMs and the IRMs provide adequate coverage in the startup and intermediate range.

The high reactor pressure, high drywell pressure, reactor low water level and scram discharge volume high level scrams are required for STARTUP and RUN modes of plant operation. They are, therefore, required to be operational for these modes of reactor operation.

Because of the APRM downscale limit of $\geq$ 3 percent when in the RUN mode and high level limit of $\leq$15 percent when in the STARTUP Mode, the transition between the STARTUP and RUN Modes must be made with the APRM instrumentation indicating between 3 percent and 15 percent of rated power or a control rod scram will occur. In addition, the IRM system must be indicating below the High Flux setting (120/125 of scale) or a scram will occur when in the STARTUP Mode. For normal operating conditions, these limits provide assurance of overlap between the IRM system and APRM system so that there are no "gaps" in the power level indications (i.e., the power level is continuously monitored from beginning of startup to full power and from full power to shutdown). When power is being reduced, if a transfer to the STARTUP mode is made and the IRMs have not been fully inserted (a maloperational but not impossible condition) a control rod block immediately occurs so that reactivity insertion by control rod withdrawal cannot occur.

The minimum functional testing frequency used in this specification is based on a reliability analysis using the concepts developed in reference (1). This concept was specifically adapted to the one-out-of-two taken twice logic of the reactor protection system. The analysis shows that the sensors are primarily responsible for the reliability of the reactor protection system. This analysis makes use of "unsafe failure" rate experience at conventional and nuclear power plants in a reliability model for the system. An "unsafe failure" is defined as one which negates channel operability and which, due to its nature, is revealed only when the channel is functionally tested or attempts to respond to a real signal. Failure such as blown fuses, ruptured bourdon tubes, faulted amplifiers, faulted cables, etc., which result in "upscale" or "downscale" readings on the reactor instrumentation are "safe" and will be easily recognized by the operators during operation because they are revealed by an alarm or a scram.

The channels listed in Tables 4.1.A and 4.1.B are divided into three groups for functional testing. These are:

A. On-Off sensors that provide a scram trip function.

B. Analog devices coupled with bistable trips that provide a scram function.

C. Devices which only serve a useful function during some restricted mode of operation, such as STARTUP, or for which the only practical test is one that can be performed at shutdown.

The sensors that make up group (A) are specifically selected from among the whole family of industrial on-off sensors that have earned an excellent reputation for reliable operation. During design, a goal of 0.99999 probability of success (at the 50 percent confidence level) was adopted to assure that a balanced and adequate design is achieved. The probability of success is primarily a function of the sensor failure rate and the test interval. A three-month test interval was planned for group (A) sensors. This is in keeping with good operating practices, and satisfies the design goal for the logic configuration utilized in the Reactor Protection System.

To satisfy the long-term objective of maintaining an adequate level of safety throughout the plant lifetime, a minimum goal of 0.9999 at the 95 percent confidence level is proposed. With the (1-out-of-2) X (2) logic, this requires that each sensor have an availability of 0.993 at the 95 percent confidence level. This level of availability may be maintained by adjusting the test interval as a function of the observed failure history.[1]

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1. Reliability of Engineered Safety Features as a Function of Testing Frequency, I. M. Jacobs, "Nuclear Safety," Vol. 9, No. 4, July-August, 1968, pp. 310-312.

To facilitate the implementation of this technique, Figure 4.1-1 is provided to indicate an appropriate trend in test interval. The procedure is as follows:

1. Like sensors are pooled into one group for the purpose of data acquisition.

2. The factor M is the exposure hours and is equal to the number of sensors in a group, n, times the elapsed time T (M = nT).

3. The accumulated number of unsafe failures is plotted as an ordinate against M as an abscissa on Figure 4.1-1.

4. After a trend is established, the appropriate monthly test interval to satisfy the goal will be the test interval to the left of the plotted points.

5. A test interval of one month will generally be used initially until a trend is established.

Group (B) devices utilize an analog sensor followed by an amplifier and a bistable trip circuit. The sensor and amplifier are active components and a failure is almost always accompanied by an alarm and an indication of the source of trouble. In the event of failure, repair or substitution can start immediately. An "as-is" failure is one that "sticks" mid-scale and is not capable of going either up or down in response to an out-of-limits input. This type of failure for analog devices is a rare occurrence and is detectable by an operator who observes that one signal does not track the other three. For purpose of analysis, it is assumed that this rare failure will be detected within two hours.

The bistable trip circuit which is a part of the Group (B) devices can sustain unsafe failures which are revealed only on test. Therefore, it is necessary to test them periodically.

A study was conducted of the instrumentation channels included in the Group (B) devices to calculate their "unsafe" failure rates. The analog devices (sensors and amplifiers) are predicted to have an unsafe failure rate of less than 20×10^{-6} failure/hour. The bistable trip circuits are predicted to have unsafe failure rate of less than 2×10^{-6} failures/hour. Considering the two hour monitoring interval for the analog devices as assumed above, and a weekly test interval for the bistable trip circuits, the design reliability goal of 0.99999 is attained with ample margin.

The bistable devices are monitored during plant operation to record their failure history and establish a test interval using the curve of Figure 4.1-1. There are numerous identical bistable devices used throughout the plant's instrumentation system. Therefore, significant data on the failure rates for the bistable devices should be accumulated rapidly.

The frequency of calibration of the APRM Flow Biasing Network has been established as each refueling outage. There are several instruments which must be calibrated and it will take several hours to perform the calibration of the entire network. While the calibration is being performed, a zero flow signal will be sent to half of the APRMs resulting in a half scram and rod block condition. Thus, if the calibration were performed during operation, flux shaping would not be possible. Based on experience at other generating stations, drift of instruments, such as those in the Flow Biasing Network, is not significant and therefore, to avoid spurious scrams, a calibration frequency of each refueling outage is established.

Group (C) devices are active only during a given portion of the operational cycle. For example, the IRM is active during the STARTUP/HOT STANDBY and REFUEL (with any control rod withdrawn from a core cell containing one or more fuel assemblies) Modes and inactive during full-power operation. Thus, the only test that is meaningful is the one performed prior to entering the applicable Mode (i.e., the tests that are performed prior to use of the instrument). Since testing of the IRM functions is not practical in the RUN Mode, testing is not required to be completed until 12 hours after entering the STARTUP/HOT STANDBY Mode from the RUN Mode. Twelve hours is based on operating experience and in consideration of providing reasonable time in which to complete the test.

Calibration frequency of the instrument channel is divided into two groups. These are as follows:

1. Passive type indicating devices that can be compared with like units on a continuous basis.

2. Vacuum tube or semiconductor devices and detectors that drift or lose sensitivity.

Experience with passive type instruments in generating stations and substations indicates that the specified calibrations are adequate. For those devices which employ amplifiers, etc., drift specifications call for drift to be less than 0.4 percent/month; i.e., in the period of a month a drift of 4 percent would occur and thus providing for adequate margin. For the APRM system drift of electronic apparatus is not the only consideration in determining a calibration frequency. Change in power distribution and loss of chamber sensitivity dictate a calibration every seven days. Calibration on this frequency assures plant operation at or below thermal limits.

