May 19, 1982

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

Mr. Hugh G. Parris
Manager of Power
Tennessee Valley Authority
500A Chestnut Street, Tower II
Chattanooga, TN 37401

Dear Mr. Parris:

The Commission has issued the enclosed Amendment Nos. 83, 80 and 54 to Facility License Nos. DPR-33, DPR-52 and DPR-68 for the Browns Ferry Nuclear Plant, Units 1, 2 and 3. These amendments are in response to your application dated October 16, 1980 (TVA BFNP TS 153), as supplemented by your letter of November 18, 1981.

These amendments change the Technical Specifications to provide additional surveillance requirements for the scram discharge volume (SDV) vent and drain valves and additional limiting conditions for operation and surveillance requirements on the SDV limit switches as requested by our generic letter to you of July 7, 1980.

Copies of the Safety Evaluation and Notice of Issuance are also enclosed.

Sincerely,

Richard J. Clark

Richard J. Clark, Project Manager
Operating Reactors Branch #2
Division of Licensing

Enclosures:
1. Amendment No. 83 to DPR-33
2. Amendment No. 80 to DPR-52
3. Amendment No. 54 to DPR-68
4. Safety Evaluation
5. Notice

cc: w/enclosures
See next page

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KTE

Mr. Hugh G. Parris

cc:

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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-259

BROWNS FERRY NUCLEAR PLANT, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 83
License No. DPR-33

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

   A. The application for amendments by Tennessee Valley Authority (the licensee) dated October 16, 1980, as supplemented by letter dated November 18, 1981, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

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

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 83, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: May 19, 1982

ATTACHMENT TO LICENSE AMENDMENT NO. 83

FACILITY OPERATING LICENSE NO. DPR-33

DOCKET NO. 50-259

Revise Appendix A as follows:

1. Replace the following pages with identically numbered pages:

35
37
73
75
102
126
134

Marginal lines on the above pages indicate the areas being revised.

2. The overleaf pages are not being revised and should be retained.

NOTES FOR TABLE 3.1.A

1. There shall be two operable or tripped trip systems for each function. If the minimum number of operable instrument channels per trip system cannot be met for both trip systems, the appropriate actions listed below shall be taken.

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

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

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

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

2. Scram discharge volume high bypass may be used in shutdown or refuel to bypass scram discharge volume scram with control rod block for reactor protection system reset.

3. Bypassed if reactor pressure < 1055 psig and mode switch not in run.

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

5. IRM's are bypassed when APRM's are onscale and the reactor mode switch is in the run position.

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

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

   A. Mode switch in shutdown

   B. Manual scram

   C. High flux IRM

   D. Scram discharge volume high level

   E. APRM 15% scram

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

9. Not required if all main steamlines are isolated.

Amendment No. 83

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

	Group (2)	Functional Test	Minimum Frequency (3)
Mode Switch in Shutdown	A	Place Mode Switch in Shutdown	Each Refueling Outage
Manual Scram	A	Trip Channel and Alarm	Every 3 Months
IRM			
High Flux	C	Trip Channel and Alarm (4)	Once Per Week During Refuelin and Before Each Startup
Inoperative	C	Trip Channel and Alarm (4)	Once Per Week During Refuelin and Before Each Startup
APRM			
High Flux (15% scram)	C	Trip Output Relays (4)	Before Each Startup and Weekl When Required to be Operable
High Flux	B	Trip Output Relays (4)	Once/Week
Inoperative	B	Trip Output Relays (4)	Once/Week
Downscale	B	Trip Output Relays (4)	Once/Week
Flow Bias	B	(6)	(6)
High Reactor Pressure	A	Trip Channel and Alarm	Once/Month (1)
High Drywell Pressure	A	Trip Channel and Alarm	Once/Month (1)
Reactor Low Water Level (5)	A	Trip Channel and Alarm	Once/Month (1)
High Water Level in Scram Discharge Tank	A	Trip Channel and Alarm	Once/month
Turbine Condenser Low Vacuum	A	Trip Channel and Alarm	Once/Month (1)
Main Steam Line High Radiation	B	Trip Channel and Alarm (4)	Once/Week

Amendment Nos. 44, 47, 83

TABLE 3.2.C
INSTRUMENTATION THAT INITIATES ROD BLOCKS

Minimum No. Operable Per Trip Sys (5)	Function	Trip Level Setting
2(1)	APRM Upscale (Flow Bias)	≤0.66W+42% (2)
2(1)	APRM Upscale (Startup Mode) (8)	≤12%
2(1)	APRM Downscale (9)	≥3%
2(1)	APRM Inoperative	(10b)
1(7)	RBM Upscale (Flow Bias)	≤0.66W+40% (2)
1(7)	RBM Downscale (9)	≥3%
1(7)	RBM Inoperative	(10c)
3(1)	IRM Upscale (8)	≤108/125 of full scale
3(1)	IRM Downscale (3)(8)	≥5/125 of full scale
3(1)	IRM Detector not in Startup Position (8)	(11)
3(1)	IRM Inoperative (8)	(10a)
2(1)(6)	SRM Upscale (8)	≤1 x 10^5 counts/sec.
2(1)(6)	SRM Downscale (4)(8)	≥3 counts/sec.
2(1)(6)	SRM Detector not in Startup Position (4)(8)	(11)
2(1)(6)	SRM Inoperative (8)	(10a)
2(1)	Flow Bias Comparator	≤10% difference in recirculation flows
2(1)	Flow Bias Upscale	≤110% recirculation flow
1(1)	Rod Block Logic	N/A
2(1)	RSCS Restraint (PS-85-61A and PS-85-61B)	147 psig turbine first-stage pressure
1(12)	Scram Discharge Tank Water Level High	≤25 gal.

8. This function is bypassed when the mode switch is placed in Run.

9. This function is only active when the mode switch is in Run. This function is automatically bypassed when the IRM instrumentation is operable and not high.

10. The inoperative trips are produced by the following functions:

    a. SRM and IRM

        (1) Local "operate-calibrate" switch not in operate.

        (2) Power supply voltage low.

        (3) Circuit boards not in circuit.

    b. APRM

        (1) Local "operate-calibrate" switch not in operate.

        (2) Less than 14 LPRM inputs.

        (3) Circuit boards not in circuit.

    c. RBM

        (1) Local "operate-calibrate" switch not in operate.

        (2) Circuit boards not in circuit.

        (3) RBM fails to null.

        (4) Less than required number of LPRM inputs for rod selected.

11. Detector traverse is adjusted to 114 $\pm$ 2 inches, placing the detector lower position 24 inches below the lower core plate.

12. This function may be bypassed in the shutdown or refuel mode. If this function is inoperable at a time when operability is required the channel shall be tripped or administrative controls shall be immediately imposed to prevent control rod withdrawal.

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
RSCS Restraint	(1)	once/3 months	N/A
Scram Discharge Tank Water level High	Once/quarter	once/operating cycle	N/A

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.3 Reactivity Control	4.3 Reactivity Control
E. If Specifications 3.3.C and .D above cannot be met, an orderly shutdown shall be initiated and the reactor shall be in the shutdown condition within 24 hours.	E. Surveillance requirements are as specified in 4.3.C and .D, above.
F. Scram Discharge Volume	F. Scram Discharge Volume
The scram discharge volume drain and vent valves shall be operable any time that the Reactor Protection System scram function is required to be operable. When it is determined that one of these valves is inoperable at a time when operability is required, the reactor shall be in cold shutdown within 24 hours.	1.a. The scram discharge volume drain and vent valves shall be verified open prior to each startup and monthly thereafter. The valves may be closed intermittently for testing not to exceed 1 hour in any 24 hour period during operation. b. The scram discharge volume drain and vent valves shall be demonstrated operable monthly.

3.3/4.3 BASES:

D. Reactivity Anomalies

During each fuel cycle excess operative reactivity varies as fuel depletes and as any burnable poison in supplementary control is burned. The magnitude of this excess reactivity may be inferred from the critical rod configuration. As fuel burnup progresses, anomalous behavior in the excess reactivity may be detected by comparison of the critical rod pattern at selected base states to the predicted rod inventory at that state. Power operating base conditions provide the most sensitive and directly interpretable data relative to core reactivity. Furthermore, using power operating base conditions permits frequent reactivity comparisons.

Requiring a reactivity comparison at the specified frequency assures that a comparison will be made before the core reactivity change exceeds 1% Δk. Deviations in core reactivity greater than 1% Δk are not expected and require thorough evaluation. One percent reactivity into the core would not lead to transients exceeding design conditions of the reactor system.

F. Scram Discharge Volume

The nominal stroke time for the scram discharge volume vent and drain valves is $\leq$30 seconds following a scram. The purpose of these valves is to limit the quantity of reactor water discharged after a scram and no direct safety function is performed. The surveillance for the valves assures that system drainage is not impeded by a valve which fails to open and that the valves are operable and capable of closing upon a scram.

References

1. Generic Reload Fuel Application, Licensing Topical Report, NEDE-24011-P-A and Addenda.

Amendment Nos. ~~35~~, ~~47~~, ~~59~~, 83

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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-260

BROWNS FERRY NUCLEAR PLANT, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 80
License No. DPR-52

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

   A. The application for amendments by Tennessee Valley Authority (the licensee) dated October 16, 1980, as supplemented by letter dated November 18, 1981, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C(2) of Facility License No. DPR-52 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 80, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: May 19, 1982

ATTACHMENT TO LICENSE AMENDMENT NO. 80

FACILITY OPERATING LICENSE NO. DPR-52

DOCKET NO. 50-260

Revise Appendix A as follows:

1. Replace the following pages with identically numbered pages:

35
37
73
75
102
126
134

Marginal lines on the above pages indicate the areas being revised.

2. The overleaf pages are not being revised and should be retained.

NOTES FOR TABLE 3.1.A

1. There shall be two operable or tripped trip systems for each function. If the minimum number of operable instrument channels per trip system cannot be met for both trip systems, the appropriate actions listed below shall be taken.

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

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

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

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

2. Scram discharge volume high bypass may be used in shutdown or refuel to bypass scram discharge volume scram with control rod block for reactor protection system reset.

