Mr. J. A. Scalice
Chief Nuclear Officer
and Executive Vice President
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

March 11, 1999

SUBJECT: AMENDMENT NO. 258 TO FACILITY OPERATING LICENSE NO. DPR-52: OSCILLATION POWER RANGE MONITOR UPSCALE TRIP FUNCTION IN THE AVERAGE POWER RANGE MONITOR - TECHNICAL SPECIFICATION CHANGE TS-354 (TAC NO. MA3556)

Dear Mr. Scalice:

The Commission has issued the enclosed Amendment No. 258 to Facility Operating License No. DPR-52 for the Browns Ferry Nuclear Plant Unit 2. This amendment is in response to your application dated September 8, 1998, as supplemented by letter dated February 22, 1999.

The amendment revises the Appendix A Technical Specifications to include provisions for enabling the Oscillation Power Range Monitor (OPRM) Upscale trip function in the Average Power Range Monitor (APRM).

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

Sincerely,
Original signed by A. De Agazio for:
L. Raghavan, Senior Project Manager
Project Directorate II-3
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-260
Serial No. BFN-98-20

Enclosures: 1. Amendment No 258 to License No. DPR-52
2. Safety Evaluation

cc w/encls: See next page

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

March 5, 1999

Mr. J. A. Scalice
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6A Lookout Place
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Chattanooga, Tennessee 37402-2801

SUBJECT: AMENDMENT NO. 258 TO FACILITY OPERATING LICENSE NO. DPR-52: OSCILLATION POWER RANGE MONITOR UPSCALE TRIP FUNCTION IN THE AVERAGE POWER RANGE MONITOR - TECHNICAL SPECIFICATION CHANGE TS-354 (TAC NO. MA3556)

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Sincerely,

Albert W. McGuire Jr

L. Raghavan, Senior Project Manager
Project Directorate II-3
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-260
Serial No. BFN-98-20

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2. Safety Evaluation

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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. **258**
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 September 8, 1998, as supplemented by letter dated February 22, 1999, 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. 258 are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective and shall be implemented at the end of the Unit 2 cycle 10 outage schedule to begin on April 11, 1999.

FOR THE NUCLEAR REGULATORY COMMISSION

Cecil O. Thomas, Jr., Director
Project Directorate II-3
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the
Technical Specifications

Date of Issuance: March 5, 1999

ATTACHMENT TO LICENSE AMENDMENT NO 258

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.

Remove	Insert
3.3-1	3.3-1
3.3-2	3.3-2
3.3-3	3.3-3
3.3-6	3.3-6
3.3-8	3.3-8
3.3-9	3.3-9
3.4-1	3.4-1
3.4-2	3.4-2
3.4-3	3.4-3
3.4-4	3.4-4
B 3.3-9	B 3.3-9
-----	B 3.3-9a
B 3.3-14	B 3.3-14
B 3.3-15	B 3.3-15
-----	B 3.3-15a
-----	B 3.3-15b
B 3.3-30	B 3.3-30
B 3.3-32	B 3.3-32
B 3.3-34	B 3.3-34
B 3.3-35	B 3.3-35
-----	B 3.3-35a
B 3.3-44	B 3.3-44
-----	B 3.3-45a
B 3.3-46	B 3.3-46
-----	B 3.3-46a

B 3.4-4	B 3.4-4
B 3.4-5	B 3.4-5
B 3.4-5 (1)	-----
B 3.4-5a	-----
B 3.4-6	B 3.4-6
B 3.4-7	B 3.4-7
B 3.4-8	B 3.4-8
B 3.4-9	B 3.4-9
B 3.4-10	B 3.4-10

3.3 INSTRUMENTATION

3.3.1.1 Reactor Protection System (RPS) Instrumentation

LCO 3.3.1.1 The RPS instrumentation for each Function in Table 3.3.1.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.1.1-1.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required channels inoperable.	A.1 Place channel in trip. OR	12 hours
	A.2 ----------NOTE---------- Not applicable for Functions 2.a, 2.b, 2.c, 2.d, or 2.f. ---------- Place associated trip system in trip.	12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. ----------NOTE---------- Not applicable for Functions 2.a, 2.b, 2.c, 2.d, or 2.f. ---------- One or more Functions with one or more required channels inoperable in both trip systems.	B.1 Place channel in one trip system in trip. OR B.2 Place one trip system in trip.	6 hours 6 hours
C. One or more Functions with RPS trip capability not maintained.	C.1 Restore RPS trip capability.	1 hour
D. Required Action and associated Completion Time of Condition A, B, or C not met.	D.1 Enter the Condition referenced in Table 3.3.1.1-1 for the channel.	Immediately
E. As required by Required Action D.1 and referenced in Table 3.3.1.1-1.	E.1 Reduce THERMAL POWER to < 30% RTP.	4 hours
F. As required by Required Action D.1 and referenced in Table 3.3.1.1-1.	F.1 Be in MODE 2.	6 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
G. As required by Required Action D.1 and referenced in Table 3.3.1.1-1.	G.1	Be in MODE 3.	12 hours
H. As required by Required Action D.1 and referenced in Table 3.3.1.1-1.	H.1	Initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies.	Immediately
I. As required by Required Action D.1 and referenced in Table 3.3.1.1-1.	I.1	Initiate alternate method to detect and suppress thermal hydraulic instability oscillations.	12 hours
	AND		
	I.2	Restore required channels to OPERABLE.	120 days
J. Required Action and associated Completion Time of Condition I not met.	J.1	Be in Mode 2.	4 hours