A comparison of Tables 4.1.A and 4.1.B indicates that two instrument channels have been included in the latter table. These are: mode switch in SHUTDOWN and manual scram. All of the devices or sensors associated with these scram functions are simple on-off switches and, hence, calibration during operation is not applicable, i.e., the switch is either on or off.

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. 242
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 4 1995, 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. 242, 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: November 2, 1995

ATTACHMENT TO LICENSE AMENDMENT NO. 242

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 and **spillover pages are provided to maintain document completeness.

REMOVE	INSERT
3.1/4.1-3	3.1/4.1-3
3.1/4.1-4	3.1/4.1-4*
3.1/4.1-5	3.1/4.1-5*
3.1/4.1-6	3.1/4.1-6
3.1/4.1-7	3.1/4.1-7
3.1/4.1-8	3.1/4.1-8
3.1/4.1-9	3.1/4.1-9*
3.1/4.1-10	3.1/4.1-10
3.1/4.1-16	3.1/4.1-16
3.1/4.1-17	3.1/4.1-17
3.1/4.1-18	3.1/4.1-18*
3.1/4.1-19	3.1/4.1-19
3.1/4.1-20	3.1/4.1-20**
3.1/4.1-21	3.1/4.1-21*

TABLE 3.1.A
REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENTS

Min. No. of Operable Instr. Channels Per Trip System (1)(23)	Trip Function	Trip Level Setting	Modes in which Function Must Be Operable: Shut-down	Refuel (7)	Startup/ Hot Standby	Run	Action (1)
1	Mode Switch in Shutdown		X	X	X	X	1.A
1	Manual Scram		X	X	X	X	1.A
	IRM (16)						
3	High Flux	≤120/125 Indicated on scale		X(22)	X	(5)	1.A
3	Inoperative			X(22)	X	(5)	1.A
	APRM (16)(24)(25)						
2	High Flux (Flow Biased)	See Spec. 2.1.A.1				X	1.A or 1.B
2	High Flux (Fixed Trip)	≤ 120%				X	1.A or 1.B
2	High Flux	≤ 15% rated power (13)		X(21)	X(17)	(15)	1.A
2	Inoperative			X(21)	X(17)	X	1.A
2	Downscale	≥ 3 Indicated on Scale		(11)	(11)	X(12)	1.A or 1.B
2	High Reactor Pressure (PIS-3-22AA,BB,C,D)	≤ 1055 psig		X(10)	X	X	1.A
2	High Drywell Pressure (14) (PIS-64-56 A-D)	≤ 2.5 psig		X(8)	X(8)	X	1.A
2	Reactor Low Water Level (14) (LIS-3-203 A-D)	≥ 538" above vessel zero		X	X	X	1.A

TABLE 3.1.A
REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENTS

Min. No. of Operable Instr. Channels Per Trip System (1)(23)	Trip Function	Trip Level Setting	Modes in which Function Must Be Operable: Shut-down	Refuel (7)	Startup/ Hot Standby	Run	Action (1)
2	High Water Level in West Scram Discharge Tank (LS-85-45A-D)	≤ 50 Gallons	X(2)	X(2)	X	X	1.A
2	High Water Level in East Scram Discharge Tank (LS-85-45E-H)	≤ 50 Gallons	X(2)	X(2)	X	X	1.A
4	Main Steam Line Isolation Valve Closure	≤10% Valve Closure				X(6)	1.A or 1.C
2	Turbine Control Valve Fast Closure or Turbine Trip	≥550 psig				X(4)	1.A or 1.D
4	Turbine Stop Valve Closure	≤10% Valve Closure				X(4)	1.A or 1.D
2	Turbine First Stage Pressure Permissive (PIS-1-81A&B, PIS-1-91A&B)	not ≥154 psig		X(18)	X(18)	X(18)	1.A or 1.D (19)
2	Low Scram Pilot Air Header Pressure	≥50 psig	X(2)	X(2)	X	X	1.A

NOTES FOR TABLE 3.1.A

1. There shall be two OPERABLE or tripped trip systems for each function. If the minimum number of OPERABLE instrument channels per trip system cannot be met for one trip system, trip the inoperable channels or entire trip system within one hour, or, alternatively, take the below listed action for that trip function. If the minimum number of OPERABLE instrument channels cannot be met by either trip system, the appropriate action listed below (refer to right-hand column of Table) shall be taken. An inoperable channel need not be placed in the tripped condition where this would cause the trip function to occur. In these cases, the inoperable channel shall be restored to OPERABLE status within two hours, or take the action listed below for that trip function.

   A. Initiate insertion of OPERABLE rods and complete insertion of all OPERABLE rods within four hours. In refueling mode, suspend all operations involving core alterations and fully insert all OPERABLE control rods within one hour.

   B. Reduce power level to IRM range and place mode switch in the STARTUP/HOT Standby position within 8 hours.

   C. Reduce turbine load and close main steam line isolation valves within 8 hours.

   D. Reduce power to less than 30 percent of rated.

2. The scram discharge volume high water level bypass may be used in SHUTDOWN or REFUEL to bypass both the scram discharge volume high-high water level and scram pilot air header low pressure scram signals in order to reset the reactor protection system trip. A control rod withdraw block is present when these scram signals are bypassed.

3. (Deleted)

4. Bypassed when turbine first stage pressure is less than 154 psig.

5. IRMs are bypassed when APRMs are onscale and the reactor mode switch is in the RUN position.

6. The design permits closure of any two lines without a scram being initiated.

7. When the reactor is subcritical and the reactor water temperature is less than 212°F, only the following trip functions need to be OPERABLE:

   A. Mode switch in SHUTDOWN

   B. Manual scram

   C. High flux IRM

   D. Scram discharge volume high level

E. APRM 15 percent scram

F. Scram pilot air header low pressure

8. Not required to be OPERABLE when primary containment integrity is not required.

9. (Deleted)

10. Not required to be OPERABLE when the reactor pressure vessel head is not bolted to the vessel.

11. The APRM downscale trip function is only active when the reactor mode switch is in RUN.

12. The APRM downscale trip is automatically bypassed when the IRM instrumentation is OPERABLE and not high.

13. Less than 14 OPERABLE LPRMs will cause a trip system trip.

14. Channel shared by Reactor Protection System and Primary Containment and Reactor Vessel Isolation Control System. A channel failure may be a channel failure in each system.

15. The APRM 15 percent scram is bypassed in the RUN Mode.

16. Channel shared by Reactor Protection System and Reactor Manual Control System (Rod Block Portion). A channel failure may be a channel failure in each system. If a channel is allowed to be inoperable per Table 3.1.A, the corresponding function in that same channel may be inoperable in the Reactor Manual Control System (Rod Block).