3. Bypassed if reactor pressure < 1055 psig and mode switch not in run.

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

5. IRM's are bypassed when APRM's are onscale and the reactor mode switch is in the run position.

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

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

   A. Mode switch in shutdown

   B. Manual scram

   C. High flux IRM

   D. Scram discharge volume high level

   E. APRM 15% scram

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

9. Not required if all main steamlines are isolated.

Amendment No. 80

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

	Group (2)	Functional Test	Minimum Frequency (3)
Mode Switch in Shutdown	A	Place Mode Switch in Shutdown	Each Refueling Outage
Manual Scram	A	Trip Channel and Alarm	Every 3 Months
IRM			
High Flux	C	Trip Channel and Alarm (4)	Once Per Week During Refuelin and Before Each Startup
Inoperative	C	Trip Channel and Alarm (4)	Once Per Week During Refuelin and Before Each Startup
APRM			
High Flux (15% scram)	C	Trip Output Relays (4)	Before Each Startup and Weekl When Required to be Operable
High Flux	B	Trip Output Relays (4)	Once/Week
Inoperative	B	Trip Output Relays (4)	Once/Week
Downscale	B	Trip Output Relays (4)	Once/Week
Flow Bias	B	(6)	(6)
High Reactor Pressure	A	Trip Channel and Alarm	Once/Month (1)
High Drywell Pressure	A	Trip Channel and Alarm	Once/Month (1)
Reactor Low Water Level (5)	A	Trip Channel and Alarm	Once/Month (1)
High Water Level in Scram Discharge Tank	A	Trip Channel and Alarm	Once/month
Turbine Condenser Low Vacuum	A	Trip Channel and Alarm	Once/Month (1)
Main Steam Line High Radiation	B	Trip Channel and Alarm (4)	Once/Week

TABLE 3.2.C
INSTRUMENTATION THAT INITIATES ROD BLOCKS

Minimum No. Operable Per Trip Sys (5)	Function	Trip Level Setting
2(1)	APRM Upscale (Flow Bias)	$\leq$0.66W+42% (2)
2(1)	APRM Upscale (Startup Mode) (8)	$\leq$12%
2(1)	APRM Downscale (9)	$\geq$3%
2(1)	APRM Inoperative	(10b)
1(7)	RBM Upscale (Flow Bias)	$\leq$ 0.66W+40% (2)
1(7)	RBM Downscale (9)	$\geq$ 3%
1(7)	RBM Inoperative	(10c)
3(1)	IRM Upscale (8)	$\leq$ 108/125 of full scale
3(1)	IRM Downscale (3) (8)	$\geq$ 5/125 of full scale
3(1)	IRM Detector not in Startup Position (8)	(11)
3(1)	IRM Inoperative (8)	(10a)
2(1) (6)	SRM Upscale (8)	$\leq$ 1 x 10^5 counts/sec.
2(1) (6)	SRM Downscale (4) (8)	$\geq$ 3 counts/sec.
2(1) (6)	SRM Detector not in Startup Position (4) (8)	(11)
2(1) (6)	SRM Inoperative (8)	(10a)
2(1)	Flow Bias Comparator	$\leq$ 10% difference in recirculation flows
2(1)	Flow Bias Upscale	$\leq$110% recirculation flow
1(1)	Rod Block Logic	N/A
2(1)	RSCS Restraint (PS-85-61A and PS-85-61B)	147 psig turbine first-stage pressure
1(12)	Scram Discharge Tank Water Level High	$\leq$25 gal.

8. This function is bypassed when the mode switch is placed in Run.

9. This function is only active when the mode switch is in Run. This function is automatically bypassed when the IRM instrumentation is operable and not high.

10. The inoperative trips are produced by the following functions:

    a. SRM and IRM

        (1) Local "operate-calibrate" switch not in operate.

        (2) Power supply voltage low.

        (3) Circuit boards not in circuit.

    b. APRM

        (1) Local "operate-calibrate" switch not in operate.

        (2) Less than 14 LPRM inputs.

        (3) Circuit boards not in circuit.

    c. RBM

        (1) Local "operate-calibrate" switch not in operate.

        (2) Circuit boards not in circuit.

        (3) RBM fails to null.

        (4) Less than required number of LPRM inputs for rod selected.

11. Detector traverse is adjusted to 114 $\pm$ 2 inches, placing the detector lower position 24 inches below the lower core plate.

12. This function may be bypassed in the shutdown or refuel mode. If this function is inoperable at a time when operability is required the channel shall be tripped or administrative controls shall be immediately imposed to prevent control rod withdrawal.

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
RSCS Restraint	(1)	once/3 months	N/A
Scram Discharge Tank Water level High	Once/quarter	once/operating cycle	N/A

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.3 Reactivity Control	4.3 Reactivity Control
E. If Specifications 3.3.C and .D above cannot be met, an orderly shutdown shall be initiated and the reactor shall be in the shutdown condition within 24 hours.	E. Surveillance requirements are as specified in 4.3.C and .D, above.
F. Scram Discharge Volume The scram discharge volume drain and vent valves shall be operable any time that the Reactor Protection System scram function is required to be operable. When it is determined that one of these valves is inoperable at a time when operability is required, the reactor shall be in cold shutdown within 24 hours.	F. Scram Discharge Volume 1.a. The scram discharge volume drain and vent valves shall be verified open prior to each startup and monthly thereafter. The valves may be closed intermittently for testing not to exceed 1 hour in any 24 hour period during operation. b. The scram discharge volume drain and vent valves shall be demonstrated operable monthly.

3.3/4.3 BASES:

D. Reactivity Anomalies

During each fuel cycle excess operative reactivity varies as fuel depletes and as any burnable poison in supplementary control is burned. The magnitude of this excess reactivity may be inferred from the critical rod configuration. As fuel burnup progresses, anomalous behavior in the excess reactivity may be detected by comparison of the critical rod pattern at selected base states to the predicted rod inventory at that state. Power operating base conditions provide the most sensitive and directly interpretable data relative to core reactivity. Furthermore, using power operating base conditions permits frequent reactivity comparisons.

Requiring a reactivity comparison at the specified frequency assures that a comparison will be made before the core reactivity change exceeds 1% Δk Deviations in core reactivity greater than 1% Δk are not expected and require thorough evaluation. One percent reactivity into the core would not lead to transients exceeding design conditions of the reactor system.

F. Scram Discharge Volume

The nominal stroke time for the scram discharge volume vent and drain valves is $\leq$30 seconds following a scram. The purpose of these valves is to limit the quantity of reactor water discharged after a scram and no direct safety function is performed. The surveillance for the valves assures that system drainage is not impeded by a valve which fails to open and that the valves are operable and capable of closing upon a scram.

References

1. Generic Reload Fuel Application, Licensing Topical Report, NEDE-24011-P-A and Addenda.

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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-296

BROWNS FERRY NUCLEAR PLANT, UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 54
License No. DPR-68

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

   A. The application for amendments by Tennessee Valley Authority (the licensee) dated October 16, 1980, as supplemented by letter dated November 18, 1981, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C(2) of Facility License No. DPR-68 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 54 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: May 19, 1982

ATTACHMENT TO LICENSE AMENDMENT NO. 54

FACILITY OPERATING LICENSE NO. DPR-68

DOCKET NO. 50-296

Revise Appendix A as follows:

1. Remove the following pages and replace with identically numbered pages:

   34
   36
   76
   78
   99
   129
   136

2. Marginal lines on the above pages indicate revised area.

3. Add the following new page:

   136a

NOTES FOR TABLE 3.1.A

1. There shall be two operable or tripped trip systems for each function. If the minimum number of operable instrument channels per trip system cannot be met for both trip systems, the appropriate actions listed below shall be taken.

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

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

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

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

2. Scram discharge volume high bypass may be used in shutdown or refuel to bypass scram discharge volume scram with control rod block for reactor protection system reset.

3. Bypassed if reactor pressure < 1055 psig and mode switch not in run.

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

5. IRM's are bypassed when APRM's are onscale and the reactor mode switch is in the run position.

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

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

   A. Mode switch in shutdown

   B. Manual scram

   C. High flux IRM

   D. Scram discharge volume high level

   E. APRM 15% scram

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

9. Not required if all main steamlines are isolated.

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

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

Amendment No. 54

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

	Group (2)	Functional Test	Minimum Frequency (3)
Mode Switch in Shutdown	A	Place Mode Switch in Shutdown	Each Refueling Outage
Manual Scram	A	Trip Channel and Alarm	Every 3 Months
IRM			
High Flux	C	Trip Channel and Alarm (4)	Once Per Week During Refueling and Before Each Startup
Inoperative	C	Trip Channel and Alarm (4)	Once Per Week During Refueling and Before Each Startup
APRM			
High Flux (15% scram)	C	Trip Output Relays (4)	Before Each Startup and Weekly When Required to be Operable
High Flux	B	Trip Output Relays (4)	Once/Week
Inoperative	B	Trip Output Relays (4)	Once/Week
Downscale	B	Trip Output Relays (4)	Once/Week
Flow Bias	B	(6)	(6)
High Reactor Pressure	A	Trip Channel and Alarm	Once/Month (1)
High Drywell Pressure	A	Trip Channel and Alarm	Once/Month (1)
Reactor Low Water Level (5)	A	Trip Channel and Alarm	Once/Month (1)
High Water Level in Scram Discharge Tank	A	Trip Channel and Alarm	Once/Month
Turbine Condenser Low Vacuum	A	Trip Channel and Alarm	Once/Month (1)

Amendment No. 54

TABLE 3.2.C
INSTRUMENTATION THAT INITIATES ROD BLOCKS

Minimum No. Operable Per Trip Sys (5)	Function	Trip Level Setting
2(1)	APRM Upscale (Flow Bias)	$\leq$0.66W+42% (2)
2(1)	APRM Upscale (Startup Mode) (8)	$\leq$12%
2(1)	APRM Downscale (9)	$\geq$3%
2(1)	APRM Inoperative	(10b)
1(7)	RBM Upscale (Flow Bias)	$\leq$ 0.66W+40% (2)
1(7)	RBM Downscale (9)	$\geq$ 3%
1(7)	RBM Inoperative	(10c)
3(1)	IRM Upscale (8)	$\leq$ 108/125 of full scale
3(1)	IRM Downscale (3) (8)	$\geq$ 5/125 of full scale
3(1)	IRM Detector not in Startup Position (8)	(11)
3(1)	IRM Inoperative (8)	(10a)
2(1) (6)	SRM Upscale (8)	$\leq$ 1 x 10^5 counts/sec.
2(1) (6)	SRM Downscale (4) (8)	$\geq$ 3 counts/sec.
2(1) (6)	SRM Detector not in Startup Position (4) (8)	(11)
2(1) (6)	SRM Inoperative (8)	(10a)
2(1)	Flow Bias Comparator	$\leq$ 10% difference in recirculation flows
2(1)	Flow Bias Upscale	$\leq$110% recirculation flow
1(1)	Rod Block Logic	N/A
2(1)	RSCS Restraint (PS-85-61A and PS-85-61B)	147 psig turbine first-stage pressure
1(12)	Scram Discharge Tank Water Level High	$\leq$25 gal.

8. This function is bypassed when the mode switch is placed in Run.

9. This function is only active when the mode switch is in Run. This function is automatically bypassed when the IRM instrumentation is operable and not high.

10. The inoperative trips are produced by the following functions:

    a. SRM and IRM

        (1) Local "operate-calibrate" switch not in operate.

        (2) Power supply voltage low.

        (3) Circuit boards not in circuit.

    b. APRM

        (1) Local "operate-calibrate" switch not in operate.

        (2) Less than 14 LPRM inputs.

        (3) Circuit boards not in circuit.

    c. RBM

        (1) Local "operate-calibrate" switch not in operate.

        (2) Circuit boards not in circuit.

        (3) RBM fails to null.

        (4) Less than required number of LPRM inputs for rod selected.

11. Detector traverse is adjusted to 114 ± 2 inches, placing the detector lower position 24 inches below the lower core plate.

12. This function may be bypassed in the shutdown or refuel mode. If this function is inoperable at a time when operability is required the channel shall be tripped or administrative controls shall be immediately imposed to prevent control rod withdrawal.

Amendment No. 54

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
RSCS Restraint	(1)	once/3 months	N/A
Scram Discharge Tank Water Level High	once/quarter	once/operating cycle	N/A

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.3 REACTIVITY CONTROL	4.3 REACTIVITY CONTROL
D. Reactivity Anomalies The reactivity equivalent of the difference between the actual critical rod configuration and the expected configuration during power operation shall not exceed 1% Δ k. If this limit is exceeded, the reactor will be shut down until the cause has been determined and corrective actions have been taken as appropriate.	D. Reactivity Anomalies During the startup test program and startup following refueling outages, the critical rod configurations will be compared to the expected configurations at selected operating conditions. These comparisons will be used as base data for reactivity monitoring during subsequent power operation throughout the fuel cycle. At specific power operating conditions, the critical rod configuration will be compared to the configuration expected based upon appropriately corrected past data. This comparison will be made at least every full power month.
E. Reactivity Control If Specifications 3.3.C and .D above cannot be met, an orderly shutdown shall be initiated and the reactor shall be in the shutdown condition within 24 hours.	E. Reactivity Control Surveillance requirements are as specified in 4.3.C and .D, above.
F. Scram Discharge Volume The scram discharge volume drain and vent valves shall be operable any time that the Reactor Protection System scram function is required to be operable. When it is determined that one of these valves is inoperable at a time when operability is required, the reactor shall be in cold shutdown within 24 hours.	F. Scram Discharge Volume 1.a. The scram discharge volume drain and vent valves shall be verified open prior to each startup and monthly thereafter. The valves may be closed intermittently for testing not to exceed 1 hour in any 24 hour period during operation. b. The scram discharge volume drain and vent valves shall be demonstrated operable monthly.

