TVA

Tenne .ee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609

June 2, 1995

TVA-BFN-TS-353

10 CFR 50.90
10 CFR 2.790(b)(1)

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

In the Matter of	)	Docket Nos. 50-259
Tennessee Valley Authority	)	50-260
		50-296

BROWNS FERRY NUCLEAR PLANT (BFN) - UNITS 1, 2, AND 3 - TECHNICAL SPECIFICATION (TS) 353 - POWER RANGE NEUTRON MONITOR (PRNM) UPGRADE WITH IMPLEMENTATION OF AVERAGE POWER RANGE MONITOR (APRM) AND ROD BLOCK MONITOR (RBM) TS (ARTS) IMPROVEMENTS AND MAXIMUM EXTENDED LOAD LINE LIMIT (MELLL) ANALYSES

In accordance with the provisions of 10 CFR 50.4 and 50.90, TVA is submitting a request for an amendment (TS-353) to licenses DPR-33, DPR-52, and DPR-68 to change the TSs for Units 1, 2, and 3. The proposed changes are described below.

The proposal revises the TSs to be consistent with a planned replacement of the current power range monitoring portion of the existing Neutron Monitoring System (NMS). This change is consistent with our response to Generic Letter (GL) 94-02, and will allow TVA to proceed with implementation of the long-term solution designated as Option III in NEDO-31960 and NEDO-31960, Supplement 1, "BWR Owners' Group Long Term Stability Solution Licensing Methodology."

Additionally, the proposal reflects TVA's planned implementation of ARTS/MELLL improvements. The purpose of the ARTS/MELLL changes is to enhance operating flexibility and efficiency by implementing RBM design improvements, incorporating APRM/RBM TS improvements, and expanding the current allowable operating domain to the MELLL region of the power/flow chart.

A001 1/1

TVA has determined that there are no significant hazards considerations associated with the proposed change and that the change is exempt from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). The BFN Plant Operations Review Committee and the BFN Nuclear Safety Review Board have reviewed this proposed change and determined that operation of BFN Units 1, 2, and 3 in accordance with the proposed change will not endanger the health and safety of the public. Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and enclosures to the Alabama State Department of Public Health.

Enclosure 1 to this letter provides the description and evaluation of the proposed change. Enclosure 2 contains copies of the appropriate TS pages from Units 1, 2, and 3 marked-up to show the proposed change. Enclosure 3 forwards the revised TS pages for Units 1, 2, and 3 which incorporate the proposed change.

As supporting documentation for the proposed ARTS/MELLL change, Attachment 1 of Enclosure 1 provides an engineering report prepared by GE to document results of analysis to support the proposed change. This engineering report contains information proprietary to GE. GE requests that the document be withheld from public disclosure in accordance with 10 CFR 2.790(a)(4). An affidavit supporting this request in accordance with 10 CFR 2.790(b)(1) is provided in Attachment 1 of Enclosure 1.

As described in our response to GL 94-02, TVA plans to have the PRNM upgrade with the Option III trip in the "indicate only" mode installed in Unit 2 during the Cycle 8 refueling outage. TVA intends to implement the PRNM upgrade first on Unit 2, followed by Unit 3, then by Unit 1. TVA plans to install the PRNM upgrade on Unit 3 during its first refueling outage following restart from its current extended outage. As stated in Reference 1, TVA expects to confirm its implementation schedule for the stability long term solution for BFN Units 1, 2 and 3 within 30 days of NRC issuance of a safety evaluation report (SER) approving the GE licensing topical report, Reference 2.

TVA requests that the revised TS be approved by February 19, 1996, (i.e., 30 days prior to shutdown of Unit 2 for its Cycle 8 refueling outage which is currently scheduled for March 22, 1996). TVA requests that the revised TS be made effective per the following milestone schedule:

Unit 1 - Effective at the start of the Unit 2 Cycle 8 refueling outage (March 1996).
Unit 2 - Effective at the start of the Unit 2 Cycle 8 refueling outage (March 1996).
Unit 3 - Effective at the start of the Unit 3 Cycle 7 refueling outage (March 1997).

If you have any questions about this change, please contact me at (205) 729-2636.

Sincerely,

Pedro Salas
Manager of Site Licensing

Enclosures
cc: See page 4

Subscribed and sworn to before me
on this 2 day of June 1995.

Barbara A. Blanton
Notary Public

My Commission Expires 10/06/98

My Commission Expires ____________

cc (Enclosures):

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General Electric Company

AFFIDAVIT

I, George B. Stramback, being duly sworn, depose and state as follows:

(1) I am Project Manager, Licensing Services, General Electric Company ("GE") and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in the GE proprietary report NEDC-32433P, *Maximum Extended Load Line Limit and ARTS Improvement Program Analyses for Browns Ferry Nuclear Plant Unit 1, 2 and 3,* Class III (GE Proprietary Information), dated April 1995. The proprietary information is delineated by bars marked in the margin adjacent to the specific material.

(3) In making this application for withholding of proprietary information of which it is the owner, GE relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), 2.790(a)(4), and 2.790(d)(1) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information", and some portions also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by General Electric's competitors without license from General Electric constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

c. Information which reveals cost or price information, production capacities, budget levels, or commercial strategies of General Electric, its customers, or its suppliers;

d. Information which reveals aspects of past, present, or future General Electric customer-funded development plans and programs, of potential commercial value to General Electric;

e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in both paragraphs (4)a. and (4)b., above.

(5) The information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GE, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GE, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within GE is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GE are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information identified in paragraph (2), above, is classified as proprietary because it contains current hardware and software arrangement justified from numerous tests and applications, detailed results of analytical methods including computer codes, which GE has developed, obtained NRC approval of, and applied to perform transient conditions for the BWR.

The development and approval of the BWR computer codes used in this analysis was achieved at a significant cost, on the order of several million dollars, to GE.

The development of the evaluation process along with the interpretation and application of the analytical results is derived from the extensive experience database that constitutes a major GE asset.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GE's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GE's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical and NRC review costs comprise a substantial investment of time and money by GE.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GE's competitive advantage will be lost if its competitors are able to use the results of the GE experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GE would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GE of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

STATE OF CALIFORNIA)
) ss:
COUNTY OF SANTA CLARA)

George B. Stramback, being duly sworn, deposes and says:

That he has read the foregoing affidavit and the matters stated therein are true and correct to the best of his knowledge, information, and belief.

Executed at San Jose, California, this 6th day of April 1995.

George B. Stramback
General Electric Company

Subscribed and sworn before me this 6th day of April 1995.

PAULA F. HUSSEY
COMM. #1046120
Notary Public — California
SANTA CLARA COUNTY
My Comm. Expires DEC 1, 1998

Paula F. Hussey
Notary Public, State of California

ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNITS 1, 2, AND 3

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE TS-353
DESCRIPTION AND EVALUATION OF THE PROPOSED CHANGE

INDEX

I. DESCRIPTION OF THE PROPOSED CHANGE

This proposed change to BFN Technical Specifications (TS) consists, broadly, of two groups of changes, Group A and Group B. A brief description of each group, together with a detailed listing of the proposed changes, is provided.

Group A: The following proposed changes support a planned replacement of the power range portion of the existing Neutron Monitoring System (NMS) with a General Electric (GE) digital Nuclear Measurement Analysis and Control Power Range Neutron Monitor (NUMAC PRNM) retrofit design. As part of the planned modification, the number of Average Power Range Monitor (APRM) instrument channels will be reduced from six to four. The Local Power Range Monitor (LPRM) inputs to the APRMs will be reconfigured. The four APRM instrument channels will be combined in four 2-out-of-4 trip logic channels which provide input to the Reactor Protection System (RPS) trip channels. The number of recirculation flow instrument channels associated with the APRMs will be increased from two total-flow channels (four transmitters) to four total-flow channels (eight transmitters).

BFN TS changes proposed in support of the planned modification are provided below. These changes are consistent with the TS changes recommended in Section 8 of reference 2 for implementation of the NUMAC PRNM retrofit. TS page numbers are presented in the format "Page x.z/y.z-U1/U2/U3" where U1, U2 and U3 are the respective Unit 1, Unit 2, and Unit 3 page numbers. Where only one number is given, the TS page number is the same in all three units.

1. Page 3.1/4.1-3/3/2. For the APRMs, Table 3.1.A currently reads:

Min. No. of Operable Instr. Channels Per Trip System (1)(23)	Trip Function	Trip Level Setting	Shut-down	Refuel (7)	Startup/ Hot Standby	Run	Action (1)
	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

The proposed change revises the minimum operability requirements and actions, deletes the APRM Downscale trip function, deletes requirements for APRM trip functions in the Refuel mode, adds a 2/4 Trip Voter trip function, and adjusts associated notes. The revised table is provided below.

Min. No. of Operable Instr. Channels Per Trip System (1)(23)	Trip Function	Trip Level Setting	Shut-down	Refuel (7)	Startup/ Hot Standby	Run	Action (1)
	APRM (16)(24)(25)						
3 (11)	High Flux (Flow Biased)	See Spec. 2.1.A.1				X	1.A or 1.B or 1.E
3 (11)	High Flux (Fixed Trip)	≤ 120%				X	1.A or 1.B or 1.E
3 (11)	High Flux	≤15% rated power			X(17)	(15)	1.A or 1.E
3 (11)	Inoperative	(13)			X(17)	X	1.A or 1.E
2	2/4 Trip Voters	(12)			X	X	1.A or 1.F

2. Page 3.1/4.1-5/5/4. The proposed change adds the following actions to Note 1 of "Notes for Table 3.1.A":

   E. For the APRM functions only, if only two APRM channels are OPERABLE, restore a third APRM channel to OPERABLE status or trip one of the inoperable APRM channels within 6 hours. If only one APRM channel is OPERABLE, trip one inoperable APRM channel immediately and restore an inoperable APRM channel to OPERABLE status or initiate alternative action within 2 hours.

   F. For the APRM functions only, if one voter channel is inoperable in one trip system, restore the voter channel to OPERABLE status or trip the inoperable channel or the entire trip system within 12 hours. If one voter channel is inoperable in both trip systems, restore the inoperable voter channels to OPERABLE status or initiate alternative action within 6 hours.

In Note 7 of "Notes for Table 3.1.A", the proposed change deletes Note 7.E ("APRM 15 percent scram"). This reflects deletion of the requirement for the APRM scram function in the Refuel mode.

3. Page 3.1/4.1-6/6/5. Notes 11, 12 and 13 in "Notes for Table 3.1.A" currently read:

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

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

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

   The proposed change revises Notes 11, 12 and 13 to read:

   11. The same three (3) required APRM channels are shared by both RPS trip systems.

   12. Any combination of APRM upscale or inoperative trips from two different (non-bypassed) APRMs will trip all of the 2/4 voter units.

   13. Less than the required minimum number of OPERABLE LPRMS will cause an instrument channel inoperative alarm.

4. Page 3.1/4.1-3/3/2 and Page 3.1/4.1-6/6/5. In Table 3.1.A, the proposed change adds application of Note 21 to IRM High Flux in the Refuel mode, and revises Note 21 in "Notes for Table 3.1.A" as specified below.

   Note 21, which currently provides an indirect requirement for enabling the SRM noncoincidence High Flux scram, reads as follows:

   (21) The APRM High Flux and Inoperative Trips do not have to be OPERABLE in the REFUEL Mode 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.

   The proposed change revises Note 21 to be a direct requirement for shorting link removal. The revised Note 21 reads:

   (21) In the REFUEL Mode unless adequate shutdown margin has been demonstrated per Specification 3.3.A.1, whenever any control rod is withdrawn from a core cell containing one or more fuel assemblies, shorting links shall be removed from

the RPS circuitry to enable the Source Range Monitor (SRM) noncoincidence high-flux scram function. 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 SRMs.