17. Not required while performing low power physics tests at atmospheric pressure during or after refueling at power levels not to exceed 5 MW(t).

18. This function must inhibit the automatic bypassing of turbine control valve fast closure or turbine trip scram and turbine stop valve closure scram whenever turbine first stage pressure is greater than or equal to 154 psig.

19. Action 1.A or 1.D shall be taken only if the permissive fails in such a manner to prevent the affected RPS logic from performing its intended function. Otherwise, no action is required.

20. (Deleted)

21. Only required with any control rod withdrawn from a core cell containing one or more fuel assemblies. The APRM High Flux and Inoperative Trips do not have to be OPERABLE if the Source Range Monitors are connected to give a noncoincidence, High Flux scram, at 5×10^5 cps. The SRMs shall be OPERABLE per Specification 3.10.B.1. The removal of eight (8) shorting links is required to provide noncoincidence high-flux scram protection from the Source Range Monitors.

NOTES FOR TABLE 3.1.A (Cont'd)

22. Only required with any control rod withdrawn from a core cell containing one or more fuel assemblies. For the IRM High Flux Trip Function, the three required IRMs per trip channel is not required if at least four IRMs (one in each core quadrant) are connected to give a noncoincidence, High Flux scram. The removal of four (4) shorting links is required to provide noncoincidence high-flux scram protection from the IRMs.

23. A channel may be placed in an INOPERABLE status for up to 4 hours for required surveillance without placing the trip system in the tripped condition provided at least one OPERABLE channel in the same trip system is monitoring that parameter.

24. The Average Power Range Monitor scram function is varied (Reference Figure 2.1-1) as a function of recirculation loop flow (W). The trip setting of this function must be maintained in accordance with 2.1.A.

25. The APRM flow-biased neutron flux signal is fed through a time constant circuit of approximately 6 seconds. This time constant may be lowered or equivalently removed (no time delay) without affecting the operability of the flow-biased neutron flux trip channels. The APRM fixed high neutron flux signal does not incorporate the time constant but responds directly to instantaneous neutron flux.

TABLE 4.1.A
REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION FUNCTIONAL TESTS
MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTRUMENT AND CONTROL CIRCUITS

	Group (2)	Functional Test	Minimum Frequency(3)
Mode Switch in Shutdown	A	Place Mode Switch in Shutdown	Each Refueling Outage
Manual Scram	A	Trip Channel and Alarm	Every 3 Months
IRM			
High Flux	C	Trip Channel and Alarm (4)	Once/Week (9)
Inoperative	C	Trip Channel and Alarm (4)	Once/Week (9)
APRM			
High Flux (15% Scram)	C	Trip Output Relays (4)	Once/Week (9)
High Flux (Flow Biased)	B	Trip Output Relays (4)	Once/Week
High Flux (Fixed Trip)	B	Trip Output Relays (4)	Once/Week
Inoperative	B	Trip Output Relays (4)	Once/Week
Downscale	B	Trip Output Relays (4)	Once/Week
Flow Bias	B	(6)	(6)
High Reactor Pressure (PIS-3-22AA, BB, C, D)	B	Trip Channel and Alarm (7)	Once/Month
High Drywell Pressure (PIS-64-56 A-D)	B	Trip Channel and Alarm (7)	Once/Month
Reactor Low Water Level (LIS-3-203 A-D)	B	Trip Channel and Alarm (7)	Once/Month

TABLE 4.1.A (Continued)

	Group (2)	Functional Test	Minimum Frequency(3)
High Water Level in Scram Discharge Tank Float Switches (LS-85-45C-F)	A	Trip Channel and Alarm	Once/Month
Electronic Level Switches (LS-85-45A, B, G, H)	B	Trip Channel and Alarm (7)	Once/Month
Main Steam Line Isolation Valve Closure	A	Trip Channel and Alarm	Once/3 Months (8)
Turbine Control Valve Fast Closure or turbine trip	A	Trip Channel and Alarm	Once/Month (1)
Turbine First Stage Pressure Permissive (PIS-1-81A and B, PIS-1-91A and B)	B	Trip Channel and Alarm (7)	Every three months
Turbine Stop Valve Closure	A	Trip Channel and Alarm	Once/Month (1)
Low Scram Pilot Air Header Pressure (PS 85-35 A1, A2, B1, & B2)	A	Trip Channel and Alarm	Once/6 Months

NOTES FOR TABLE 4.1.A

1. Initially the minimum frequency for the indicated tests shall be once per month.

2. A description of the three groups is included in the Bases of this specification.

3. Functional tests are not required when the systems are not required to be OPERABLE or are operating (i.e., already tripped). If tests are missed, they shall be performed prior to returning the systems to an OPERABLE status.

4. This instrumentation is exempted from the instrument channel test definition. This instrument channel functional test will consist of injecting a simulated electrical signal into the measurement channels.

5. (Deleted)

6. The functional test of the flow bias network is performed in accordance with Table 4.2.C.

7. Functional test consists of the injection of a simulated signal into the electronic trip circuitry in place of the sensor signal to verify operability of the trip end alarm functions.

8. The functional test frequency decreased to once every three months to reduce challenges to relief valves per NUREG 0737, Item II.K.3.16.

9. Not required to be performed when entering the STARTUP/HOT STANDBY Mode from RUN Mode until 12 hours after entering the STARTUP/HOT STANDBY Mode.

be accommodated which would result in slow scram times or partial control rod insertion. To preclude this occurrence, level switches have been provided in the instrument volume which alarm and scram the reactor when the volume of water reaches 50 gallons. As indicated above, there is sufficient volume in the piping to accommodate the scram without impairment of the scram times or amount of insertion of the control rods. This function shuts the reactor down while sufficient volume remains to accommodate the discharge water and precludes the situation in which a scram would be required but not be able to perform its function adequately.

A source range monitor (SRM) system is also provided to supply additional neutron level information during startup but has no scram functions. Reference Section 7.5.4 FSAR. Thus, the IRM is required in the REFUEL (with any control rod withdrawn from a core cell containing one or more fuel assemblies) and STARTUP Modes. In the power range the APRM system provides required protection. Reference Section 7.5.7 FSAR. Thus, the IRM System is not required in the RUN mode. The APRMs and the IRMs provide adequate coverage in the STARTUP and intermediate range.

The high reactor pressure, high drywell pressure, reactor low water level, low scram pilot air header pressure and scram discharge volume high level scrams are required for STARTUP and RUN modes of plant operation. They are, therefore, required to be operational for these modes of reactor operation.

