ENCLOSURE 1

PROPOSED TECHNICAL SPECIFICATION CHANGE
BROWNS FERRY NUCLEAR PLANT
UNITS 1, 2, AND 3
(TVA BFNP TS 310)

PROPOSED TECHNICAL SPECIFICATION CHANGE
BROWNS FERRY NUCLEAR PLANT
UNIT 1
(TVA BFNP TS 310)

UNIT 1
EFFECTIVE PAGE LIST

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TABLE 3.2.C
INSTRUMENTATION THAT INITIATES ROD BLOCKS

Minimum Operable Channels Per Trip Function (5)	Function	Trip Level Setting
4(1)	APRM Upscale (Flow Bias)	≤0.66W + 42% (2)
4(1)	APRM Upscale (Startup Mode) (8)	≤12%
4(1)	APRM Downscale (9)	≥3%
4(1)	APRM Inoperative	(10b)
2(7)	RBM Upscale (Flow Bias)	≤0.66W + 40% (2)(13)
2(7)	RBM Downscale (9)	≥3%
2(7)	RBM Inoperative	(10c)
6(1)	IRM Upscale (8)	≤108/125 of full scale
6(1)	IRM Downscale (3)(8)	≥5/125 of full scale
6(1)	IRM Detector not in Startup Position (8)	(11)
6(1)	IRM Inoperative (8)	(10a)
3(1) (6)	SRM Upscale (8)	≤ $1X10^5$ counts/sec.
3(1) (6)	SRM Downscale (4)(8)	≥3 counts/sec.
3(1) (6)	SRM Detector not in Startup Position (4)(8)	(11)
3(1) (6)	SRM Inoperative (8)	(10a)
2(1)	Flow Bias Comparator	≤10% difference in recirculation flows
2(1)	Flow Bias Upscale	≤115% recirculation flow
1	Rod Block Logic	N/A
1(12)	High Water Level in West Scram Discharge Tank (LS-85-45L)	≤25 gal.
1(12)	High Water Level in East Scram Discharge Tank (LS-85-45M)	≤25 gal.

TABLE 4.2.C
SURVEILLANCE REQUIREMENTS FOR INSTRUMENTATION THAT INITIATE ROD BLOCKS

Function	Functional Test	Calibration (17)	Instrument Check
APRM Upscale (Flow Bias)	(1) (13)	once/3 months	once/day (8)
APRM Upscale (Startup Mode)	(1) (13)	once/3 months	once/day (8)
APRM Downscale	(1) (13)	once/3 months	once/day (8)
APRM Inoperative	(1) (13)	N/A	once/day (8)
RBM Upscale (Flow Bias)	(1) (13)	once/6 months	once/day (8)
RBM Downscale	(1) (13)	once/6 months	once/day (8)
RBM Inoperative	(1) (13)	N/A	once/day (8)
IRM Upscale	(1)(2) (13)	once/3 months	once/day (8)
IRM Downscale	(1)(2) (13)	once/3 months	once/day (8)
IRM Detector Not in Startup Position	(2) (once operating cycle)	once/operating cycle (12)	N/A
IRM Inoperative	(1)(2) (13)	N/A	N/A
SRM Upscale	(1)(2) (13)	once/3 months	once/day (8)
SRM Downscale	(1)(2) (13)	once/3 months	once/day (8)
SRM Detector Not in Startup Position	(2) (once/operating cycle)	once/operating cycle (12)	N/A
SRM Inoperative	(1)(2) (13)	N/A	N/A
Flow Bias Comparator	(1)(15)	once/operating cycle (20)	N/A
Flow Bias Upscale	(1)(13)	once/3 months	N/A
Rod Block Logic	(16)	N/A	N/A
West Scram Discharge Tank Water Level High (LS-85-45L)	once/quarter	once/operating cycle	N/A
East Scram Discharge Tank Water Level High (LS-85-45M)	once/quarter	once/operating cycle	N/A

LIMITING CONDITIONS FOR OPERATION

3.3.A.2 Reactivity margin - inoperable control rods

a. Control rod drives which cannot be moved with control rod drive pressure shall be considered inoperable. If a partially or fully withdrawn control rod drive cannot be moved with drive or scram pressure the reactor shall be brought to the COLD SHUTDOWN CONDITION within 24 hours and shall not be started unless (1) investigation has demonstrated that the cause of the failure is not a failed control rod drive mechanism collet housing and (2) adequate shutdown margin has been demonstrated as required by Specification 4.3.A.2.c.

SURVEILLANCE REQUIREMENTS

4.3.A.2 Reactivity margin - inoperable control rods

a. Each partially or fully withdrawn OPERABLE control rod shall be exercised one notch at least once each week when operating above the power level cutoff of the RWM. In the event power operation is continuing with three or more inoperable control rods, this test shall be performed at least once each day, when operating above the power level cutoff of the RWM.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.3.A.2 Reactivity margin - inoperable control rods (Cont'd)	4.3.A.2 Reactivity margin - inoperable control rods (Cont'd)
b. The control rod directional control valves for inoperable control rods shall be disarmed electrically.	b. DELETED
c. Control rods with scram times greater than those permitted by Specification 3.3.C.3 are inoperable, but if they can be inserted with control rod drive pressure they need not be disarmed electrically.	c. When it is initially determined that a control rod is incapable of normal insertion a test shall be conducted to demonstrate that the cause of the malfunction is not a failure in the control rod drive mechanism. If this can be demonstrated an attempt to fully insert the control rod shall be made. If the control rod cannot be inserted and an investigation has demonstrated that the cause of failure is not a failed control rod drive mechanism collet housing, a shutdown margin test shall be made to demonstrate under this condition that the core can be made subcritical for any reactivity condition during the remainder of the operating cycle with the analytically determined highest worth control rod capable of withdrawal fully withdrawn, and all other control rods capable of insertion fully inserted.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.3.A.2 Reactivity margin - inoperable control rods (Cont'd)	4.3.A.2 Reactivity margin - inoperable control rods (Cont'd)
d. DELETED	d. The control rod accumulators shall be determined OPERABLE at least once per 7 days by verifying that the pressure and level detectors are not in the alarmed condition.
e. Control rods with inoperable accumulators or those whose position cannot be positively determined shall be considered inoperable.	
f. Inoperable control rods shall be positioned such that Specification 3.3.A.1 is met. In addition, during reactor power operation, no more than one control rod in any 5x5 array may be inoperable (at least 4 OPERABLE control rods must separate any 2 inoperable ones). If this specification cannot be met the reactor shall not be started, or if at power, the reactor shall be brought to a shutdown condition within 24 hours.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.3.B. Control Rods	4.3.B. Control Rods
1. Each control rod shall be coupled to its drive or completely inserted and the control rod directional control valves disarmed electrically. This requirement does not apply in the SHUTDOWN CONDITION when the reactor is vented. Two control rod drives may be removed as long as Specification 3.3.A.1 is met.	1. The coupling integrity shall be verified for each withdrawn control rod as follows: a. Verify that the control rod is following the drive by observing any response in the nuclear instrumentation each time a rod is moved when the reactor is operating above the preset power level cutoff of the RWM. b. When the rod is fully withdrawn the first time after each refueling outage or after maintenance, observe that the drive does not go to the overtravel position.
2. The control rod drive housing support system shall be in place during REACTOR POWER OPERATION or when the reactor coolant system is pressurized above atmospheric pressure with fuel in the reactor vessel, unless all control rods are fully inserted and Specification 3.3.A.1 is met.	2. The control rod drive housing support system shall be inspected after reassembly and the results of the inspection recorded.

LIMITING CONDITIONS FOR OPERATION

3.3.B. Control Rods

3.a DELETED

3.b Whenever the reactor is in the startup or run modes below 10% rated power, the Rod Worth Minimizer (RWM) shall be OPERABLE.

1. Should the RWM become inoperable after the first twelve rods have been withdrawn, the start-up may continue provided that a second licensed operator or other technically qualified member of the plant staff is present at the console verifying compliance with the prescribed control rod program.

2. Should the RWM be inoperable before the first twelve rods are withdrawn, start-up may continue provided a second licensed operator or other technically qualified member of the plant staff is present at the console verifying compliance with the prescribed control rod program. Use of this provision is limited to one plant startup per calendar year.

SURVEILLANCE REQUIREMENTS

4.3.B. Control Rods

3.a DELETED

3.b.1 The Rod Worth Minimizer (RWM) shall be demonstrated to be OPERABLE for a reactor startup by the following checks:

a. By demonstrating that the control rod patterns and Banked Position Withdrawal Sequence (or equivalent) input to the RWM computer are correctly loaded following any loading of the program into the computer.

b. Within 8 hours prior to withdrawal of control rods for the purpose of making the reactor critical verify proper annunciation of the selection error of at least one out-of-sequence control rod.

c. Within 8 hours prior to withdrawal of control rods for the purpose of making the reactor critical, the rod block function of the RWM shall be verified by moving an out-of-sequence control rod.

LIMITING CONDITIONS FOR OPERATION

3.3.B. Control Rods

3.b (Cont'd)

3. Should the RWM become inoperable on a shutdown, shutdown may continue provided that a second licensed operator or other technically qualified member of the plant staff is present at the console verifying compliance with the prescribed control rod program.