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 the sensor and circuit delays after which the pilot scram solenoid deenergizes and 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.

In order to perform scram time testing as required by specification 4.3.C.1, the relaxation of certain restraints in the rod sequence control system is required. Individual rod bypass switches may be used as described in specification 4.3.C.1.

The position of any rod bypassed must be known to be in accordance with rod withdrawal sequence. Bypassing of rods in the manner described in specification 4.3.C.1 will allow the subsequent withdrawal of any rod scrammed in the 100 percent to 50 percent rod density groups; however, it will maintain group notch control over all rods in the 50 percent to 0 percent rod density groups. In addition, RSCS will prevent movement of rods in the 50 percent density to a preset power level range until the scrammed rod has been withdrawn.

D. Reactivity Anomalies

During each fuel cycle excess operative reactivity varies as fuel depletes and as any burnable poison in supplementary control is burned. The magnitude of this excess reactivity may be inferred from the critical rod configuration. As fuel burnup progresses, anomalous behavior in the excess reactivity may be detected by comparison of the critical rod pattern at selected base states to the predicted rod inventory at that state. Power operating base conditions provide the most sensitive and directly interpretable data relative to core reactivity. Furthermore, using power operating base conditions permits frequent reactivity comparisons.

Requiring a reactivity comparison at the specified frequency assures that a comparison will be made before the core reactivity change exceeds 1% ΔK. Deviations in core reactivity greater than 1% ΔK are not expected and require thorough evaluation. One percent reactivity limit is considered safe since an insertion of the reactivity into the core would not lead to transients exceeding design conditions of the reactor system.

3.3/4.3 BASES:

F. Scram Discharge Volume

The nominal stroke time for the scram discharge volume vent and drain valves is $\leq$30 seconds following a scram. The purpose of these valves is to limit the quantity of reactor water discharged after a scram and no direct safety function is performed. The surveillance for the valves assures that system drainage is not impeded by a valve which fails to open and that the valves are operable and capable of closing upon a scram.

References

1. Generic Reload Fuel Application, Licensing Topical Report, NEDE-24011-P-A and Addenda.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 83 TO FACILITY OPERATING LICENSE NO. DPR-33

AMENDMENT NO. 80 TO FACILITY OPERATING LICENSE NO. DPR-52

AMENDMENT NO. 54 TO FACILITY OPERATING LICENSE NO. DPR-68

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNIT NOS. 1, 2 AND 3

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

Authors: Dick Clark, Ken Eccleston

1.0 Introduction

By letter dated October 16, 1980 (TVA BFNP TS 153), and supplemented by letter dated November 18, 1981, the Tennessee Valley Authority (the licensee or TVA) requested changes to the Technical Specifications (Appendix A) appended to Facility Operating License Nos. DPR-33, DPR-52 and DPR-68 for the Browns Ferry Nuclear Plant, Units 1, 2 and 3. The proposed amendments and revised Technical Specifications would provide additional surveillance requirements for the scram discharge volume (SDV) vent and drain valves and limiting conditions for operation (LCO) and surveillance requirements on the SDV limit switches as requested by our generic letter of July 7, 1980 to the licensees of All Operating Boiling Water Reactors.

2.0 Discussion

As a result of events involving common cause failures of SDV limit switches and SDV drain valve operability, the NRC staff issued IE Bulletin 80-14 on June 12, 1980. In addition, the staff sent a letter dated July 7, 1980 to all operating BWR licensees requesting that they propose Technical Specification changes to provide surveillance requirements for SDV vent and drain valves and LCO/surveillance requirements on SDV limit switches. Model Technical Specifications were enclosed with this letter to provide guidance to licensees for preparation of the requested submittals.

3.0 Evaluation

The enclosed report (TER-C-5506-67/71/76) was prepared by Franklin Research Center (FRC) as part of a technical assistance contract program. Their report provides their technical evaluation of the compliance of the licensee's submittal with NRC provided criteria.

FRC has concluded that the licensee's response does not meet the explicit requirements of paragraph 3.3-6 and Table 3.3.6-1 of the NRC staff's Model Technical Specifications (TS). However, the FRC report concludes that technical bases are defined on p.50 of our "Generic Safety Evaluation Report BWR Scram Discharge System" dated December 1, 1980 that permit consideration of this departure from the explicit requirements of the Model Technical Specifications. We conclude that these technical bases justify a deviation from the explicit requirements of the Model TS.

FRC has concluded that the licensee's proposed TS revisions meet the staff-developed criteria without the need for further revision.

Based upon our review of the contractor's report of its evaluations, we conclude that the licensee's proposed TSs satisfy the staff-developed criteria for surveillance of SDV vent and drain valves and for LCOs and surveillance requirements for SDV limit switches. Consequently, we find the licensee's proposed TSs acceptable.

4.0 Environmental Consideration

We have determined that these amendments do not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that these amendments involve an action which is insignificant from the standpoint of environmental impact, and pursuant to 10 CFR 51.5(d)(4) that an environmental impact statement, or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of these amendments.

5.0 Conslusions

We have concluded based on the considerations discussed above that: (1) because the amendments do not involve a significant increase in the probability or consequences of accidents previously considered and do not involve a significant decrease in a safety margin, the amendments do not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Dated: May 19, 1982

Enclosure: Technical Evaluation Report

TECHNICAL EVALUATION REPORT

BWR SCRAM DISCHARGE VOLUME LONG-TERM MODIFICATIONS

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT UNITS 1, 2, AND 3

NRC DOCKET NO. 50-259, 50-260, 50-296

NRC TAC NO. 42230, 42231, 42232

NRC CONTRACT NO. NRC-03-81-130

FRC PROJECT C5506

FRC ASSIGNMENT 2

FRC TASKS 67, 71, 76

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February 5, 1982

DESIGNATED ORIGINAL

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CONTENTS

FOREWORD

This Technical Evaluation Report was prepared by Franklin Research Center under a contract with the U.S. Nuclear Regulatory Commission (Office of Nuclear Reactor Regulation, Division of Operating Reactors) for technical assistance in support of NRC operating reactor licensing actions. The technical evaluation was conducted in accordance with criteria established by the NRC.

SUMMARY

This technical evaluation report reviews and evaluates proposed Phase 1 changes in the Browns Ferry Nuclear Plant Units 1, 2 and 3 Technical Specifications for scram discharge volume (SDV) long-term modifications regarding surveillance requirements for SDV vent and drain valves and the limiting condition for operation (LCO)/surveillance requirements for reactor protection system and control rod withdrawal block SDV limit switches. Conclusions are based on the degree of compliance of the Licensee's submittal with criteria from the Nuclear Regulatory Commission (NRC) staff's Model Technical Specifications.

Proposed revisions of pages 35, 37, 73, 75, 102, 126, and 134 and unrevised pages 40, 41, and 133 for Units 1 and 2 and proposed revisions of pages 34, 36, 76, 78, 99, 129, 136, and 136a and unrevised pages 39 and 40 for Unit 3 of the Browns Ferry Technical Specifications fully meet the surveillance requirements of the NRC staff's Model Technical Specifications. Table 5-1 on pages 23 and 24 of this report summarizes the evaluation results.

1. INTRODUCTION

1.1 PURPOSE OF THE TECHNICAL EVALUATION

The purpose of this technical evaluation report (TER) is to review and evaluate the proposed changes in the Technical Specifications of the Browns Ferry Nuclear Plant Units 1, 2, and 3 boiling water reactor (BWR) in regard to "BWR Scram Discharge Volume Long-Term Modification," specifically:

- o surveillance requirements for scram discharge volume (SDV) vent and drain valves
- o limiting condition for operation (LCO)/surveillance requirements for the reactor protection system
- o LCO/surveillance requirements for the control rod withdrawal block SDV limit switches.

The evaluation uses criteria proposed by the NRC staff in Model Technical Specifications (see Appendix A of this report). This effort is directed toward the NRC objective of increasing the reliability of installed BWR scram discharge volume systems, the need for which was made apparent by events described below.

1.2 GENERIC ISSUE BACKGROUND

On June 13, 1979, while the reactor at Hatch Unit 1 was in the refuel mode, two SDV high level switches had been modified, tested, and found inoperable. The remaining switches were operable. Inspection of each inoperable level switch revealed a bent float rod binding against the side of the float chamber.

On October 19, 1979, Brunswick Unit 1 reported that water hammer due to slow closure of the SDV drain valve during a reactor scram damaged several pipe supports on the SDV drain line. Drain valve closure time was approximately 5 minutes because of a faulty solenoid controlling the air supply to the valve. After repair, to avoid probable damage from a scram, the unit was started with the SDV vent and drain valves closed except for periodic draining. During this mode of operation, the reactor scrammed due to a high water level in the

SDV system without prior actuation of either the high level alarm or rod block switch. Inspection revealed that the float ball on the rod block switch was bent, making the switches inoperable. The water hammer was reported to be the cause of these level switch failures.

As a result of these events involving common-cause failures of SDV limit switches and SDV drain valve operability, the NRC issued IE Bulletin 80-14, "Degradation of BWR Scram Discharge Volume Capability," on June 12, 1980 [1]. In addition, to strengthen the provisions of this bulletin and to ensure that the scram system would continue to work during reactor operation, the NRC sent a letter dated July 7, 1980 [2] to all operating BWR licensees requesting that they propose Technical Specifications changes to provide surveillance requirements for reactor protection system and control rod block SDV limit switches. The letter also contained the NRC staff's Model Technical Specifications to be used as a guide by licensees in preparing their submittals.

Meanwhile, during a routine shutdown of the Browns Ferry Unit 3 reactor on June 28, 1980, 76 of 185 control rods failed to insert fully. Full insertion required two additional manual scrams and an automatic scram for a total elapsed time of approximately 15 minutes between the first scram initiation and the complete insertion of all the rods. On July 3, 1980, in response to both this event and the previous events at Hatch Unit 1 and Brunswick Unit 1, the NRC issued (in addition to the earlier IE Bulletin 80-14) IE Bulletin 80-17 followed by five supplements. These initiated short-term and long-term programs described in "Generic Safety Evaluation Report BWR Scram Discharge System," NRC Staff, December 1, 1980 [9] and "Staff Report and Evaluation of Supplement 4 to IE Bulletin 80-17 (Continuous Monitoring Systems)" [10].

Analysis and evaluation of the Browns Ferry Unit 3 and other SDV system events convinced the NRC staff that SDV systems in all BWRs should be modified to assure long-term SDV reliability. Improvements were needed in three major areas: SDV-IV hydraulic coupling, level instrumentation, and system isolation. To achieve these objectives, an Office of Nuclear Reactor Regulation (NRR) task force and a subgroup of the BWR Owners Group developed revised scram discharge

system design and safety criteria for use in establishing acceptable SDV systems modifications [9]. Also, an NRC letter dated October 1, 1980 requested all operating BWR licensees to reevaluate installed SDV systems and modify them as necessary to comply with the revised criteria.