Because of the APRM downscale limit of $\geq$ 3 percent when in the RUN mode and high level limit of $\leq$15 percent when in the STARTUP Mode, the transition between the STARTUP and RUN Modes must be made with the APRM instrumentation indicating between 3 percent and 15 percent of rated power or a control rod scram will occur. In addition, the IRM system must be indicating below the High Flux setting (120/125 of scale) or a scram will occur when in the STARTUP Mode. For normal operating conditions, these limits provide assurance of overlap between the IRM system and APRM system so that there are no "gaps" in the power level indications (i.e., the power level is continuously monitored from beginning of startup to full power and from full power to SHUTDOWN). When power is being reduced, if a transfer to the STARTUP mode is made and the IRMs have not been fully inserted (a maloperational but not impossible condition) a control rod block immediately occurs so that reactivity insertion by control rod withdrawal cannot occur.

The low scram pilot air header pressure trip performs the same function as the high water level in the scram discharge instrument volume for fast fill events in which the high level instrument response time may be inadequate. A fast fill event is postulated for certain degraded control air events in which the scram outlet valves unseat enough to allow 5 gpm per drive leakage into the scram discharge volume but not enough to cause control rod insertion.

The minimum functional testing frequency used in this specification is based on a reliability analysis using the concepts developed in reference (1). This concept was specifically adapted to the one-out-of-two taken twice logic of the reactor protection system. The analysis shows that the sensors are primarily responsible for the reliability of the reactor protection system. This analysis makes use of "unsafe failure" rate experience at conventional and nuclear power plants in a reliability model for the system. An "unsafe failure" is defined as one which negates channel operability and which, due to its nature, is revealed only when the channel is functionally tested or attempts to respond to a real signal. Failure such as blown fuses, ruptured bourdon tubes, faulted amplifiers, faulted cables, etc., which result in "upscale" or "downscale" readings on the reactor instrumentation are "safe" and will be easily recognized by the operators during operation because they are revealed by an alarm or a scram.

The channels listed in Tables 4.1.A and 4.1.B are divided into three groups for functional testing. These are:

A. On-Off sensors that provide a scram trip function.

B. Analog devices coupled with bistable trips that provide a scram function.

C. Devices which only serve a useful function during some restricted mode of operation, such as STARTUP, or for which the only practical test is one that can be performed at SHUTDOWN.

The sensors that make up group (A) are specifically selected from among the whole family of industrial on-off sensors that have earned an excellent reputation for reliable operation. During design, a goal of 0.9999 probability of success (at the 50 percent confidence level) was adopted to assure that a balanced and adequate design is achieved. The probability of success is primarily a function of the sensor failure rate and the test interval. A three-month test interval was planned for group (A) sensors. This is in keeping with good operating practices, and satisfies the design goal for the logic configuration utilized in the Reactor Protection System.

The once per six-month functional test frequency for the scram pilot air header low pressure trip function is acceptable due to:

1. The functional reliability previously demonstrated by these switches on Unit 2 during Cycles 6 and 7,

2. The need for minimizing the radiation exposure associated with the functional testing of these switches, and

3. The increased risk to plant availability while the plant is in a half-scram condition during the performance of the functional testing versus the limited increase in reliability that would be obtained by more frequent functional testing.

A single failure of one of the scram pilot air header low pressure trip switches would not result in the loss of the trip function. It is highly unlikely that two switches in one channel would experience an undetected failure during the period between six-month functional tests.

To satisfy the long-term objective of maintaining an adequate level of safety throughout the plant lifetime, a minimum goal of 0.9999 at the 95 percent confidence level is proposed. With the (1-out-of-2) X (2) logic, this requires that each sensor have an availability of 0.993 at the 95 percent confidence level. This level of availability may be maintained by adjusting the test interval as a function of the observed failure history.[1]

To facilitate the implementation of this technique, Figure 4.1-1 is provided to indicate an appropriate trend in test interval. The procedure is as follows:

1. Like sensors are pooled into one group for the purpose of data acquisition.

2. The factor M is the exposure hours and is equal to the number of sensors in a group, n, times the elapsed time T (M = nT).

3. The accumulated number of unsafe failures is plotted as an ordinate against M as an abscissa on Figure 4.1-1.

4. After a trend is established, the appropriate monthly test interval to satisfy the goal will be the test interval to the left of the plotted points.

5. A test interval of one month will generally be used initially until a trend is established.

Group (B) devices utilize an analog sensor followed by an amplifier and a bistable trip circuit. The sensor and amplifier are active components and a failure is almost always accompanied by an alarm and an indication of the source of trouble. In the event of failure, repair or substitution can start immediately. An "as-is" failure is one that "sticks" mid-scale and is not capable of going either up or down in response to an out-of-limits input. This type of failure for analog devices is a rare occurrence and is detectable by an operator who observes that one signal does not track the other three. For purpose of analysis, it is assumed that this rare failure will be detected within two hours.

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1. Reliability of Engineered Safety Features as a Function of Testing Frequency, I. M. Jacobs, "Nuclear Safety," Vol. 9, No. 4, July-August, 1968, pp. 310-312.

The bistable trip circuit which is a part of the Group (B) devices can sustain unsafe failures which are revealed only on test. Therefore, it is necessary to test them periodically.

A study was conducted of the instrumentation channels included in the Group (B) devices to calculate their "unsafe" failure rates. The analog devices (sensors and amplifiers) are predicted to have an unsafe failure rate of less than 20×10^{-6} failure/hour. The bistable trip circuits are predicted to have unsafe failure rate of less than 2×10^{-6} failures/hour. Considering the two hour monitoring interval for the analog devices as assumed above, and a weekly test interval for the bistable trip circuits, the design reliability goal of 0.99999 is attained with ample margin.

The bistable devices are monitored during plant operation to record their failure history and establish a test interval using the curve of Figure 4.1-1. There are numerous identical bistable devices used throughout the plant's instrumentation system. Therefore, significant data on the failure rates for the bistable devices should be accumulated rapidly.

The frequency of calibration of the APRM Flow Biasing Network has been established at each refueling outage. There are several instruments which must be calibrated and it will take several hours to perform the calibration of the entire network. While the calibration is being performed, a zero flow signal will be sent to half of the APRMs resulting in a half scram and rod block condition. Thus, if the calibration were performed during operation, flux shaping would not be possible. Based on experience at other generating stations, drift of instruments, such as those in the Flow Biasing Network, is not significant and therefore, to avoid spurious scrams, a calibration frequency of each refueling outage is established.

Group (C) devices are active only during a given portion of the operational cycle. For example, the IRM is active during the STARTUP/HOT STANDBY and REFUEL (with any control rod withdrawn from a core cell containing one or more fuel assemblies) Modes and inactive during full-power operation. Thus, the only test that is meaningful is the one performed prior to entering the applicable Mode (i.e., the tests that are performed prior to use of the instrument). Since testing of the IRM functions is not practical in the RUN Mode, testing is not required to be completed until 12 hours after entering the STARTUP/HOT STANDBY Mode from the RUN Mode. Twelve hours is based on operating experience and in consideration of providing reasonable time in which to complete the test.