SURVEILLANCE REQUIREMENTS

4.3.B. Control Rods

3.b.2 The Rod Worth Minimizer (RWM) shall be demonstrated to be OPERABLE for a reactor shutdown by the following checks:

a. By demonstrating that the control rod patterns and Banked Position Withdrawal Sequence (or equivalent) input to the RWM computer are correctly loaded following any loading of the program into the computer.

b. Within 8 hours prior to RWM automatic initiation when reducing thermal power, verify proper annunciation of the selection error of at least one out-of-sequence control rod.

c. Within one hour after RWM automatic initation when reducing thermal power, the rod block function of the RWM shall be verified by moving an out-of-sequence control rod.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.3.B. Control Rods	4.3.B. Control Rods
3.c. If Specifications 3.3.B.3.b.1 through 3.3.B.3.b.3 cannot be met the reactor shall not be started, or if the reactor is in the run or startup modes at less than 10% rated power, control rod movement may be only by actuating the manual scram or placing the reactor mode switch in the shutdown position.	3.b.3 When the RWM is not OPERABLE a second licensed operator other technically qualified member of the plant staff shall verify that the correct rod program is followed.
4. Control rods shall not be withdrawn for startup or refueling unless at least two source range channels have an observed count rate equal to or greater than three counts per second.	4. Prior to control rod withdrawal for startup or during refueling, verify that at least two source range channels have an observed count rate of at least three counts per second.
5. During operation with limiting control rod patterns, as determined by the designated qualified personnel, either: a. Both RBM channels shall be OPERABLE: or b. Control rod withdrawal shall be blocked.	5. When a limiting control rod pattern exists, an instrument functional test of the RBM shall be performed prior to withdrawal of the designated rod(s) and at least once per 24 hours thereafter.

LIMITING CONDITIONS FOR OPERATION

3.3.C. Scram Insertion Times

1. The average scram insertion time, based on the deenergization of the scram pilot valve solenoids as time zero, of all OPERABLE control rods in the reactor power operation condition shall be no greater than:

% Inserted From Fully Withdrawn	Avg. Scram Insertion Times (sec)
5	0.375
20	0.90
50	2.0
90	3.500

SURVEILLANCE REQUIREMENTS

4.3.C. Scram Insertion Times

1. After each refueling outage, all OPERABLE rods shall be scram-time tested from the fully withdrawn position with the nuclear system pressure above 800 psig. This testing shall be completed prior to exceeding 40% power. Below 10% power, only rods in those sequences which were fully withdrawn in the region from 100% rod density to 50% rod density shall be scram-time tested.

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2. Reactivity margin - inoperable control rods - Specification 3.3.A.2 requires that a rod be taken out of service if it cannot be moved with drive pressure. If the rod is fully inserted and disarmed electrically*, it is in a safe position of maximum contribution to shutdown reactivity. If it is disarmed electrically in a nonfully inserted position, that position shall be consistent with the shutdown reactivity limitations stated in Specification 3.3.A.1. This assures that the core can be shut down at all times with the remaining control rods assuming the strongest OPERABLE control rod does not insert. Also if damage within the control rod drive mechanism and in particular, cracks in drive internal housings, cannot be ruled out, then a generic problem affecting a number of drives cannot be ruled out. Circumferential cracks resulting from stress-assisted intergranular corrosion have occurred in the collet housing of drives at several BWRs. This type of cracking could occur in a number of drives and if the cracks propagated until severance of the collet housing occurred, scram could be prevented in the affected rods. Limiting the period of operation with a potentially severed rod after detecting one stuck rod will assure that the reactor will not be operated with a large number of rods with failed collet housings. The Rod Worth Minimizer is not automatically bypassed until reactor power is above the preset power level cutoff. Therefore, control rod movement is restricted and the single notch exercise surveillance test is only performed above this power level. The Rod Worth Minimizer prevents movement of out-of-sequence rods unless power is above the preset power level cutoff.

B. Control Rods

1. Control rod dropout accidents as discussed in the FSAR can lead to significant core damage. If coupling integrity is maintained, the possibility of a rod dropout accident is eliminated. The overtravel position feature provides a positive check as only uncoupled drives may reach this position. Neutron instrumentation response to rod movement provides a verification that the rod is following its drive. Absence of such response to drive movement could indicate an uncoupled condition. Rod position indication is required for proper function of the Rod Worth Minimizer.

* To disarm the drive electrically, four amphenol type plug connectors are removed from the drive insert and withdrawal solenoids rendering the rod incapable of withdrawal. This procedure is equivalent to valving out the drive and is preferred because, in this condition, drive water cools and minimizes crud accumulation in the drive. Electrical disarming does not eliminate position indication.

2. The control rod housing support restricts the outward movement of a control rod to less than 3 inches in the extremely remote event of a housing failure. The amount of reactivity which could be added by this small amount of rod withdrawal, which is less than a normal single withdrawal increment, will not contribute to any damage to the primary coolant system. The design basis is given in subsection 3.5.2 of the FSAR and the safety evaluation is given in subsection 3.5.4. This support is not required if the reactor coolant system is at atmospheric pressure since there would then be no driving force to rapidly eject a drive housing. Additionally, the support is not required if all control rods are fully inserted and if an adequate shutdown margin with one control rod withdrawn has been demonstrated, since the reactor would remain subcritical even in the event of complete ejection of the strongest control rod.

3. The Rod Worth Minimizer (RWM) restricts withdrawals and insertions of control rods to prespecified sequences. All patterns associated with these sequences have the characteristic that, assuming the worst single deviation from the sequence, the drop of any control rod from the fully inserted position to the position of the control rod drive would not cause the reactor to sustain a power excursion resulting in any pellet average enthalpy in excess of 280 calories per gram. An enthalpy of 280 calories per gram is well below the level at which rapid fuel dispersal could occur (i.e., 425 calories per gram). Primary system damage in this accident is not possible unless a significant amount of fuel is rapidly dispersed. Reference Sections 3.6.6, 7.16.5.3, and 14.6.2 of the FSAR, and NEDE-24011-P-A, Amendment 17.

   In performing the function described above, the RWM is not required to impose any restrictions at core power levels in excess of 10 percent of rated. Material in the cited reference shows that it is impossible to reach 280 calories per gram in the event of a control rod drop occurring at power greater than 10 percent, regardless of the rod pattern. This is true for all normal and abnormal patterns including those which maximize individual control rod worth.

At power levels below 10 percent of rated, abnormal control rod patterns could produce rod worths high enough to be of concern relative to the 280 calorie per gram rod drop limit. In this range the RWM constrains the control rod sequences and patterns to those which involve only acceptable rod worths.

The Rod Worth Minimizer provides automatic supervision to assure that out of sequence control rods will not be withdrawn or inserted; i.e., it limits operator deviations from planned withdrawal sequences. Reference Section 7.16.5.3 of the FSAR. The RWM functions as a backup to procedural control of control rod sequences, which limit the maximum reactivity worth of control rods. When the Rod Worth Minimizer is out of service, special criteria allow a second licensed operator or other technically qualified member of the plant staff to manually fulfill the control rod pattern conformance functions of this system. The requirement that the RWM be OPERABLE for the withdrawal of the first twelve rods on a startup is to ensure that a high degree of RWM availability is maintained.

The functions of the RWM make it unnecessary to specify a license limit on rod worth to preclude unacceptable consequences in the event of a control rod drop. At low powers, below 10 percent, the RWM forces adherence to acceptable (Banked Position Withdrawal Sequence or equivalent) rod patterns. Above 10 percent of rated power, no constraint on rod pattern is required to assure that rod drop accident consequences are acceptable. Control rod pattern constraints above 10 percent of rated power are imposed by power distribution requirements, as defined in Sections 3.5.I, 3.5.J, 4.5.I, and 4.5.J of these technical specifications.

4. The Source Range Monitor (SRM) system performs no automatic safety system function; i.e., it has no scram function. It does provide the operator with a visual indication of neutron level. The consequences of reactivity accidents are functions of the initial neutron flux. The requirement of at least 3 counts per second assures that any transient, should it occur, begins at or above the initial value of 10^{-8} of rated power used in the analyses of transients from cold conditions. One OPERABLE SRM channel would be adequate to monitor the approach to criticality using homogeneous patterns of scattered control rod withdrawal. A minimum of two OPERABLE SRMs are provided as an added conservatism.

The surveillance requirement for scram testing of all the control rods after each refueling outage and 10 percent of the control rods at 16-week intervals is adequate for determining the OPERABILITY of the control rod system yet is not so frequent as to cause excessive wear on the control rod system components.

The numerical values assigned to the predicted scram performance are based on the analysis of data from other BWRs with control rod drives the same as those on Browns Ferry Nuclear Plant.

The occurrence of scram times within the limits, but significantly longer than the average, should be viewed as an indication of systematic problem with control rod drives especially if the number of drives exhibiting such scram times exceeds eight, the allowable number of inoperable rods.

In the analytical treatment of the transients which are assumed to scram on high neutron flux, 290 milliseconds are allowed between a neutron sensor reaching the scram point and the start of control rod motion.

This is adequate and conservative when compared to the typical time delay of about 210 milliseconds estimated from scram test results. Approximately the first 90 milliseconds of each of these time intervals result from sensor and circuit delays after which the pilot scram solenoid deenergizes to 120 milliseconds later, the control rod motion is estimated to actually begin. However, 200 milliseconds, rather than 120 milliseconds, are conservatively assumed for this time interval in the transient analyses and are also included in the allowable scram insertion times of Specification 3.3.C.