5. Page 3.1/4.1-8/8/7. In Table 4.1.A the Surveillance Requirements (SRs) for APRMs currently read as follows:

	Group (2)	Functional Test	Minimum Frequency (3)
APRM			
High Flux (15% Scram)	C	Trip Output Relays (4)	Before Each Startup and Weekly When Required to be Operable
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)

The proposed change deletes the APRM functional testing "group" assignments, deletes requirements for the APRM Downscale and Flow Bias trip functions, revises the minimum functional test frequency for the APRM trip functions, adds testing requirements for the 2/4 Voter Logic function, specifies a weekly test of the scram contactors initiated from the 2/4 voters, and adjusts associated notes. The revised table is provided below:

	Group (2)	Functional Test	Minimum Frequency (3)
APRM			
High Flux (15% Scram)		Trip Output Relays (4) (5) 2/4 Voter Logic (10)	Every 6 months (9) Each Refueling Outage
High Flux (Flow Biased)		Trip Output Relays (4) (6) 2/4 Voter Logic (10)	Every 6 months Each Refueling Outage
High Flux (Fixed Trip)		Trip Output Relays (4) (5) 2/4 Voter Logic (10)	Every 6 months Each Refueling Outage
Inoperative		Trip Output Relays (4) (6) 2/4 Voter Logic (10)	Every 6 months Each Refueling Outage
2/4 Trip Voter		Trip Scram Contactors (11)	Once/Week

6. Page 3.1/4.1-10/10/9. In "Notes for Table 4.1.A" the proposed change replaces Note 5 and Note 6 and adds new Notes 9 and 10.

Notes 5 and 6 currently read as follows:

5. (Deleted)

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

The proposed change reads as follows:

5. The channel functional test shall include both the APRM channels and the 2/4 voter channels.

6. The channel functional test shall include both the APRM channels and the 2/4 voter channels plus the flow input function, excluding the flow transmitters.

....

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.

10. Functional test consists of simulating APRM trip conditions at the APRM channel outputs to check all combinations of two tripped inputs to the 2/4 voter logic in each voter channel.

11. Functional test consists of manually tripping the 2/4 voter trip output, one voter channel at a time, to demonstrate that each scram contactor for each RPS trip system channel (A1, A2, B1 and B2) operates and produces a half-scram.

7. Page 3.1/4.1-11/11/10. In Table 4.1.B, the proposed change deletes group designations for APRM High Flux "Output Signal", "Flow Bias Signal" and "LPRM Signal". The proposed change also indents "LPRM Signal" parallel with "Output Signal" and "Flow Bias Signal".

8. Page 3.1/4.1-12/12/11. Note 7 currently reads:

The Flow Bias Signal calibration will consist of calibrating the sensors, flow converters, and signal offset networks during each operating cycle. The instrumentation is an analog type with redundant flow signals that can be compared. The flow comparator trip and upscale will be functionally tested according to Table 4.2.C to ensure the proper operation during the operating cycle. Refer to 4.1. Bases for further explanation of calibrating frequency.

The proposed change revises Note 7 to read:

The flow bias signal calibration will consist of calibrating the analog differential pressure flow sensors once per operating cycle. Calibration of the flow bias processing system is done once per operating

cycle as part of the overall APRM instrumentation calibration.

9. Page 3/1/4.1-14/14/13. The proposed change deletes the last sentence of the sixth paragraph which reads:

   Three APRM instrument channels are provided for each protection trip system.

   Following deletion, the proposed change adds:

   The APRM system is divided into four APRM channels and four 2-out-of-4 trip voter channels. Each APRM channel provides input 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 APRM 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 units, but no trip inputs to either RPS trip system. A 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 into each RPS trip system resulting in a full scram.

   Each APRM instrument channel receives input signals from forty-three (43) Local Power Range Monitors (LPRMs). A minimum of twenty (20) LPRM inputs with three (3) per axial level is required for the APRM instrument channel to be OPERABLE. Fewer than the required minimum number of LPRM inputs generates an instrument channel inoperative alarm and a control rod block but does not result in an automatic trip input to the 2-out-of-4 voters.

10. Page 3.1/4.1-15/15/14. The proposed change revises the first two sentences of the first paragraph on this page, and deletes the third sentence of the paragraph.

    The paragraph currently reads:

    Each protection trip system has one more APRM than is necessary to meet the minimum number required per channel. This allows the bypassing of one APRM per protection trip system for maintenance testing or calibration. Additional IRM channels have also been provided to allow for bypassing one such channel. The bases for....

    The revised paragraph will read:

    Each protection trip system has one more IRM than is necessary to meet the minimum number required per

channel. This allows the bypassing of one IRM per protection trip system for maintenance testing or calibration. The bases for....

11. Page 3.1/4.1-16/16/15. The proposed change revises the sentence (approximately middle of the page) describing the APRM downscale function which currently reads:

    Because of the APRM downscale limit of ≥ 3 percent when in the RUN mode and high level limit of ≤ 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.

    The proposed change revises the sentence to read:

    Because of the APRM downscale rod block limit of ≥ 3 percent when in the RUN mode and high level flux scram limit of ≤ 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.

12. Page 3.1/4.1-17/17/16. A sentence currently reads:

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

    The proposed change revises this sentence to read:

    Except for the APRMs which take credit for self-test capability, the channels listed in Tables 4.1.A and 4.1.B are divided into three groups for functional testing.

13. Page 3.1/4.1-19/19/18. The proposed change deletes the paragraph describing calibration of the APRM Flow Biasing Network which currently reads:

    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.

The proposed change adds the following paragraphs describing the APRM self-test functions and periodic manual test requirements before the paragraph beginning "The sensitivity of LPRM detectors...":

The APRM and 2-out-of-4 voter channel hardware is provided with a self-test capability which automatically checks most of the critical hardware at least once per 15 minute interval whenever the APRM channel is in the operate mode. This provides a virtually continuous monitoring of the essential APRM trip functions. In the event a critical fault is detected, an "inoperative" trip signal results. A fault detected in non-critical hardware results in an "inoperative" alarm. Following receipt of an "inoperative" trip or alarm signal, the operator can employ numerous diagnostic testing options to locate the problem.

The automatic self-test function is supplemented with a manual APRM trip functional test, including the 2-out-of-4 voter channels and the interface with the RPS trip systems. In combination with the virtually continuous self-testing, the manual APRM trip functional test provides adequate functional testing of the APRM trip function. Therefore, the six-month test frequency for the manual testing provides an acceptable level of availability of the APRM.

In addition to the above tests, the 2-out-of-4 voter is used to test the RPS scram contactors. The output of each voter channel is tripped to produce a scram signal into each of the RPS trip system channels (A1, A2, B1 and B2) to individually operate the respective scram contactors. The weekly test interval provides an acceptable level of availability of the scram contactors.

Each APRM receives the output signals from two analog differential pressure flow transducers, one associated with recirculation loop A and the other with recirculation loop B. These differential pressure signals are converted into representative digital loop flow signals within the same hardware that performs the APRM functions and are added to determine a total recirculation flow. The total recirculation flow value is used by the APRM to determine the flow biased setpoints. Each total recirculation flow signal developed by an APRM is compared in the hardware that performs the RBM functions to the signals from the remaining three APRMs. An alarm is given if a preset

compare level setpoint is exceeded. The flow processing is integrated with the APRM processing and is covered by the same self-test and alarm functions described earlier. As a result of the virtually continuous monitoring of the equipment performing the flow processing, and the automatic comparison of redundant flow signals, it is acceptable to calibrate this equipment once per operating cycle.

14. Page 3.2/4.2-25/25/24. In Table 3.2.C, for the APRM rod block functions the proposed change revises the Minimum Operable Channels Per Trip Function from "4" to "3" and deletes requirements for the "Flow Bias Comparator" and "Flow Bias Upscale" rod block functions.

    Additional proposed changes in Table 3.2.C are described under the second group of changes, Group B.

15. Page 3.2/4.2-26,27/26,27/25,26. In "Notes for Table 3.2.C" the proposed change revises Note 5, Note 10.b and Note 10.c as described below.

    Note 5 currently reads:

    5. During repair...not more than one SRM or RBM channel nor more than two APRM or IRM channels may be bypassed....

    The proposed change revises Note 5 to read:

    5. During repair...not more than one SRM, RBM or APRM channel nor more than two IRM channels may be bypassed....

    Note 10.b, APRM inoperative trips (2) and (3) currently read:

    (2) Less than 14 LPRM inputs.

    (3) Circuit boards not in circuit.

    The proposed change revises these notes and adds Note 10.b.(4). The proposed change reads as follows:

    (2) Less than the required minimum number of LPRM inputs.

    (3) APRM module unplugged.

    (4) Self-test detected critical fault.

Note 10.c, RBM inoperative trip (2) currently reads:

(2) Circuit boards not in circuit.

The proposed change revises this note and adds Note 10.c.(5). The proposed change reads as follows:

(2) RBM module unplugged.

....

(5) Self-test detected critical fault.

Additional proposed changes in Notes for Table 3.2.C are described under the second group of changes, Group B.

16. Page 3.2/4.2-50/50/49. In Table 4.2.C, the proposed change deletes surveillance requirements for "Flow Bias Comparator" and "Flow Bias Upscale" and revises test frequency requirements as follows:

Calibration frequency changes from "once/3 months" to "once/operating cycle" for the APRM Upscale and Downscale rod block trip functions.

Calibration frequency changes from "once/6 months" to "once/operating cycle" for the RBM Upscale and Downscale rod block trip functions.

Instrument check frequency changes from "once/day" to "N/A" for the RBM Upscale, Downscale and Inoperative rod block trip functions.

The additional proposed change in Table 4.2.C is described under the second group of changes, Group B.

17. Page 3.2/4.2-59/59/58. In "Notes for Tables 4.2.A Through 4.2.L, Except 4.2.D and 4.2.K", Note 1 currently reads:

(1) Functional tests shall be performed once per month.

The proposed change revises Note 1 to read:

(1) For IRMs and SRMs functional tests shall be performed once per month. For APRMs and RBMs functional tests shall be performed once per 6 months.

18. Page 3.2/4.2-60/60/59. In "Notes for Tables 4.2.A Through 4.2.L, Except 4.2.D and 4.2.K", the proposed change deletes Note 15 and Note 20 which currently read:

15. The flow bias comparator will be tested by putting one flow unit in "Test" (producing 1/2 scram) and adjusting the test input to obtain comparator rod block. The flow bias upscale will be verified by observing a local upscale trip light during operation and verified that it will produce a rod block during the operating cycle.

20. Calibration of the comparator requires the inputs from both recirculation loops to be interrupted, thereby removing the flow bias signal to the APRM and RBM and scramming the reactor. This calibration can only be performed during an outage.

19. Page 3.2/4.2-68/68/67. The proposed change revises a sentence in "3.2 Bases" describing control rod block functions. The sentence currently reads as follows:

The trip logic for this function is 1-out-of-n: e.g., any trip on one of six APRMs, eight IRMs or four SRMs will result in a rod block.

The revised sentence will read:

The trip logic for this function is 1-out-of-n: e.g., any trip on one of four APRMs, eight IRMs or four SRMs will result in a rod block.

20. Page 3.2/4.2-73/73a/72. The proposed change adds the following new discussion of APRM and RBM rod block function test frequency at the end of the current "4.2 Bases" section:

The electronic instrumentation comprising the APRM rod block and Rod Block Monitor functions together with the recirculation flow instrumentation for flow bias purposes is monitored by the same self-test functions as applied to the APRM function for the RPS. The functional test frequency of every six months is based on this automatic self-test monitoring at 15 minute intervals and on the low expected equipment failure rates. Calibration frequency of once per operating cycle is based on the drift characteristics of the limited number of analog components, recognizing that most of the processing is performed digitally without drift of setpoint values.

Group B: The following proposed changes are related to planned implementation of APRM and RBM technical specification (ARTS) improvements recommended by GE and proposed operation in an expanded core power/flow domain, the Maximum Extended Load Line Limit (MELLL) region. RBM modifications and APRM setpoint changes required to implement the proposed ARTS/MELLL operation are included in the NUMAC PRNM design. The proposed expanded operating region above the rated (design) power/flow control line is bounded by the rated (100%) power line and the power/flow control line which passes through the 100% power/75% core flow point (approximately the 121% rod line).