In Reference 9, the SDV-IV hydraulic coupling at the Big Rock Point, Brunswick Units 1 and 2, Duane Arnold, and Hatch Units 1 and 2 BWRs was judged acceptable. The remaining BWRs will require modification to meet the revised SDV-IV hydraulic coupling criteria, and all operating BWRs may require modification to meet the revised instrumentation and isolation criteria. The changes in Technical Specifications associated with this effort will be carried out in two phases:

Phase 1 - Improvements in surveillance for vent and drain valves and instrument volume level switches.

Phase 2 - Improvements required as a result of long-term modifications made to comply with revised design and performance criteria.

This TER is a review and evaluation of Technical Specifications changes proposed for Phase 1.

1.3 PLANT-SPECIFIC BACKGROUND

The July 7, 1980 NRC letter [2] not only requested all BWR licensees to amend their facilities' Technical Specifications with respect to control rod drive SDV capability, but enclosed the NRC staff's proposed Model Technical Specifications (see Appendix A of this TER) as a guide for the licensees in preparing the requested submittals and as a source of criteria for an FRC technical evaluation of the submittals. In this TER, FRC has reviewed and evaluated Technical Specifications changes for the Browns Ferry Nuclear Plant Units 1, 2, and 3 as proposed in letters dated October 16, 1980 and November 18, 1981 (see Appendices B and C, respectively) by the Licensee, the Tennessee Valley Authority (TVA), in regard to "BWR Scram Discharge Volume (SDV) Long-Term Modifications" and, specifically, the surveillance requirements for SDV vent and drain valves and the limiting condition for operation (LCO)/

surveillance requirements for the reactor protection system and control rod withdrawal block SDV limit switches. FRC assessed the adequacy with which the TVA information documented compliance of the proposed Technical Specifications changes with the NRC staff's Model Technical Specifications.

2. REVIEW CRITERIA

The criteria established by the NRC staff's Model Technical Specifications involving surveillance requirements of the main SDV components and instrumentation cover three areas of concern:

- o surveillance requirements for SDV vent and drain valves
- o LCO/surveillance requirements for reactor protection system SDV limit switches
- o LCO/surveillance requirements for control rod block SDV limit switches.

2.1 SURVEILLANCE REQUIREMENTS FOR SDV DRAIN AND VENT VALVES

The surveillance criteria of the NRC staff's Model Technical Specifications for SDV drain and vent valves are:

> "4.1.3.1.1 - The scram discharge volume drain and vent valves shall be demonstrated OPERABLE by:
>
> a. Verifying each valve to be open* at least once per 31 days, and
>
> b. Cycling each valve at least one complete cycle of full travel at least once per 92 days.
>
> *These valves may be closed intermittently for testing under administrative controls."

The Model Technical Specifications require testing the drain and vent valves, checking at least once every 31 days that each valve is fully open during normal operation, and cycling each valve at least one complete cycle of full travel under administrative controls at least once per 92 days.

Full opening of each valve during normal operation indicates that there is no degradation in the control air system and its components that control the air pressure to the pneumatic actuators of the drain and vent valves. Cycling each valve checks whether the valve opens fully and whether its movement is smooth, jerky, or oscillatory.

During normal operation, the drain and vent valves stay in the open position for very long periods. A silt of particulates such as metal chips

and flakes, various fibers, lint, sand, and weld slag from the water or air may accumulate at moving parts of the valves and temporarily freeze them. A strong breakout force may be needed to overcome this temporary "freeze," producing a violent jerk which may induce a severe water hammer if it occurs during a scram or a scram resetting. Periodic cycling of the drain and vent valves is the best method to clear the effects of particulate silting, thus promoting smooth opening and closing and more reliable valve operation. Also, in case of improper valve operation, cycling can indicate whether excessive pressure transients may be generated during and after a reactor scram which might damage the SDV piping system and cause a loss of system integrity or function.

2.2 LCO/SURVEILLANCE REQUIREMENTS FOR REACTOR PROTECTION SYSTEM SDV LIMIT SWITCHES

The paragraphs of the NRC staff's Model Technical Specifications pertinent to LCO/surveillance requirements for reactor protection system SDV limit switches are:

> "3.3.1 - As a minimum, the reactor protection system instrumentation channels shown in Table 3.3.1-1 shall be OPERABLE with the REACTOR PROTECTION SYSTEM RESPONSE TIME as shown in Table 3.3.1-2.

Table 3.3.1-1. Reactor Protection System Instrumentation

Functional Unit	Applicable Operational Conditions	Minimum Operable Channels Per Trip System (a)	Action
8. Scram Discharge Volume Water Level-High	1,2,5 (h)	2	4

Table 3.3.1-2. Reactor Protection System Response Times

Functional Unit	Response Time (Seconds)
8. Scram Discharge Volume Water Level-High	NA"

"4.3.1.1 - Each reactor protection system instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST, and CHANNEL CALIBRATION operations for the OPERATIONAL CONDITIONS and at the frequencies shown in Table 4.3.1.1-1.

Table 4.3.1.1-1. Reactor Protection System Instrumentation Surveillance Requirements

Functional Unit	Channel Check	Channel Functional Test	Channel Calibration	Operational Conditions in Which Surveillance Required
8. Scram Discharge Volume Water Level-High	NA	M	R	1,2,5

Notation (a) A channel may be placed in an inoperable status up to 2 hours for required surveillance without placing the trip system in the tripped condition provided at least one OPERABLE channel in the same trip system is monitoring that parameter.

(h) With any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2

Action 4: In OPERATIONAL CONDITION 1 or 2, be in at least HOT SHUTDOWN within 6 hours.

In OPERATIONAL CONDITION 5, suspend all operations involving CORE ALTERATIONS* and fully insert all insertable control rods within one hour.

*Except movement of IRM, SRM or special movable detectors, or replacement of LPRM strings provided SRM instrumentation is OPERABLE per Specification 3.9.2."

Paragraph 3.3.1 and Table 3.3.1-1 of the Model Technical Specifications require the functional unit of SDV water level-high to have at least 2 operable channels containing 2 limit switches per trip system, for a total of 4 operable channels containing 4 limit switches per 2 trip systems for the reactor protection system which automatically initiates a scram. The technical objective of these requirements is to provide 1-out-of-2-taken-twice

logic for the reactor protection system. The response time of the reactor protection system for the functional unit of SDV water level-high should be measured and kept available (it is not given in Table 3.3.1-2).

Paragraph 4.3.1.1 and Table 4.3.1.1-1 give reactor protection system instrumentation surveillance requirements for the functional unit of SDV water level-high. Each reactor protection system instrumentation channel containing a limit switch should be shown to be operable by the Channel Functional Test monthly and Channel Calibration at each refueling outage.

2.3 LCO/SURVEILLANCE REQUIREMENTS FOR CONTROL ROD WITHDRAWAL BLOCK SDV LIMIT SWITCHES

The NRC staff's Model Technical Specifications specify the following LCO/surveillance requirements for control rod withdrawal block SDV limit switches:

> "3.3.6 - The control rod withdrawal block instrumentation channel shown in Table 3.3.6-1 shall be OPERABLE with trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3.6-2.

Table 3.3.6-1. Control Rod Withdrawal Block Instrumentation

Trip Function	Minimum Operable Channels Per Trip Function	Applicable Operational Conditions	Action
5. Scram Discharge Volume			
a. Water level-high	2	1, 2, 5**	62
b. Scram trip bypassed	1	(1, 2, 5**)	62

ACTION 62: With the number of OPERABLE channels less than required by the minimum OPERABLE channels per Trip Function requirement, place the inoperable channel in the tripped condition within one hour.

**With more than one control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

Table 3.3.6-2. Control Rod Withdrawal Block Instrumentation Setpoints

Trip Function	Trip Setpoint	Allowable Value
5. Scram Discharge Volume		
a. Water level-high	To be specified	NA
b. Scram trip bypassed	NA	NA"

"4.3.6 - Each of the above control rod withdrawal block trip systems and instrumentation channels shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL CONDITIONS and at the frequencies shown in Table 4.3.6-1.

Table 4.3.6-1. Control Rod Withdrawal Block Instrumentation Surveillance Requirements

Trip Function	Channel Check	Channel Functional Test	Channel Calibration	Operational Conditions in Which Surveillance Required
5. Scram Discharge Volume				
a. Water Level-High	NA	Q	R	1, 2, 5**
b. Scram Trip Bypassed	NA	M	NA	(1, 2, 5**)

**With more than one control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2."

Paragraph 3.3.6 and Table 3.3.6-1 of the Model Technical Specifications require the control rod withdrawal block instrumentation to have at least 2 operable channels containing 2 limit switches for SDV water level-high and 1 operable channel containing 1 limit switch for SDV scram trip bypassed. The technical objective of these requirements is to have at least one channel containing one limit switch available to monitor the SDV water level when the other channel with a limit switch is being tested or undergoing maintenance. The trip setpoint for control rod withdrawal block instrumentation monitoring

SDV water level-high should be specified as indicated in Table 3.3.6-2. The trip function prevents further withdrawal of any control rod when the control rod block SDV limit switches indicate water level-high.

Paragraph 4.3.6 and Table 4.3.6-1 require that each control rod withdrawal block instrumentation channel containing a limit switch be shown to be operable by the Channel Functional Test once per 3 months for SDV water level-high, by the Channel Functional Test once per month for SDV scram trip bypassed, and by Channel Calibration at each refueling outage for SDV water level-high.

The Surveillance Criteria of the BWR Owners Subgroup given in Appendix A, "Long-Term Evaluation of Scram Discharge System," of "Generic Safety Evaluation Report BWR Scram Discharge System," written by the NRC staff and issued on December 1, 1980, are:

1. Vent and drain valves shall be periodically tested.
2. Verifying and level detection instrumentation shall be periodically tested in place.
3. The operability of the entire system as an integrated whole shall be demonstrated periodically and during each operating cycle, by demonstrating scram instrument response and valve function at pressure and temperature at approximately 50% control rod density.

Analysis of the above criteria indicates that the NRC staff's Model Technical Specifications requirements, the acceptance criteria for the present TER, fully cover the BWR Owners Subgroup Surveillance Criteria 1 and 2 and partially cover Criterion 3.

3. METHOD OF EVALUATION

The TVA submittal for the Browns Ferry Nuclear Plant Units 1, 2, and 3 was evaluated in two stages, initial and final.

During the initial evaluation, only the NRC staff's Model Technical Specifications requirements were used to determine if:

- the Licensee's submittal was responsive to the July 7, 1980 NRC request for proposed Technical Specifications changes involving the surveillance requirements of the SDV vent and drain valves, LCO/surveillance requirements for reactor protection system SDV limit switches, and LCO/surveillance requirements for control rod block SDV limit switches
- the submitted information was sufficient to permit a detailed technical evaluation.

During the final evaluation, in addition to the NRC staff's Model Technical Specifications requirements, background material in References 1 through 10, pertinent sections of "Tennessee Valley Authority Browns Ferry Nuclear Plant Units 1, 2, and 3 Safety Analysis Report," and Browns Ferry Technical Specifications were studied to determine the technical bases for the design of SDV main components and instrumentation. Subsequently, the Licensee's response was compared directly to the requirements of the NRC staff's Model Technical Specifications. The findings of the final evaluation are presented in Section 4 of this report.

The initial evaluation concluded that the Licensee's submittal was responsive to the NRC request of July 7, 1980, but some detailed information was lacking. A Request for Additional Information (RAI) was sent to TVA by the NRC on October 2, 1981. Thus, this TER is based on the initial submittal and the Licensee's response dated November 18, 1981 (see Appendix C) to the RAI.

4. TECHNICAL EVALUATION

4.1 SURVEILLANCE REQUIREMENTS FOR SDV DRAIN AND VENT VALVES

NRC STAFF'S MODEL TECHNICAL SPECIFICATIONS

Paragraph 4.1.3.1.1 requires demonstrating that the SDV drain and vent valves are operable by:

a. verifying each valve to be open at least once per 31 days (valves may be closed intermittently for testing under administrative controls)

b. cycling each valve at least one complete cycle of full travel at least once per 92 days.