PROPOSED TECHNICAL SPECIFICATION CHANGE
BROWNS FERRY NUCLEAR PLANT
UNIT 2
(TVA BFNP TS 310)

UNIT 2
EFFECTIVE PAGE LIST

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3.2/4.2-50	3.2/4.2-50
3.3/4.3-2	3.3/4.3-2
3.3/4.3-3	3.3/4.3-3
3.3/4.3-4	3.3/4.3-4
3.3/4.3-5	3.3/4.3-5
3.3/4.3-6	3.3/4.3-6
3.3/4.3-7	3.3/4.3-7
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TABLE 3.2.C
INSTRUMENTATION THAT INITIATES ROD BLOCKS

Minimum Operable Channels Per Trip Function (5)	Function	Trip Level Setting
4(1)	APRM Upscale (Flow Bias)	≤0.58W + 50% (2)
4(1)	APRM Upscale (Startup Mode) (8)	≤12%
4(1)	APRM Downscale (9)	≥3%
4(1)	APRM Inoperative	(10b)
2(7)	RBM Upscale (Flow Bias)	≤0.66W + 40% (2)(13)
2(7)	RBM Downscale (9)	≥3%
2(7)	RBM Inoperative	(10c)
6(1)	IRM Upscale (8)	≤108/125 of full scale
6(1)	IRM Downscale (3)(8)	≥5/125 of full scale
6(1)	IRM Detector not in Startup Position (8)	(11)
6(1)	IRM Inoperative (8)	(10a)
3(1) (6)	SRM Upscale (8)	≤ $1X10^5$ counts/sec.
3(1) (6)	SRM Downscale (4)(8)	≥3 counts/sec.
3(1) (6)	SRM Detector not in Startup Position (4)(8)	(11)
3(1) (6)	SRM Inoperative (8)	(10a)
2(1)	Flow Bias Comparator	≤10% difference in recirculation flows
2(1)	Flow Bias Upscale	≤115% recirculation flow
1	Rod Block Logic	N/A
1(12)	High Water Level in West Scram Discharge Tank (LS-85-45L)	≤25 gal.
1(12)	High Water Level in East Scram Discharge Tank (LS-85-45M)	≤25 gal.

TABLE 4.2.C
SURVEILLANCE REQUIREMENTS FOR INSTRUMENTATION THAT INITIATE ROD BLOCKS

Function	Functional Test		Calibration (17)	Instrument Check
APRM Upscale (Flow Bias)	(1)	(13)	once/3 months	once/day (8)
APRM Upscale (Startup Mode)	(1)	(13)	once/3 months	once/day (8)
APRM Downscale	(1)	(13)	once/3 months	once/day (8)
APRM Inoperative	(1)	(13)	N/A	once/day (8)
RBM Upscale (Flow Bias)	(1)	(13)	once/6 months	once/day (8)
RBM Downscale	(1)	(13)	once/6 months	once/day (8)
RBM Inoperative	(1)	(13)	N/A	once/day (8)
IRM Upscale	(1)(2)	(13)	once/3 months	once/day (8)
IRM Downscale	(1)(2)	(13)	once/3 months	once/day (8)
IRM Detector Not in Startup Position	(2) (once operating cycle)		once/operating cycle (12)	N/A
IRM Inoperative	(1)(2)	(13)	N/A	N/A
SRM Upscale	(1)(2)	(13)	once/3 months	once/day (8)
SRM Downscale	(1)(2)	(13)	once/3 months	once/day (8)
SRM Detector Not in Startup Position	(2) (once/operating cycle)		once/operating cycle (12)	N/A
SRM Inoperative	(1)(2)	(13)	N/A	N/A
Flow Bias Comparator	(1)(15)		once/operating cycle (20)	N/A
Flow Bias Upscale	(1)(15)		once/3 months	N/A
Rod Block Logic	(16)		N/A	N/A
West Scram Discharge Tank Water Level High (LS-85-45L)	once/quarter		once/18 months	N/A
East Scram Discharge Tank Water Level High (LS-85-45M)	once/quarter		once/18 months	N/A

LIMITING CONDITIONS FOR OPERATION

3.3.A.2 Reactivity Margin - Inoperable Control Rods

a. Control rod drives which cannot be moved with control rod drive pressure shall be considered inoperable. If a partially or fully withdrawn control rod drive cannot be moved with drive or scram pressure the reactor shall be brought to the COLD SHUTDOWN CONDITION within 24 hours and shall not be started unless (1) investigation has demonstrated that the cause of the failure is not a failed control rod drive mechanism collet housing and (2) adequate shutdown margin has been demonstrated as required by Specification 4.3.A.2.c.

SURVEILLANCE REQUIREMENTS

4.3.A.2 Reactivity Margin - Inoperable Control Rods

a. Each partially or fully withdrawn OPERABLE control rod shall be exercised one notch at least once each week when operating above the power level cutoff of the RWM. In the event power operation is continuing with three or more inoperable control rods, this test shall be performed at least once each day, when operating above the power level cutoff of the RWM.

LIMITING CONDITIONS FOR OPERATION

3.3.A.2 Reactivity Margin - Inoperable Control Rods (Cont'd)

b. The control rod directional control valves for inoperable control rods shall be disarmed electrically.

c. Control rods with scram times greater than those permitted by Specification 3.3.C.3 are inoperable, but if they can be inserted with control rod drive pressure they need not be disarmed electrically.

SURVEILLANCE REQUIREMENTS

4.3.A.2 Reactivity Margin - Inoperable Control Rods (Cont'd)

b. DELETED

c. When it is initially determined that a control rod is incapable of normal insertion a test shall be conducted to demonstrate that the cause of the malfunction is not a failure in the control rod drive mechanism. If this can be demonstrated an attempt to fully insert the control rod shall be made. If the control rod cannot be inserted and an investigation has demonstrated that the cause of failure is not a failed control rod drive mechanism collet housing, a shutdown margin test shall be made to demonstrate under this condition that the core can be made subcritical for any reactivity condition during the remainder of the operating cycle with the analytically determined highest worth control rod capable of withdrawal fully withdrawn, and all other control rods capable of insertion fully inserted.

LIMITING CONDITIONS FOR OPERATION

3.3.A.2 Reactivity Margin - Inoperable Control Rods (Cont'd)

d. DELETED

e. Control rods with inoperable accumulators or those whose position cannot be positively determined shall be considered inoperable.

f. Inoperable control rods shall be positioned such that Specification 3.3.A.1 is met. In addition, during reactor power operation, no more than one control rod in any 5x5 array may be inoperable (at least 4 OPERABLE control rods must separate any 2 inoperable ones). If this specification cannot be met the reactor shall not be started, or if at power, the reactor shall be brought to a shutdown condition within 24 hours.

SURVEILLANCE REQUIREMENTS

4.3.A.2 Reactivity Margin - Inoperable Control Rods (Cont'd)

d. The control rod accumulators shall be determined OPERABLE at least once per 7 days by verifying that the pressure and level detectors are not in the alarmed condition.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.3.B. Control Rods	4.3.B. Control Rods
1. Each control rod shall be coupled to its drive or completely inserted and the control rod directional control valves disarmed electrically. This requirement does not apply in the SHUTDOWN CONDITION when the reactor is vented. Two control rod drives may be removed as long as Specification 3.3.A.1 is met.	1. The coupling integrity shall be verified for each withdrawn control rod as follows: a. Verify that the control rod is following the drive by observing any response in the nuclear instrumentation each time a rod is moved when the reactor is operating above the preset power level cutoff of the RWM. b. When the rod is fully withdrawn the first time after each refueling outage or after maintenance, observe that the drive does not go to the overtravel position.
2. The control rod drive housing support system shall be in place during REACTOR POWER OPERATION or when the reactor coolant system is pressurized above atmospheric with fuel in the reactor vessel, unless all control rods are fully inserted and Specification 3.3.A.1 is met.	2. The control rod drive housing support system shall be inspected after reassembly and the results of the inspection recorded.

LIMITING CONDITIONS FOR OPERATION

3.3.B. Control Rods

3.a DELETED

3.b Whenever the reactor is in the startup or run modes below 10% rated power, the Rod Worth Minimizer (RWM) shall be OPERABLE.

1. Should the RWM become inoperable after the first twelve rods have been withdrawn, the start-up may continue provided that a second licensed operator or other technically qualified member of the plant staff is present at the console verifying compliance with the prescribed control rod program.

2. Should the RWM be inoperable before the first twelve rods are withdrawn, start-up may continue provided a second licensed operator or other technically qualified member of the plant staff is present at the console verifying compliance with the prescribed control rod program. Use of this provision is limited to one plant startup per calendar year.

SURVEILLANCE REQUIREMENTS

4.3.B. Control Rods

3.a DELETED

3.b.1 The Rod Worth Minimizer (RWM) shall be demonstrated to be OPERABLE for a reactor startup by the following checks:

a. By demonstrating that the control rod patterns and Banked Position Withdrawal Sequence (or equivalent) input to the RWM computer are correctly loaded following any loading of the program into the computer.

b. Within 8 hours prior to withdrawal of control rods for the purpose of making the reactor critical verify proper annunciation of the selection error of at least one out-of-sequence control rod.

c. Within 8 hours prior to withdrawal of control rods for the purpose of making the reactor critical, the rod block function of the RWM shall be verified by moving an out-of-sequence control rod.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS

3.3.B. Control Rods

3.b (Cont'd)

3. Should the RWM become inoperable on a shutdown, shutdown may continue provided that a second licensed operator or other technically qualified member of the plant staff is present at the console verifying compliance with the prescribed control rod program.

4.3.B. Control Rods

3.b.2 The Rod Worth Minimizer (RWM) shall be demonstrated to be OPERABLE for a reactor shutdown by the following checks:

a. By demonstrating that th[illegible] control ro[illegible]erns and Banked Position Withdrawal Sequence (or equivalent) input to the RWM computer are correctly loaded following any loading of the program into the computer.

b. Within 8 hours prior to RWM automatic initiation when reducing thermal power, verify proper annunciation of the selection error of at least one out-of-sequence control rod.

c. Within one hour after RWM automatic initation when reducing thermal power, the rod block function of the RWM shall be verified by moving an out-of-sequence control rod.