BFN TS changes proposed in support of ARTS/MELLL operation are provided below. These changes are supported by analyses performed for BFN by GE as documented in reference 3 and are consistent with the recommendations contained therein. TS page numbers are presented in the format "Page x.z/y.z-U1/U2/U3" where U1, U2 and U3 are the respective Unit 1, Unit 2, and Unit 3 page numbers. Where only one number is given, the TS page number is the same in all three units.

21. Pages 1.0-7 and 1.0-8: The proposed change deletes the following definitions under the heading of "Thermal Parameters":

    3. Core Maximum Fraction of Limiting Power Density (CMFLPD) -- ....

    5. Core Maximum Fraction of Critical Power (CMFCP) -- ....

22. Page 1.1/2.1-2. Under Limiting Safety System Setting (LSSS) 2.1.A.1.a, the APRM flow biased scram setpoint equation currently reads:

    $S \leq (0.58W+62\%)$.

    The proposed change revises this equation to read:

    $S \leq (0.66W+71\%)$.

23. Page 1.1/2.1-3. Under the note in LSSS 2.1.A.1.b. the proposed change deletes the following sentence:

    Surveillance requirements for APRM scram setpoint are given in Specification 4.5.L.

24. Page 1.1/2.1-7. The proposed change revises Figure 2.1-2 to show the new APRM Flow Bias Scram Setpoint.

25. Page 1.1/2.1-16. Under Bases Section 2.1.L the proposed change adds a new reference:

    Maximum Extended Load Line Limit and ARTS Improvement Program Analyses for Browns Ferry Nuclear Plant Unit 1, 2 and 3, NEDC-32433P.

26. Page 3.1/4.1-20/20/19. The proposed change deletes the term "CMFLPD" from the sentence which currently reads, "The technical specification limits of CMFLPD, CPR, and APLHGR are determined...."

27. Page 3.2/4.2-25/25/24. In Table 3.2.C requirements for the RBM functions currently read as follows:

Minimum Operable Channels Per Trip Function (5)	Function	Trip Level Setting
2(7)	RBM Upscale (Flow Bias)	(13)
2(7)	RBM Downscale (9)	≥3%

The proposed change revises the RBM functions to reflect a change from flow-biased to power-biased setpoints. The revised table entries are provided below:

Minimum Operable Channels Per Trip Function (5)	Function	Trip Level Setting
2(7)	RBM Upscale (Power Bias)	
	Low Power Range (13)	(14)
	Intermediate Power Range (13)	(14)
	High Power Range (13)	(14)
2(7)	RBM Downscale (9) (13)	(15)

28. Page 3.2/4.2-26/26/25. In Note 7 of "Notes for Table 3.2.C" the proposed change adds, as Note 7.c, new conditions of power and MCPR where the RBM is not required to be operable. Previous Notes "7.c" and "7.d" are relabeled as "7.d" and "7.e", respectively, but their text is not changed.

7.c The RBM need not be OPERABLE if either of the following two conditions is met:

(1) Reactor thermal power is $\geq$90 percent of rated and MCPR is $\geq$1.40, or

(2) Reactor thermal power is <90 percent of rated and MCPR is $\geq$1.70.

29. Page 3.2/4.2-27/27/26. Note 13 in "Notes for Table 3.2.C" currently reads:

13. The trip level setting and clipped value for this setting shall be as specified in the CORE OPERATING LIMITS REPORT.

The proposed change revises Note 13 and adds new Notes 14 and 15. The revised notes read as follows:

13. The RBM rod block trip setpoints and applicable power ranges are specified in the CORE OPERATING LIMITS REPORT (COLR).

14. Less than or equal to the setpoint allowable value specified in the COLR.

15. Greater than or equal to the setpoint allowable value specified in the COLR.

30. Page 3.2/4.2-50/50/49. In Table 4.2.C the parenthetic description of the RBM Upscale function is changed from "Flow Bias" to "Power Bias".

31. Page 3.3/4.3-8. The proposed change deletes LCO 3.3.B.5 and SR 4.3.B.5 which read:

3.3.B.5 During operation with CMFCP or CMFLPD equal to or greater than 0.95, either:

a. Both RBM channels shall be OPERABLE; or

b. Control rod withdrawal shall be blocked.

4.3.B.5 During operation with CMFCP or CMFLPD equal to or greater than 0.95, an instrument functional test of the RBM shall be performed prior to control rod withdrawal and at least once per 24 hours thereafter.

32. Page 3.3/4.3-17. The proposed change deletes the bases section 3.3/4.3-B.5 which reads:

The Rod Block Monitor (RBM) is designed....The specified restrictions with one channel out of service conservatively assure that fuel damage will not occur due to rod withdrawal errors when this condition exists.

33. Page 3.5/4.5-18. The proposed change revises LCO 3.5.I to implement flow-dependent and power-dependent APLHGR limits.

LCO 3.5.I currently reads:

...the Average Planar Linear Heat Generation Rate (APLHGR) of any fuel assembly at any axial location shall not exceed the appropriate APLHGR limit provided in the CORE OPERATING LIMITS REPORT.

The proposed change revises LCO 3.5.I to read:

...the Average Planar Linear Heat Generation Rate (APLHGR) of any fuel assembly at any axial location shall not exceed the appropriate rated, flow-dependent or power-dependent APLHGR limit provided in the CORE OPERATING LIMITS REPORT.

34. Page 3.5/4.5-19. The proposed change revises LCO 3.5.K and SR 3.5.K to implement flow-dependent and power-dependent MCPR operating limits.

LCO 3.5.K currently reads:

The minimum critical power ratio (MCPR) shall be equal to or greater than the operating limit MCPR (OLMCPR) as provided in the CORE OPERATING LIMITS REPORT. ....

The proposed change revises LCO 3.5.K to read:

The minimum critical power ratio (MCPR) shall be equal to or greater than the appropriate rated, flow-dependent or power-dependent operating limit MCPR (OLMCPR) as provided in the CORE OPERATING LIMITS REPORT. ....

SR 4.5.K.2 currently reads:

The MCPR limit at rated flow and rated power shall be determined as provided in the CORE OPERATING LIMITS REPORT....

The proposed change revises SR 4.5.K.2 to read:

The operating limit MCPR shall be determined as provided in the CORE OPERATING LIMITS REPORT....

35. Page 3.5/4.5-20. The proposed change deletes the APRM setpoint setdown requirements of LCO 3.5.L and SR 4.5.L. These requirements currently read as follows.

3.5.L. <u>APRM Setpoints</u>

1. Whenever the core thermal power is $\geq$25% of rated, the ratio of FRP/CMFLPD shall be $\geq$1.0, or the APRM scram setpoint equation listed in section 2.1.A and the APRM rod block setpoint equation listed in the CORE OPERATING LIMITS REPORT shall be multiplied by FRP/CMFLPD.

2. When it is determined that 3.5.L.1 is not being met, 6 hours is allowed to correct the condition.

3. If 3.5.L.1 and 3.5.L.2 cannot be met, the reactor power shall be reduced to $\leq$25% of rated thermal power within 4 hours.

4.5.L <u>APRM Setpoints</u>

FRP/CMFLPD shall be determined daily when the reactor is $\geq$ 25% of rated thermal power.

36. Page 3.5/4.5-33/31/34. In Bases 3.5.I the proposed change adds the following description of power-dependent and flow-dependent APLHGR limits at the end of the current section:

At less than rated power conditions, the rated APLHGR limit is adjusted by a power dependent correction factor, MAPFAC(P). At less than rated flow conditions, the rated APLHGR limit is adjusted by a flow dependent correction factor, MAPFAC(F). The most limiting power-adjusted or flow-adjusted value is taken as the APLHGR operating limit for the off-rated condition.

The flow dependent correction factor, MAPFAC(F), applied to the rated APLHGR limit assures that (1) the 10 CFR 50.46 limit would not be exceeded during a LOCA initiated from less than rated core flow conditions and (2) the fuel thermal mechanical design criteria would be met during abnormal operating transients initiated from less than rated core flow conditions. MAPFAC(F) values are provided in the CORE OPERATING LIMITS REPORT.

The power dependent correction factor, MAPFAC(P), applied to the rated APLHGR limit assures that the fuel thermal mechanical design criteria would be met during abnormal operating transients initiated from less than rated power conditions. MAPFAC(P) values are provided in the CORE OPERATING LIMITS REPORT.

37. Page 3.5/4.5-33/31/34. In Bases 3.5.K the proposed change adds the following description of power-dependent and flow-dependent MCPR limits at the end of the current section:

At less than rated power conditions, a power dependent MCPR operating limit, MCPR(P), is applicable. At less than rated flow conditions, a Flow dependent MCPR operating limit, MCPR(F), is applicable. The most limiting power dependent or flow dependent value is taken as the MCPR operating limit for the off-rated condition.

The flow dependent limit, MCPR(F), provides the thermal margin required to protect the fuel from transients resulting from inadvertent core flow increases. MCPR(F) values are provided in the CORE OPERATING LIMITS REPORT.

The power dependent limit, MCPR(P), protects the fuel from the other limiting abnormal operating transients, including localized events such as a rod withdrawal error. MCPR(P) values are provided in the CORE OPERATING LIMITS REPORT.

38. Page 3.5/4.5-33,34/31,32/34,35. The proposed change deletes Bases Section 3.5.L, which reads:

3.5.L. APRM Setpoints

Operation is constrained to the LHGR limit.... ....additional margin gained by the setdown adjustment is above and beyond that ensured by the safety analysis.

39. Page 6.0-26a,b/26a/26a. The proposed change revises the description of the content of the CORE OPERATING LIMITS REPORT as indicated below:

	Current Description	Revised Description
(1)	The APLHGR for Specification 3.5.I.	The rated APLHGR limit; the Flow Dependent APLHGR Factor, MAPFAC(F); and the Power Dependent APLHGR Factor, MAPFAC(P) for Specification 3.5.I.
(2)	The LHGR for Specification 3.5.J.	The LGHR limit for Specification 3.5.J.
(3)	The MCPR Operating Limit for Specification 3.5.K/ 4.5.K.	The rated MCPR Operating Limit; the Flow Dependent MCPR Operating Limit, MCPR(F); and the Power Dependent MCPR Operating Limit, MCPR(P) for Specification 3.5.K/4.5.K.
(4)	The APRM Flow Biased Rod Block Trip Setting for Specification 2.1.A.1.c, Table 3.2.C, and Specification 3.5.L.	The APRM flow biased rod block trip setting for Specification 2.1.A.1.c and Table 3.2.C.
(5)	The RBM Upscale (Flow Bias) Trip Setting and clipped value for this setting for Table 3.2.C.	The RBM downscale trip setpoint, high power trip setpoint, intermediate power trip setpoint, and low power trip setpoint, and applicable reactor thermal power ranges for each of the setpoints for Table 3.2.C.

II. REASON FOR THE PROPOSED CHANGE

All proposed TS changes described under Group A, above, are required to support replacement of the existing power range neutron monitoring equipment. As discussed in reference 1, BFN is planning to replace the power range monitor portion of the NMS with a GE digital NUMAC PRNM retrofit system. The new equipment will include capability for an automatic Oscillation Power Range Monitor (OPRM) trip to detect and suppress possible thermal hydraulic instabilities in the plant. The new OPRM trip function, when enabled, will implement the Boiling Water Reactor Owners Group (BWROG) defined "Stability Option III" alternative. However, the OPRM trip function will not be enabled during the first cycle of operation with the new equipment, and this proposed change in technical specifications does not include revisions to incorporate the Stability Option III automatic trip function.

The proposed modification involves replacement of all of the existing power range monitor electronics with new NUMAC digital PRNM hardware. The current equipment is mounted in a 5-bay panel in the main control room of each reactor unit. The modification removes and replaces virtually all of the existing power range monitor equipment within the confines of the main control room panels, but with minor exceptions leaves the plant level cabling and interfaces undisturbed.