Calibration frequency of the instrument channel is divided into two groups. These are as follows:

1. Passive type indicating devices that can be compared with like units on a continuous basis.

2. Vacuum tube or semiconductor devices and detectors that drift or lose sensitivity.

Experience with passive type instruments in generating stations and substations indicates that the specified calibrations are adequate. For those devices which employ amplifiers, etc., drift specifications call for drift to be less than 0.4 percent/month; i.e., in the period of a month a drift of 4 percent would occur and thus providing for adequate margin.

For the APRM system drift of electronic apparatus is not the only consideration in determining a calibration frequency. Change in power distribution and loss of chamber sensitivity dictate a calibration every seven days. Calibration on this frequency assures plant operation at or below thermal limits.

A comparison of Tables 4.1.A and 4.1.B indicates that two instrument channels have been included in the latter table. These are: mode switch in SHUTDOWN and manual scram. All of the devices or sensors associated with these scram functions are simple on-off switches and, hence, calibration during operation is not applicable, i.e., the switch is either on or off.

The sensitivity of LPRM detectors decreases with exposure to neutron flux at a slow and approximately constant rate. The APRM system, which uses the LPRM readings to detect a change in thermal power, will be calibrated every seven days using a heat balance to compensate for this change in sensitivity. The RBM system uses the LPRM reading to detect a localized change in thermal power. It applies a correction factor based on the APRM output signal to determine the percent thermal power and therefore any change in LPRM sensitivity is compensated for by the APRM calibration. The technical specification limits of CMFLPD, CPR, and APLHGR are determined by the use of the process computer or other backup methods. These methods use LPRM readings and TIP data to determine the power distribution.

Compensation in the process computer for changes in LPRM sensitivity will be made by performing a full core TIP traverse to update the computer calculated LPRM correction factors every 1000 effective full power hours.

As a minimum the individual LPRM meter readings will be adjusted at the beginning of each operating cycle before reaching 100 percent power.

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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. 201
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 4, 1995, 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. 201, 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: November 2, 1995

ATTACHMENT TO LICENSE AMENDMENT NO. 201

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
3.1/4.1-2	3.1/4.1-2
3.1/4.1-3	3.1/4.1-3*
3.1/4.1-4	3.3/4.1-4*
3.1/4.1-5	3.1/4.1-5
3.1/4.1-6	3.1/4.1-6
3.1/4.1-7	3.1/4.1-7
3.1/4.1-8	3.1/4.1-8*
3.1/4.1-9	3.1/4.1-9
3.1/4.1-15	3.1/4.1-15
3.1/4.1-16	3.1/4.1-16
3.1/4.1-17	3.1/4.1-17*
3.1/4.1-18	3.1/4.1-18

TABLE 3.1.A
REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENTS

Min. No. of Operable Instr. Channels Per Trip System (1)(23)	Trip Function	Trip Level Setting	Modes in Which Function Must Be Operable: Shut-down	Refuel (7)	Startup/ Hot Standby	Run	Action (1)
1	Mode Switch in Shutdown		X	X	X	X	1.A
1	Manual Scram		X	X	X	X	1.A
	IRM (16)						
3	High Flux	≤120/125 Indicated on scale		X(22)	X	(5)	1.A
3	Inoperative			X(22)	X	(5)	1.A
	APRM (16)(24)(25)						
2	High Flux (Fixed Trip)	≤ 120%				X	1.A or 1.B
2	High Flux (Flow Biased)	See Spec. 2.1.A.1				X	1.A or 1.B
2	High Flux	≤ 15% rated power		X(21)	X(17)	(15)	1.A
2	Inoperative	(13)		X(21)	X(17)	X	1.A
2	Downscale	≥ 3 Indicated on Scale		(11)	(11)	X(12)	1.A or 1.B
2	High Reactor Pressure (PIS-3-22AA,BB,C,D)	≤ 1055 psig		X(10)	X	X	1.A
2	High Drywell Pressure (14) (PIS-64-56 A-D)	≤ 2.5 psig		X(8)	X(8)	X	1.A
2	Reactor Low Water Level (14) (LIS-3-203 A-D)	≥ 538" above vessel zero		X	X	X	1.A

TABLE 3.1.A
REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENTS

Min. No. of Operable Instr. Channels Per Trip System (1)(23)	Trip Function	Trip Level Setting	Modes in Which Function Must Be Operable: Shut-down	Refuel (7)	Startup/ Hot Standby	Run	Action (1)
2	High Water Level in West Scram Discharge Tank (LS-85-45A-D)	≤ 50 Gallons	X(2)	X(2)	X	X	1.A
2	High Water Level in East Scram Discharge Tank (LS-85-45E-H)	≤ 50 Gallons	X(2)	X(2)	X	X	1.A
4	Main Steam Line Isolation Valve Closure	≤10% Valve Closure				X(6)	1.A or 1.C
2	Turbine Control Valve Fast Closure or Turbine Trip	≥550 psig				X(4)	1.A or 1.D
4	Turbine Stop Valve Closure	≤10% Valve Closure				X(4)	1.A or 1.D
2	Turbine First Stage Pressure Permissive (PIS-1-81A&B) (PIS-1-91A&B)	not ≥154 psig		X(18)	X(18)	X(18)	1.A or 1.D (19)
2	Low Scram Pilot Air Header Pressure	≥ 50 psig	X(2)	X(2)	X	X	1.A

NOTES FOR TABLE 3.1.A

1. There shall be two OPERABLE or tripped trip systems for each function. If the minimum number of OPERABLE instrument channels per trip system cannot be met for one trip system, trip the inoperable channels or entire trip system within one hour, or, alternatively, take the below listed action for that trip function. If the minimum number of OPERABLE instrument channels cannot be met by either trip system, the appropriate action listed below (refer to right-hand column of Table) shall be taken. An inoperable channel need not be placed in the tripped condition where this would cause the trip function to occur. In these cases, the inoperable channel shall be restored to OPERABLE status within two hours, or take the action listed below for that trip function.

   A. Initiate insertion of OPERABLE rods and complete insertion of all OPERABLE rods within four hours. In refueling mode, suspend all operations involving core alterations and fully insert all OPERABLE control rods within one hour.

   B. Reduce power level to IRM range and place mode switch in the STARTUP/HOT STANDBY position within 8 hours.

   C. Reduce turbine load and close main steam line isolation valves within 8 hours.

   D. Reduce power to less than 30 percent of rated.

2. The scram discharge volume high water level bypass may be used in SHUTDOWN or REFUEL to bypass both the scram discharge volume high-high water level and scram pilot air header low pressure scram signals in order to reset the reactor protection system trip. A control rod withdraw block is present when these scram signals are bypassed.