LIMITING CONDITIONS FOR OPERATION

3.3.B. Control Rods

3.c. If Specifications 3.3.B.3.b.1 through 3.3.B.3.b.3 cannot be met the reactor shall not be started, or if the reactor is in the run or startup modes at less than 10% rated power, control rod movement may be only by actuating the manual scram or placing the reactor mode switch in the shutdown position.

4. Control rods shall not be withdrawn for startup or refueling unless at least two source range channels have an observed count rate equal to or greater than three counts per second.

5. During operation with limiting control rod patterns, as determined by the designated qualified personnel, either:

   a. Both RBM channels shall be OPERABLE:

   or

   b. Control rod withdrawal shall be blocked.

SURVEILLANCE REQUIREMENTS

4.3.B. Control Rods

3.b.3 When the RWM is not OPERABLE a second licensed operator or other technically qualified member of the plant staff shall verify that the correct rod program is followed.

4. Prior to control rod withdrawal for startup or during refueling, verify that at least two source range channels have an observed count rate of at least three counts per second.

5. When a limiting control rod pattern exists, an instrument functional test of the RBM shall be performed prior to withdrawal of the designated rod(s) and at least once per 24 hours thereafter.

LIMITING CONDITIONS FOR OPERATION

3.3.C. Scram Insertion Times

1. The average scram insertion time, based on the deenergization of the scram pilot valve solenoids as time zero, of all OPERABLE control rods in the reactor power operation condition shall be no greater than:

% Inserted From Fully Withdrawn	Avg. Scram Insertion Times (sec)
5	0.375
20	0.90
50	2.0
90	3.500

SURVEILLANCE REQUIREMENTS

4.3.C. Scram Insertion Times

1. After each refueling outage, all OPERABLE rods shall be scram-time tested from the fully withdrawn position with the nuclear system pressure above 800 psig. This testing shall be completed prior to exceeding 40% power. Below 10% power, only rods in those sequences which were fully withdrawn in the region from 100% rod density to 50% rod density shall be scram-time tested.

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2. Reactivity Margin - Inoperable Control Rods - Specification 3.3.A.2 requires that a rod be taken out of service if it cannot be moved with drive pressure. If the rod is fully inserted and disarmed electrically*, it is in a safe position of maximum contribution to shutdown reactivity. If it is disarmed electrically in a nonfully inserted position, that position shall be consistent with the shutdown reactivity limitations stated in Specification 3.3.A.1. This assures that the core can be shut down at all times with the remaining control rods assuming the strongest OPERABLE control rod does not insert. Also if damage within the control rod drive mechanism and in particular, cracks in drive internal housings, cannot be ruled out, then a generic problem affecting a number of drives cannot be ruled out. Circumferential cracks resulting from stress-assisted intergranular corrosion have occurred in the collet housing of drives at several BWRs. This type of cracking could occur in a number of drives and if the cracks propagated until severance of the collet housing occurred, scram could be prevented in the affected rods. Limiting the period of operation with a potentially severed rod after detecting one stuck rod will assure that the reactor will not be operated with a large number of rods with failed collet housings. The Rod Worth Minimizer is not automatically bypassed until reactor power is above the preset power level cutoff. Therefore, control rod movement is restricted and the single notch exercise surveillance test is only performed above this power level. The Rod Worth Minimizer prevents movement of out-of-sequence rods unless power is above the preset power level cutoff.

B. Control Rods

1. Control rod dropout accidents as discussed in the FSAR can lead to significant core damage. If coupling integrity is maintained, the possibility of a rod dropout accident is eliminated. The overtravel position feature provides a positive check as only uncoupled drives may reach this position. Neutron instrumentation response to rod movement provides a verification that the rod is following its drive. Absence of such response to drive movement could indicate an uncoupled condition. Rod position indication is required for proper function of the Rod Worth Minimizer.

* To disarm the drive electrically, four amphenol type plug connectors are removed from the drive insert and withdrawal solenoids rendering the rod incapable of withdrawal. This procedure is equivalent to valving out the drive and is preferred because, in this condition, drive water cools and minimizes crud accumulation in the drive. Electrical disarming does not eliminate position indication.

2. The control rod housing support restricts the outward movement of a control rod to less than 3 inches in the extremely remote event of a housing failure. The amount of reactivity which could be added by this small amount of rod withdrawal, which is less than a normal single withdrawal increment, will not contribute to any damage to the primary coolant system. The design basis is given in subsection 3.5.2 of the FSAR and the safety evaluation is given in subsection 3.5.4. This support is not required if the reactor coolant system is at atmospheric pressure since there would then be no driving force to rapidly eject a drive housing. Additionally, the support is not required if all control rods are fully inserted and if an adequate shutdown margin with one control rod withdrawn has been demonstrated, since the reactor would remain subcritical even in the event of complete ejection of the strongest control rod.

3. The Rod Worth Minimizer (RWM) restricts withdrawals and insertions of control rods to prespecified sequences. All patterns associated with these sequences have the characteristic that, assuming the worst single deviation from the sequence, the drop of any control rod from the fully inserted position to the position of the control rod drive would not cause the reactor to sustain a power excursion resulting in any pellet average enthalpy in excess of 280 calories per gram. An enthalpy of 280 calories per gram is well below the level at which rapid fuel dispersal could occur (i.e., 425 calories per gram). Primary system damage in this accident is not possible unless a significant amount of fuel is rapidly dispersed. Reference Sections 3.6.6, 7.16.5.3, and 14.6.2 of the FSAR, and NEDE-24011-P-A, Amendment 17.

   In performing the function described above, the RWM is not required to impose any restrictions at core power levels in excess of 10 percent of rated. Material in the cited reference shows that it is impossible to reach 280 calories per gram in the event of a control rod drop occurring at power greater than 10 percent, regardless of the rod pattern. This is true for all normal and abnormal patterns including those which maximize individual control rod worth.

At power levels below 10 percent of rated, abnormal control rod patterns could produce rod worths high enough to be of concern relative to the 280 calorie per gram rod drop limit. In this range the RWM constrains the control rod sequences and patterns to those which involve only acceptable rod worths.

The Rod Worth Minimizer provides automatic supervision to assure that out of sequence control rods will not be withdrawn or inserted; i.e., it limits operator deviations from planned withdrawal sequences. Reference Section 7.16.5.3 of the FSAR. The RWM functions as a backup to procedural control of control rod sequences, which limit the maximum reactivity worth of control rods. When the Rod Worth Minimizer is out of service, special criteria allow a second licensed operator or other technically qualified member of the plant staff to manually fulfill the control rod pattern conformance functions of this system. The requirement that the RWM be OPERABLE for the withdrawal of the first twelve rods on a startup is to ensure that a high degree of RWM availability is maintained.

The functions of the RWM make it unnecessary to specify a license limit on rod worth to preclude unacceptable consequences in the event of a control rod drop. At low powers, below 10 percent, the RWM forces adherence to acceptable (Banked Position Withdrawal Sequence or equivalent) rod patterns. Above 10 percent of rated power, no constraint on rod pattern is required to assure that rod drop accident consequences are acceptable. Control rod pattern constraints above 10 percent of rated power are imposed by power distribution requirements, as defined in Sections 3.5.I, 3.5.J, 4.5.I, and 4.5.J of these technical specifications.

4. The Source Range Monitor (SRM) system performs no automatic safety system function; i.e., it has no scram function. It does provide the operator with a visual indication of neutron level. The consequences of reactivity accidents are functions of the initial neutron flux. The requirement of at least 3 counts per second assures that any transient, should it occur, begins at or above the initial value of 10^{-8} of rated power used in the analyses of transients from cold conditions. One OPERABLE SRM channel would be adequate to monitor the approach to criticality using homogeneous patterns of scattered control rod withdrawal. A minimum of two OPERABLE SRMs are provided as an added conservatism.

The surveillance requirement for scram testing of all the control rods after each refueling outage and 10 percent of the control rods at 16-week intervals is adequate for determining the OPERABILITY of the control rod system yet is not so frequent as to cause excessive wear on the control rod system components.

The numerical values assigned to the predicted scram performance are based on the analysis of data from other BWRs with control rod drives the same as those on Browns Ferry Nuclear Plant.

The occurrence of scram times within the limits, but significantly longer than the average, should be viewed as an indication of systematic problem with control rod drives especially if the number of drives exhibiting such scram times exceeds eight, the allowable number of inoperable rods.

In the analytical treatment of the transients which are assumed to scram on high neutron flux, 290 milliseconds are allowed between a neutron sensor reaching the scram point and the start of control rod motion.

This is adequate and conservative when compared to the typical time delay of about 210 milliseconds estimated from scram test results. Approximately the first 90 milliseconds of each of these time intervals result from sensor and circuit delays after which the pilot scram solenoid deenergizes to 120 milliseconds later, the control rod motion is estimated to actually begin. However, 200 milliseconds, rather than 120 milliseconds, are conservatively assumed for this time interval in the transient analyses and are also included in the allowable scram insertion times of Specification 3.3.C.