All power range monitor functions are maintained, including LPRM detector signal processing, LPRM averaging, APRM trips, and RBM logic and interlocks. Recirculation flow signal processing, previously accomplished using separate hardware within the power range monitor control panels, is integrated into the APRM chassis in the new PRNM system.

The six existing APRM channels in the current system are replaced with four APRM channels, each using 1/4 of the total LPRM detectors. The APRM function is retained, but four 2-out-of-4 trip output voters are added to the input to the RPS, two in each RPS trip system. The trip outputs from all four APRM channels are sent to each voter so that each of the inputs to the RPS is a voted result of all four APRM channels. The number of recirculation flow instrument inputs to the APRMs is increased from two total-flow instrument loops (four transmitters) to four total-flow instrument loops (eight transmitters), permitting one recirculation total-flow instrument loop to be assigned to each APRM channel.

The reasons for the various individual proposed TS changes described in Group A are as follows:

The required minimum number of operable instrument channels for the APRM scram trip functions is changed to 3 because the new configuration will have 4 total APRM channels combined in a 2-out-of-4 logic. In the proposed configuration, a minimum of 3 of the 4 channels is required operable to meet single failure criteria for the RPS trips initiated by APRMs. Note 11 is added to the minimum channel number in Table 3.1.A to highlight the way in which the proposed APRM instrument channel configuration is different from the rest of the RPS instrument channels.

Note 13 in Table 3.1.A is revised because in the proposed configuration the minimum required number of operable LPRMs changes, and fewer than the required minimum number results in an inoperative alarm, not an inoperative trip. The new required minimum number is provided in a description added to Bases 3.1. This new requirement is based on analyses performed for BFN by GE which cover the worst case combinations of LPRM input failures and LPRM bypass conditions. Fewer than the required minimum number of LPRM inputs (20 total, with 3 per axial level) causes an instrument channel inoperative alarm and control rod block, but does not result in an automatic inoperative trip input to the 2-out-of-4 voters. An automatic APRM inoperative trip is required to occur when the APRM channel is incapable of providing a trip based on normal functions. However, when the minimum number of LPRM detectors is reached, the APRM still is capable of providing normal protective trips. Thus, applicable LCO action times are allowed to evaluated and correct the situation. This is consistent with the requirements of reference 2.

The 2/4 APRM trip voters require a minimum operable number of 2 instrument channels per RPS trip system. This requirement is consistent with the proposed new hardware configuration. There are 2 voters per RPS trip system, and requiring 2 voters operable in each of the two RPS trip systems ensures that single failure criteria is met. Note 12 is revised to provide details of the logic of the 2/4 voter trips.

New action statements associated with inoperability of the APRM trip functions or the 2/4 voters are added. If fewer than the required minimum number of APRM trip functions are operable, the new action requirements permit a maximum of 6 hours to restore the configuration to one that will withstand single failure (by either repairing or tripping an inoperable channel). Use of 6

hours for this action is consistent with Standard TS requirements when fewer than the required number of instrument channels is operable in both RPS trip systems. One 2/4 voter interfaces with only one RPS trip system. Thus, the required actions for 2/4 voter inoperability reflect Standard TS action time limits for instruments inoperable in one RPS trip system (12 hours) or for instruments inoperable in both RPS trip systems (6 hours). These requirements are consistent with the recommendations of reference 2.

Requirements for an APRM downscale scram trip and for operability of APRMs in the Refuel mode are deleted, consistent with the recommendations of reference 2. However, reference 2 maintains requirements associated with SRM/IRM scram functions in Refuel mode. The proposed change revises Note 21 to replace the previous indirect requirement for removing shorting links with a direct requirement which ensures that shorting links are removed to enable the SRM high flux scram function under appropriate conditions. Conditions requiring the SRM high flux scram function in Refuel mode are that a control rod be withdrawn from a cell containing fuel and that shutdown margin has not been demonstrated. If shutdown margin has been demonstrated, then the one-rod-out interlock provides assurance that the reactor will not become critical in the Refuel mode.

Surveillances frequencies associated with the APRM scram functions are changed to the values recommended in and supported by reference 2. These increases in APRM surveillance intervals take credit for the self-test features of the GE NUMAC PRNM equipment to reduce the administrative burdens, the manpower requirements and the risks of spurious trips associated with more frequent surveillances. Testing of the RPS scram contactors is performed by a weekly functional test of the 2/4 voter trip output. For the APRM High Flux (15 percent) scram function, application of new Note 9, Table 4.1.A, is consistent with the recommendations of reference 2; the wording is consistent with a similar change proposed in TVA-BFN-TS-355, reference 10. New requirements for functional testing of the 2/4 voter trip logic, described in new Note 10, Table 4.1.A, are consistent with the recommendations in reference 2. APRM functional testing "group" assignments are deleted because the existing Bases discussions of these "groups will no longer apply for testing of the NUMAC APRM equipment. New, separate discussions of the basis for APRM surveillance requirements are added into the appropriate TS Bases sections.

Because the proposed modification deletes separate flow bias networks by integrating all of the flow-related

logic into the APRM/RBM chassis, there are no longer separate operability or surveillance requirements associated with the APRM flow bias function. All of these functions are tested as part of the APRM/RBM functional tests and calibrations. Thus, most requirements previously associated with separate APRM flow bias networks are deleted. A requirement for once per cycle calibration of the flow bias signal is retained in Table 4.1.B, consistent with recommendations of reference 2.

Bases sections and various notes applicable to the RPS instrumentation are changed to properly reflect details of the proposed NUMAC hardware. Changes 8, 9 and 13 provide new details consistent with the proposed configuration and requirements for the NUMAC APRM equipment. Changes 10, and 11 adjust existing TS Bases descriptions consistent with the proposed APRM configuration and functional changes.

The control rod block operability and surveillance requirements for APRMs and RBMs are changed consistent with the proposed new APRM/RBM hardware configuration. Reason for the changes are, in general, similar to the reasons for changes in the requirements for APRM scram trip functions described above.

The minimum required number of APRM rod block trip channels is changed from "4" to "3" consistent with the proposed capability to bypass one of the four APRM instrument channels. As noted in reference 2, a minimum of only two APRM rod block trip channels is needed. Functional and surveillance requirements for Flow Bias Comparator and Flow Bias Upscale are deleted, consistent with recommendations of reference 2.

Bases sections and various notes for the Control Rod Block Instrumentation are changed to properly describe the configuration and features of the proposed NUMAC PRNM hardware.

All proposed TS changes described under Group B, above, are related to implementation of ARTS/MELLL improvements. These changes are proposed concurrent with the NUMAC PRNM related changes because equipment design, interface and setpoint modifications required to implement these proposed TS changes will be included as part of the NUMAC PRNM design.

Implementation of the ARTS improvements requires modification of the RBM system. The proposed modification changes the RBM trip setpoints from flow-biased to power-biased values and reconfigures the LPRM inputs to the RBMs. These proposed changes are intended to eliminate

limitations of the current RBM system, which was designed in the mid-1960s. Since that time there have been significant advances in the fields of two-phase heat transfer and electronics. The current RBM signals do not always correlate well with thermal margin changes during control rod withdrawal, and the system performs its function only at the expense of significant operational penalties due to excessive conservatism inherent in the design of the current system. The modified RBM system will provide improved correlation of RBM response with changes in fuel thermal margin and will enhance operator confidence in the system by reducing the frequency of nonessential rod blocks. The proposed changes will upgrade the performance of the RBM system and will provide new RBM setpoint and operability requirements such that the Rod Withdrawal Error (RWE) will never be the limiting transient.

In addition to changes in the RBM system's configuration, setpoints and operability requirements, ARTS improvements eliminate the current TS requirement to lower (setdown) the flow-biased APRM scram and rod block trips when the Core Maximum Fraction of Limiting Power Density (CMFLPD) exceeds the Fraction of Rated Power (FRP). To support elimination of this requirement, as well as to support the change to power-biased RBM setpoints, new power-dependent and flow-dependent fuel thermal limits are proposed to be implemented. The proposed replacement of the current APRM trip setdown requirement by more meaningful power- and flow-dependent thermal limits eliminates a need for manual setpoint adjustments and is anticipated to enhance administration of thermal limits compliance.

The proposed expansion of allowable operation to the MELLL region provides enhanced ability to achieve and maintain operation at rated power. Because rated power can be maintained with recirculation flow adjustments over a wider flow range, less frequent control rod adjustments are required to compensate for reactivity depletion, and the need for power reductions to perform control rod withdrawal is decreased. The plant will be able to operate longer at rated power, will have more flexibility to schedule load reductions and will be able to operate in a more efficient and economical manner.

The reasons for the various individual proposed TS changes described in Group B are as follows:

> The TS "Definitions" section is revised to delete definitions for Core Maximum Fraction of Limiting Power Density (CMFLPD) and Core Maximum Fraction of Critical Power (CMFCP). These definitions are no longer needed because the LCOs and SRs which use these definitions are deleted as part of the proposed change.

The LSSS APRM flow-biased setpoint equation is changed. This change is needed to support operation in the MELLL region by providing adequate operating margin between boundaries of the MELLL region and the flow biased APRM scram. Figure 2.1-2 is revised to show the revised APRM flow-biased setpoint. The APRM flow-biased rod block setpoint, in the Core Operating Limits Report (COLR), will also be revised as part of the proposed change.

A note in LSSS 2.1.A.1.b is deleted because the referenced LCO section (4.5.L) is deleted as part of the proposed change.

The LSSS Bases Section 2.1.L is revised to add a new reference to GE's ARTS/MELLL analysis for BFN which forms the analytical basis for the proposed changes.

In Bases Section 4.1 a reference to "CMFLPD" is deleted, consistent with its deletion from definitions, LCOs and SRs.

Table 3.2.C for Control Rod Block Instrumentation, is revised to reflect the change from flow-biased to power-biased RBM setpoints. As discussed in reference 3, the change to power-biased RBM setpoints improves the correlation of RBM rod blocks with available thermal margin. At low core power levels where thermal margins are high, long rod withdrawals are permitted; while at high core powers where thermal margins are relatively low, only short rod withdrawals are allowed. The new RBM Upscale power-biased setpoints apply over three power ranges, low, intermediate and high. These three power-range-dependent upscale trip functions are listed under the existing RBM Upscale trip function heading. The existing flow-biased RBM setpoints are provided in the COLR. Note 13 for Table 3.2.C is revised to say that the proposed power-biased RBM Upscale trip function setpoints and applicable power ranges will be provided in the COLR. New Note 14 to Table 3.2.C is provided to specify that the RBM Upscale Trip Level Settings must be less than or equal to the setpoint allowable values provided in the COLR. The RBM Downscale Trip Level setpoint value is replaced by a new Note 15, which requires that the Downscale Trip Level Setting be greater than or equal to the setpoint allowable value provided in the COLR. This proposed change results in all RBM setpoints being located in the COLR.

Note 7 for Table 3.2.C is revised to add new conditions of reactor thermal power and MCPR where operability of the RBM is not required. This requirement is consistent with the discussion in Section 10.5 of reference 3.

In Table 4.2.C the RBM Upscale function description is

revised to reflect the change from flow-biased to power-biased setpoints.

In the "Reactivity Control" section of TS, the proposed change deletes LCO 3.3.B.5, SR 4.3.B.5, and Bases Section 3.3/4.3-B.5. The deleted LCO is, in effect, an additional RBM operability requirement. The requirement was instituted as part of an earlier revision of flow-biased RBM setpoint values. With the proposed implementation of power-biased RBM setpoints, this additional requirement on RBM is overly restrictive and is not required by the ARTS analysis. Deleting the requirement provides more operational flexibility by allowing 24 hours to repair a single failed RBM channel, and it consolidates all RBM operability requirements in LCO Table 3.2.C and associated notes.