3. DELETED

4. Bypassed when turbine first stage pressure is less than 154 psig.

5. IRMs are bypassed when APRMs are onscale and the reactor mode switch is in the RUN position.

6. The design permits closure of any two lines without a scram being initiated.

7. When the reactor is subcritical and the reactor water temperature is less than 212°F, only the following trip functions need to be OPERABLE:

   A. Mode switch in shutdown

   B. Manual scram

   C. High flux IRM

   D. Scram discharge volume high level

NOTES FOR TABLE 3.1.A (Cont'd)

E. APRM 15 percent scram

F. Scram pilot air header low pressure

8. Not required to be OPERABLE when primary containment integrity is not required.

9. (Deleted)

10. Not required to be OPERABLE when the reactor pressure vessel head is not bolted to the vessel.

11. The APRM downscale trip function is only active when the reactor mode switch is in RUN.

12. The APRM downscale trip is automatically bypassed when the IRM instrumentation is OPERABLE and not high.

13. Less than 14 OPERABLE LPRMs will cause a trip system trip.

14. Channel shared by Reactor Protection System and Primary Containment and Reactor Vessel Isolation Control System. A channel failure may be a channel failure in each system.

15. The APRM 15 percent scram is bypassed in the RUN Mode.

16. Channel shared by Reactor Protection System and Reactor Manual Control System (Rod Block Portion). A channel failure may be a channel failure in each system. If a channel is allowed to be inoperable per Table 3.1.A, the corresponding function in that same channel may be inoperable in the Reactor Manual Control System (Rod Block).

17. Not required while performing low power physics tests at atmospheric pressure during or after refueling at power levels not to exceed 5 MWt.

18. This function must inhibit the automatic bypassing of turbine control valve fast closure or turbine trip scram and turbine stop valve closure scram whenever turbine first stage pressure is greater than or equal to 154 psig.

19. Action 1.A or 1.D shall be taken only if the permissive fails in such a manner to prevent the affected RPS logic from performing its intended function. Otherwise, no action is required.

20. (Deleted)

21. Only required with any control rod withdrawn from a core cell containing one or more fuel assemblies. The APRM High Flux and Inoperative Trips do not have to be OPERABLE if the Source Range Monitors are connected to give a noncoincidence, High Flux scram, at 5×10^5 cps. The SRMs shall be OPERABLE per Specification 3.10.B.1. The removal of eight (8) shorting links is required to provide noncoincidence high-flux scram protection from the Source Range Monitors.

22. Only required with any control rod withdrawn from a core cell containing one or more fuel assemblies. For the IRM High Flux Trip Function, the three required IRMs per trip channel is not required if at least four IRMs (one in each core quadrant) are connected to give a noncoincidence, High Flux scram. The removal of four (4) shorting links is required to provide noncoincidence high-flux scram protection from the IRMs.

23. A channel may be placed in an INOPERABLE status for up to 4 hours for required surveillance without placing the trip system in the tripped condition provided at least one OPERABLE channel in the same trip system is monitoring that parameter.

24. The Average Power Range Monitor scram function is varied (Reference Figure 2.1-1) as a function of recirculation loop flow (W). The trip setting of this function must be maintained in accordance with 2.1.A.

25. The APRM flow-biased neutron flux signal is fed through a time constant circuit of approximately 6 seconds. This time constant may be lowered or equivalently removed (no time delay) without affecting the operability of the flow-biased neutron flux trip channels. The APRM fixed high neutron flux signal does not incorporate the time constant but responds directly to instantaneous neutron flux.

TABLE 4.1.A
REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION FUNCTIONAL TESTS
MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTR. AND CONTROL CIRCUITS

	Group (2)	Functional Test	Minimum Frequency(3)
Mode Switch in Shutdown	A	Place Mode Switch in Shutdown	Each Refueling Outage
Manual Scram	A	Trip Channel and Alarm	Every 3 Months
IRM			
High Flux	C	Trip Channel and Alarm (4)	Once/Week (9)
Inoperative	C	Trip Channel and Alarm (4)	Once/Week (9)
APRM			
High Flux (15% Scram)	C	Trip Output Relays (4)	Once/Week (9)
High Flux (Flow Biased)	B	Trip Output Relays (4)	Once/Week
High Flux (Fixed Trip)	B	Trip Output Relays (4)	Once/Week
Inoperative	B	Trip Output Relays (4)	Once/Week
Downscale	B	Trip Output Relays (4)	Once/Week
Flow Bias	B	(6)	(6)
High Reactor Pressure (PIS-3-22AA,BB,C,D)	B	Trip Channel and Alarm (7)	Once/Month
High Drywell Pressure (PIS-64-56 A-D)	B	Trip Channel and Alarm (7)	Once/Month
Reactor Low Water Level (LIS-3-203 A-D)	B	Trip Channel and Alarm (7)	Once/Month

TABLE 4.1.A (Continued)

	Group (2)	Functional Test	Minimum Frequency(3)
High Water Level in Scram Discharge Tank Float Switches (LS-85-45C-F)	A	Trip Channel and Alarm	Once/Month
Electronic Level Switches (LS-85-45A, B, G, H)	B	Trip Channel and Alarm (7)	Once/Month
Main Steam Line Isolation Valve Closure	A	Trip Channel and Alarm	Once/3 Months (8)
Turbine Control Valve Fast Closure or turbine trip	A	Trip Channel and Alarm	Once/Month (1)
Turbine First Stage Pressure Permissive (PIS-1-81A and B, PIS-1-91A and B)	B	Trip Channel and Alarm (7)	Every three months
Turbine Stop Valve Closure	A	Trip Channel and Alarm	Once/Month (1)
Low Scram Pilot Air Header Pressure (PS 85-35 A1, A2, B1, and B2)	A	Trip Channel and Alarm	Once/6 Months

NOTES FOR TABLE 4.1.A

1. Initially the minimum frequency for the indicated tests shall be once per month.

2. A description of the three groups is included in the Bases of this specification.

3. Functional tests are not required when the systems are not required to be OPERABLE or are operating (i.e., already tripped). If tests are missed, they shall be performed prior to returning the systems to an OPERABLE status.

4. This instrumentation is exempted from the instrument channel test definition. This instrument channel functional test will consist of injecting a simulated electrical signal into the measurement channels.

5. (Deleted)

6. The functional test of the flow bias network is performed in accordance with Table 4.2.C.

7. Functional test consists of the injection of a simulated signal into the electronic trip circuitry in place of the sensor signal to verify operability of the trip end alarm functions.

8. Functional test frequency decreased to once/3 months to reduce the challenges to relief valves per NUREG 0737, Item II.K.3.16.

9. Not required to be performed when entering the STARTUP/HOT STANDBY Mode from RUN Mode until 12 hours after entering the STARTUP/HOT STANDBY Mode.

be accommodated which would result in slow scram times or partial control rod insertion. To preclude this occurrence, level switches have been provided in the instrument volume which alarm and scram the reactor when the volume of water reaches 50 gallons. As indicated above, there is sufficient volume in the piping to accommodate the scram without impairment of the scram times or amount of insertion of the control rods. This function shuts the reactor down while sufficient volume remains to accommodate the discharge water and precludes the situation in which a scram would be required but not be able to perform its function adequately.