PROPOSED TECHNICAL SPECIFICATION CHANGE
BROWNS FERRY NUCLEAR PLANT
UNIT 3
(TVA BFNP TS 310)

UNIT 3
EFFECTIVE PAGE LIST

REMOVE	INSERT
i	i
3.2/4.2-24	3.2/4.2-24
3.2/4.2-49	3.2/4.2-49
3.3/4.3-2	3.3/4.3-2
3.3/4.3-4	3.3/4.3-4
3.3/4.3-5	3.3/4.3-5
3.3/4.3-6	3.3/4.3-6
3.3/4.3-7	3.3/4.3-7
3.3/4.3-8	3.3/4.3-8
3.3/4.3-9	3.3/4.3-9
3.3/4.3-10	3.3/4.3-10
3.3/4.3-14	3.3/4.3-14
3.3/4.3-15	3.3/4.3-15
3.3/4.3-16	3.3/4.3-16
3.3/4.3-19	3.3/4.3-19

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TABLE 3.2.C
INSTRUMENTATION THAT INITIATES ROD BLOCKS

Minimum Operable Channels Per Trip Function (5)	Function	Trip Level Setting
4(1)	APRM Upscale (Flow Bias)	≤0.66W + 42% (2)
4(1)	APRM Upscale (Startup Mode) (8)	≤12%
4(1)	APRM Downscale (9)	≥3%
4(1)	APRM Inoperative	(10b)
2(7)	RBM Upscale (Flow Bias)	≤0.66W + 40% (2)(13)
2(7)	RBM Downscale (9)	≥3%
2(7)	RBM Inoperative	(10c)
6(1)	IRM Upscale (8)	≤108/125 of full scale
6(1)	IRM Downscale (3)(8)	≥5/125 of full scale
6(1)	IRM Detector not in Startup Position (8)	(11)
6(1)	IRM Inoperative (8)	(10a)
3(1) (6)	SRM Upscale (8)	≤ $1X10^5$ counts/sec.
3(1) (6)	SRM Downscale (4)(8)	≥3 counts/sec.
3(1) (6)	SRM Detector not in Startup Position (4)(8)	(11)
3(1) (6)	SRM Inoperative (8)	(10a)
2(1)	Flow Bias Comparator	≤10% difference in recirculation flows
2(1)	Flow Bias Upscale	≤115% recirculation flow
1	Rod Block Logic	N/A
1(12)	High Water Level in West Scram Discharge Tank (LS-85-45L)	≤25 gal.
1(12)	High Water Level in East Scram Discharge Tank (LS-85-45M)	≤25 gal.

TABLE 4.2.C
SURVEILLANCE REQUIREMENTS FOR INSTRUMENTATION THAT INITIATE ROD BLOCKS

Function	Functional Test	Calibration (17)	Instrument Check
APRM Upscale (Flow Bias)	(1) (13)	once/3 months	once/day (8)
APRM Upscale (Startup Mode)	(1) (13)	once/3 months	once/day (8)
APRM Downscale	(1) (13)	once/3 months	once/day (8)
APRM Inoperative	(1) (13)	N/A	once/day (8)
RBM Upscale (Flow Bias)	(1) (13)	once/6 months	once/day (8)
RBM Downscale	(1) (13)	once/6 months	once/day (8)
RBM Inoperative	(1) (13)	N/A	once/day (8)
IRM Upscale	(1)(2) (13)	once/3 months	once/day (8)
IRM Downscale	(1)(2) (13)	once/3 months	once/day (8)
IRM Detector Not in Startup Position	(2) (once operating cycle)	once/operating cycle (12)	N/A
IRM Inoperative	(1)(2) (13)	N/A	N/A
SRM Upscale	(1)(2) (15)	once/3 months	once/day (8)
SRM Downscale	(1)(2) (13)	once/3 months	once/day (8)
SRM Detector Not in Startup Position	(2) (once/operating cycle)	once/operating cycle (12)	N/A
SRM Inoperative	(1)(2) (13)	N/A	N/A
Flow Bias Comparator	(1)(15)	once/operating cycle (20)	N/A
Flow Bias Upscale	(1)(15)	once/3 months	N/A
Rod Block Logic	(16)	N/A	N/A
West Scram Discharge Tank Water Level High (LS-85-45L)	once/quarter	once/operating cycle	N/A
East Scram Discharge Tank Water Level High (LS-85-45M)	once/quarter	once/operating cycle	N/A

LIMITING CONDITIONS FOR OPERATION

3.3.A.2 Reactivity margin - inoperable control rods

a. Control rod drives which cannot be moved with control rod drive pressure shall be considered inoperable. If a partially or fully withdrawn control rod drive cannot be moved with drive or scram pressure the reactor shall be brought to the COLD SHUTDOWN CONDITION within 24 hours and shall not be started unless (1) investigation has demonstrated that the cause of the failure is not a failed control rod drive mechanism collet housing and (2) adequate shutdown margin has been demonstrated as required by Specification 4.3.A.2.c.

b. The control rod directional control valves for inoperable control rods shall be disarmed electrically.

SURVEILLANCE REQUIREMENTS

4.3.A.2 Reactivity margin - inoperable control rods

a. Each partially or fully withdrawn OPERABLE control rod shall be exercised one notch at least once each week when operating above the power level cutoff of the RWM. In the event power operation is continuing with three or more inoperable control rods, this test shall be performed at least once each day, when operating above the power level cutoff of the RWM.

b. DELETED

LIMITING CONDITIONS FOR OPERATION

3.3.A.2 Reactivity margin - inoperable control rods (Cont'd)

d. DELETED

e. Control rods with inoperable accumulators or those whose position cannot be positively determined shall be considered inoperable.

f. Inoperable control rods shall be positioned such that Specification 3.3.A.1 is met. In addition, during reactor power operation, no more than one control rod in any 5x5 array may be inoperable (at least 4 OPERABLE control rods must separate any 2 inoperable ones). If this specification cannot be met the reactor shall not be started, or if at power, the reactor shall be brought to a shutdown condition within 24 hours.

SURVEILLANCE REQUIREMENTS

4.3.A.2 Reactivity margin - inoperable control rods (Cont'd)

d. The control rod accumulators shall be determined OPERABLE at least once per 7 days by verifying that the pressure and level detectors are not in the alarmed condition.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.3.B. Control Rods	4.3.B. Control Rods
1. Each control rod shall be coupled to its drive or completely inserted and the control rod directional control valves disarmed electrically. This requirement does not apply in the SHUTDOWN CONDITION when the reactor is vented. Two control rod drives may be removed as long as Specification 3.3.A.1 is met.	1. The coupling integrity shall be verified for each withdrawn control rod as follows: a. Verify that the control rod is following the drive by observing any response in the nuclear instrumentation each time a rod is moved when the reactor is operating above the preset power level cutoff of the RWM. b. When the rod is fully withdrawn the first time after each refueling outage or after maintenance, observe that the drive does not go to the overtravel position.
2. The control rod drive housing support system shall be in place during REACTOR POWER OPERATION or when the reactor coolant system is pressurized above atmospheric pressure with fuel in the reactor vessel, unless all control rods are fully inserted and Specification 3.3.A.1 is met.	2. The control rod drive housing support system shall be inspected after reassembly and the results of the inspection recorded.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.3.B. Control Rods	4.3.B. Control Rods
3.a DELETED	3.a DELETED
3.b Whenever the reactor is in the startup or run modes below 10% rated power, the Rod Worth Minimizer (RWM) shall be OPERABLE.	3.b.1 The Rod Worth Minimizer (RWM) shall be demonstrated to be OPERABLE for a reactor startup by the following checks:
1. Should the RWM become inoperable after the first twelve rods have been withdrawn, the start-up may continue provided that a second licensed operator or other technically qualified member of the plant staff is present at the console verifying compliance with the prescribed control rod program.	a. By demonstrating that the control rod patterns and Banked Position Withdrawal Sequence (or equivalent) input to the RWM computer are correctly loaded following any loading of the program into the computer
2. Should the RWM be inoperable before the first twelve rods are withdrawn, start-up may continue provided a second licensed operator or other technically qualified member of the plant staff is present at the console verifying compliance with the prescribed control rod program. Use of this provision is limited to one plant startup per calendar year.	b. Within 8 hours prior to withdrawal of control rods for the purpose of making the reactor critical verify proper annunciation of the selection error of at least one out-of-sequence control rod.
	c. Within 8 hours prior to withdrawal of control rods for the purpose of making the reactor critical, the rod block function of the RWM shall be verified by moving an out-of-sequence control rod.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.3.B. Control Rods	4.3.B. Control Rods

LIMITING CONDITIONS FOR OPERATION

3.3.B. Control Rods

3.b (Cont'd)

3. Should the RWM become inoperable on a shutdown, shutdown may continue provided that a second licensed operator or other technically qualified member of the plant staff is present at the console verifying compliance with the prescribed control rod program.

SURVEILLANCE REQUIREMENTS

4.3.B. Control Rods

3.b.2 The Rod Worth Minimizer (RWM) shall be demonstrated to be OPERABLE for a reactor shutdown by the following checks:

a. By demonstrating that the control rod patterns and Banked Position Withdrawal Sequence (or equivalent) input to the RWM computer are correctly loaded following any loading of the program into the computer.

b. Within 8 hours prior to RWM automatic initiation when reducing thermal power, verify proper annunciation of the selection error of at least one out-of-sequence control rod.

c. Within one hour after RWM automatic initation when reducing thermal power, the rod block function of the RWM shall be verified by moving an out-of-sequence control rod.

LIMITING CONDITIONS FOR OPERATION

3.3.B. Control Rods

3.c. If Specifications 3.3.B.3.b.1 through 3.3.B.3.b.3 cannot be met the reactor shall not be started, or if the reactor is in the run or startup modes at less than 10% rated power, control rod movement may be only by actuating the manual scram or placing the reactor mode switch in the shutdown position.