LCO 3.5.I is revised to reflect the proposed implementation of flow-dependent and power-dependent APLHGR limits. LCO 3.5.K is revised to reflect the proposed implementation of flow-dependent and power-dependent operating MCPR limits. SR 5.4.K.2 is revised to reflect the proposed LCO change. Bases Sections 3.5.I and 3.5.K are revised to add new discussions of the proposed flow-dependent and power-dependent APLHGR and MCPR limits. As discussed in reference 3, implementation of these flow- and power-dependent thermal limits permits more direct administration of thermal limits compliance and supports deletion of the APRM setpoint setdown requirement.

LCO 3.5.L (the APRM setpoint setdown requirement) and associated SR and Bases sections are deleted as justified by the evaluation in Section 5.3 of reference 3. The proposed deletion of this LCO eliminates the need to make APRM setpoint adjustments under certain conditions. Eliminating this requirement reduces administrative and manpower burdens and eliminates the risks of spurious trips associated with the previously required APRM setpoint adjustments.

In TS Section 6.9.1.7 the description of the Core Operating Limits Report is changed to reflect the proposed change to flow- and power-dependent APLHGR and MCPR operating limits, the proposed elimination of the APRM setpoint setdown requirement, and the proposed changes from flow-biased to power-biased RBM setpoints.

III. SAFETY ANALYSIS

Group A Changes: These proposed TS changes are all associated with replacement of the existing power range neutron monitoring system with a GE digital NUMAC PRNM retrofit design. The NRC has separately received and is reviewing a "generic" licensing topical report (reference 2) which provides detailed information needed to perform a licensing review and safety evaluation of the planned NUMAC PRNM retrofit. Reference 2 provides descriptions, discussions and data which are applicable for all GE NUMAC PRNM retrofit designs. Reference 2 also identifies specific utility actions required in order to take credit of the evaluations provided in reference 2. Attachment 2 of this enclosure provides TVA's responses to the utility actions required by reference 2. Evaluations of the proposed TS changes are summarized below:

For the functions addressed by the proposed TS change, the NUMAC PRNM has the same design basis requirements as the original power range neutron monitoring system. The original system was designed to meet IEEE 279-1971 compliance; therefore the requirements of this standard apply to the replacement design. In addition, USNRC Reg. Guide 1.152 -1985 is applied as a requirement, and reference 2 includes a "compliance matrix" that correlates the requirements of the Reg. Guide to the NUMAC PRNM implementing program. Section 4 of reference 2 further discusses the design bases and regulatory requirements applicable for the NUMAC PRNM system.

All previous ARPM upscale scram trips are retained in the new design. The proposed design and related LCOs permit one APRM instrument channel to be bypassed at any time for maintenance or testing while retaining the ability to withstand single failure of one of the remaining instrument channels. However, because of requirements to meet single failure criteria, bypass of any 2/4 voter is not permitted. LCO action times and required actions for fewer than the required number of APRM trip functions or 2/4 voter functions are consistent with what has been previously approved for Standard Technical Specifications.

The proposed TS change deletes the previous requirement for APRM operability in Refuel mode. In eliminating the APRM operability requirement in Refuel mode, the proposed TS change makes explicit the requirement to enable the SRM high flux scram function under appropriate conditions in the Refuel mode. The proposed change also deletes the previously required APRM downscale scram trip in the Run mode. No postulated event takes credit for this downscale trip, and eliminating the logic for the trip reduces the potential

for spurious scrams in testing, maintenance or operation.

The proposed TS change extends required surveillance intervals of the APRM and RBM equipment to the maximum periods supported by reference 2. This reduction in surveillance frequency is supported by the increased reliability and the extensive self-test capability of the new hardware. Testing of the RPS scram contactors via the APRM system is retained and is performed by weekly testing of the 2/4 voter trip output function. Extending APRM surveillance intervals reduces the potential for spurious trips while testing is being performed, thus enhancing the overall reliability of plant operations.

Group B Changes: These proposed TS changes are all associated with implementing ARTS improvements and with extending operation to the MELLL region of the power/flow map. The NRC has previously approved implementation of ARTS/MELLL changes at other BWRs (references 4, 5, 6 and 7) and has also approved extension of BFN's original operating region to the Extended Load Line Limit (ELLL) region (references 8 and 9).

Reference 3 documents results of analyses and evaluations performed for BFN by GE to support the proposed ARTS/MELLL changes. Appendix A of reference 3 discusses major features of the modified RBM system, and Section 10 of reference 3 provides an in-depth discussion of the RBM system evaluation and requirements to support the ARTS improvement. Sections 4 and 5 of reference 3 provide a description of APRM improvements and a detailed discussion of the new power- and flow-dependent thermal limits which support elimination of the previous APRM setpoint setdown requirement. Reference 3 provides documentation of extensive analyses of operation in the MELLL region performed for BFN based on the Unit 2, Cycle 8 fuel schedule.

The safety and system evaluations documented in reference 3 to justify the safety of operation in the MELLL region consist of two portions, the portion which is not fuel-dependent, and the portion that is fuel dependent and therefore fuel cycle dependent. In general, the limiting anticipated operational occurrences (AOOs) MCPR calculation and the reactor vessel overpressure protection analysis are fuel cycle dependent. These analyses as presented in reference 3 are based on BFN Unit 2, Cycle 8, refueling schedules at the current rated core thermal power of 3293 MWt. For non-fuel dependent evaluations such as containment responses, an uprated power level of 3458 MWt (105% of the current rated core thermal power) is used. The non-fuel dependent evaluations are mostly based on

hardware design, geometries, and system performance which are similar among the BFN units. Thus, these non-fuel dependent evaluation are considered applicable to BFN Units 1, 2 and 3 for MELLL region operation.

Evaluations of the proposed TS changes associated with ARTS/MELLL implementation are summarized below:

The proposed TS change revises the flow-biased APRM scram setpoint from S≤(0.58W+62%) to S≤(0.66W+71%). The flow-biased APRM scram setpoint maximum (clamped) value of 120% does not change. The proposed change revises Figure 2.1-2 to show the proposed flow-biased APRM scram setpoint. In addition, the flow-biased APRM rod block setpoints documented in the COLR will be changed. These changes incorporate new setpoints for the flow-biased APRM scram and rod block functions based on the MELLL analysis documented in reference 3. The TS setpoints are allowable values consistent with the analytical limits presented in reference 3. These setpoint allowable values are documented in calculations performed for BFN by GE and are based on the proposed configuration of NUMAC PRNM equipment.

For original plant operation with the maximum load line limited to the rated rod line, the setpoint for the flow-biased APRM scram line was S≤(0.66W+54%). With the first expansion of the power/flow map to allow operation up to the 108% rod line (references 8 and 9), the flow-biased APRM flux scram line was modified to S≤(0.58W+62%). With the proposed expansion of the power/flow map to include the MELLL region depicted in Figure 2-1 of reference 3, the upper boundary of the analyzed operating domain is further extended to the 121% rod line. The proposed change in flow-biased APRM setpoints maximizes plant operating flexibility, restores the slopes of the flow-biased APRM scram and rod block setpoints to their original design basis values, and restores the original design basis operating margin between the maximum extended load line and the APRM flow-biased scram setpoint.

The purpose of the flow-biased APRM rod block is to block control rod withdrawal when core power exceeds design bases and approaches the scram level. Should operation continue in a manner such that the power/flow condition exceeds that specified by the ARPM rod block setpoint, the flow-biased APRM scram trip setpoint would initiate a scram. Credit for the flow-biased APRM rod block or scram is not taken in analysis of any design basis event.

The proposed TS change revises LCO Table 3.2.C to reflect the change from flow-biased to power-biased RBM

setpoints. The RBM system is explicitly designed to mitigate the consequences of the rod withdrawal error (RWE) event and is not assumed to be available to mitigate any other AOOs. The current RBM system configuration is described in detail in Section 10 of reference 3. The modified RBM system configuration is described in Section 10 and Appendix A of reference 3. The modified RBM system uses advances in electronics to enhance instrumentation accuracy and improve the signal to thermal margin correlation. The RBM modifications incorporate power-biased setpoints and provide a system response which more accurately reflects the actual margin to the safety limit at various power conditions.

Coincident with the analyses of the modified RBM system, a generic RWE approach was taken such that neither the safety limit MCPR nor the fuel thermal-mechanical design basis is jeopardized. This approach included determining appropriate MCPR requirements and corresponding RBM power dependent setpoints for the modified RBM system for current fuel designs. By appropriate selection of the setpoints, the RWE will not be the limiting event and will not determine the operating limit MCPR. In this respect, the RBM setpoints are dependent upon the operating limit values which depend on the cycle-specific conditions; thus the setpoint values are proposed to be documented in the COLR. Using an MCPR operating limit of 1.25 and setpoint calculations applicable for the proposed configuration, the power-biased RBM setpoints and applicable reactor thermal power (RTP) ranges are as follows:

Low Trip Setpoint ≤118.5% for RTP ≥ 28% and < 63%;

Intermediate Trip Setpoint ≤113.7% for RTP ≥63% and < 83%;

High Trip Setpoint ≤108.7% for RTP ≥ 81% and ≤ 100%; and

Downscale Trip Setpoint ≥89%/125% for RTP ≥ 28% and ≤ 100%.

The proposed TS change revises Note 7 for Table 3.2.C to specify RTP and MCPR conditions where operability of the RBM system is not required. Section 10.5 of reference 3 documents that with RTP ≥ 90% and operating MCPR ≥1.40, or with RTP < 90% and operating MCPR ≥1.70, withdrawal of any single control rod from the full-in to the full-out position will not result in violation of the MCPR safety limit. Thus, under these conditions the RBM system is not required to function in order to assure that an RWE has acceptable results.

The proposed TS change deletes LCO/SR 3.3/4.3.B.5 and revises the Bases to reflect this change. These specifications are, in effect, additional requirements

setpoints. The RBM system is explicitly designed to mitigate the consequences of the rod withdrawal error (RWE) event and is not assumed to be available to mitigate any other AOOs. The current RBM system configuration is described in detail in Section 10 of reference 3. The modified RBM system configuration is described in Section 10 and Appendix A of reference 3. The modified RBM system uses advances in electronics to enhance instrumentation accuracy and improve the signal to thermal margin correlation. The RBM modifications incorporate power-biased setpoints and provide a system response which more accurately reflects the actual margin to the safety limit at various power conditions.

Coincident with the analyses of the modified RBM system, a generic RWE approach was taken such that neither the safety limit MCPR nor the fuel thermal-mechanical design basis is jeopardized. This approach included determining appropriate MCPR requirements and corresponding RBM power dependent setpoints for the modified RBM system for current fuel designs. By appropriate selection of the setpoints, the RWE will not be the limiting event and will not determine the operating limit MCPR. In this respect, the RBM setpoints are dependent upon the operating limit values which depend on the cycle-specific conditions; thus the setpoint values are proposed to be documented in the COLR. Using an MCPR operating limit of 1.25 and setpoint calculations applicable for the proposed configuration, the power-biased RBM setpoints and applicable reactor thermal power (RTP) ranges are as follows:

Low Trip Setpoint ≤118.5% for RTP ≥ 28% and < 63%;

Intermediate Trip Setpoint ≤113.7% for RTP ≥63% and < 83%;

High Trip Setpoint ≤108.7% for RTP ≥ 81% and ≤ 100%; and

Downscale Trip Setpoint ≥89%/125% for RTP ≥ 28% and ≤ 100%.

The proposed TS change revises Note 7 for Table 3.2.C to specify RTP and MCPR conditions where operability of the RBM system is not required. Section 10.5 of reference 3 documents that with RTP ≥ 90% and operating MCPR ≥1.40, or with RTP < 90% and operating MCPR ≥1.70, withdrawal of any single control rod from the full-in to the full-out position will not result in violation of the MCPR safety limit. Thus, under these conditions the RBM system is not required to function in order to assure that an RWE has acceptable results.