LICENSEE RESPONSE

The Licensee proposed to revise pages 126 and 134 of the Browns Ferry Nuclear Plant Units 1 and 2 Technical Specifications and pages 129, 136, and 136a of the Browns Ferry Nuclear Plant Unit 3 Technical Specifications, providing the following information:

"LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
F. Scram Discharge Volume	F. Scram Discharge Volume
The scram discharge volume drain and vent valves shall be operable any time that the Reactor Protection System scram function is required to be operable. When it is determined that one of these valves is inoperable at a time when operability is required, the reactor shall be in cold shutdown within 24 hours.	1.a. The scram discharge volume drain and vent valves shall be verified open prior to each startup and monthly thereafter. The valves may be closed intermittently for testing not to exceed 1 hour in any 24 hour period during operation. b. The scram discharge volume drain and vent valves shall be demonstrated operable monthly.

3.3/4.3 BASES:

F. Scram Discharge Volume

The nominal stroke time for the scram discharge volume vent and drain valves is $\leq$30 seconds following a scram. The purpose of these valves is to limit the quantity of reactor water discharged after a scram and no

direct safety function is performed. The surveillance for the valves assures that system drainage is not impeded by a valve which fails to open and that the valves are operable and capable of closing upon a scram."

FRC EVALUATION

The proposed revision of pages 126 and 134 for Units 1 and 2 and pages 129, 136, and 136a for Unit 3 of the Browns Ferry Nuclear Plant Technical Specifications complies with the requirements of paragraphs 4.1.3.1.1a and b of the NRC staff's Model Technical Specifications regarding surveillance requirements for SDV drain and vent valves.

4.2 LCO/SURVEILLANCE REQUIREMENTS FOR REACTOR PROTECTION SYSTEM SDV LIMIT SWITCHES

NRC STAFF'S MODEL TECHNICAL SPECIFICATIONS

Paragraph 3.3.1 and Table 3.3.1-1 require the functional unit of SDV water level-high to have at least 2 operable channels containing 2 limit switches per trip system, for a total of 4 operable channels containing 4 limit switches per 2 trip systems for the reactor protection system which automatically initiates scram.

Paragraph 3.3.1 and Table 3.3.1-2 concern the response time of the reactor protection system for the functional unit of SDV water level-high which should be specified for each BWR (it is not specified in the table). Paragraph 4.3.1.1 and Table 4.3.1.1-1 require that each reactor protection system instrumentation channel containing a limit switch be shown to be operable for the functional unit of SDV water level-high by the Channel Functional Test monthly and Channel Calibration at each refueling outage. The applicable operational conditions for these requirements are startup, run, and refuel.

LICENSEE RESPONSE

The Licensee provided the following information in answer to the RAI:

"Item

Provide a reference to that section of the Technical Specifications for Browns Ferry Nuclear Power Station Units 1, 2, and 3 which indicates that

the reactor protection system SDV water level-high consists of 2 OPERABLE channels containing two limit switches per trip system, for a total of 4 OPERABLE channels containing 4 limit switches per two trip system, making 1-out-of 2 taken twice logic.

Response

Browns Ferry Technical Specifications Section 3.1 in conjunction with Table 3.1.A and Note 1 to Table 3.1.A indicate that the SDV water level-high reactor scram function consists of four operable channels containing four switches for two trip systems, making 1-out-of-2 twice logic.

Item

1. Provide a reference to the pages of the Technical Specifications where CHANNEL CALIBRATION operations each refueling outage is specified, or

2. Provide technical bases why the CHANNEL CALIBRATION operations each refueling outage should not be performed.

RESPONSE

Browns Ferry Technical Specifications Table 4.1.B and Note 5 to that table require physical inspection and actuation of each channel once each operating cycle. Physical actuation upon the presence of liquid at the switch serves the purpose of a calibration."

In addition, the Licensee proposed to revise pages 35 and 37 for Units 1 and 2 and pages 34 and 36 for Unit 3 in the initial submittal of October 16, 1980.

Page 33 for Units 1 and 2 and page 32 for Unit 3 contain Table 3.1.A, Reactor Protection System (Scram) Instrumentation Requirement, with the following information for Trip Function:

"High Water Level in Scram Discharge Tank:

1. Min. No. of Operable Inst. Channels Per Trip System (1): 2

2. Trip Level Setting: $\leq$50 Gallons

3. Modes in Which Function Must be Operable: Shutdown, Refuel (7) (2), Startup/Hot Standby, Run

4. Action (1): 1.A

Notes for Table 3.1.A

1. There shall be two operable or tripped trip systems for each function. If the minimum number of operable instrument channels per trip system cannot be met for both trip systems, the appropriate actions listed below shall be taken.

   A. Initiate insertion of operable rods and complete insertion of all operable rods within four hours

2. Scram discharge volume high bypass may be used in shutdown or refuel to bypass scram discharge volume scram with control rod block for reactor protection system reset.

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

   A. Mode switch in shutdown

   B. Manual scram

   C. High flux IRM

   D. Scram discharge volume high level

   E. APRM 15% scram"

The revised page 35 for Units 1 and 2 and the revised page 34 for Unit 3 in "Notes for Table 3.1.A" contain revision of Note 1.A. The following sentence is added at the end of Note 1.A.: "In refueling mode, suspend all operations involving core alterations and fully insert all operable control rods within one hour." Table 3.1.A of the current Browns Ferry Technical Specifications with revised Note 1.A contained in the revised pages 35 (for Units 1 and 2) and 34 (for Unit 3) addresses the NRC staff's Model Technical Specifications requirements of paragraph 3.3.1 and Table 3.3.1-1.

The requirements of paragraph 3.3.1 and Table 3.3.1-2 concerning the response time of the reactor protection system for the functional unit of SDV water level-high are covered by the Browns Ferry Specifications page 133 (for Units 1 and 2) and page 136 (for Unit 3). These pages contain the following statement:

"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 and 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."

The revised page 37 for Units 1 and 2 and the revised page 36 for Unit 3 contain Table 4.1.A, Reactor Protection System (Scram) Instrumentation Functional Tests, Minimum Functional Test Frequencies for Safety Instr. and Control Circuits, with the following information for High Water Level in Scram Discharge Tank:

"1. Group (2): A

2. Functional Test: Trip Channel and Alarm

3. Minimum Frequency (3): Once/month

Notes for Table 4.1.A:

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

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

A. On-off sensors that provide a scram trip function."

The original page 40 for Units 1 and 2 and the original page 39 for Unit 3 of the Browns Ferry Technical Specifications contain Table 4.1.B, Reactor Protection System (Scram) Instrument Calibration, Minimum Calibration Frequencies for Reactor Protection Instrument Channels, with the following information for Instrument Channel High Water Level in Scram Discharge Volume:

"1. Group (1): A

2. Calibration: Note (5)

3. Minimum Frequency (2): Note (5)"

From page 41 for Units 1 and 2, and from page 40 for Unit 3:

"Notes for Table 4.1.B

1. A description of three groups is included in the bases of this specification.

2. Calibrations are not required when the systems are not required to be operable or are tripped. If calibrations are missed, they shall be performed prior to returning the system to an operable status.

5. Physical inspection and actuation of these position switches will be performed once per operating cycle."

Tables 4.1.A and 4.1.B of the Browns Ferry Technical Specifications address the requirements of paragraph 4.3.1.1 and Table 4.3.1.1-1 of the NRC staff's Model Technical Specifications.

FRC EVALUATION

The Licensee's response to the NRC staff's Model Technical Specifications requirements of paragraph 3.3.1 and Table 3.3.1-1 is acceptable. The Browns Ferry Nuclear Plant Units 1, 2, and 3 reactor protection system SDV water level-high instrumentation consists of two operable channels containing two limit switches per trip system, for a total of four operable channels containing four limit switches per two trip systems, making 1-out-of-2-taken-twice logic. The original page 33 for Units 1 and 2 and the original page 32 for Unit 3 with Table 3.1.A also specify $\leq$ 50 gallons as a trip setting for scram initiation and applicable operating conditions of shutdown, refuel, startup/hot standby, and run, which are acceptable.

The reactor protection system response time of 290 milliseconds specified by the Browns Ferry Specifications, page 133 for Units 1 and 2 and page 136 for Unit 3, is acceptable and covers the requirements of paragraph 3.3.1 and Table 3.3.1-2.

The revised page 37 for Units 1 and 2 and the revised page 36 for Unit 3 meet the NRC staff's Model Technical Specifications requirements of paragraph 4.3.1.1 and Table 4.3.1.1-1, which require the Channel Functional Test monthly. The original pages 40 and 41 for Units 1 and 2 and the original pages 39 and

40 for Unit 3 with Table 4.1.B and Note (5) specify Channel Calibration once per operating cycle; this addresses the NRC staff's Model Technical Specifications requirements of paragraph 4.3.1.1 and Table 4.3.1.1-1 and is acceptable.

4.3 LCO/SURVEILLANCE REQUIREMENTS FOR CONTROL ROD WITHDRAWAL BLOCK SDV LIMIT SWITCHES

NRC STAFF'S MODEL TECHNICAL SPECIFICATIONS

Paragraph 3.3.6 and Table 3.3.6-1 require the control rod withdrawal block instrumentation to have at least 2 operable channels containing 2 limit switches for SDV water level-high, and 1 operable channel containing 1 limit switch for SDV trip bypassed. Paragraph 3.3.6 also requires specifying the trip setpoint for control rod withdrawal block instrumentation monitoring SDV water level-high as indicated in Table 3.3.6-2.

Paragraph 4.3.6 and Table 4.3.6-1 require each control rod withdrawal block instrumentation channel containing a limit switch to be shown to be operable by the Channel Functional Test once per 3 months for SDV water level-high, by the Channel Functional Test once per month for SDV scram trip bypassed, and by Channel Calibration at each refueling outage for SDV water level-high.

LICENSEE RESPONSE

The Licensee provided the revised pages 73, 75, and 102 for Units 1 and 2 and pages 76, 78, and 99 for Unit 3 of the Browns Ferry Technical Specifications. Page 73 for Units 1 and 2 and page 76 for Unit 3 contain Table 3.2.C, Instrumentation That Initiates Rod Blocks, with the following information for "Function - Scram Discharge Tank Water Level High":

"1. Minimum No. Operable Per Trip Sys. (5): 1(12)

2. Trip Level Setting: $\leq$25 gal."

From revised page 75 for Units 1 and 2 and 78 for Unit 3:

"Note 12. This function may be bypassed in the shutdown or refuel mode. If this function is inoperable at a time when operability is required the

channel shall be tripped or administrative controls shall be immediately imposed to prevent control rod withdrawal."

Table 3.2.C addresses the NRC staff's Model Technical Specifications requirements of paragraph 3.3.6, Table 3.3.6-1, and Table 3.3.6-2. The requirements of paragraph 4.3.6 and Table 4.3.6-1 are covered by proposed revision of page 102 for Units 1 and 2 and page 99 for Unit 3. These pages contain Table 4.2.C, Surveillance Requirements for Instrumentation that Initate Rod Blocks, with the following information for "Function - Scram Discharge Tank Water Level High":

"1. Functional Test: Once/quarter

2. Calibration: Once/operating cycle

3. Instrument Check: N/A"

FRC EVALUATION*

The existing Browns Ferry Nuclear Plant Units 1, 2, and 3 scram discharge system has six level switches on the scram discharge volume (see FSAR, page 3.4-15) set at three different water levels to guard against operation of the reactor without sufficient free volume present in the scram discharge headers to receive the scram discharge water in the event of a scram. At the first (lowest) level, one level switch initiates an alarm for operator action. At the second level, with the setpoint of $\leq$ 25 gallons (see revised page 73 for Units 1 and 2 and page 76 for Unit 3, Table 3.2.C), one level switch initiates a rod withdrawal block to prevent further withdrawal of any control rod. At the third (highest) level, with the setpoint of 50 $\pm$ 0/1 gallons (see FSAR, Table 7.2.1), the four level switches (two for each reactor protection system trip system) initiate a scram to shut down the reactor while sufficient free volume is available to receive the scram discharge water. Reference 9, page

*No use was made of the Licensee's response to the RAI, since the proposed specifications changes in the original submittal, regarding LCO/surveillance requirements for control rod withdrawal block SDV limit switches, are acceptable.