4. Control rods shall not be withdrawn for startup or refueling unless at least two source range channels have an observed count rate equal to or greater than three counts per second.

5. During operation with limiting control rod patterns, as determined by the designated qualified personnel, either:

   a. Both RBM channels shall be OPERABLE:

   or

   b. Control rod withdrawal shall be blocked.

SURVEILLANCE REQUIREMENTS

4.3.B. Control Rods

3.b.3 When the RWM is not OPERABLE a second licensed operator or other technically qualified member of the plant staff shall verify that the correct rod program is followed.

4. Prior to control rod withdrawal for startup or during refueling, verify that at least two source range channels have an observed count rate of at least three counts per second.

5. When a limiting control rod pattern exists, an instrument functional test of the RBM shall be performed prior to withdrawal of the designated rod(s) and at least once per 24 hours thereafter.

LIMITING CONDITIONS FOR OPERATION

3.3.C. Scram Insertion Times

1. The average scram insertion time, based on the deenergization of the scram pilot valve solenoids as time zero, of all OPERABLE control rods in the reactor power operation condition shall be no greater than:

% Inserted From Fully Withdrawn	Avg. Scram Insertion Times (sec)
5	0.375
20	0.90
50	2.0
90	3.5

SURVEILLANCE REQUIREMENTS

4.3.C. Scram Insertion Times

1. After each refueling outage, all OPERABLE rods shall be scram-time tested from the fully withdrawn position with the nuclear system pressure above 800 psig. This testing shall be completed prior to exceeding 40% power. Below 10% power, only rods in those sequences which were fully withdrawn in the region from 100% rod density to 50% rod density shall be scram-time tested.

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2. Reactivity margin - inoperable control rods - Specification 3.3.A.2 requires that a rod be taken out of service if it cannot be moved with drive pressure. If the rod is fully inserted and disarmed electrically*, it is in a safe position of maximum contribution to shutdown reactivity. If it is disarmed electrically in a nonfully inserted position, that position shall be consistent with the shutdown reactivity limitations stated in Specification 3.3.A.1. This assures that the core can be shut down at all times with the remaining control rods assuming the strongest OPERABLE control rod does not insert. Also if damage within the control rod drive mechanism and in particular, cracks in drive internal housings, cannot be ruled out, then a generic problem affecting a number of drives cannot be ruled out. Circumferential cracks resulting from stress-assisted intergranular corrosion have occurred in the collet housing of drives at several BWRs. This type of cracking could occur in a number of drives and if the cracks propagated until severance of the collet housing occurred, scram could be prevented in the affected rods. Limiting the period of operation with a potentially severed rod after detecting one stuck rod will assure that the reactor will not be operated with a large number of rods with failed collet housings. The Rod Worth Minimizer is not automatically bypassed until reactor power is above the preset power level cutoff. Therefore, control rod movement is restricted and the single notch exercise surveillance test is only performed above this power level. The Rod Worth Minimizer prevents movement of out-of-sequence rods unless power is above the preset power level cutoff.

B. Control Rods

1. Control rod dropout accidents as discussed in the FSAR can lead to significant core damage. If coupling integrity is maintained, the possibility of a rod dropout accident is eliminated. The overtravel position feature provides a positive check as only uncoupled drives may reach this position. Neutron instrumentation response to rod movement provides a verification that the rod is following its drive. Absence of such response to drive movement could indicate an uncoupled condition. Rod position indication is required for proper function of the Rod Worth Minimizer.

* To disarm the drive electrically, four amphenol type plug connectors are removed from the drive insert and withdrawal solenoids rendering the rod incapable of withdrawal. This procedure is equivalent to valving out the drive and is preferred because, in this condition, drive water cools and minimizes crud accumulation in the drive. Electrical disarming does not eliminate position indication.

2. The control rod housing support restricts the outward movement of a control rod to less than three inches in the extremely remote event of a housing failure. The amount of reactivity which could be added by this small amount of rod withdrawal, which is less than a normal single withdrawal increment, will not contribute to any damage to the primary coolant system. The design basic is given in subsection 3.5.2 of the FSAR and the safety evaluation is given in subsection 3.5.4. This support is not required if the reactor coolant system is at atmospheric pressure since there would then be no driving force to rapidly eject a drive housing. Additionally, the support is not required if all control rods are fully inserted and if an adequate shutdown margin with one control rod withdrawn has been demonstrated, since the reactor would remain subcritical even in the event of complete ejection of the strongest control rod.

3. The Rod Worth Minimizer (RWM) restricts withdrawals and insertions of control rods to prespecified sequences. All patterns associated with these sequences have the characteristic that, assuming the worst single deviation from the sequence, the drop of any control rod from the fully inserted position to the position of the control rod drive would not cause the reactor to sustain a power excursion resulting in any pellet average enthalpy in excess of 280 calories per gram. An enthalpy of 280 calories per gram is well below the level at which rapid fuel dispersal could occur (i.e., 425 calories per gram). Primary system damage in this accident is not possible unless a significant amount of fuel is rapidly dispersed. Reference Sections 3.6.6, 7.16.5.3, and 14.6.2 of the FSAR, and NEDE-24011-P-A, Amendment 17.

   In performing the function described above, the RWM is not required to impose any restrictions at core power levels in excess of 10 percent of rated. Material in the cited reference shows that it is impossible to reach 280 calories per gram in the event of a control rod drop occurring at power greater than 10 percent regardless of the rod pattern. This is true for all normal and abnormal patterns including those which maximize individual control rod worth.

At power levels below 10 percent of rated, abnormal control rod patterns could produce rod worths high enough to be of concern relative to the 280 calorie per gram rod drop limit. In this range the RWM constrains the control rod sequences and patterns to those which involve only acceptable rod worths.

The Rod Worth Minimizer provides automatic supervision to assure that out of sequence control rods will not be withdrawn or inserted; i.e., it limits operator deviations from planned withdrawal sequences. Reference Section 7.16.5.3 of the FSAR. The RWM functions as a backup to procedural control of control rod sequences, which limit the maximum reactivity worth of control rods. When the Rod Worth Minimizer is out of service, special criteria allow a second licensed operator or other technically qualified member of the plant staff to manually fulfill the control rod pattern conformance functions of this system. The requirement that the RWM be OPERABLE for the withdrawal of the first twelve rods on a startup is to ensure that a high degree of RWM availability is maintained.

The functions of the RWM make it unnecessary to specify a license limit on rod worth to preclude unacceptable consequences in the event of a control rod drop. At low powers, below 10 percent, the RWM forces adherence to acceptable (Banked Position Withdrawal Sequence or equivalent) rod patterns. Above 10 percent of rated power, no constraint on rod pattern is required to assure that rod drop accident consequences are acceptable. Control rod pattern constraints above 10 percent of rated power are imposed by power distribution requirements, as defined in Sections 3.5.I, 3.5.J, 4.5.I, and 4.5.J of these technical specifications.

4. The Source Range Monitor (SRM) system performs no automatic safety system function; i.e., it has no scram function. It does provide the operator with a visual indication of neutron level. The consequences of reactivity accidents are functions of the initial neutron flux. The requirement of at least three counts per second assures that any transient, should it occur, begins at or above the initial value of 10^{-8} of rated power used in the analyses of transients from cold conditions. One OPERABLE SRM channel would be adequate to monitor the approach to criticality using homogeneous patterns of scattered control rod withdrawal. A minimum of two OPERABLE SRMs are provided as an added conservatism.

The surveillance requirement for scram testing of all the control rods after each refueling outage and 10 percent of the control rods at 16-week intervals is adequate for determining the OPERABILITY of the control rod system yet is not so frequent as to cause excessive wear on the control rod system components.

The numerical values assigned to the predicted scram performance are based on the analysis of data from other BWRs with control rod drives the same as those on Browns Ferry Nuclear Plant.

The occurrence of scram times within the limits, but significantly longer than the average, should be viewed as an indication of systematic problem with control rod drives especially if the number of drives exhibiting such scram times exceeds eight, the allowable number of inoperable rods.

In the analytical treatment of the transients which are assumed to scram on high neutron flux, 290 milliseconds are allowed between a neutron sensor reaching the scram point and the start of control rod motion.

This is adequate and conservative when compared to the typical time delay of about 210 milliseconds estimated from scram test results. Approximately the first 90 milliseconds of each of these time intervals result from sensor and circuit delays after which the pilot scram solenoid deenergizes to 120 milliseconds later, the control rod motion is estimated to actually begin. However, 200 milliseconds, rather than 120 milliseconds, are conservatively assumed for this time interval in the transient analyses and are also included in the allowable scram insertion times of Specification 3.3.C.

ENCLOSURE 2

REASON THE FOR CHANGE, DESCRIPTION AND JUSTIFICATION
BROWNS FERRY NUCLEAR PLANT (BFN)
UNITS 1, 2, AND 3
(TVA BFNP TS 310)

REASON FOR THE CHANGE

The Rod Sequence Control System (RSCS) and Rod Worth Minimizer (RWM) are designed to mitigate the consequences of a control rod drop accident (RDA) by placing restrictions on the sequence in which control rods are withdrawn from or inserted into the core and the control rod patterns achieved during plant startup. The RSCS was required for BWR reactors at a time when the RDA consequences were believed to be more severe than current analyses now demonstrate. Current analyses show that the consequences of a RDA are effectively mitigated by conformance with control rod patterns equivalent to the Banked Position Withdrawal Sequence (BPWS) as enforced by the RWM. These analyses also demonstrate that the power level at which the RDA is a concern is much lower than that considered in the original analysis.