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.1.10	Perform CHANNEL CALIBRATION.	184 days
SR 3.3.1.1.11	(Deleted)	
SR 3.3.1.1.12	Perform CHANNEL FUNCTIONAL TEST.	24 months
SR 3.3.1.1.13	----------NOTE---------- Neutron detectors are excluded. ---------- Perform CHANNEL CALIBRATION.	24 months
SR 3.3.1.1.14	Perform LOGIC SYSTEM FUNCTIONAL TEST.	24 months
SR 3.3.1.1.15	Verify Turbine Stop Valve - Closure and Turbine Control Valve Fast Closure, Trip Oil Pressure - Low Functions are not bypassed when THERMAL POWER is $\geq$ 30% RTP.	24 months
SR 3.3.1.1.16	----------NOTE---------- For Function 2.a, not required to be performed when entering MODE 2 from MODE 1 until 12 hours after entering MODE 2. ---------- Perform CHANNEL FUNCTIONAL TEST.	184 days
SR 3.3.1.1.17	Verify OPRM is not bypassed when APRM Simulated Thermal Power is $\geq$ 25% and recirculation drive flow is < 60% of rated recirculation drive flow.	24 months

Table 3.3.1.1-1 (page 2 of 3)
Reactor Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION D.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. Average Power Range Monitors (continued)					
d. Inop	1,2	3(b)	G	SR 3.3.1.1.16	NA
e. 2-Out-Of-4 Voter	1,2	2	G	SR 3.3.1.1.1 SR 3.3.1.1.14 SR 3.3.1.1.16	NA
f. OPRM Upscale	1	3(b)	I	SR 3.3.1.1.1 SR 3.3.1.1.7 SR 3.3.1.1.13 SR 3.3.1.1.16 SR 3.3.1.1.17	NA
3. Reactor Vessel Steam Dome Pressure - High	1,2	2	G	SR 3.3.1.1.1 SR 3.3.1.1.8 SR 3.3.1.1.10 SR 3.3.1.1.14	≤ 1090 psig
4. Reactor Vessel Water Level - Low, Level 3	1,2	2	G	SR 3.3.1.1.1 SR 3.3.1.1.8 SR 3.3.1.1.13 SR 3.3.1.1.14	≥ 538 inches above vessel zero
5. Main Steam Isolation Valve - Closure	1	8	F	SR 3.3.1.1.8 SR 3.3.1.1.13 SR 3.3.1.1.14	≤ 10% closed
6. Drywell Pressure - High	1,2	2	G	SR 3.3.1.1.8 SR 3.3.1.1.13 SR 3.3.1.1.14	≤ 2.5 psig
7. Scram Discharge Volume Water Level - High					
a. Resistance Temperature Detector	1,2	2	G	SR 3.3.1.1.8 SR 3.3.1.1.13 SR 3.3.1.1.14	≤ 50 gallons
	5(a)	2	H	SR 3.3.1.1.8 SR 3.3.1.1.13 SR 3.3.1.1.14	≤ 50 gallons

(continued)

(a) With any control rod withdrawn from a core cell containing one or more fuel assemblies.

(b) Each APRM channel provides inputs to both trip systems.

Table 3.3.1.1-1 (page 3 of 3)
Reactor Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION D.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
7. Scram Discharge Volume Water Level - High (continued)					
b. Float Switch	1,2	2	G	SR 3.3.1.1.8 SR 3.3.1.1.13 SR 3.3.1.1.14	≤ 50 gallons
	5(a)	2	H	SR 3.3.1.1.8 SR 3.3.1.1.13 SR 3.3.1.1.14	≤ 50 gallons
8. Turbine Stop Valve - Closure	≥ 30% RTP	4	E	SR 3.3.1.1.8 SR 3.3.1.1.13 SR 3.3.1.1.14 SR 3.3.1.1.15	≤ 10% closed
9. Turbine Control Valve Fast Closure, Trip Oil Pressure - Low	≥ 30% RTP	2	E	SR 3.3.1.1.8 SR 3.3.1.1.13 SR 3.3.1.1.14 SR 3.3.1.1.15	≥ 550 psig
10. Reactor Mode Switch - Shutdown Position	1,2	1	G	SR 3.3.1.1.12 SR 3.3.1.1.14	NA
	5(a)	1	H	SR 3.3.1.1.12 SR 3.3.1.1.14	NA
11. Manual Scram	1,2	1	G	SR 3.3.1.1.8 SR 3.3.1.1.14	NA
	5(a)	1	H	SR 3.3.1.1.8 SR 3.3.1.1.14	NA
12. RPS Channel Test Switches	1,2	2	G	SR 3.3.1.1.4	NA
	5(a)	2	H	SR 3.3.1.1.4	NA
13. Low Scram Pilot Air Header Pressure	1,2	2	G	SR 3.3.1.1.13 SR 3.3.1.1.14 SR 3.3.1.1.16	≥ 50 psig
	5(a)	2	H	SR 3.3.1.1.13 SR 3.3.1.1.14 SR 3.3.1.1.16	≥ 50 psig

(a) With any control rod withdrawn from a core cell containing one or more fuel assemblies.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.1 Recirculation Loops Operating

LCO 3.4.1 Two recirculation loops with matched flows shall be in operation.

OR

One recirculation loop may be in operation provided the following limits are applied when the associated LCO is applicable:

a. LCO 3.2.1, "AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR)," single loop operation limits specified in the COLR;

b. LCO 3.2.2, "MINIMUM CRITICAL POWER RATIO (MCPR)," single loop operation limits specified in the COLR;

c. LCO 3.3.1.1, "Reactor Protection System (RPS) Instrumentation," Function 2.b (Average Power Range Monitors Flow Biased Simulated Thermal Power - High), Allowable Value of Table 3.3.1.1-1 is reset for single loop operation;

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of the LCO not met.	A.1 Satisfy the requirements of the LCO.	24 hours
B. Required Action and associated Completion Time of Condition A not met. OR No recirculation loops in operation.	B.1 Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.4.1.1	----------NOTE---------- Not required to be performed until 24 hours after both recirculation loops are in operation. ---------- Verify recirculation loop jet pump flow mismatch with both recirculation loops in operation is: a. ≤ 10% of rated core flow when operating at < 70% of rated core flow; and b. ≤ 5% of rated core flow when operating at ≥ 70% of rated core flow.	24 hours

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

Average Power Range Monitor

The APRM channels provide the primary indication of neutron flux within the core and respond almost instantaneously to neutron flux increases. The APRM channels receive input signals from the 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 RTP. Each APRM also includes an Oscillation Power Range Monitor (OPRM) Upscale Function which monitors small groups of LPRM signals to detect thermal hydraulic instabilities.