The proposed TS change deletes LCO/SR 3.3/4.3.B.5 and revises the Bases to reflect this change. These specifications are, in effect, additional requirements

on the RBM system to require both RBM channels operable or block control rod withdrawal when within 5% of thermal limits. This additional RBM specification is not required by the ARTS analyses documented in reference 3. The proposed RBM LCOs in Table 3.2.C permit rod withdrawal only for a period of 24 hours with one RBM channel inoperable (or bypassed) when operability of the RBM system is required. This LCO action time is consistent with Standard TS requirements, and the added constraint of LCO/SR 3.3/4.3.B.5 is not necessary.

The proposed TS change deletes the flow-biased APRM scram and rod block setpoint setdown requirement (LCO 3.5.L); and it implements flow- and power-dependent thermal limits by revising LCO 3.5.I and LCO/SR 3.5.K to reflect the change to flow- and power-dependent APLHGR and MCPR limits. Related Bases sections are revised to reflect deletion of LCO 3.5.L and to include discussion of this new treatment of thermal limits. The proposed change eliminates the requirement for setdown of the flow-biased APRM scram and rod block trip setpoints when the CMFLPD is greater than the FRP and substitutes adjustments to the rated MCPR and APLHGR operating limits that are flow and power dependent. Reference 3 documents results of analyses to justify implementation of flow- and power-dependent APLHGR and MCPR operating limits and elimination of the flow-biases APRM setpoint setdown requirement. Analyses documented in reference 3 demonstrate that with the setpoint setdown requirement eliminated and flow- and power-dependent thermal limits implemented 1) MCPR safety limit will not be violated as a result of any AOOs, 2) all fuel thermal-mechanical design bases will remain within the licensing limits described in the GE generic fuel licensing report GESTAR-II, and 3) peak cladding temperature and maximum cladding oxidation fraction following a LOCA will remain within the limits defined in 10CFR50.46.

The proposed TS change revises the description of the Core Operating Limits Report (COLR). The COLR already included the APLHGR and MCPR operating limits and the RBM trip setpoints. The proposed change to the COLR description is an administrative revision to reflect the changes in these limits and setpoints as described above.

IV. NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

TVA has concluded that operation of Browns Ferry Nuclear Plant (BFN) Units 1, 2 and 3 in accordance with the proposed change to the technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91(a)(1), of the three standards set forth in 10 CFR 50.92(c).

1. **The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.**

   Group A Changes: This proposed TS change is associated with the NUMAC PRNM retrofit design. The proposed TS change involves modification of the LCOs and SRs for equipment designed to mitigate events which result in power increase transients. For the APRM system mitigative action is to block control rod withdrawal or initiate a reactor scram which terminates the power increase when setpoints are exceeded. For the RBM system mitigative action is to block continuous control rod withdrawal prior to exceeding the MCPR safety limit during a postulated Rod Withdrawal Error. The worst case failure of either the APRM or the RBM systems is failure to initiate mitigative action (failure to scram or block rod withdrawal). Failure to initiate mitigative action will not increase the probability of an accident. Thus, the proposed change does not increase the probability of an accident previously evaluated.

   For the APRM and the RBM systems, the NUMAC PRNM design, together with revised operability requirements (LCOs) and revised testing requirements (SRs), results in equipment which continues to perform the same mitigation functions under identical conditions with reliability equal to or greater than the equipment which it replaces. Because there is no change in mitigation functions and because reliability of the functions is maintained, the proposed change does not involve an increase in the consequences of an accident previously evaluated.

   Group B Changes: This proposed change is associated with implementation of the ARTS/MELLL analysis. The proposed change will permit expansion of the current allowable power/flow operating region and will apply a new methodology for assuring that fuel thermal and mechanical design limits are satisfied. Reference 3 evaluates operation in the MELLL region with assumed implementation of the ARTS changes. The conclusion of reference 3 is that for all events and parameters

considered there is adequate design margin for operation in the MELLL region. Because operation in the MELLL region maintains adequate design margin, the proposed change does not significantly increase the probability of an accident previously evaluated.

In support of operation in the MELLL region, the proposed change modifies flow-biased APRM scram and rod block setpoints and implements new RBM power-biased setpoints. This potentially changes the way in which the APRM and RBM systems perform their mitigation functions. However, no credit for the flow-biased APRM scram or rod block is taken in mitigation of any design basis event; thus, changing the APRM setpoints does not impact the consequences of any accident previously evaluated. The proposed changes to the RBM system potentially impact mitigation of the RWE. However, per discussion in reference 3, the proposed RBM changes will assure that the RWE is not a limiting event; thus, the consequences of the RWE are not increased. The proposed change does not increase the consequences of an accident previously evaluated.

2. **<u>The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.</u>**

The proposed changes (Group A and Group B) involve modification and replacement of the existing power range neutron monitoring equipment, modification of the setpoints and operational requirements for the APRM and RBM systems, implementation of a new methodology for administering compliance with fuel thermal limits, and operation in an extended power/flow domain. These proposed changes do not modify the basic functional requirements of the affected equipment, create any new system interfaces or interactions, nor create any new system failure modes or sequence of events that could lead to an accident. The worst case failure of the affected equipment is failure to perform a mitigation action, and failure of this mitigative equipment does not create the possibility of a new or different kind of accident. The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. **<u>The proposed amendment does not involve a significant reduction in a margin of safety.</u>**

<u>Group A Changes</u>: This proposed TS change is associated with the NUMAC PRNM retrofit design. The NUMAC PRNM change does not impact reactor operating parameters nor the functional requirements of the power range neutron monitoring system. The replacement equipment continues to provide information, enforce control rod blocks and initiate reactor scrams under appropriate specified conditions. The proposed change does not revise any safety margin requirements. The replacement APRM/RBM equipment has improved channel trip accuracy compared to the current system and meets or exceeds system requirements previously assumed in setpoint analysis. Thus, the ability of the new equipment to enforce compliance with margins of safety equals or exceeds the ability of the equipment which it replaces. The proposed change does not involve a reduction in a margin of safety

<u>Group B Changes</u>: This proposed change is associated with implementation of recommendations presented in the ARTS/MELLL analysis. Operation in the MELLL region does not affect the ability of the plant safety-related trips or equipment to perform their functions, nor does it cause any significant increase in offsite radiation doses resulting from any analyzed event. Analyses documented in reference 3 demonstrate that for operation in the MELLL region adequate margin to design limits is maintained. Implementation of the ARTS improvements provides flow- and power-dependent thermal limits which maintain existing margins of safety in normal operation, anticipated operational occurrences and accident events. Implementation of power-biased RBM setpoints improves the margin of safety in a postulated RWE by assuring that the RWE is not a limiting event. The proposed change does not involve a significant reduction in a margin of safety.

3. **The proposed amendment does not involve a significant reduction in a margin of safety.**

Group A Changes: This proposed TS change is associated with the NUMAC PRNM retrofit design. The NUMAC PRNM change does not impact reactor operating parameters nor the functional requirements of the power range neutron monitoring system. The replacement equipment continues to provide information, enforce control rod blocks and initiate reactor scrams under appropriate specified conditions. The proposed change does not revise any safety margin requirements. The replacement APRM/RBM equipment has improved channel trip accuracy compared to the current system and meets or exceeds system requirements previously assumed in setpoint analysis. Thus, the ability of the new equipment to enforce compliance with margins of safety equals or exceeds the ability of the equipment which it replaces. The proposed change does not involve a reduction in a margin of safety

Group B Changes: This proposed change is associated with implementation of recommendations presented in the ARTS/MELLL analysis. Operation in the MELLL region does not affect the ability of the plant safety-related trips or equipment to perform their functions, nor does it cause any significant increase in offsite radiation doses resulting from any analyzed event. Analyses documented in reference 3 demonstrate that for operation in the MELLL region adequate margin to design limits is maintained. Implementation of the ARTS improvements provides flow- and power-dependent thermal limits which maintain existing margins of safety in normal operation, anticipated operational occurrences and accident events. Implementation of power-biased RBM setpoints improves the margin of safety in a postulated RWE by assuring that the RWE is not a limiting event. The proposed change does not involve a significant reduction in a margin of safety.

V. ENVIRONMENTAL IMPACT CONSIDERATION

The proposed change does not involve a significant hazards consideration, a significant change in the types of or significant increase in the amounts of any effluents that may be released offsite, or a significant increase in individual or cumulative occupational radiation exposure. Therefore, the proposed change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed change is not required.

VI. REFERENCES

1. TVA letter to NRC, dated September 8, 1994, Response to NRC Generic Letter (GL) 94-02 - Long-Term Solutions and Upgrade of Interim Operating Recommendations for Thermal Hydraulic Instabilities in Boiling Water Reactors.

2. Licensing Topical Report, Nuclear Measurement Analysis And Control Power Range Neutron Monitor (NUMAC PRNM) Retrofit Plus Option III Stability Trip Function, Volumes 1 and 2, NEDC-32410P, March 1995.

3. GE Report, Maximum Extended Load Line Limit and ARTS Improvement Program Analyses for Browns Ferry Nuclear Plant Unit 1, 2 and 3, NEDC-32433P (Attachment 1).

4. Letter from NRC to Carolina Power & Light Company, dated October 23, 1990, Issuance of Amendment No. 147 to Facility Operating License No. DPR-71 Regarding Maximum Extended Operating Domain.

5. Letter from NRC to Carolina Power & Light Company, dated October 12, 1989, Issuance of Amendment No. 168 to Facility Operating License No. DPR-62 Regarding Maximum Extended Operating Domain.

6. Letter from NRC to Detroit Edison Company, dated May 15, 1991, Amendment No. 69 to Facility Operating License No. NPF-43.

7. Letter from NRC to PECO Energy Company, dated August 10, 1994, Expanded Operating Domain (ARTS/MELLLA) Technical Specifications, Peach Bottom Atomic Power Station, Unit 2 (TAC No. M86132).

8. Letter from NRC to TVA, dated December 18, 1990, Issuance of Amendment (TAC No. 76934) (TS 285) [Extended Load Line Limit Analysis - Amendment 181 to BFN Unit 2 Technical Specifications]

9. Letter from NRC to TVA, dated February 24, 1995, Issuance of Technical Specification Amendment for the Browns Ferry Nuclear Plant Units 1, 2 and 3 (TAC Nos. M89251, M89252, and M89253) (TS 339) [Extended Load Line Limit and Revised Rod Block Monitor Operability Requirements (Units 1 and 3); Deletion of Specific Values.... (Units 1, 2, and 3)]

10. Letter from TVA to NRC, dated January 4, 1995, Browns Ferry Nuclear Plant (BFN) - Units 1, 2 and 3 - Technical Specification (TS) No. 355 - Reactor Protection System TS Requirements for Intermediate Range Monitor (IRM) and Average Power Range Monitor Trip Functions (APRM).