50, defines Design Criterion 9 ("Instrumentation shall be provided to aid the operator in the detection of water accumulation in the instrumented volume(s) prior to scram initiation"), gives the technical basis for "Long-Term Evaluation of Scram Discharge System," and defines acceptable compliance ("The present alarm and rod block instrumentation meets this criterion given adequate hydraulic coupling with the SDV headers"). Thus, if the Browns Ferry Nuclear Plant Units 1, 2, and 3 scram discharge system is modified (long term) so that the hydraulic coupling between scram discharge headers and instrumented volume is adequate and acceptable, then the present alarm and rod block instrumentation consisting of one operable instrument channel with one limit switch for control rod withdrawal block as specified on revised page 73 for Units 1 and 2 and page 76 for Unit 3 is also acceptable.

In the Browns Ferry Nuclear Plant Units 1, 2, and 3, "Scram Discharge Volume Scram Trips" cannot be bypassed while the reactor is in operational conditions of startup and run (see FSAR page 7.2-12), and operational condition "refuel with more than one control rod withdrawn" is not applicable, since interlocks are provided which prevent the withdrawal of more than one control rod with the mode switch in the refuel position. Thus, the NRC staff's Model Technical Specifications requirements of paragraph 3.3.6 with Table 3.3.6-1 and paragraph 4.3.6 with Table 4.3.6-1 are not applicable to the Browns Ferry Nuclear Plant Units 1, 2, and 3 for "Trip Function 5.b, Scram Discharge Volume Scram Trip Bypassed" and were not addressed in the proposed revision of pages 73 and 102 for Units 1 and 2 and pages 76 and 99 for Unit 3. This is acceptable.

The 25-gallon trip setpoint for control rod withdrawal block instrumentation is acceptable (see revised page 73 for Units 1 and 2 and page 76 for Unit 3 of the Browns Ferry Technical Specifications). The Licensee's proposed revision of pages 102 and 99, Table 4.2.C, to meet the requirements of paragraph 4.3.6 and Table 4.3.6-1 is also acceptable since it prescribes the Channel Functional Test of each control rod withdrawal block instrumentation channel containing a limit switch quarterly and Channel Calibration once per operating cycle for SDV water level-high.

5. CONCLUSIONS

Table 5-1 summarizes the results of the final review and evaluation of the Browns Ferry Nuclear Plant Units 1, 2, and 3 proposed Phase 1 Technical Specifications changes for SDV long-term modification in regard to surveillance requirements for SDV vent and drain valves and LCO/surveillance requirements for reactor protection system and control rod block SDV limit switches. The following conclusions were made:

- The proposed revision of pages 35, 37, 73, 75, 102, 126, and 134 for Units 1 and 2 and pages 34, 36, 76, 78, 99, 129, 136, and 136a for Unit 3 of the Browns Ferry Technical Specifications is acceptable.
- The revised pages given above and the original pages 40, 41, and 133 for Units 1 and 2 and pages 39 and 40 for Unit 3 meet the surveillance requirements of the NRC staff's Model Technical Specifications.

Table 5-1. Evaluation of Phase 1 Proposed Technical Specifications Changes for Scram Discharge Volume Long-Term Modifications Browns Ferry Nuclear Plant Units 1, 2, and 3

Surveillance Requirements	Technical Specifications: NRC Staff Model (Paragraph)	Technical Specifications: Proposed by Licensee	Evaluation
SDV DRAIN AND VENT VALVES			
Verify each valve open	Once per 31 days (4.1.3.1.1a)	Once per month (pp. 126, 134 and 129, 136, 136a revised)	Acceptable
Cycle each valve one complete cycle	Once per 92 days (4.1.3.1.1b)	Once per month (pp. 126, 134 and 129, 136, 136a revised)	Acceptable
REACTOR PROTECTION SYSTEM SDV LIMIT SWITCHES			
Minimum operable channels per trip system	2 (3.3.1, Table 3.3.1-1)	2 (pp. 33 and 32, Table 3.1.A)	Acceptable
SDV water level-high response time	NA (3.3.1, Table 3.3.1-2)	0.290 sec. max. 0.210 sec. test. (pp. 133 and 136)	Acceptable
SDV water level-high			
Channel functional test	Monthly (4.3.1.1, Table 4.3.1.1-1)	Once per month (pp. 37 and 36, Table 4.1.A, revised)	Acceptable
Channel calibration	Each refueling (4.3.1.1, Table 4.3.1.1-1)	Once per operating cycle (pp. 40, 41 and 39, 40, Table 4.1.B)	Acceptable

Surveillance Requirements	Technical Specifications: NRC Staff Model (Paragraph)	Technical Specifications: Proposed by Licensee	Evaluation
CONTROL ROD BLOCK SDV LIMIT SWITCHES			
Minimum operable channels per trip function			
SDV water level-high	2 (3.3.6, Table 3.3.6-1)	1 (pp. 73 and 76, Table 3.2.C, revised)	Acceptable*
SDV scram trip bypassed	1 (3.3.6, Table 3.3.6-1)	NA (pp. 73 and 76, Table 3.2.C, revised)	Acceptable*
SDV water level-high			
Trip setpoint	NA (3.3.6, Table 3.3.6-2)	≤25 gallons (pp. 73 and 76, Table 3.2.C, revised)	Acceptable
Channel functional test	Quarterly (4.3.6, Table 4.3.6-1)	Quarterly (pp. 102 and 99, Table 4.2.C, revised)	Acceptable
Channel calibration	Each refueling (4.3.6, Table 4.3.6-1)	Once per operating cycle (pp. 102 and 99, Table 4.2.C, revised)	Acceptable
SDV scram trip bypassed			
Channel functional test	Monthly (4.3.6, Table 4.3.6-1)	NA	Acceptable*

* See Reference 9, p. 50, and pp. 20 and 21 of this TER.

6. REFERENCES

1. IE Bulletin 80-14, "Degradation of BWR Scram Discharge Volume Capacity"
   NRC, Office of Inspection and Enforcement, June 12, 1980

2. D. G. Eisenhut (NRR), letter "To All Operating Boiling Water Reactors (BWRs)" with enclosure, "Model Technical Specifications"
   July 7, 1980

3. IE Bulletin 80-17, "Failure of 76 of 185 Control Rods to Fully Insert During a Scram at a BWR"
   NRC, Office of Inspection and Enforcement, July 3, 1980

4. IE Bulletin 80-17, Supplement 1, "Failure of 76 of 185 Control Rods to Fully Insert During a Scram at a BWR"
   NRC, Office of Inspection and Enforcement, July 18, 1980

5. IE Bulletin 80-17, Supplement 2, "Failures Revealed by Testing Subsequent to Failure of Control Rods to Insert During a Scram at a BWR"
   NRC, Office of Inspection and Enforcement, July 22, 1980

6. IE Bulletin 80-17, Supplement 3, "Failure of Control Rods to Insert During a Scram at a BWR"
   NRC, Office of Inspection and Enforcement, August 22, 1980

7. IE Bulletin 80-17, Supplement 4, "Failure of Control Rods to Insert During a Scram at a BWR"
   NRC, Office of Inspection and Enforcement, December 18, 1980

8. IE Bulletin 80-17, Supplement 5, "Failure of Control Rods to Insert During a Scram at a BWR"
   NRC, Office of Inspection and Enforcement, February 13, 1981

9. P. S. Check (NRR), memorandum with enclosure, "Generic Safety Evaluation Report BWR Scram Discharge System"
   December 1, 1980

10. P. S. Check (NRR), memorandum with enclosure, "Staff Report and Evaluation of Supplement 4 to IE Bulletin 80-17"
    June 10, 1981

APPENDIX A

NRC STAFF'S MODEL TECHNICAL SPECIFICATIONS*

* Note: Applicable changes are marked by vertical lines in the margins.

REACTIVITY CONTROL SYSTEMS

LIMITING CONDITION FOR OPERATION (Continued)

ACTION (Continued)

2. If the inoperable control rod(s) is inserted, within one hour disarm the associated directional control valves either:

   a) Electrically, or

   b) Hydraulically by closing the drive water and exhaust water isolation valves.

3. Otherwise, be in at least HOT SHUTDOWN within the next 12 hours.

c. With more than 8 control rods inoperable, be in at least HOT SHUTDOWN within 12 hours.

SURVEILLANCE REQUIREMENTS

4.1.3.1.1 The scram discharge volume drain and vent valves shall be demonstrated OPERABLE by:

a. Verifying each valve to be open* at least once per 31 days and

b. Cycling each valve through at least one complete cycle of full travel at least once per 92 days.

4.1.3.1.2 When above the preset power level of the RWM and RSCS, all withdrawn control rods not required to have their directional control valves disarmed electrically or hydraulically shall be demonstrated OPERABLE by moving each control rod at least one notch:

a. At least once per 7 days, and

b. At least once per 24 hours when any control rod is immovable as a result of excessive friction or mechanical interference.

4.1.3.1.3 All control rods shall be demonstrated OPERABLE by performance of Surveillance Requirements 4.1.3.2, 4.1.3.4, 4.1.3.5, 4.1.3.6 and 4.1.3.7.

*These valves may be closed intermittently for testing under administrative controls.

REACTIVITY CONTROL SYSTEMS

CONTROL ROD MAXIMUM SCRAM INSERTION TIMES

LIMITING CONDITION FOR OPERATION

3.1.3.2 The maximum scram insertion time of each control rod from the fully withdrawn position to notch position (6), based on de-energization of the scram pilot valve solenoids as time zero, shall not exceed (7.0) seconds.

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2.

ACTION:

With the maximum scram insertion time of one or more control rods exceeding (7.0) seconds:

a. Declare the control rod(s) with the slow insertion time inoperable, and

b. Perform the Surveillance Requirements of Specification 4.1.3.2.c at least once per 60 days when operation is continued with three or more control rods with maximum scram insertion times in excess of (7.0) seconds, or

c. Be in at least HOT SHUTDOWN within 12 hours.

SURVEILLANCE REQUIREMENTS

4.1.3.2 The maximum scram insertion time of the control rods shall be demonstrated through measurement with reactor coolant pressure greater than or equal to 950 psig and, during single control rod scram time tests, the control rod drive pumps isolated from the accumulators:

a. For all control rods prior to THERMAL POWER exceeding 40% of RATED THERMAL POWER following CORE ALTERATIONS or after a reactor shutdown that is greater than 120 days,

b. For specifically affected individual control rods following maintenance on or modification to the control rod or control rod drive system which could affect the scram insertion time of those specific control rods, and

c. For 10% of the control rods, on a rotating basis, at least once per 120 days of operation.

3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR PROTECTION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the reactor protection system instrumentation channels shown in Table 3.3.1-1 shall be OPERABLE with the REACTOR PROTECTION SYSTEM RESPONSE TIME as shown in Table 3.3.1-2.

APPLICABILITY: As shown in Table 3.3.1-1.