The APRM System is divided into four APRM channels and four 2-out-of-4 voter channels. Each APRM channel provides inputs to each of the four voter channels. The four voter channels are divided into two groups of two each, with each group of two providing inputs to one RPS trip system. The system is designed to allow one APRM channel, but no voter channels, to be bypassed. A trip from any one unbypassed APRM will result in a "half-trip" in all four of the voter channels, but no trip inputs to either RPS trip system. APRM trip Functions 2.a, 2.b, 2.c, and 2.d are voted independently from OPRM Upscale Function 2.f. Therefore, any Function 2.a, 2.b, 2.c, or 2.d trip from any two unbypassed APRM channels will result in a full trip in each of the four voter channels, which in turn results in two trip inputs to each RPS trip system logic channel (A1, A2, B1, or B2). Similarly, a Function 2.f trip from any two unbypassed APRM channels will result in a full trip from each of the four voter channels. Three of the four APRM channels and all four of the voter channels are required to be OPERABLE to ensure that no single failure will preclude a scram on a valid signal. In addition, to provide adequate coverage of the entire core, consistent with the design bases for the APRM Functions 2.a, 2.b, and 2.c, at least twenty (20) LPRM inputs, with at least

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

Average Power Range Monitor (continued)

three (3) LPRM inputs from each of the four axial levels at which the LPRMs are located, must be operable for each APRM channel. For the OPRM Upscale Function 2.f, LPRMs are assigned to "cells" with either 3 or 4 detectors, with a total of 33 "cells" assigned to each OPRM channel. A minimum of 23 cells, each with a minimum of 2 LPRMs must be OPERABLE for the OPRM Upscale Function 2.f to be OPERABLE.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

2.d. Average Power Range Monitor - Inop

Three of the four APRM channels are required to be OPERABLE for each of the APRM Functions. This Function (Inop) provides assurance that the minimum number of APRMs are OPERABLE. For any APRM channel, any time its mode switch is in any position other than "Operate," an APRM module is unplugged, or the automatic self-test system detects a critical fault with the APRM channel, an Inop trip is sent to all four voter channels. Inop trips from two or more unbypassed APRM channels result in a trip output from all four voter channels to their associated trip system.

This Function was not specifically credited in the accident analysis, but it is retained for the overall redundancy and diversity of the RPS as required by the NRC approved licensing basis.

There is no Allowable Value for this Function.

This Function is required to be OPERABLE in the MODES where the APRM Functions are required.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

2.e. 2-Out-Of-4 Voter

The 2-Out-Of-4 Voter Function provides the interface between the APRM Functions, including the OPRM Upscale Function, and the final RPS trip system logic. As such, it is required to be OPERABLE in the MODES where the APRM Functions are required and is necessary to support the safety analysis applicable to each of those Functions. Therefore, the 2-Out-Of-4 Voter Function needs to be OPERABLE in MODES 1 and 2.

All four voter channels are required to be OPERABLE. Each voter channel includes self-diagnostic functions. If any voter channel detects a critical fault in its own processing, a trip is issued from that voter channel to the associated trip system.

The 2-Out-Of-4 Voter Function votes APRM Functions 2.a, 2.b, 2.c, and 2.d independently of Function 2.f. The voter also includes separate outputs to RPS for the two independently voted sets of Functions, each of which is redundant (four total outputs). The Voter Function 2.e must be declared inoperable if any of its functionality is inoperable. However, due to the independent voting of APRM trips, and the redundancy of outputs, there may be conditions where the Voter Function 2.e is inoperable, but trip capability for one or more of the other APRM Functions through that voter is still maintained. This may be considered when determining the condition of other APRM Functions resulting from partial inoperability of the Voter Function 2.e.

There is no Allowable Value for this Function.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

2.f. Oscillation Power Range Monitor (OPRM) Upscale

The OPRM Upscale Function provides compliance with GDC 10 and GDC 12, thereby providing protection from exceeding the fuel MCPR safety limit (SL) due to anticipated thermal hydraulic power oscillations.

References 13, 14, and 15 describe three algorithms for detecting thermal hydraulic instability related neutron flux oscillations: the period based detection algorithm, the amplitude based algorithm, and the growth rate algorithm. All three are implemented in the OPRM Upscale Function, but the safety analysis takes credit only for the period based detection algorithm. The remaining algorithms provide defense in depth and additional protection against unanticipated oscillations. OPRM Upscale Function OPERABILITY for Technical Specification purposes is based only on the period based detection algorithm.

The OPRM Upscale Function receives input signals from the local power range monitors (LPRMs) within the reactor core, which are combined into "cells" for evaluation of the OPRM algorithms.

The OPRM Upscale Function is required to be OPERABLE when the plant is in a region of power flow operation where anticipated events could lead to thermal hydraulic instability and related neutron flux oscillations. Within this region, the automatic trip is enabled when THERMAL POWER, as indicated by the APRM Simulated Thermal Power, is $\geq$ 25% RTP and reactor core flow, as indicated by recirculation drive flow is < 60% of rated flow, the operating region where actual thermal hydraulic oscillations may occur. Requiring the OPRM Upscale Function to be OPERABLE in MODE 1 provides consistency with operability requirements for other APRM functions and assures that the OPRM Upscale Function is OPERABLE whenever reactor power could increase into the region of concern without operator action.

(continued)

Figure 3.4.1-1
(Deleted Per TS 354)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2.f. Oscillation Power Range Monitor (OPRM) Upscale (continued)

An OPRM Upscale trip is issued from an APRM channel when the period based detection algorithm in that channel detects oscillatory changes in the neutron flux, indicated by the combined signals of the LPRM detectors in a cell, with period confirmations and relative cell amplitude exceeding specified setpoints. One or more cells in a channel exceeding the trip conditions will result in a channel trip. An OPRM Upscale trip is also issued from the channel if either the growth rate or amplitude based algorithms detect growing oscillatory changes in the neutron flux for one or more cells in that channel.