Enclosure 1

ATTACHMENT 2

Plant-Specific Information Required for NUMAC PRNM Retrofit

Plant-Specific Information Required for NUMAC PRNM Retrofit

Section No.	Utility Action Required	Response
2.3.4	Confirm that the actual plant configuration is included in the variations covered in the Power Range Neutron Monitor (PRNM) Licensing Topical Report (LTR) [NEDC-32410P], and the configuration alternative(s) being applied for the replacement PRNM are covered by the PRNM LTR. Document in the ***plant specific licensing submittal*** for the PRNM project the actual, current plant configuration of the replacement PRNM, and document confirmation that those are covered by the PRNM LTR. For any changes to the plant operator's panel, document in the submittal the human factors review actions that were taken to confirm compatibility with existing plant commitments and procedures.	The actual, current plant configuration and the proposed replacement PRNM are included in the PRNM LTR as follows: (Applicable LTR sections are listed.) — Current — Proposed APRMs — 2.3.3.1.1.2 — 2.3.3.1.2.2 RBM — 2.3.3.2.1.1 — 2.3.3.2.2.1 Flow Units — 2.3.3.3.1.1 — 2.3.3.3.2.2 Rod Cntrl. — 2.3.3.4.1.1 — 2.3.3.4.2.1 ARTS — 2.3.3.5.1.2 — 2.3.3.5.2.1 Panel Inter. — 2.3.3.6.1.1 — 2.3.3.6.2.1 Human Factors Engineering review will be performed as part of the normal design change process.
3.4	As part of the ***plant specific licensing submittal***, the utility should document the following: 1) The pre-modification flow channel configuration, and any changes planned. 2) Document the APRM trips currently applied at the plant. If different from those documented in the PRNM LTR, document plans to change to those in the LTR. 3) Document the current status related to ARTS and the planned post modification status.	1) The current flow channel configuration consists of two flow channels, four transmitters (3.2.3.1.1). The post modification configuration will be four flow channels, eight transmitters (3.2.3.2.2). Four transmitters which meet or exceed requirements of the Note in PRNM LTR Section 3.4 will be added. 2) APRM trips currently at the plant are the same as those identified in PRNM LTR Sections 3.2.4, 3.2.5, 3.2.6 and 3.2.7. 3) ARTS currently is not implemented. ARTS will be implemented concurrently with the PRNM. Tech spec changes proposed in support of ARTS are included in the PRNM submittal.
4.4.1.11	The PRNM LTR identifies requirements that are expected to encompass most specific plant commitments relative to the PRNM replacement project. The utility must confirm that the requirements identified in the PRNM LTR address all of those identified in plant specific commitments. The ***plant specific licensing submittal*** should identify the specific requirements applicable for the plant, confirm that any clarifications included in the PRNM LTR apply to the plant, and document the specific requirements that the replacement PRNM is intended to meet.	Review of applicable BFN general and system design criteria documents confirms that BFN's requirements/commitments for the replacement PRNM are consistent with the requirements described in Section 4.4 of the PRNM LTR. As part of the normal design process, applicable system design criteria documents will be revised to appropriately reflect the proposed modifications in APRM and RBM hardware configuration.

Plant-Specific Information Required for NUMAC PRNM Retrofit

Section	Utility Action Required	Response
4.4.2.2.1.4	Plant specific action will confirm that the maximum control room temperatures plus mounting panel temperature rise, allowing for heat load of the PRNM equipment, does not exceed the temperatures presented in the PRNM LTR, and that control room humidity is maintained within the limits stated in the PRNM LTR. Documentation of the above action, including the specific method used for the required confirmation should be included in ***plant specific licensing submittals***.	The PRNM control room electronics is qualified for continuous operation under the following temperature conditions: 5 to 50 °C [41 to 122 °F]. Normal control room temperature is 76 °F, and maximum abnormal temperature is 104 °F. Thus, allowing for any temperature differences between the ambient room and the mounting panels plus reasonable heat loads expected of the PRNM equipment, the PRNM control room electronics is expected to be within the qualified range. Measurements and/or calculations will be completed during the design process to confirm that the PRNM temperature environment is within the qualified range. The PRNM control room electronics is qualified for continuous operation under the following relative humidity conditions: 10 to 90% (non-condensing). Normal control room relative humidity is in the range of 40% to 60%, which is well within the range for which the PRNM equipment is qualified.
4.4.2.2.2.4	Plant specific action will confirm that the maximum control room pressure does not exceed the limits presented in the PRNM LTR. Documentation of this action and the required confirmation should be included in ***plant specific licensing submittals***.	The PRNM control room electronics is qualified for continuous operation under the following pressure conditions: Maximum (above ambient) = 1.0 " of water and Minimum (below ambient) = -1.0" of water. Normal control room pressure is maintained between 0.125" and approximately 0.5" of water which is within the qualified pressure range.
4.4.2.2.3.4	Plant specific action will confirm that the maximum control room radiation levels do not exceed the limits stated in the PRNM LTR. Documentation of this action and the required confirmation should be included in ***plant specific licensing submittals***.	The PRNM control room electronics is qualified for continuous operation under the following conditions: Dose Rate ≤ .001 Rads(carbon)/hr and Total Integrated Dose (TID) ≤ 1000 Rads(carbon). The BFN control room dose rates and TID are within the qualified ranges.

Plant-Specific Information Required for NUMAC PRNM Retrofit

Section	Utility Action Required	Response
4.4.2.3.4	Plant specific action or analysis will confirm that the maximum seismic accelerations at the mounting locations of the equipment (control room floor acceleration plus panel amplification) do not exceed the limits stated in the PRNM LTR. Documentation of this action and the required confirmation should be included in plant ***specific licensing submittals***.	Evaluations to confirm that the maximum seismic accelerations at the mounting locations of the equipment do not exceed qualification limits of the equipment will be completed as part of the normal design change process.
4.4.2.4.4	With regard to electromagnetic interference (EMI), the utility will establish or document practices to control emission sources, maintain good grounding practices and maintain equipment and cable separation. .... The ***plant specific licensing submittals*** should identify the practices that are in place or will be applied for the PRNM modification to address each of the above items.	TVA has previously provided information to the NRC by letter dated December 23, 1993, Browns Ferry Nuclear Plant (BFN) Units 1, 2 and 3 -- Reply to NRC Request to Provide Results of BFN Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Tests and On-Site Surveys for the Reactor Building Ventilation Radiation Monitoring System (TAC Nos. M84161, M84162 and M84163). Based on the previously provided test results, the BFN environment satisfies the conditions and limitations defined in EPRI TI-102323 and is within the qualification envelope of the PRNM equipment.

Plant-Specific Information Required for NUMAC PRNM Retrofit

Section	Utility Action Required	Response
6.6	The utility must confirm applicability of the failure analysis conclusions contained in the PRNM LTR by the following actions. (These confirmations and conclusions should be documented in the ***plant specific licensing submittal*** for the PRNM modification.) a) Confirm that the events defined in EPRI report No. NP-2230 or in Appendices F and G, Reference 11 of the PRNM LTR, encompass the events that are analyzed for the plant; b) Confirm that the configuration implemented by the plant is within the limits described in the LTR; and c) Prepare a plant specific 10CFR50.59 evaluation of the modification per the applicable plant procedures. [Reference 11 of the LTR is NEDC-30851P-A, "Technical Specification Improvement Analysis for BWR Reactor Protection system," dated March 1988.]	a) Events analyzed for BFN in which credit for the APRM scram function is taken, as documented in the Final Safety Analysis Report and the Safe Shutdown Analysis, are encompassed by the events listed in Reference 11, Appendices F and G. b) The proposed PRNM configuration is included among the configurations described in the PRNM LTR, as itemized under Section 2.3.4, above. The proposed configuration is being designed by GE and is within the limits described in the LTR. c) A plant specific 10CFR50.59 evaluation of the proposed modification will be prepared and approved as part of the normal design process.
7.6	The plant specific action required for FSAR updates will vary between plants. In all cases, however, existing FSAR documents should be reviewed to identify areas that have descriptions specific to the current PRNM using the general guidance of paragraphs 7.2 through 7.5 of the PRNM LTR to identify potential areas impacted. The utility should include in the ***plant specific licensing submittal*** a statement of the plans for updating the plant FSAR for the PRNM project.	Applicable sections of the FSAR will be reviewed and appropriate revisions of those sections will be prepared and approved as part of the normal design process. Following implementation of the design modification, and closure of the design package, the FSAR revisions will be submitted to the NRC and included in the updated FSAR as part of the routine FSAR update submittal.
8.3.1.4	Utility actions necessary to implement technical specification changes to **APRM RPS Trip Function**: a) Delete the APRM Downscale Trip ... from the RPS Instrumentation "function" table, the related surveillance requirements and ... the related setpoint and the related descriptions in the bases sections. b) Delete the APRM Flow Biased Neutron Flux Upscale Trip if currently used, ..., related surveillance requirements, ... setpoint, and ... bases sections. Replace these with the corresponding entries for the APRM Simulated Thermal Power Upscale Trip and the APRM Neutron Flux Upscale Trip. Perform analysis necessary to establish setpoints for added trips. c) Add the APRM Neutron Flux Upscale, Setdown Trip, if not currently used, ... related surveillance requirements and ... related descriptions in the bases sections. Perform analysis necessary to establish setpoints for added trips.	a) The proposed technical specification changes include deleting the APRM Downscale Trip, related SRs, setpoints, and Bases descriptions. b) BFN technical specifications do not include the "APRM Flow Biased Neutron Flux Upscale [instantaneous] Trip" as this term is applied in the PRNM LTR. The flow biased APRM flux scram trip in BFN TS LSSS 2.1.A.1.a and its maximum (clamped) value in LSSS 2.1.A.1.b include a nominal 6 second time delay representing the fuel time constant and are comparable to the "Simulated Thermal Power" trips as used in the PRNM LTR. The "APRM Neutron Flux Upscale [instantaneous] Trip" in the PRNM LTR is comparable to the APRM fixed high neutron flux scram trip in BFN TS LSSS 2.1.A.1.d. BFN will continue to use its current terminology. APRM setpoints have been recalculated by GE and results of these calculations are reflected in the proposed TS changes. No other change in this area is needed to satisfy requirements of the PRNM LTR. c) The APRM Neutron Flux Upscale, Setdown Trip is in BFN's current TS in LSSS 2.1.A.2.a. No change is needed to satisfy requirements of the PRNM LTR.

Plant-Specific Information Required for NUMAC PRNM Retrofit

Section	Utility Action Required	Response
8.3.2.4	Utility actions necessary to implement technical specification changes for the **Minimum Operable APRM Channels**: a) For the 4 APRM channel replacement configuration, revise the RPS Instrumentation "function" table, either by footnote or directly, to show 3 APRM channels shared by both trip systems and two 2-out-of-4 voter channels under the "minimum operable channels" for each APRM function shown (after any additions or deletions per PRNM LTR Paragraph 8.3.1.4). For plants with Tech Specs that include a footnote calling for removing shorting links, remove the references to the footnote related to APRM (retain references for SRM and IRM) ... For smaller core plants, delete the notes for and references to special conditions related to loss of LPRMs from the "other" APRM. b) Review action statements to see if changes are required. If the improvements documented in Reference 11 have not been implemented then changes will likely be required to implement the 12-hour and 6-hour operation times discussed above for fewer than the minimum required channels. If Improved Tech Specs are applied to the plant, action statements remain unchanged. c) Revise the Bases section as needed to replace the descriptions of the current 6 or 8 APRM channel systems and bypass capability with a corresponding description of the 4 APRM system, 2-out-of-4 Voters (2 per RPS system), and allowed one APRM bypass total.	a) BFN's proposed TS changes include the items described in the PRNM LTR. BFN's proposed RPS Instrumentation Requirements Table presents each APRM function and the 2/4 Voters as single line item entries, consistent with BFN's current TS format. b) BFN's current action requirements for inoperable channels in both RPS logic system require action to be taken within 2 hours. Per the PRNM LTR, the APRM insturment channel and the 2/4 Voter instrument channel action requirements are changed to reflect the 12-hour and 6-hour operation times for fewer than the minimum number of required channels. c) This proposed TS change includes the items described in the PRNM LTR.
8.3.3.4	Utility actions necessary to implement technical specification changes for **APRM Applicable Modes of Operation**: a) APRM Neutron Flux Upscale, Setdown Trip. Change Tech Spec "applicable modes" entry, if required, to be Mode 2 (startup). Delete references to actions and surveillance requirements associated with other modes. Delete any references to notes associated with "non-coincidence mode and correct notes as required. Revise "bases" descriptions as required. b) APRM Simulated Thermal Upscale Trip. Retain as is unless this function is being added.... c) APRM Neutron Flux Upscale Trip. Retain as is unless this function is being added.... d) APRM Inop Trip. Delete requirements for operation in modes other than Mode 1 and Mode 2 (run and start-up). Revise the "bases" descriptions as needed.	a) The proposed BFN TS change implements the PRNM LTR requirements. This includes deleting application of the ARPM Upscale, Setdown Trip in the REFUEL mode. b) No change to BFN TS is required to implement the PRNM LTR requirement. c) No change to BFN TS is required to implement the PRNM LTR requirement. d) The proposed BFN TS change implements the PRNM LTR requirements. This includes deleting application of the APRM Inop Trip in the REFUEL mode.