ACTION:

a. With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement for one trip system, place at least one inoperable channel in the tripped condition within one hour.

b. With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement for both trip systems, place at least one inoperable channel in at least one trip system* in the tripped condition within one hour and take the ACTION required by Table 3.3.1-1.

c. The provisions of Specification 3.0.3 are not applicable in OPERATIONAL CONDITION 5.

SURVEILLANCE REQUIREMENTS

4.3.1.1 Each reactor protection system instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL CONDITIONS and at the frequencies shown in Table 4.3.1.1-1.

4.3.1.2 LOGIC SYSTEM FUNCTIONAL TESTS and simulated automatic operation of all channels shall be performed at least once per 18 months.

4.3.1.3 The REACTOR PROTECTION SYSTEM RESPONSE TIME of each reactor trip function shown in Table 3.3.1-2 shall be demonstrated to be within its limit at least once per 18 months. Each test shall include at least one logic train such that both logic trains are tested at least once per 36 months and one channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip function.

* If both channels are inoperable in one trip system, select at least one inoperable channel in that trip system to place in the tripped condition, except when this would cause the Trip Function to occur.

TABLE 3.3.1-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	APPLICABLE OPERATIONAL CONDITIONS	MINIMUM OPERABLE CHANNELS PER TRIP SYSTEM (a)	ACTION
8. Scram Discharge Volume Water Level - High	1, 2, 5(h)	2	4
9. Turbine Stop Valve - Closure	1(i)	4(j)	7
10. Turbine Control Valve Fast Closure, Trip Oil Pressure - Low	1(i)	2(j)	7
11. Reactor Mode Switch in Shutdown Position	1, 2, 3, 4, 5	1	8
12. Manual Scram	1, 2, 3, 4, 5	1	9

TABLE 3.3.1-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION

ACTION

ACTION 1 - In OPERATIONAL CONDITION 2, be in at least HOT SHUTDOWN within 6 hours.

In OPERATIONAL CONDITION 5, suspend all operations involving CORE ALTERATIONS* and fully insert all insertable control rods within one hour.

ACTION 2 - Lock the reactor mode switch in the Shutdown position within one hour.

ACTION 3 - Be in at least STARTUP within 2 hours.

ACTION 4 - In OPERATIONAL CONDITION 1 or 2, be in at least HOT SHUTDOWN within 6 hours.

In OPERATIONAL CONDITION 5, suspend all operations involving CORE ALTERATIONS* and fully insert all insertable control rods within one hour.

ACTION 5 - Be in at least HOT SHUTDOWN within 6 hours.

ACTION 6 - Be in STARTUP with the main steam line isolation valves closed within 2 hours or in at least HOT SHUTDOWN within 6 hours.

ACTION 7 - Initiate a reduction in THERMAL POWER within 15 minutes and reduce turbine first stage pressure to $\leq$ (250) psig, equivalent to THERMAL POWER less than (30)% of RATED THERMAL POWER, within 2 hours..

ACTION 8 - In OPERATIONAL CONDITION 1 or 2, be in at least HOT SHUTDOWN within 6 hours.

In OPERATIONAL CONDITION 3 or 4, verify all insertable control rods to be fully inserted within one hour.

In OPERATIONAL CONDITION 5, suspend all operations involving CORE ALTERATIONS* and fully insert all insertable control rods within one hour.

ACTION 9 In OPERATIONAL CONDITION 1 or 2, be in at least HOT SHUTDOWN within 6 hours.

In OPERATIONAL CONDITION 3 or 4, lock the reactor mode switch in the Shutdown position within one hour.

In OPERATIONAL CONDITION 5, suspend all operations involving CORE ALTERATIONS* and fully insert all insertable control rods within one hour.

*Except movement of IRM, SRM or special movable detectors, or replacement of LPRM strings provided SRM instrumentation is OPERABLE per Specification 3.9.2.

TABLE 3.3.1-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION

TABLE NOTATIONS

(a) A channel may be placed in an inoperable status for up to 2 hours for required surveillance without placing the trip system in the tripped condition provided at least one OPERABLE channel in the same trip system is monitoring that parameter.

b) The "shorting links" shall be removed from the RPS circuitry prior to and during the time any control rod is withdrawn* and shutdown margin demonstrations performed per Specification 3.10.3.

(c) An APRM channel is inoperable if there are less than 2 LPRM inputs per level or less than (11) LPRM inputs to an APRM channel.

(d) These functions are not required to be OPERABLE when the reactor pressure vessel head is unbolted or removed per Specification 3.10.1.

(e) This function shall be automatically bypassed when the reactor mode switch is not in the Run position.

(f) This function is not required to be OPERABLE when PRIMARY CONTAINMENT INTEGRITY is not required.

(g) Also actuates the standby gas treatment system.

(h) With any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

(i) These functions are automatically bypassed when turbine first stage pressure is < (250) psig, equivalent to THERMAL POWER less than (30)% of RATED THERMAL POWER.

(j) Also actuates the EOC-RPT system.

*Not required for control rods removed per Specification 3.9.10.1 or 3.9.10.2.

TABLE 3.3.1-2

REACTOR PROTECTION SYSTEM RESPONSE TIMES

FUNCTIONAL UNIT	RESPONSE TIME (Seconds)
1. Intermediate Range Monitors:	
a. Neutron Flux - Upscale	NA
b. Inoperative	NA
2. Average Power Range Monitor*:	
a. Neutron Flux - Upscale, (15)%	NA
b. Flow Biased Simulated Thermal Power - Upscale	≤ (0.09)**
c. Fixed Neutron Flux - Upscale, (118)%	≤ (0.09)
d. Inoperative	NA
e. LPRM	NA
3. Reactor Vessel Steam Dome Pressure - High	≤ (0.55)
4. Reactor Vessel Water Level - Low, Level 3	≤ (1.05)
5. Main Steam Line Isolation Valve - Closure	≤ (0.06)
6. Main Steam Line Radiation - High	NA
7. Primary Containment Pressure - High	NA
8. Scram Discharge Volume Water Level - High	NA
9. Turbine Stop Valve - Closure	≤ (0.06)
10. Turbine Control Valve Fast Closure, Trip Oil Pressure - Low	≤ (0.08)#
11. Reactor Mode Switch in Shutdown Position	NA
12. Manual Scram	NA

*Neutron detectors are exempt from response time testing. Response time shall be measured from the detector output or from the input of the first electronic component in the channel. (This provision is not applicable to Construction Permits docketed after January 1, 1970. See Regulatory Guide 1.10, November 1977.)

**Not including simulated thermal power time constant.

#Measured from start of turbine control valve fast closure.

TABLE 4.3.1.1-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED
8. Scram Discharge Volume Water Level - High	NA	M	R	1, 2, 5
9. Turbine Stop Valve - Closure	NA	M	R	1
10. Turbine Control Valve Fast Closure Trip Oil Pressure - Low	NA	M	Q	1
11. Reactor Mode Switch in Shutdown Position	NA	R	NA	1, 2, 3, 4, 5
12. Manual Scram	NA	M	NA	1, 2, 3, 4, 5

(a) Neutron detectors may be excluded from CHANNEL CALIBRATION.
(b) Within 24 hours prior to startup, if not performed within the previous 7 days.
(c) The IRM and SRM channels shall be determined to overlap for at least ( ) decades during each startup and the IRM and APRM channels shall be determined to overlap for at least ( ) decades during each controlled shutdown, if not performed within the previous 7 days.
(d) This calibration shall consist of the adjustment of the APRM channel to conform to the power values calculated by a heat balance during OPERATIONAL CONDITION 1 when THERMAL POWER ≥ 25% of RATED THERMAL POWER. Adjust the APRM channel if the absolute difference greater than 2%. Any APRM channel gain adjustment made in compliance with Specification 3.2.2 shall not be included in determining the absolute difference.
(e) This calibration shall consist of the adjustment of the APRM readout to conform to a calibrated flow signal.
(f) The LPRMs shall be calibrated at least once per 1000 effective full power hours (EFPH) using the TIP system.

INSTRUMENTATION

3/4.3.6 CONTROL ROD WITHDRAWAL BLOCK INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.6. The control rod withdrawal block instrumentation channels shown in Table 3.3.6-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3.6-2.

APPLICABILITY: As shown in Table 3.3.6-1.

ACTION:

a. With a control rod withdrawal block instrumentation channel trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3.6-2, declare the channel inoperable until the channel is restored to OPERABLE status with its trip setpoint adjusted consistent with the Trip Setpoint value.

b. With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, take the ACTION required by Table 3.3.6-1.

c. The provisions of Specification 3.0.3 are not applicable in OPERATIONAL CONDITION 5.

SURVEILLANCE REQUIREMENTS

4.3.6 Each of the above required control rod withdrawal block trip systems and instrumentation channels shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL CONDITIONS and at the frequencies shown in Table 4.3.6-1.

TABLE 3.3.6-1

CONTROL ROD WITHDRAWAL BLOCK INSTRUMENTATION

TRIP FUNCTION	MINIMUM OPERABLE CHANNELS PER TRIP FUNCTION	APPLICABLE OPERATIONAL CONDITIONS	ACTION
1. ROD BLOCK MONITOR[a]			
a. Upscale	2	1*	60
b. Inoperative	2	1*	60
c. Downscale	2	1*	60
2. APRM			
a. Flow Biased Simulated Thermal Power - Upscale	4	1	61
b. Inoperative	4	1, 2, 5	61
c. Downscale	4	1	61
d. Neutron Flux - Upscale, Startup	4	2, 5	61
3. SOURCE RANGE MONITORS			
a. Detector not full in[b]	3	2	61
	2	5	61
b. Upscale[c]	3	2	61
	2	5	61
c. Inoperative[c]	3	2	61
	2	5	61
d. Downscale[d]	3	2	61
	2	5	61
4. INTERMEDIATE RANGE MONITORS			
a. Detector not full in (e)	6	2, 5	61
b. Upscale	6	2, 5	61
c. Inoperative	6	2, 5	61
d. Downscale[e]	6	2, 5	61
5. SCRAM DISCHARGE VOLUME			
a. Water Level-High	2	1, 2, 5**	62
b. Scram Trip Bypassed	1	(1, 2, 5**)	62
6. REACTOR COOLANT SYSTEM RECIRCULATION FLOW			
a. Upscale	2	1	62
b. Inoperative	2	1	62
c. (Comparator) (Downscale)	2	1	62

TABLE 3.3.6-1 (Continued)

CONTROL ROD WITHDRAWAL BLOCK INSTRUMENTATION

ACTION

ACTION 60 - Take the ACTION required by Specification 3.1.4.3.

ACTION 61 - With the number of OPERABLE Channels:

a. One less than required by the Minimum OPERABLE Channels per Trip Function requirement, restore the inoperable channel to OPERABLE status within 7 days or place the inoperable channel in the tripped condition within the next hour.

b. Two or more less than required by the Minimum OPERABLE Channels per Trip Function requirement, place at least one inoperable channel in the tripped condition within one hour.

ACTION 62 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, place the inoperable channel in the tripped condition within one hour.

NOTES

* With THERMAL POWER ≥ (20)% of RATED THERMAL POWER.

** With more than one control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

a. The RBM shall be automatically bypassed when a peripheral control rod is selected.

b. This function shall be automatically bypassed if detector count rate is > 100 cps or the IRM channels are on range (2) or higher.

c. This function shall be automatically bypassed when the associated IRM channels are on range 8 or higher.

d. This function shall be automatically bypassed when the IRM channels are on range 3 or higher.

e. This function shall be automatically bypassed when the IRM channels are on range 1.