Three of the four channels are required to be OPERABLE. Each channel is capable of detecting thermal hydraulic instabilities, by detecting the related neutron flux oscillations, and issuing a trip signal before the MCPR SL is exceeded. There is no allowable value for this function.

(continued)

BASES

ACTIONS
(continued)

A.1 and A.2

Because of the diversity of sensors available to provide trip signals and the redundancy of the RPS design, an allowable out of service time of 12 hours has been shown to be acceptable (Ref. 9 and 12) to permit restoration of any inoperable channel to OPERABLE status. However, this out of service time is only acceptable provided the associated Function's inoperable channel is in one trip system and the Function still maintains RPS trip capability (refer to Required Actions B.1, B.2, and C.1 Bases). If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, the channel or the associated trip system must be placed in the tripped condition per Required Actions A.1 and A.2. Placing the inoperable channel in trip (or the associated trip system in trip) would conservatively compensate for the inoperability, restore capability to accommodate a single failure, and allow operation to continue. Alternatively, if it is not desired to place the channel (or trip system) in trip (e.g., as in the case where placing the inoperable channel in trip would result in a full scram), Condition D must be entered and its Required Action taken.

As noted, Action A.2 is not applicable for APRM Functions 2.a, 2.b, 2.c, 2.d, or 2.f. Inoperability of one required APRM channel affects both trip systems. For that condition, Required Action A.1 must be satisfied, and is the only action (other than restoring operability) that will restore capability to accommodate a single failure.

Inoperability of more than one required APRM channel of the same trip function results in loss of trip capability and entry into Condition C, as well as entry into Condition A for each channel.

(continued)

BASES

ACTIONS

B.1 and B.2 (continued)

The 6 hour Completion Time is judged acceptable based on the remaining capability to trip, the diversity of the sensors available to provide the trip signals, the low probability of extensive numbers of inoperabilities affecting all diverse Functions, and the low probability of an event requiring the initiation of a scram.

Alternately, if it is not desired to place the inoperable channels (or one trip system) in trip (e.g., as in the case where placing the inoperable channel or associated trip system in trip would result in a scram or RPT), Condition D must be entered and its Required Action taken.

As noted, Condition B is not applicable for APRM Functions 2.a, 2.b, 2.c, 2.d, or 2.f. Inoperability of an APRM channel affects both trip systems and is not associated with a specific trip system as are the APRM 2-out-of-4 voter and other non-APRM channels for which Condition B applies. For an inoperable APRM channel, Required Action A.1 must be satisfied, and is the only action (other than restoring operability) that will restore capability to accommodate a single failure. Inoperability of a Function in more than one required APRM channel results in loss of trip capability for that Function and entry into Condition C, as well as entry into Condition A for each channel. Because Conditions A and C provide Required Actions that are appropriate for the inoperability of APRM Functions 2.a, 2.b, 2.c, 2.d, or 2.f, and these functions are not associated with specific trip systems as are the APRM 2-out-of-4 voter and other non-APRM channels, Condition B does not apply.

(continued)

BASES

ACTIONS
(continued)

D.1

Required Action D.1 directs entry into the appropriate Condition referenced in Table 3.3.1.1-1. The applicable Condition specified in the Table is Function and MODE or other specified condition dependent and may change as the Required Action of a previous Condition is completed. Each time an inoperable channel has not met any Required Action of Condition A, B, or C and the associated Completion Time has expired, Condition D will be entered for that channel and provides for transfer to the appropriate subsequent Condition.

E.1, F.1, G.1, and J.1

If the channel(s) is not restored to OPERABLE status or placed in trip (or the associated trip system placed in trip) within the allowed Completion Time, the plant must be placed in a MODE or other specified condition in which the LCO does not apply. The allowed Completion Times are reasonable, based on operating experience, to reach the specified condition from full power conditions in an orderly manner and without challenging plant systems. In addition, the Completion Time of Required Action E.1 is consistent with the Completion Time provided in LCO 3.2.2, "MINIMUM CRITICAL POWER RATIO (MCPR)."

(continued)

BASES

ACTIONS
(continued)

H.1

If the channel(s) is not restored to OPERABLE status or placed in trip (or the associated trip system placed in trip) within the allowed Completion Time, the plant must be placed in a MODE or other specified condition in which the LCO does not apply. This is done by immediately initiating action to fully insert all insertable control rods in core cells containing one or more fuel assemblies. Control rods in core cells containing no fuel assemblies do not affect the reactivity of the core and are, therefore, not required to be inserted. Action must continue until all insertable control rods in core cells containing one or more fuel assemblies are fully inserted.

I.1

If OPRM Upscale trip capability is not maintained, Condition I exists. Reference 12 justified use of alternate methods to detect and suppress oscillations for a limited period of time. The alternate methods are procedurally established consistent with the guidelines identified in Reference 17 requiring manual operator action to scram the plant if certain predefined events occur. The 12 hour allowed action time is based on engineering judgment to allow orderly transition to the alternate methods while limiting the period of time during which no automatic or alternate detect and suppress trip capability is formally in place. Based on the small probability of an instability event occurring at all, the 12 hours is judged to be reasonable.

(continued)

BASES

ACTIONS (continued)

I.2

The alternate method to detect and suppress oscillations implemented in accordance with I.1 was evaluated (Reference 12) based on use up to 120 days only. The evaluation, based on engineering judgment, concluded that the likelihood of an instability event that could not be adequately handled by the alternate methods during this 120 day period was negligibly small. The 120 day period is intended to be an outside limit to allow for the case where design changes or extensive analysis might be required to understand or correct some unanticipated characteristic of the instability detection algorithms or equipment. This action is not intended and was not evaluated as a routine alternative to returning failed or inoperable equipment to OPERABLE status. Correction of routine equipment failure or inoperability is expected to normally be accomplished within the completion times allowed for Actions for Conditions A and B.