A source range monitor (SRM) system is also provided to supply additional neutron level information during startup but has no scram functions. Reference Section 7.5.4 FSAR. Thus, the IRM is required in the REFUEL (with any control rod withdrawn from a core cell containing one or more fuel assemblies) and STARTUP Modes. In the power range the APRM system provides required protection. Reference Section 7.5.7 FSAR. Thus, the IRM System is not required in the RUN mode. The APRMs and the IRMs provide adequate coverage in the STARTUP and intermediate range.

The high reactor pressure, high drywell pressure, reactor low water level, low scram pilot air header pressure and scram discharge volume high level scrams are required for STARTUP and RUN modes of plant operation. They are, therefore, required to be operational for these modes of reactor operation.

Because of the APRM downscale limit of $\geq$ 3 percent when in the RUN mode and high level limit of $\leq$15 percent when in the STARTUP Mode, the transition between the STARTUP and RUN Modes must be made with the APRM instrumentation indicating between 3 percent and 15 percent of rated power or a control rod scram will occur. In addition, the IRM system must be indicating below the High Flux setting (120/125 of scale) or a scram will occur when in the STARTUP Mode. For normal operating conditions, these limits provide assurance of overlap between the IRM system and APRM system so that there are no "gaps" in the power level indications (i.e., the power level is continuously monitored from beginning of startup to full power and from full power to shutdown). When power is being reduced, if a transfer to the STARTUP mode is made and the IRMs have not been fully inserted (a maloperational but not impossible condition) a control rod block immediately occurs so that reactivity insertion by control rod withdrawal cannot occur.

The low scram pilot air header pressure trip performs the same function as the high water level in the scram discharge instrument volume for fast fill events in which the high level instrument response time may be inadequate. A fast fill event is postulated for certain degraded control air events in which the scram outlet valves unseat enough to allow 5 gpm per drive leakage into the scram discharge volume but not enough to cause control rod insertion.

The minimum functional testing frequency used in this specification is based on a reliability analysis using the concepts developed in reference (1). This concept was specifically adapted to the one-out-of-two taken twice logic of the reactor protection system. The analysis shows that the sensors are primarily responsible for the reliability of the reactor protection system. This analysis makes use of "unsafe failure" rate experience at conventional and nuclear power plants in a reliability model for the system. An "unsafe failure" is defined as one which negates channel operability and which, due to its nature, is revealed only when the channel is functionally tested or attempts to respond to a real signal. Failure such as blown fuses, ruptured bourdon tubes, faulted amplifiers, faulted cables, etc., which result in "upscale" or "downscale" readings on the reactor instrumentation are "safe" and will be easily recognized by the operators during operation because they are revealed by an alarm or a scram.

The channels listed in Tables 4.1.A and 4.1.B are divided into three groups for functional testing. These are:

A. On-Off sensors that provide a scram trip function.

B. Analog devices coupled with bistable trips that provide a scram function.

C. Devices which only serve a useful function during some restricted mode of operation, such as STARTUP, or for which the only practical test is one that can be performed at shutdown.

The sensors that make up group (A) are specifically selected from among the whole family of industrial on-off sensors that have earned an excellent reputation for reliable operation. During design, a goal of 0.99999 probability of success (at the 50 percent confidence level) was adopted to assure that a balanced and adequate design is achieved. The probability of success is primarily a function of the sensor failure rate and the test interval. A three-month test interval was planned for group (A) sensors. This is in keeping with good operating practices, and satisfies the design goal for the logic configuration utilized in the Reactor Protection System.

The once per six-month functional test frequency for the scram pilot air header low pressure trip function is acceptable due to:

1. The functional reliability previously demonstrated by these switches on Unit 2 during Cycles 6 and 7,

2. The need for minimizing the radiation exposure associated with the functional testing of these switches, and

3. The increased risk to plant availability while the plant is in a half-scram condition during the performance of the functional testing versus the limited increase in reliability that would be obtained by more frequent functional testing.

A single failure of one of the scram pilot air header low pressure trip switches would not result in the loss of the trip function. It is highly unlikely that two switches in one channel would experience an undetected failure during the period between six-month functional tests.

To satisfy the long-term objective of maintaining an adequate level of safety throughout the plant lifetime, a minimum goal of 0.9999 at the 95-percent confidence level is proposed. With the (1-out-of-2) X (2) logic, this requires that each sensor have an availability of 0.993 at the 95 percent confidence level. This level of availability may be maintained by adjusting the test interval as a function of the observed failure history.[1]

To facilitate the implementation of this technique, Figure 4.1-1 is provided to indicate an appropriate trend in test interval. The procedure is as follows:

1. Like sensors are pooled into one group for the purpose of data acquisition.

2. The factor M is the exposure hours and is equal to the number of sensors in a group, n, times the elapsed time T (M = nT).

3. The accumulated number of unsafe failures is plotted as an ordinate against M as an abscissa on Figure 4.1-1.

4. After a trend is established, the appropriate monthly test interval to satisfy the goal will be the test interval to the left of the plotted points.

5. A test interval of one month will generally be used initially until a trend is established.

Group (B) devices utilize an analog sensor followed by an amplifier and a bistable trip circuit. The sensor and amplifier are active components and a failure is almost always accompanied by an alarm and an indication of the source of trouble. In the event of failure, repair or substitution can start immediately. An "as-is" failure is one that "sticks" mid-scale and is not capable of going either up or down in response to an out-of-limits input. This type of failure for analog devices is a rare occurrence and is detectable by an operator who observes that one signal does not track the other three. For purpose of analysis, it is assumed that this rare failure will be detected within two hours.

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1. Reliability of Engineered Safety Features as a Function of Testing Frequency, I. M. Jacobs, "Nuclear Safety," Vol. 9, No. 4, July-August, 1968, pp. 310-312.

The bistable trip circuit which is a part of the Group (B) devices can sustain unsafe failures which are revealed only on test. Therefore, it is necessary to test them periodically.

A study was conducted of the instrumentation channels included in the Group (B) devices to calculate their "unsafe" failure rates. The analog devices (sensors and amplifiers) are predicted to have an unsafe failure rate of less than 20×10^{-6} failure/hour. The bistable trip circuits are predicted to have unsafe failure rate of less than 2×10^{-6} failures/hour. Considering the two hour monitoring interval for the analog devices as assumed above, and a weekly test interval for the bistable trip circuits, the design reliability goal of 0.99999 is attained with ample margin.

The bistable devices are monitored during plant operation to record their failure history and establish a test interval using the curve of Figure 4.1-1. There are numerous identical bistable devices used throughout the plant's instrumentation system. Therefore, significant data on the failure rates for the bistable devices should be accumulated rapidly.