DESCRIPTION OF THE PROPOSED CHANGE

1. The existing Units 1, 2, and 3 Technical Specification (TS) Tables 3.2.C, Instrumentation That Initiates Rod Blocks, and 4.2.C, Surveillance Requirements For Instrumentation That Initiates Rod Blocks, contain an entry, "RSCS Restraint (PS85-61A, B)."

   The proposed change deletes this entry for all three units.

2. The proposed change deletes the following Limiting Conditions for Operation (LCOs) and Surveillance Requirements (SRs) in their entirety for all three units:

LCOs	SRs
3.3.A.2.d	4.3.A.2.b
3.3.B.3.a	4.3.B.3.a

3. The existing SR 4.3.A.2.a currently reads:

   Each partially or fully withdrawn OPERABLE control rod shall be exercised one notch at least once each week when operating above 30% power. In the event power operation is continuing with three or more inoperable control rods, this test shall be performed at least once each day, when operating above 30% power.

The proposed change reads for all three units:

> Each partially or fully withdrawn OPERABLE control rod shall be exercised one notch at least once each week when operating above the power level cutoff of the RWM. In the event power operation is continuing with three or more inoperable control rods, this test shall be performed at least once each day, when operating above the power level cutoff of the RWM.

4. SR 4.3.B.1.a currently reads:

> Verify that the control rod is following the drive by observing a response in the nuclear instrumentation each time a rod is moved when the reactor is operating above the preset power level of the RSCS.

The following change to SR 4.3.B.1.a is proposed for all three units:

> Verify that the control rod is following the drive by observing any response in the nuclear instrumentation each time a rod is moved when the reactor is operating above the preset power level cutoff of the RWM.

5. The proposed change deletes the existing text for LCO 3.3.B.3.b in its entirety and is replaces it with the following text for all three units:

> Whenever the reactor is in the startup or run modes below 10% rated power, the Rod Worth Minimizer (RWM) shall be operable.
>
> 1. Should the RWM become inoperable after the first twelve rods have been withdrawn, the start-up may continue provided that a second licensed operator or other technically qualified member of the plant staff is present at the console verifying compliance with the prescribed control rod program.
>
> 2. Should the RWM be inoperable before the first twelve rods are withdrawn, start-up may continue provided a second licensed operator or other technically qualified member of the plant staff is present at the console verifying compliance with the prescribed control rod program. Use of this provision is limited to one plant startup per calendar year.
>
> 3. Should the RWM become inoperable on a shutdown, shutdown may continue provided that a second licensed operator or other technically qualified member of the plant staff is present at the console verifying compliance with the prescribed control rod program.

6. SR 4.3.B.3.b.1.a currently reads for all three units:

   The Rod Worth Minimizer (RWM) shall be demonstrated OPERABLE for a reactor start-up by the following checks:

   By demonstrating that the control rod patterns and sequence input to the RWM computer are correctly loaded following any loading of the program into the computer.

   The proposed change revises this text as follows for all three units:

   The Rod Worth Minimizer (RWM) shall be demonstrated to be OPERABLE for a reactor start-up by the following checks:

   By demonstrating that the control rod patterns and Banked Position Withdrawal Sequence (or equivalent) input to the RWM computer are correctly loaded following any loading of the program into the computer.

7. The existing text for SR 4.3.B.3.b.2.a currently reads for all three units:

   The Rod Worth Minimizer (RWM) shall be demonstrated OPERABLE for a reactor start-up by the following checks:

   By demonstrating that the control rod patterns and sequence input to the RWM computer are correctly loaded following any loading of the program into the computer.

   The proposed change revises this text as follows for all three units:

   The Rod Worth Minimizer (RWM) shall be demonstrated to be OPERABLE for a reactor shutdown by the following checks:

   By demonstrating that the control rod patterns and Banked Position Withdrawal Sequence (or equivalent) input to the RWM computer are correctly loaded following any loading of the program into the computer.

8. LCO 3.3.B.3.c currently reads for all three units:

   If Specification 3.3.B.3.A through .b cannot be met the reactor shall not be started, or if the reactor is in the run modes at less than 20% rated power, control rod movement may be only by actuating the manual scram or placing the reactor mode switch in the shutdown position.

   The proposed change revises this text as follows for all three units:

   If Specifications 3.3.B.3.b.1 through 3.3.B.3.b.3 cannot be met the reactor shall not be started, or if the reactor is in the run or startup modes at less than 10% rated power, control rod movement may be only by actuating the manual scram or placing the reactor mode switch in the shutdown position.

9. The existing text for SR 4.3.B.3.b.3 currently reads as follows for all three units:

   When the RWM is not OPERABLE a second licensed operator or other technically qualified member of the plant staff shall verify that the correct rod program is followed except as specified in 3.3.B.3.a.

   The proposed revision reads as follows for all three units:

   When the RWM is not OPERABLE a second licensed operator or other technically qualified member of the plant staff shall verify that the correct rod program is followed.

10. SR 4.3.C.1 currently reads for all three units:

    After each refueling outage, all OPERABLE rods shall be scram-time tested from the fully withdrawn position with the nuclear system pressure above 800 psig. This testing shall be completed prior to exceeding 40% power. Below 20% power, only rods in those sequences (A_{12} and A_{34} or B_{12} and B_{34}) which were fully withdrawn in the in the region from 100% rod density to 50% rod density shall be scram-tested. The sequence restraints imposed upon the control rods in the 100-50 percent rod density groups to the preset power level may be removed by use of the individual bypass switches associated with those control rods which are fully or partially withdrawn and are not within the 100-50 percent rod density groups. In order to bypass a rod, the actual rod axial position must be known; and the rod must be in the correct in sequence position.

The proposed revision to SR 4.3.C.1 reads:

> After each refueling outage, all OPERABLE rods shall be scram-time tested from the fully withdrawn position with the nuclear system pressure above 800 psig. This testing shall be completed prior to exceeding 40% power. Below 10% power, only rods in those sequences which were fully withdrawn in the region from 100% rod density to 50% rod density shall be scram-tested.

11. BASES 3.3/4.3.A.2 for all three units presently reads in part:

> ... The Rod Sequence Control System is not automatically bypassed until reactor power is above 20 percent power. Therefore, control rod movement is restricted and the single notch exercise surveillance test is only performed above this power level. The Rod Sequence Control System prevents movement of out-of-sequence rods unless power is above 20 percent.

The proposed revision revises this text as follows for all three units.

> ... The Rod Worth Minimizer is not automatically bypassed until reactor power is above the preset power level cutoff. Therefore, control rod movement is restricted and the single notch exercise surveillance test is only performed above this power level. The Rod Worth Minimizer prevents movement of out-of-sequence rods unless power is above the preset power level cutoff.

12. BASES 3.3/4.3.B.1 for all three units presently reads in part:

> ... Rod position indication is required for proper function of the Rod Sequence Control System and the rod worth minimizer.

The proposed revision to BASES 3.3/4.3.B.1 for all three units reads as follows:

> ... Rod position indication is required for proper function of the Rod Worth Minimizer.

13. A proposed revision to BASES 3.3/4.3.B.3 reads as follows for all three units:

> The Rod Worth Minimizer (RWM) restricts withdrawals and insertions of control rods to prespecified sequences. All patterns... Reference Sections 3.6.6, 7.16.5.3, and 14.6.2 of the FSAR, and NEDE-24011-P-A, Amendment 17.

In performing the function described above, the RWM is not required to impose any restrictions at core power levels in excess of 10 percent of rated. Material in the cited reference shows that it is impossible to reach 280 calories per gram in the event of a control rod drop occurring at power greater than 10 percent, regardless of the rod pattern. This is true for all normal and abnormal patterns including those which maximize individual control rod worth.

At power levels below 10 percent of rated, abnormal control rod patterns could produce rod worths high enough to be of concern relative to the 280 calorie per gram rod drop limit. In this range the RWM constrains the control rod sequences and patterns to those which involve only acceptable rod worths.

The Rod Worth Minimizer provides automatic supervision to assure that out of sequence control rods will not be withdrawn or inserted; i.e., it limits operator deviations from planned withdrawal sequences. Reference Section 7.16.5.3 of the FSAR. The RWM functions as a backup to procedural control of control rod sequences, which limit the maximum reactivity worth of control rods. When the Rod Worth Minimizer is out of service, special criteria allow a second licensed operator or other technically qualified member of the plant staff to manually fulfill the control rod pattern conformance functions of this system. The requirement that the RWM be operable for the withdrawal of the first twelve rods on a startup is to ensure that a high degree of RWM availability is maintained.

The functions of the RWM make it unnecessary to specify a license limit on rod worth to preclude unacceptable consequences in the event of a control rod drop. At low powers, below 10 percent, the RWM forces adherence to acceptable (Banked Position Withdrawal Sequence or equivalent) rod patterns. Above 10 percent of rated power, no constraint on rod pattern is required to assure that rod drop accident consequences are acceptable. Control rod pattern constraints above 10 percent of rated power are imposed by power distribution requirements, as defined in Sections 3.5.I, 3.5.J, 4.5.I, and 4.5.J of these technical specifications.

14. The last two paragraphs of BASES 3.3.C/4.3.C presently read:

    In order to perform scram testing...

    :

    ... In addition, RSCS will, prevent movement of rods in the 50 percent density to preset power level range until the scrammed rod has been withdrawn.

The proposed revision deletes these two paragraphs for all three units.