SURVEILLANCE REQUIREMENTS

As noted at the beginning of the SRs, the SRs for each RPS instrumentation Function are located in the SRs column of Table 3.3.1.1-1.

The Surveillances are modified by a Note to indicate that when a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours, provided the associated Function maintains RPS trip capability. Upon completion of the Surveillance, or expiration of the 6 hour allowance, the channel must be returned to OPERABLE status or the applicable Condition entered and Required Actions taken. This Note is based on the reliability analysis (Ref. 3) assumption of the average time required to perform channel Surveillance. That analysis demonstrated that the 6 hour testing allowance does not significantly reduce the probability that the RPS will trip when necessary.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.1.11

(Deleted)

SR 3.3.1.1.14

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required trip logic for a specific channel. The functional testing of control rods (LCO 3.1.3), and SDV vent and drain valves (LCO 3.1.8), overlaps this Surveillance to provide complete testing of the assumed safety function.

The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience with these components supports performance of the Surveillance at the 24 month Frequency.

The LOGIC SYSTEM FUNCTIONAL TEST for APRM Function 2.e simulates APRM and OPRM trip conditions at the 2-out-of-4 voter channel inputs to check all combinations of two tripped inputs to the 2-out-of-4 logic in the voter channels and APRM related redundant RPS relays.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.1.17

This SR ensures that scrams initiated from OPRM Upscale Function (Function 2.f) will not be inadvertently bypassed when THERMAL POWER, as indicated by the APRM Simulated Thermal Power, is ≥ 25% RTP and core flow, as indicated by recirculation drive flow, is < 60% rated core flow. This normally involves confirming the bypass setpoints. Adequate margins for the instrument setpoint methodologies are incorporated into the actual setpoint. The actual surveillance ensures that the OPRM Upscale Function is enabled (not bypassed) for the correct values of APRM Simulated Thermal Power and recirculation drive flow. Other surveillances ensure that the APRM Simulated Thermal Power and recirculation flow properly correlate with THERMAL POWER and core flow, respectively.

If any bypass setpoint is nonconservative (i.e., the OPRM Upscale Function is bypassed when APRM Simulated Thermal Power ≥ 25% RTP and recirculation drive flow < 60% rated), then the affected channel is considered inoperable for the OPRM Upscale Function. Alternatively, the bypass setpoint may be adjusted to place the channel in a conservative condition (unbypass). If placed in the unbypassed condition, this SR is met and the channel is considered OPERABLE.

The frequency of 24 months is based on engineering judgment and reliability of the components.

(continued)

BASES (continued)

REFERENCES

1. FSAR, Section 7.2.
2. FSAR, Chapter 14.
3. NEDO-23842, "Continuous Control Rod Withdrawal in the Startup Range," April 18, 1978.
4. FSAR, Appendix N.
5. FSAR, Section 14.6.2.
6. FSAR, Section 6.5.
7. FSAR, Section 14.5.
8. P. Check (NRC) letter to G. Lainas (NRC), "BWR Scram Discharge System Safety Evaluation," December 1, 1980.
9. NEDC-30851-P-A , "Technical Specification Improvement Analyses for BWR Reactor Protection System," March 1988.
10. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.
11. MED-32-0286, "Technical Specification Improvement Analysis for Browns Ferry Nuclear Plant, Unit 2," October 1995.
12. NEDC-32410P-A, "Nuclear Measurement Analysis and Control Power Range Neutron Monitor (NUMAC PRNM) Retrofit Plus Option III Stability Trip Function," October 1995.
13. NEDO-31960-A, "BWR Owners' Group Long-Term Stability Solutions Licensing Methodology," November 1995.

(continued)

BASES

REFERENCES (continued)

14. NEDO-31960-A, Supplement 1, "BWR Owners' Group Long-Term Stability Solutions Licensing Methodology," November 1995.

15. NEDO-32465-A, "BWR Owners' Group Long-Term Stability Detect and Suppress Solutions Licensing Basis Methodology and Reload Applications," August 1996.

16. NEDC-32410P-A, Supplement 1, "Nuclear Measurement Analysis and Control Power Range Neutron Monitor (NUMAC PRNM) Retrofit Plus Option III Stability Trip Function," August 1996.

17. Letter, L.A. England (BWROG) to M.J. Virgilio, "BWR Owners' Group Guidelines for Stability Interim Corrective Action," June 6, 1994.

BASES

APPLICABLE SAFETY ANALYSES (continued)

Plant specific LOCA analyses have been performed assuming only one operating recirculation loop. These analyses have demonstrated that, in the event of a LOCA caused by a pipe break in the operating recirculation loop, the Emergency Core Cooling System response will provide adequate core cooling, provided the APLHGR requirements are modified accordingly (Refs. 7 and 8).

The transient analyses of Chapter 14 of the FSAR have also been performed for single recirculation loop operation (Ref. 7) and demonstrate sufficient flow coastdown characteristics to maintain fuel thermal margins during the abnormal operational transients analyzed provided the MCPR requirements are modified. During single recirculation loop operation, modification to the Reactor Protection System (RPS) average power range monitor (APRM) instrument is also required to account for the different relationships between recirculation drive flow and reactor core flow. The APLHGR and MCPR setpoints for single loop operation are specified in the COLR. The APRM Flow Biased Simulated Thermal Power-High setpoint is in LCO 3.3.1.1, "Reactor Protection System (RPS) Instrumentation."

Recirculation loops operating satisfies Criterion 2 of the NRC Policy Statement (Ref. 6).

(continued)

BASES (continued)

LCO

Two recirculation loops are required to be in operation with their flows matched within the limits specified in SR 3.4.1.1 to ensure that during a LOCA caused by a break of the piping of one recirculation loop the assumptions of the LOCA analysis are satisfied. With the limits specified in SR 3.4.1.1 not met, the recirculation loop with the lower flow must be considered not in operation. With only one recirculation loop in operation, modifications to the required APLHGR Limits (LCO 3.2.1, "AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR)"), MCPR limits (LCO 3.2.2, 'MINIMUM CRITICAL POWER RATIO (MCPR)"), and APRM Flow Biased Simulated Thermal Power-High Setpoint (LCO 3.3.1.1) may be applied to allow continued operation consistent with the assumptions of References 7 and 8.