Plant-Specific Information Required for NUMAC PRNM Retrofit

Section	Utility Action Required	Response
	Utility actions necessary to implement technical specification changes for **APRM Required Surveillances and Calibrations**:	
8.3.4.1.4	<u>Channel Check/Instrument Test</u>: a) For plants without Channel Check requirements, add once per 12 hour channel check requirement for the three APRM trip functions. No Channel Check requirements are added for APRM Inop Trip. b) For plants with 4 full recirculation flow channels and with Tech Specs that call for daily or other channel check requirements for flow comparisons under APRM Flow Biased Simulated Thermal Power Trip, delete those requirements. Move any note reference related to verification of flow signal to Channel Functional Test entry.	<u>Channel Check/Instrument Test</u>: a) BFN TS currently require APRM channel checks ("instrument checks") daily per SR Table 4.2.C. The proposed TS change does not revise this requirement. b) The proposed TS change implements the requirements described in the PRNM LTR.
8.3.4.2.4	<u>Channel Functional Test</u>: a) Delete existing channel functional test requirements and replace with a requirement for a Channel Functional Test frequency of each 184 days (6 months) [delete any specific requirement related to start-up or shutdown except for the APRM Neutron Flux-High (Setdown) function as noted in Paragraph 8.3.4.2.2(1) of the PRNM LTR]. Add a notation that both the APRM channels and the 2-out-of-4 Voter channels are to be included in the Channel Functional Test. b) Add a notation for the APRM Simulated Thermal Power Upscale function that the test shall include the recirculation flow processing, excluding the flow transmitters.	<u>Channel Functional Test</u>: a) The proposed TS change implements the requirements described in the PRNM LTR. b) The proposed TS change implements the requirements described in the PRNM LTR.
8.3.4.3.4	<u>Channel Calibrations</u>: a) Replace current calibration interval with either 18 or 24 months except for APRM Inop. Retain Inop requirement as is. b) Delete any requirement for flow calibration and calibration of the 6 second time constant separate from overall calibration of the APRM Simulated Thermal Power Upscale Trip. c) Replace every 3 day frequency for calibration of APRM against thermal power with a 7 day frequency if applicable. d) Revise Bases text as required.	<u>Channel Calibrations</u>: a) The proposed TS change revises APRM channel calibration frequency to once per operating cycle. Because operating cycles are anticipated to be no greater than 24 months long, this is consistent with the requirements described in the PRNM LTR. b) The proposed TS change implements the requirements described in the PRNM LTR. c) Current BFN TS require an APRM heat balance calibration on a frequency of once/7 days (LCO Table 4.1.B). This is consistent with the requirements described in the PRNM LTR. d) The proposed TS change revises appropriate Bases sections.
8.8.4.4.4	<u>Response Time Testing</u>: Delete response time testing requirements for APRM functions.	<u>Response Time Testing</u>: Current BFN TS do not require APRM response time testing. This is consistent with the requirements described in the PRNM LTR.

Plant-Specific Information Required for NUMAC PRNM Retrofit

Section	Utility Action Required	Response
8.3.5.4	Utility actions necessary to implement technical specification changes for **APRM Logic System Functional Testing (LSFT)**: Revise Tech Specs to change the interval for LSFT from 18 months to 24 months unless the utility elects to retain the 18-month interval for plant scheduling purposes.	The proposed TS change adds functional testing of the 2/4 Trip Voter Logic to be performed each refueling outage.
8.3.6.1	Utility actions necessary to implement technical specification changes for **APRM Setpoints**: Add to or delete from the appropriate document any changed RPS setpoint information. If ARTS is being implemented concurrently with the PRNM modification, either include the related Tech Spec submittal information with the PRNM information in the plant specific submittal, or reference the ARTS submittal in the PRNM submittal. In the ***plant specific submittal***, identify what changes, if any, are being implemented and identify the basis or method used for the calculation of setpoints and where the setpoint information or changes will be recorded.	The proposed TS change includes revisions necessary to implement ARTS. ARTS implementation is based on GE engineering report NEDC-32433P, which is included as part of the TS change package. New PRNM setpoints for flow-biased APRM scram and rod block and for power-biased RBM trips have been calculated by GE using NRC approved setpoint methodology. The flow-biased APRM scram setpoint equation is included explicitly in BFN tech specs. The flow-biased APRM rod block equation and the power-biased RBM setpoints are included in the Core Operating Limits Report (COLR).
8.4	Utility actions necessary to implement technical specification changes for **OPRM Related RPS Trip Functions**: The required actions are in Sections 8.4.1.4, 8.4.2.4, 8.4.3.4, 8.4.4.4, 8.4.5.4 and 8.4.6.1 of the PRNM LTR.	Because the proposed TS change does not request changes to implement the OPRM (Oscillation Power Range Monitor) trip functions, no confirmations of action are required at this time.

Plant-Specific Information Required for NUMAC PRNM Retrofit

Section	Utility Action Required	Response
8.5.1.4	Utility actions necessary to implement technical specification changes for **APRM/RBM Related Control Rod Block Functions**: If ARTS will be implemented concurrently with the PRNM modification, include or reference those changes in the ***plant specific PRNM submittal***. Implement the applicable portion of the below described changes via modifications to the Tech Specs and related procedures and documents. In the ***plant specific submittal***, identify functions currently in the plant Tech Specs and which changes are being implemented. NOTE: A utility may choose not to delete some or all of the items identified in the PRNM LRT fr... .he plant Tech Specs. a) Some plants may implement ARTS concurrently with the PRNM modification. For those plants, appropriate changes should be made to the plant's Tech Specs.... b) For ARTS plants, delete the Recirculation Flow Upscale, Compare and Inop control rod block trip functions from the Tech Specs, and their related information (if currently in the Tech Specs). c) For ARTS plants, delete the Tech Spec functional entry for Bypass Time Delay. d) For plants that currently have not implemented Improved Tech Specs, delete the APRM Flow Biased Neutron Flux Upscale, APRM Neutron Flux Upscale, Setdown, APRM Downscale and APRM Inop control rod block trip functions from the Tech Specs.	a) BFN is implementing ARTS concurrently with the NUMAC PRNM design change. The proposed TS change includes revisions necessary to implements the ARTS improvements. b) The Recirculation Flow Upscale, Compare and INOP control rod block funtions and related information are deleted as part of the proposed TS change. c) N/A. This function was not identified in BFN tech specs; no action is required. d) These APRM control rod block functions are still to be included in BFN tech specs; they are not deleted as part of the proposed change. The functions will be deleted from tech specs, as appropriate, when BFN converts to Improved Tech Specs.
8.5.2.4	Utility actions necessary to implement technical specification changes for **Minimum Number of Operable APRM/RBM Related Control Rod Block Channels**: No action required relative to minimum operable channels beyond that required by 8.5.1.4 above.	See 8.5.1.4 above. No additional confirmation of action required.
8.5.3.4	Utility actions necessary to implement technical specification changes for **Applicable Modes of Operation for APRM/RBM Related Control Rod Blocks**: No action required relative to modes during which the function must be available beyond that required by 8.5.1.4 above.	See 8.5.1.4 above. No additional confirmation of action required.

Plant-Specific Information Required for NUMAC PRNM Retrofit

Section	Utility Action Required	Response
	Utility actions necessary to implement technical specification changes for APRM/RBM Related Control Block **Required Surveillances and Calibrations**:	
8.5.4.1.4	**Channel Check**: Delete any requirements for instrument or channel checks related to RBM and, where applicable, recirculation flow rod block functions (non-ARTS plants), and APRM functions. Identify in the plant specific PRNM submittals if any checks are currently included in Tech Specs, and confirm that they are being deleted.	**Channel Check:** For the APRM rod block functions, the instrument check currently in tech specs is continued on a frequency of once per day. This is comparable to the APRM trip function channel check called for in Section 8.3.4.1.2 of the PRNM LTR. For the RBM rod block functions, the proposed TS change deletes the current requirement for an instrument check once/day.
8.5.4.2.4	**Channel Functional Test**: Change Channel Functional Test requirements to identify a frequency of every 184 days (6 months). In the ***plant specific licensing submittal***, identify current Tech Spec test frequencies that will be changed to 184 days (6 months).	<u>Channel Functional Test:</u> The APRM and RBM rod block channel functional test frequency is changed to once per 6 months. Changes in test frequency are as identified in Section I, Enclosure 1 of this TS change package.
8.5.4.3.4	**Channel Calibrations**: Change channel calibration requirements to identify a frequency of every 24 months. In the ***plant specific licensing submittal***, identify current Tech Spec test frequencies that will be changed to 24 months.	<u>Channel Calibrations:</u> APRM and RBM rod block channel calibrations are changed to once/operating cycle.
8.5.4.4.4	**Response Time Testing**: None. [There currently are no response time testing requirements; none are proposed by the PRNM LTR.]	<u>Response Time Testing:</u> N/A
8.5.5.4	Utility actions necessary to implement technical specification changes for APRM/RBM Related Control Block **Logic System Functional Testing**: None. [There currently are no logic system functional testing requirements; none are proposed by the PRNM LTR.]	N/A

Plant-Specific Information Required for NUMAC PRNM Retrofit

Section	Utility Action Required	Response
8.5.6.1	Utility actions necessary to implement technical specification changes for APRM/RBM Related Control Block **Setpoints**: Add to or delete from the appropriate document any changed control rod block setpoint information. If ARTS is being implemented concurrently with the PRNM modification, either include the related Tech Spec submittal information with the PRNM information in the ***plant specific submittal***, or reference the ARTS submittal in the PRNM submittal. In the ***plant specific submittal***, identify what changes, if any, are being implemented and identify the basis or method used for calculation of setpoints and where the setpoint information or changes will be recorded.	ARTS is being implemented concurrently with the NUMAC PRNM modification, and appropriate setpoint changes are included as part of the TS change package. RBM and APRM rod block setpoints are based on setpoint calculations performed for BFN by GE using NRC approved setpoint methodology. The APRM flow-biased setpoint equation and the power-biased RBM setpoints will be contained in the Core Operating Limits Report, as discussed in Enclosure 1 of the TS change package.
9.1.3	Utility Quality Assurance Program: As part of the ***plant specific licensing submittal***, the utility should document the established program that is applicable for the project modification. The submittal should also document for the project what scope is being performed by the utility and what scope is being supplied by others. For scope supplied by others, document the utility actions taken or planned to define or establish requirements for the project, to assure those requirements are compatible with the plant specific configuration. Actions taken or planned by the utility to assure compatibility of the GE quality program with the utility program should also be documented. Utility planned level of participation in the overall V&V process for the project should be documented, along with utility plans for soft ware configuration management and provision to support any required changes after delivery should be documented.	Quality assurance requirements for work performed at BFN are defined and described in TVA Nuclear Quality Assurance Plan, TVA-NQA-PLN89-A. For the PRNM modification, TVA has contracted with GE to include the following PRNM scope: 1) design, 2) hardware/software, 3) modification instruction, 4) licensing support, 5) training, 6) O & M manuals and design documentation, 7) stability indicator, 8) seismic qualification of the NMS panel, 9) EMI/RFI qualification, and 10) NMS setpoint calculations. On-site engineering work to incorporate the GE-provided design information into a Design Change Notice (DCN) or to provide any supporting, interface design changes will be performed per requirements of applicable TVA/BFN procedures. Modification work to implement the design change will be performed per TVA/BFN procedures or TVA/BFN-approved contractor procedures. TVA has participated and will continue to participate in appropriate reviews of GE's design and V&V program for the PRNM modification. For software delivered in the form of hardware (EPROMs), TVA currently intends to have GE maintain post delivery configuration control of the actual source code and handle any changes. TVA will then handle any changes in the EPROMs as hardware changes under its applicable hardware modification procedures.