JUSTIFICATION FOR THE PROPOSED CHANGE

The purpose of this proposed technical specification change is to eliminate the requirement for use of the Rod Sequence Control System Control System and to decrease the power level setpoint above which the Rod Worth Minimizer (RWM) would no longer be required to be used from the existing 20 percent rated power setpoint to a new setpoint of 10 percent rated power. This change is applicable to BFN Units 1, 2, and 3. These proposed technical specification amendments are based on and are consistent with the NRC Safety Evaluation issued on December 27, 1987 which approved Amendment 17 of General Electric Topical report NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel."

The RSCS restricts control rod movement to minimize the individual rod worth of control rods to lessen the consequences of a Rod Drop Accident (RDA). Control rod movement is restricted through the use of rod select, insert, and rod withdrawal blocks. The RSCS is a hardwired (as opposed to a computer controlled), redundant system to the RWM. It is independent of the RWM in terms of inputs and outputs, but the two systems are compatible. The RSCS is designed to monitor and block, when necessary, operator control rod selection, withdrawal and insertion actions, and thus assists in preventing significant control rod pattern errors which could lead to high reactivity worth (if dropped). A significant pattern error is one of several abnormal events which must occur to have a RDA which might exceed the fuel enthalpy criteria for the event. The RSCS was designed only for possible mitigation of the RDA and is active only during low power (currently less than 20 percent rated power) when a RDA might be significant. It does not prevent a RDA. A similar pattern control function is provided by the RWM, a computer-controlled system.

In response to NEDE-240111-P-A submitted by the BWR Owner's Group, the NRC staff issued a safety evaluation (A. C. Thadani to J. S. Charnley, Acceptance for Referencing of Licensing Topical Report NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel," Revision 8, Amendment 17) approving the methodology for 1) elimination of the RSCS while retaining the RWM to provide backup to the operator for control rod pattern control and 2) lowering the setpoint for cutoff of the RWM to 10 percent rated power from its current 20 percent level. This safety evaluation concluded that the proposed changes were acceptable provided:

1. The TSs should require provisions for minimizing operations without the RWM operable.

2. The occasional necessary use of a second operator replacement should be strengthened by a utility review of relevant procedures, related forms, and quality control to assure that the second operator provides an effective and truly independent monitoring process. A discussion of this review should accompany the request for RSCS removal.

3. The rod patterns used should be at least equivalent to Banked Position Withdrawal Sequence (BPWS) patterns.

With respect to item 1. above, the proposed TSs allow only one reactor startup per calendar year with the RWM inoperable prior to or during the withdrawal of the first twelve control rods. This will ensure that operations with the RWM inoperable are minimized.

These provisions are modeled after provisions previously found to be acceptable by the NRC staff for the application of the results of the topical report. These provisions address the need to promote effective maintenance of the RWM by severely limiting operation with the system bypassed. Commencement of a reactor startup with an inoperable RWM is generally not allowed, with a once per calendar year exemption to allow for unusual or abnormal situations. However, once a reactor startup has commenced and significantly progressed, specifically after twelve rods are withdrawn, the evolution may be completed using the verification provisions. BFN believes that these provisions provide strong incentive for RWM maintenance without engendering excessive operational restrictions and that, therefore, item 1. is adequately addressed.

Regarding item 2. above, the requirements for rod selection and rod motion verification along with the specific actions expected of the verifier are in place at BFN. 2-OI-85, Control Rod Drive Control System Operating Instruction and Surveillance Instruction 2-SI-4.3.B.3.b.3, RWM Program Verification address the administrative requirements for rod motion verification when the RWM is bypassed or inoperable for any other reason. The following controls are included in these instructions:

- Bypass of the RWM may only be performed at the direction of the Shift Operations Supervisor.
- Whenever the RWM is bypassed or inoperable, proper rod motion is verified as each control rod movement is accomplished.
- Controls to ensure that the proper control rod movement data sheet is utilized.
- Identification of the technically qualified members of the plant staff which may be utilized for rod program verification (currently limited to a nuclear engineer or STA).

With respect to item 3), BPWS patterns are in use at BFN. The proposed changes to TS surveillance requirements 4.3.B.3.b.1.a and 4.3.B.3.b.2.a require that the BPWS pattern or equivalent be correctly loaded into the computer as a condition for RWM operability. TVA believes that the requirements of the NRC safety evaluation of December 27, 1987 have been addressed and the proposed changes are acceptable.

ENCLOSURE 3

PROPOSED NO SIGNIFICANT HAZARDS CONSIDERATIONS DETERMINATION
BROWNS FERRY NUCLEAR PLANT
UNITS 1,2, AND 3
(TVA BFNP TS 310)

DESCRIPTION OF THE PROPOSED TECHNICAL SPECIFICATION CHANGE

The purpose of this proposed technical specification change is to eliminate the requirement for use of the Rod Sequence Control System and to decrease the power level setpoint above which the Rod Worth Minimizer (RWM) would no longer be required to be used from the existing 20 percent rated power setpoint to a new setpoint of 10 percent rated power. This change is applicable to BFN Units 1, 2, and 3. These proposed technical specification amendments are based on and are consistent with the NRC Safety Evaluation issued on December 27, 1987 which approved Amendment 17 of General Electric Topical report NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel."

BASES FOR PROPOSED NO SIGNIFICANT HAZARDS CONSIDERATIONS DETERMINATION

NRC has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.91(c). A proposed amendment to an operating license involves no significant hazards considerations if operation of the facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated, or (2) create the possibility of a new or different kind of accident from an accident previously evaluated, or (3) involve a significant reduction in a margin of safety. The proposed TS change is judged to involve no significant hazards considerations based on the following:

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

   Eliminating the RSCS and decreasing the RWM setpoint have no effect on the probability of any previously evaluated accident because these systems play no role in any accident initiating mechanism. These systems act to mitigate the consequences of the rod drop accident (RDA). The probability of an RDA is dependent only on the control rod drive system and mechanisms themselves, and not in any way on the RSCS or RWM. Therefore the proposed changes do not involve a significant increase in the probability of any accident previously evaluated.

A study of the RDA sponsored by the BWR Owner's Group (NEDE-24011-A-P) has concluded that the RSCS is unnecessary. This study was approved by the NRC in a safety evaluation dated December 27, 1987. The RSCS functions as a redundant system to the RWM. As long as the RWM is operable, the RSCS is not needed since the RWM prevents control rod pattern errors. In the event the RWM is unavailable, the proposed technical specifications require that control rod movement and compliance with the prescribed control rod pattern be verified by a second licensed operator or other technically qualified member of the plant staff. In addition, to further minimize control rod movement at low power with the RWM out of service, the proposed technical specifications permit only one plant startup per year with the RWM out of service prior to or during the withdrawal of the first twelve control rods. Therefore, the consequences of an RDA as previously evaluated will not be increased as a result of the elimination of the RSCS.

The effects of a RDA are more severe at low power levels and are less severe as power level increases. Although the original calculations showed that no significant RDA could occur above 10% power, the NRC required that the generic BWR technical specifications be written to require operation of the RWM below 20 percent power to account for uncertainties in the analysis. Recently, more refined calculations conducted for the NRC (NUREG-28109, "Thermal Hydraulic Effects on Control Rod Drop Accident in a BWR") have shown that even with the maximum single control rod position error, and most multiple control rod pattern errors, the peak fuel rod enthalpy reached during an RDA from these control rod patterns would not exceed the NRC limit of 280 calories per gram for RDAs above 10 percent power. These more recent calculations corroborate the original GE analyses. Therefore, the proposed decreased setpoint for the RWM will not result in a significant increase in the consequences of any accident previously evaluated.

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

Operation of the RSCS and RWM cannot cause or prevent an accident. These systems function to minimize the consequences of a RDA. The RDA is evaluated in the FSAR, and the effect of the proposed changes are discussed in item 1) above.

Elimination of the RSCS and decreasing the RWM setpoint will have no impact on the operation of any other systems, and therefore would not contribute to a malfunction in any other equipment nor create the possibility for an accident to occur which has not previously been evaluated.

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

   Elimination of the RSCS will not result in a significant reduction in the margin of safety for the reasons discussed in Item 1. above and summarized below:

   a. NRC and industry studies have demonstrated that the possibility of a RDA resulting in unacceptable consequences is so low as to negate the requirement for the RSCS.

   b. Current calculations have shown that the consequences of an RDA are acceptable above 10 percent power.

   c. The RSCS is redundant in function to the RWM. Eliminating the RSCS does not eliminate the control rod pattern monitoring function performed by the RWM.

   d. To ensure that RWM unavailability will be minimized, the proposed technical specification changes allow only one startup per calendar year with the RWM out of service prior to or during the withdrawal of the first twelve control rods. If the RWM is out of service below 10 percent power, control rod movement and compliance with prescribed control rod patterns will be verified by a second licensed operator or other technically qualified member of the plant staff.

No significant reduction in the margin of safety will result from decreasing the RWM setpoint from 20 percent power to 10 percent power because calculations have shown that even with the maximum single control rod position error, and most multiple control rod pattern errors, the peak fuel rod enthalpy reached during an RDA from these control rod patterns would not exceed the NRC limit of 280 calories per gram for RDAs above 10 percent power.

CONCLUSION

TVA has evaluated the proposed amendment described above against the criteria given in 10 CFR 50.92(c) in accordance with the requirements of 10 CFR 50.91(a)(1). This evaluation has determined that the proposed amendment will not (1) involve a significant increase in the probability or consequences of an accident previously evaluated, (2) create the possibility for a new or different kind of accident from any accident previously evaluated, or (3) involve a significant reduction in a margin of safety. Thus, TVA has concluded that the proposed amendment does not involve a significant hazards consideration.