APPLICABILITY

In MODES 1 and 2, requirements for operation of the Reactor Coolant Recirculation System are necessary since there is considerable energy in the reactor core and the limiting design basis transients and accidents are assumed to occur.

In MODES 3, 4, and 5, the consequences of an accident are reduced and the coastdown characteristics of the recirculation loops are not important.

(continued)

BASES (continued)

ACTIONS

A.1

With the requirements of the LCO not met, the recirculation loops must be restored to operation with matched flows within 24 hours. A recirculation loop is considered not in operation when the pump in that loop is idle or when the mismatch between total jet pump flows of the two loops is greater than required limits. The loop with the lower flow must be considered not in operation. Should a LOCA occur with one recirculation loop not in operation, the core flow coastdown and resultant core response may not be bounded by the LOCA analyses. Therefore, only a limited time is allowed to restore the inoperable loop to operating status.

Alternatively, if the single loop requirements of the LCO are applied to the operating limits and RPS setpoints, operation with only one recirculation loop would satisfy the requirements of the LCO and the initial conditions of the accident sequence.

(continued)

BASES

ACTIONS

A.1 (continued)

The 24 hour Completion Time is based on the low probability of an accident occurring during this time period, on a reasonable time to complete the Required Action, and on frequent core monitoring by operators allowing abrupt changes in core flow conditions to be quickly detected.

This Required Action does not require tripping the recirculation pump in the lowest flow loop when the mismatch between total jet pump flows of the two loops is greater than the required limits. However, in cases where large flow mismatches occur, low flow or reverse flow can occur in the low flow loop jet pumps, causing vibration of the jet pumps. If zero or reverse flow is detected, the condition should be alleviated by changing pump speeds to re-establish forward flow or by tripping the pump.

(continued)

BASES

ACTIONS
(continued)

B.1

With no recirculation loops in operation while in MODES 1 or 2 or the Required Action and associated Completion Time of Condition A not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 12 hours. In this condition, the recirculation loops are not required to be operating because of the reduced severity of DBAs and minimal dependence on the recirculation loop coastdown characteristics. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.4.1.1

This SR ensures the recirculation loops are within the allowable limits for mismatch. At low core flow (i.e., < 70% of rated core flow), the MCPR requirements provide larger margins to the fuel cladding integrity Safety Limit such that the potential adverse effect of early boiling transition during a LOCA is reduced. A larger flow mismatch can therefore be allowed when core flow is < 70% of rated core flow. The recirculation loop jet pump flow, as used in this Surveillance, is the summation of the flows from all of the jet pumps associated with a single recirculation loop.

The mismatch is measured in terms of percent of rated core flow. If the flow mismatch exceeds the specified limits, the loop with the lower flow is considered inoperable. The SR is not required when both loops are not in operation since the mismatch limits are meaningless during single loop or natural circulation operation. The Surveillance must be performed within 24 hours after both loops are in operation. The 24 hour Frequency is consistent with the Surveillance Frequency for jet pump OPERABILITY verification and has been shown by operating experience to be adequate to detect off normal jet pump loop flows in a timely manner.

(continued)

BASES (continued)

REFERENCES

1. FSAR, Section 14.6.3.
2. FSAR, Section 4.3.5.
3. Deleted.
4. Deleted.
5. Deleted.
6. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.
7. NEDO-24236, "Browns Ferry Nuclear Plant Units 1, 2, and 3, Single-Loop Operation," May 1981.
8. NEDC-32484P, "Browns Ferry Nuclear Plant Units 1, 2, and 3, SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis," Revision 2, December 1997.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 258 TO FACILITY OPERATING LICENSE NO. DPR-60

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNIT 2

DOCKET NO. 50-260

By letters dated March 6, 1997, and May 13, 1997, Tennessee Valley Authority (the licensee), proposed replacement of the existing analog power range monitoring system in the Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3, with a digital General Electric (GE) Nuclear Measurement Analysis and Control (NUMAC) power range neutron monitoring system (PRNMS). The licensee's submittal also requested TS changes related to the proposed NUMAC-PRNMS modification. By letters dated June 16, 1997, and April 3, 1998, the U.S. Nuclear Regulatory Commission (NRC) approved technical specification (TS) amendments for the average power range monitoring portion of the NUMAC-PRNMS. The license amendment did not include the oscillation power range monitoring (OPRM) function, which was to be operated in the "indicate only" configuration for one fuel cycle for testing purposes.

By letter dated September 8, 1998, as supplemented by letter dated February 22, 1999, the licensee proposed license amendments to the Technical Specifications (TS) for the BFN, Unit 2, to include provisions for enabling the OPRM Upscale trip function in the Average Power Range Monitor (APRM). The APRM is part of the PRNMS and includes an OPRM Upscale trip function which monitors small groups of local power range monitor signals to detect thermal-hydraulic instabilities in the reactor core. The OPRM Upscale trip function provides protection from exceeding the fuel Minimum Critical Power Ratio (MCPR) safety limit in the event of thermal-hydraulic power oscillations, and thereby, provides compliance with General Design Criteria (GDC) 10 and 12 of 10 CFR 50, Appendix A.

By letter dated December 15, 1998, at the conclusion of the test period, the licensee requested NRC approval to connect the OPRM function to the reactor protection system. The staff reviewed the licensee's submittal of proposed setpoints for the corner frequency, and period tolerance and found the setpoints to be acceptable. The associated TS amendment addresses OPRM function operability, surveillance requirements, and associated Bases.