The frequency of calibration of the APRM Flow Biasing Network has been established at each refueling outage. There are several instruments which must be calibrated and it will take several hours to perform the calibration of the entire network. While the calibration is being performed, a zero flow signal will be sent to half of the APRMs resulting in a half scram and rod block condition. Thus, if the calibration were performed during operation, flux shaping would not be possible. Based on experience at other generating stations, drift of instruments, such as those in the Flow Biasing Network, is not significant and therefore, to avoid spurious scrams, a calibration frequency of each refueling outage is established.

Group (C) devices are active only during a given portion of the operational cycle. For example, the IRM is active during the STARTUP/HOT STANDBY and REFUEL (with any control rod withdrawn from a core cell containing one or more fuel assemblies) Modes and inactive during full-power operation. Thus, the only test that is meaningful is the one performed prior to entering the applicable Mode (i.e., the tests that are performed prior to use of the instrument). Since testing of the IRM functions is not practical in the RUN Mode, testing is not required to be completed until 12 hours after entering the STARTUP/HOT STANDBY Mode from the RUN Mode. Twelve hours is based on operating experience and in consideration of providing reasonable time in which to complete the test.

Calibration frequency of the instrument channel is divided into two groups. These are as follows:

1. Passive type indicating devices that can be compared with like units on a continuous basis.

2. Vacuum tube or semiconductor devices and detectors that drift or lose sensitivity.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 227 TO FACILITY OPERATING LICENSE NO. DPR-33

AMENDMENT NO. 242 TO FACILITY OPERATING LICENSE NO. DPR-52

AMENDMENT NO. 201 TO FACILITY OPERATING LICENSE NO. DPR-68

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3

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

1.0 INTRODUCTION

By letter dated January 4, 1995, Tennessee Valley Authority (the licensee) requested changes to the Technical Specifications (TS) for the Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3. The propsed changes revise the applicability and surveillance requirements for the Intermediate Range Monitor (IRM), Average Power Range Monitor (APRM) High Flux (15% Scram), and APRM Inoperative Trip Functions.

The current TS require that the IRM Reactor Protection System (RPS) Trip Functions must be functionally tested per TS Table 4.1.A at least once per week during refueling and before each startup. APRM RPS High Flux (15% Scram) trip operability must be functionally tested per TS Table 4.1.A at least weekly when required to be operable and before each startup. The IRM RPS High Flux Trip Function is required to be operable in the Startup/Hot Standby, Shutdown and Refuel Modes. The IRM RPS Inoperative, APRM RPS High Flux (15% Scram), and APRM RPS Inoperative Trip Functions are required to be operable in the Startup/Hot Standby and Refuel Modes. Also, the APRM RPS Inoperative Trip Function is required to be operable in the Run Mode.

In order to eliminate unnecessary testing and unavailability of RPS instrumentation, and for consistency with the Improved Standard Technical Specifications (ISTS), the licensee proposes to adopt the ISTS applicability and functional testing provisions for these trip functions. The ISTS require the functional test for each trip function within 12 hours after entering Startup/Hot Standby (Mode 2) from RUN (Mode 1) and every 7 days during applicable Modes. The licensee proposes to adopt the ISTS Limiting Condition for Operation applicability for Startup/Hot Standby Mode and Refuel Mode with any control rod withdrawn from a core cell containing one or more fuel assemblies.

ENCLOSURE

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2.0 BACKGROUND

The IRM subsystem monitors neutron flux from the top of the source range to the bottom of the power range. The IRM subsystem is the primary source of information on the approach of the reactor to the power range. It has eight IRM channels, each of which includes one detector that can be physically positioned in the core by remote control. The detectors are inserted into the core for a reactor startup and are withdrawn after the reactor mode selector switch is turned to "RUN." They are normally inserted any time the reactor is not at power.

The APRM channels receive input signals from the 43 local power range monitors (LPRMs) within the reactor core to provide an indication of the power distribution and local power changes. The APRM channels average these LPRM signals to provide a continuous indication of average reactor power from a few percent to greater than Rated Thermal Power (RTP). The design basis setpoint for neutron monitoring in the "STARTUP" Mode is the APRM High Flux (15% Scram) trip.

3.0 EVALUATION

The IRM, the APRM High Flux (15% Scram), and the APRM Inoperative Trip Functions must be OPERABLE during Startup/Hot Standby when control rods may be withdrawn and the potential for criticality exists. In Refuel, they provide monitoring for and protection against unexpected reactivity excursions. Although current TS require the IRM High Flux Trip Function to be operable in the Shutdown Mode, the trip function serves no useful purpose because rod withdrawal is precluded by the mode switch.

The IRM and APRM detectors and electronics are tested under operating conditions and verified to have the operational characteristics that provide the level of precision and reliability required by the RPS design basis. Current TS require the IRM and APRM High Flux (15% Scram) Trip Functions to be functionally tested before each startup and weekly during refueling (for the IRMs) or when required to be operable (for the APRM High Flux). This could result in unnecessary testing if two startups occur within 7 days of each other since these trip functions will still be within the 7-day periodicity of the functional test requirement but would still have to be retested due to literal interpretation of the TS. The required periodic frequency has been determined to be sufficient to verify that the IRMs and APRMs are functioning properly. A reactor startup does not impact the ability of the monitors to perform their required function; therefore, an additional surveillance, required "before each startup," is not necessary.

One of the objectives of this proposed TS is to make the requirements of the BFN TS consistent with the requirements of the ISTS for these IRM and APRM Trip Functions. Section 3.3.1.1 of the ISTS provides the requirements for RPS instrumentation. The ISTS require that the IRM, APRM High Flux (15% Scram) and APRM Inoperative Trip Functions to be OPERABLE in Mode 2 (equivalent to BFN's Startup/Hot Standby Mode), and Mode 5 (equivalent to BFN's Refuel Mode)

with any control rod withdrawn from a core cell containing one or more fuel assemblies. They also require a functional test to demonstrate operability within 12 hours of entering Mode 2 from Mode 1 (equivalent to BFN's Run Mode) and every 7 days while in applicable Modes. The APRM Inoperative Trip Function is also required to be OPERABLE in Mode 1.

The intent of the ISTS is to ensure that the IRM and APRM High Flux (15% Scram) functions are tested every 7 days while in Mode 5 with any control rod withdrawn from a core cell containing one or more fuel assemblies and within 7 days prior to startup. This is accomplished by requiring the functional test to be performed within 12 hours of entering Mode 2 from Mode 1 and weekly during applicable modes. The functional test is not required to be performed prior to entering Mode 2 from Mode 1, since testing of the Mode 2-required trip functions cannot be performed without using jumpers, lifted leads, or movable links.

The staff finds that the testing requirements proposed by the licensee are sufficient to provide reasonable assurance that the APM and IRPM are functioning properly in all applicable modes. The proposed changes 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 changes 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 (60 FR 29888). 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 upon 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) issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: George F. Wunder

Dated: November 2, 1995