The GE NUMAC-PRNMS design was approved by the staff in its review of GE Licensing Topical Report NEDC-32410P, "Nuclear Measurement Analysis and Control Power Range Neutron Monitor (NUMAC-PRNM) Retrofit Plus Option III Stability Trip Function," which addresses the boiling water reactor (BWR) power instability issue addressed in GE licensing topical report NEDO-31960, "BWR Owners' Group Long-Term Stability Solutions Licensing Methodology." The staff also reviewed Supplement 1 to NEDC-32410P, "Nuclear Measurement Analysis and Control Power Range Neutron Monitor (NUMAC-PRNM) Retrofit

Plus Option III Stability Trip Function, Supplement 1." The staff safety evaluation for Supplement 1 was issued December 18, 1996. The staff's review and acceptance of the design changes and associated technical specification amendments is discussed in this safety evaluation.

1.0 BACKGROUND

GDC 10 requires that the reactor core be designed with appropriate margin to assure that specified acceptable fuel design limits will not be exceeded during any condition of normal operation, including the effects of anticipated operational occurrences. GDC 12 requires assurance that power oscillations which can result in conditions exceeding specified acceptable fuel design limits are either not possible or can be reliably and readily detected and suppressed.

Under certain conditions, BWRs may be susceptible to coupled neutronic/thermal-hydraulic instabilities. These instabilities are characterized by periodic power and flow oscillations. If power and flow oscillations become large enough, the fuel cladding integrity MCPR safety limit and GDC 10 and 12 requirements may be challenged. Based on this possibility, BFN Units 2 and 3 are currently operating with certain interim corrective actions recommended by GE and previously approved the NRC.

To detect core instabilities and provide a reactor scram signal to the reactor protection system (RPS), the licensee selected Boiling Water Reactor Owners Group Stability Option III as the long-term stability system solution (LTSSS) for BFN Unit 2. The LTSSS Option III approach consists of detecting and suppressing stability-related power oscillations by automatically inserting control rods (scramming) to terminate power oscillations. Implementation of Option III provides compliance with GDC 10 and 12 by protecting the reactor fuel rods from exceeding the fuel MCPR safety limit during thermal-hydraulic power oscillations.

The licensee implemented the Option III stability solution by replacing the power range portion of the original BFN Neutron Monitoring System (NMS) with a GE NUMAC-PRNM retrofit system. By letters dated June 16, 1997, and April 3, 1998, the NRC approved TS amendments for the APRM portion of the NUMAC-PRNMS. The licensee operated the OPRM function part of the NUMAC-PRNMS in the "indicate only" mode. During this test period, the existing interim corrective actions for determining and mitigating power oscillations remained in effect.

By letters dated September 8, 1998, and February 22, 1999, the licensee submitted proposed TS changes required to enable the OPRM trip functions for BFN Unit 2. The proposed TS changes follow the example proposed by GE in NEDC-32410P-A, Supplement 1, which the NRC reviewed and approved in a letter to GE dated August 15, 1997. The TS changes provide operability requirements, limiting conditions for operation (LCO), surveillance requirements (SR), and TS Bases for the newly enabled OPRM trip functions. In addition, the proposed changes delete certain existing stability monitoring restrictions on core flow, which are no longer required.

2.1 System Description

The GE NUMAC-PRNM system consists of four APRM channels and four voter channels. Trip signals from each of the four APRM channels are sent to all four voter channels. One voter module is dedicated to each RPS trip relay. A reactor trip occurs when two or more of the four APRM functions, or two or more of the four OPRM functions calculate a trip condition. The voters perform a vote of the OPRM channel trip outputs separate from the APRM trip outputs. For example, an OPRM trip in one channel and an APRM trip in another channel will not result in a reactor trip from 2-out-of-4 voters in a trip state.

Hardware to implement the OPRM Upscale trip function into the APRM channel, the OPRM Inop function, and the OPRM 2-out-of-4 Voter function are included with the corresponding APRM Inop and APRM 2-out-of-4 Voter function. The integration of the OPRM Inop with the APRM Inop reflect actual system design (i.e., conditions that cause an Inop signal in either APRM or OPRM trip functions cause an Inop signal in both functions). However, unlike the APRM trip functions, the OPRM Upscale trip function is voted independently from the Inop trip in the 2-out-of-4 Voter function. Thus, an APRM/OPRM Inop trip in one APRM channel and an OPRM Upscale trip in another channel will result in two half-trips in each of the four Voter channels, but no RPS trip. Conversely, an Inop trip in any two APRM/OPRM channels or an OPRM Upscale trip in any two channels will result in RPS trip outputs from all four Voter channels.

For the APRM Flux trip functions, an APRM/OPRM Inop trip in one APRM channel and an APRM Upscale trip in another channel will result in RPS trip outputs from all four voters. This reflects a somewhat more conservative APRM design in response to channel failures when compared with the OPRM design. This additional conservatism is of limited value in the OPRM design. If the OPRM Upscale trips were combined in logic with Inop trips to generate RPS trip signals, spurious and unnecessary reactor scrams might result. However, an automatic trip will occur upon an unexpected systematic failure of multiple APRM channels. This will result in an APRM/OPRM Inop trip in two or more unbypassed channels, regardless of the OPRM Upscale (or APRM Flux) trip status.

3.0 EVALUATION

The staff reviewed the licensee's proposed OPRM set points and TS amendments. The results of this review are described in the following sections.

3.1 OPRM Trip Set Points

The Staff approved NEDO-32465A, "BWR Owners' Group Reactor Stability Detect and Suppress Solutions Licensing Basis Methodology And Reload Applications," describing OPRM set point values and margins on March 4, 1996. The licensee submitted the results of the online OPRM system testing conducted in preparation for enabling the system on December 15, 1998. During the evaluation period, the licensee discovered that the settings for the period based algorithm in option III were too sensitive and susceptible to spurious alarms and trips, when the least set points defined in NED-32465A are used. The licensee determined that by modifying the corner frequency and period tolerance, the system would function as designed. The licensee supplied test data to support a request for modifications of the OPRM settings to 3 Hertz and 50 milliseconds. These settings are less sensitive than the

previous settings of 2.5 Hertz and 100 milliseconds. According to the licensee, the proposed set point changes provide margin to spurious alarms and trips during stable reactor operation and do not compromise the ability of the OPRM to detect instabilities and initiate an automatic reactor scram prior to violating the MCPR safety limit. In the NRC staff's review of NEDO-32465, the NRC staff concluded that the detect and suppress set point methodology should produce set point values that will result in a very low likelihood of exceeding critical power ratio safety limits during instability events in Solution III plants. The set point values proposed by the licensee meet this criterion and, therefore, are acceptable.

The proposed changes to incorporate provisions for enabling the OPRM trip functions on BFN Unit 2 are based on the conversion package to the improved technical specifications (ITS) submitted to NRC as TS-362 on September 6, 1996 and approved on July 14, 1998. Subsequent submitted changes related to the NUMAC-PRNM installation as described in NEDC-32410P-A Supplement 1 also were used as the basis for these proposed changes.

3.2. Pages 3.3-1 and 3.3-2, LCO 3.3.1.1, Reactor Protection System (RPS) Instrumentation

The Actions table for LCO 3.3.1.1 is revised to add appropriate requirements applicable to the OPRM Upscale trip function, Function 2.f. In Required Action A.2, the Note is revised to say that the Required Action also is not applicable for new Function 2.f. In Condition B, the Note is revised to say that Condition B also is not applicable for new Function 2.f.

These changes are consistent with the changes described in NEDC-32410P-A, Supplement 1, and, therefore, are acceptable.

3.3. Page 3.3-3, LCO 3.3.1.1, RPS Instrumentation

The licensee added Condition I and Condition J, together with Required Actions and Completion Times to the LCO Actions table. Condition I and associated required actions and completion times are consistent with the changes described in NEDC-32410P-A, Supplement 1, and, therefore, are acceptable.

The licensee's proposed Required Action J.1 for Condition J requires the plant to be in Mode 2 in 4 hours if the required action and completion time of Condition I is not met. Required Action J.1 for Condition J in NEDC-32410P-A Supplement 1 requires the licensee to reduce thermal power to less than 25% in 4 hours. The licensee's proposed required actions are more conservative than the required actions in NEDC-32410P-A Supplement 1 and are, therefore, acceptable.

3.4. Page 3.3-6, Surveillance Requirements, RPS Instrumentation

The licensee's proposed surveillance requirements (SR) for SR 3.3.1.1.1, SR 3.3.1.1.7, SR 3.3.1.1.13, and SR 3.3.1.1.16 are equivalent to or more conservative than the corresponding SR in NEDC-32410P-A Supplement 1. The surveillance interval for

SR 3.3.1.1.17 is 24 months, which is longer than the bracketed interval for the equivalent SR 3.3.1.1.18 in NEDC-32410P-A Supplement 1. This longer interval is acceptable because

the interval specified in NEDC-32410P-A Supplement 1 corresponds to an interval that allows testing during refueling outages. The BFN units are on a 24-month refueling interval; therefore, the staff finds the proposed surveillance interval for SR 3.3.1.1.17 to be acceptable.

3.5. Page 3.3-8, Table 3.3.1.1-1, RPS Instrumentation

The licensee added to Table 3.3.1.1-1 (Page 3.3-8) APRM Function 2.f, the OPRM Upscale trip function, with Applicable Modes, Required Channels with footnote, Conditions Referenced, Surveillance Requirements, and Allowable Value.

For Applicable Modes or Other Specified Conditions, the licensee proposed Mode 1, which is more conservative than NEDC-32410P-A Supplement 1, which specifies applicability at ≥[25]% RTP (rated thermal power). The staff finds the proposed applicable mode to be acceptable.

The proposed Required Channels with footnote, Conditions Referenced, Surveillance Requirements, and Allowable Value are consistent with NEDC-32410P-A Supplement 1 and, therefore, are acceptable.

3.6. Proposed Technical Specification Bases Section 3.3.1.1, RPS Instrumentation

The licensee's proposed TS Bases are consistent with NEDC-32410P-A Supplement 1 and, therefore, are acceptable.

3.7. Page 3.4-1, LCO 3.4.1, Recirculation Loops Operating

LCO 3.4.1 is revised to delete the restrictions related to thermal-hydraulic stability regions, Figure 3.4.1-1. After the deletions, the LCO states, "Two recirculation loops with matched flows shall be in operation." This change is consistent with removal of the interim corrective actions and, therefore, is acceptable.

3.8. Page 3.4-1 and -2, LCO 3.4.1, Recirculation Loops Operating

In the Actions table, Condition A, Condition B and Condition E, together with associated Required Actions and Completion Times, are deleted. Conditions C and D are relabeled "A" and "B," respectively, and are revised such that the new Condition B applies to MODES 1 and 2. These changes are consistent with removal of the interim corrective actions and, therefore, are acceptable.

3.9. Page 3.4-3, Surveillance Requirements, Recirculation Loops Operating

SR 3.4.1.2, to verify that the reactor is outside of Regions I and II of Figure 3.4.1-1, and its associated Frequency, are deleted in their entirety. This change is consistent with removal of the interim corrective actions and, therefore, is acceptable.

3.10. Page 3.4-4, Figure 3.4.1-1

Figure 3.4.1-1, Thermal Power Versus Core Flow Stability Regions, is deleted in its entirety. This change is consistent with removal of the interim corrective actions and, therefore, is acceptable.

3.11. Proposed Technical Specification Bases Section 3.4.1, Recirculation Loops Operating

The licensee's proposed TS Bases are consistent with removal of the interim corrective actions and, therefore, are acceptable.

Based on the above review and justifications for TS changes, the staff concludes that the licensee's proposed TS changes are consistent with the approved guidance in NEDC-32410P-A, Supplement 1, and the removal of the interim corrective actions, and are, therefore, 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 amendment changes 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 a surveillance requirement. The NRC staff has determined that the amendment involves 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 amendment involves no significant hazards consideration, and there has been no public comment on such finding (63 FR 53958). This proposed finding is not affected by the February 22, 1999, letter. Accordingly, the amendment meets 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 amendment.

6.0 CONCLUSION

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

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