TABLE 3.3.6-2

CONTROL ROD WITHDRAWAL BLOCK INSTRUMENTATION SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
1. ROD BLOCK MONITOR		
a. Upscale	$\leq 0.66 W + (40)\%$	$\leq 0.66 W + (43)\%$
b. Inoperative	NA	NA
c. Downscale	$\geq$ (5)% of RATED THERMAL POWER	$\geq$ (3)% of RATED THERMAL POWER
2. APRM		
a. Flow Biased Simulated Thermal Power - Upscale	$\leq 0.66 W + (42)\%$*	$\leq 0.66 W + (45)\%$*
b. Inoperative	NA	NA
c. Downscale	$\geq$ (5)% of RATED THERMAL POWER	$\geq$ (3)% of RATED THERMAL POWER
d. Neutron Flux - Upscale Startup	$\leq$ (12)% of RATED THERMAL POWER	$\leq$ (14)% of RATED THERMAL POWER
3. SOURCE RANGE MONITORS		
a. Detector not full in	NA	NA
b. Upscale	$\leq (2 \times 10^5)$ cps	$\leq (5 \times 10^5)$ cps
c. Inoperative	NA	NA
d. Downscale	$\geq$ (3) cps	$\geq$ (2) cps
4. INTERMEDIATE RANGE MONITORS		
a. Detector not full in	NA	NA
b. Upscale	$\leq$ (100/125) of full scale	$\leq$ (110/125) of full scale
c. Inoperative	NA	NA
d. Downscale	$\geq$ (5/125) of full scale	$\geq$ (3/125) of full scale
5. SCRAM DISCHARGE VOLUME		
a. Water Level High	To be specified	NA
b. Scram Trip Bypassed	NA	NA
6. REACTOR COOLANT SYSTEM RECIRCULATION FLOW		
a. Upscale	$\leq$ (___/___) of full scale	$\leq$ (___/___) of full scale
b. Inoperative	NA	NA
c. (Comparator) (Downscale)	$\leq$ (10)% flow deviation	$\leq$ (__)% flow deviation

*The Average Power Range Monitor rod block function is varied as a function of recirculation loop flow (W). The trip setting of this function must be maintained in accordance with Specification 3.2.2.

TABLE 4.3.6-1

CONTROL ROD WITHDRAWAL BLOCK INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION[a]	OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED
1. ROD BLOCK MONITOR				
a. Upscale	NA	S/U[b],M	Q	1*
b. Inoperative	NA	S/U[b],M	NA	1*
c. Downscale	NA	S/U[b],M	Q	1*
2. APRM				
a. Flow Biased Simulated Thermal Power - Upscale	NA	S/U[b],M	Q	1
b. Inoperative	NA	S/U[b],M	NA	1, 2, 5
c. Downscale	NA	S/U[b],M	Q	1
d. Neutron Flux - Upscale, Startup	NA	S/U[b],M	Q	2, 5
3. SOURCE RANGE MONITORS				
a. Detector not full in	NA	S/U[b],W[c]	NA	2, 5
b. Upscale	NA	S/U[b],W[c]	Q	2, 5
c. Inoperative	NA	S/U[b],W[c]	NA	2, 5
d. Downscale	NA	S/U[b],W[c]	Q	2, 5
4. INTERMEDIATE RANGE MONITORS				
a. Detector not full in	NA	S/U[b],W[c]	NA	2, 5
b. Upscale	NA	S/U[b],W[c]	Q	2, 5
c. Inoperative	NA	S/U[b],W[c]	NA	2, 5
d. Downscale	NA	S/U[b],W[c]	Q	2, 5
5. SCRAM DISCHARGE VOLUME				
a. Water Level-High	NA	Q	R	1, 2, 5**
b. Scram Trip Bypassed	NA	M	NA	(1, 2, 5**)
6. REACTOR COOLANT SYSTEM RECIRCULATION FLOW				
a. Upscale	NA	S/U[b],M	Q	1
b. Inoperative	NA	S/U[b],M	NA	1
c. (Comparator) (Downscale)	NA	S/U[b],M	Q	1

TABLE 4.3.6-1 (Continued)

CONTROL ROD WITHDRAWAL BLOCK INSTRUMENTATION SURVEILLANCE REQUIREMENTS

NOTES:

a. Neutron detectors may be excluded from CHANNEL CALIBRATION.

b. Within 24 hours prior to startup, if not performed within the previous 7 days.

c. When making an unscheduled change from OPERATIONAL CONDITION 1 to OPERATIONAL CONDITION 2, perform the required surveillance within 12 hours after entering OPERATIONAL CONDITION 2.

* With THERMAL POWER ≥ (20)% of RATED THERMAL POWER.

** With any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

APPENDIX B

TENNESSEE VALLEY AUTHORITY LETTER OF OCTOBER 16, 1980

AND

SUBMITTAL WITH PROPOSED TECHNICAL SPECIFICATIONS CHANGES

FOR

BROWNS FERRY NUCLEAR PLANT UNITS 1, 2, AND 3

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8010220505 DOC.DATE: 80/10/16 NOTARIZED: YES DOCKET #
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50-260 B&W Test Reactor, Babcock & Wilcox Co. 05000260
50-296 Browns Ferry Nuclear Power Station, Unit 3, Tennessee 05000296
AUTH.NAME AUTHOR AFFILIATION
MILLS,L.M. Tennessee Valley Authority
RECIP.NAME RECIPIENT AFFILIATION
DENTON,H.R. Office of Nuclear Reactor Regulation, Director

SUBJECT: Application to amend Licenses DPR-33,DPR-52 & DPR-68, changing Tech Specs re scram discharge vol vent & drain valves,in responses to NRC 800707 request.

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[redacted]

400 Chestnut Street Tower II

October 16, 1980

TVA BFNP TS 153

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Denton:

In the Matter of the)
Tennessee Valley Authority)

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

In accordance with the provisions of 10 CFR Part 50.59, we are enclosing 40 copies of a requested amendment to licenses DPR-33, DPR-52, and DPR-68 to change the technical specifications of Browns Ferry Nuclear Plant units 1, 2, and 3 (Enclosure 1). These proposed changes relate to Scram Discharge Volume vent and drain valves and are submitted in response to D. G. Eisenhut's letter to All Operating Boiling Water Reactors dated July 7, 1980. References to previously proposed technical specifications which have not yet been approved by NRC and an explanation of how the unapproved changes affect this requested change are provided (Enclosure 2).

In accordance with the requirements of 10 CFR Part 170.22, we have determined this proposed amendment to be Class III for unit 1 and Class I for units 2 and 3. These classifications are based on the facts that the proposed amendment involves a single safety issue which does not involve a significant hazard consideration for unit 1, and the proposed amendments for units 2 and 3 are duplicates of the unit 1 proposed amendment. The remittance for $4,800 ($4,000 for unit 1 and $800 for units 2 and 3) is being wired to the NRC, Attention: Licensing Fee Management Branch.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Regulation and Safety

Subscribed and sworn to before
me this [redacted] day of [redacted] 1980.

[redacted]
Notary Public

My Commission Expires [redacted]

A001
S
3/40

Enclosures
cc: See page 2

ENCLOSURE 1

PROPOSED CHANGES TO TECHNICAL SPECIFICATIONS

BROWNS FERRY NUCLEAR PLANT
(DOCKET NOS. 50-259, -260, -296)

UNITS 1 AND 2
PROPOSED CHANGES

NOTES FOR TABLE 3.1.A

1. There shall be two operable or tripped trip systems for each function. If the minimum number of operable instrument channels per trip system cannot be met for both trip systems, the appropriate actions listed below shall be taken.

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

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

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

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

2. Scram discharge volume high bypass may be used in shutdown or refuel to bypass scram discharge volume scram with control rod block for reactor protection system reset.

3. Bypassed if reactor pressure < 1055 psig and mode switch not in run.

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

5. IRM's are bypassed when APRM's are onscale and the reactor mode switch is in the run position.

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

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

   A. Mode switch in shutdown

   B. Manual scram

   C. High flux IRM

   D. Scram discharge volume high level

   E. APRM 15% scram

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

9. Not required if all main steamlines are isolated.

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

	Group (2)	Functional Test	Minimum Frequency (3)
Mode Switch in Shutdown	A	Place Mode Switch in Shutdown	Each Refueling Outage
Manual Scram	A	Trip Channel and Alarm	Every 3 Months
IRM			
High Flux	C	Trip Channel and Alarm (4)	Once Per Week During Refuelin and Before Each Startup
Inoperative	C	Trip Channel and Alarm (4)	Once Per Week During Refuelin and Before Each Startup
APRM			
High Flux (15% scram)	C	Trip Output Relays (4)	Before Each Startup and Weekl When Required to be Operable
High Flux	B	Trip Output Relays (4)	Once/Week
Inoperative	B	Trip Output Relays (4)	Once/Week
Downscale	B	Trip Output Relays (4)	Once/Week
Flow Bias	B	(6)	(6)
High Reactor Pressure	A	Trip Channel and Alarm	Once/Month (1)
High Drywell Pressure	A	Trip Channel and Alarm	Once/Month (1)
Reactor Low Water Level (5)	A	Trip Channel and Alarm	Once/Month (1)
High Water Level in Scram Discharge Tank	A	Trip Channel and Alarm	Once/month
Turbine Condenser Low Vacuum	A	Trip Channel and Alarm	Once/Month (1)
Main Steam Line High Radiation	B	Trip Channel and Alarm (4)	Once/Week

TABLE 3.2.C
INSTRUMENTATION THAT INITIATES ROD BLOCKS

Minimum No. Operable Per Trip Sys (5)	Function	Trip Level Setting
2(1)	APRM Upscale (Flow Bias)	$\leq$0.66W+42% (2)
2(1)	APRM Upscale (Startup Mode) (8)	$\leq$12%
2(1)	APRM Downscale (9)	$\geq$3%
2(1)	APRM Inoperative	(10b)
1(7)	RBM Upscale (Flow Bias)	$\leq$ 0.66W+40% (2)
1(7)	RBM Downscale (9)	$\geq$ 3%
1(7)	RBM Inoperative	(10c)
3(1)	IRM Upscale (8)	$\leq$ 108/125 of full scale
3(1)	IRM Downscale (3) (8)	$\geq$ 5/125 of full scale
3(1)	IRM Detector not in Startup Position (8)	(11)
3(1)	IRM Inoperative (8)	(10a)
2(1) (6)	SRM Upscale (8)	$\leq 1 \times 10^5$ counts/sec.
2(1) (6)	SRM Downscale (4) (8)	$\geq$ 3 counts/sec.
2(1) (6)	SRM Detector not in Startup Position (4) (8)	(11)
2(1) (6)	SRM Inoperative (8)	(10a)
2(1)	Flow Bias Comparator	$\leq$ 10% difference in recirculation flows
2(1)	Flow Bias Upscale	$\leq$110% recirculation flow
1(1)	Rod Block Logic	N/A
2(1)	RSCS Restraint (PS-85-61A and PS-85-61B)	147 psig turbine first-stage pressure
1(12)	Scram Discharge Tank Water Level High	$\leq$25 gal.

8. This function is bypassed when the mode switch is placed in Run.

9. This function is only active when the mode switch is in Run. This function is automatically bypassed when the IRM instrumentation is operable and not high.

10. The inoperative trips are produced by the following functions:

    a. SRM and IRM

        (1) Local "operate-calibrate" switch not in operate.

        (2) Power supply voltage low.

        (3) Circuit boards not in circuit.

    b. APRM

        (1) Local "operate-calibrate" switch not in operate.

        (2) Less than 14 LPRM inputs.

        (3) Circuit boards not in circuit.

    c. RBM

        (1) Local "operate-calibrate" switch not in operate.

        (2) Circuit boards not in circuit.

        (3) RBM fails to null.

        (4) Less than required number of LPRM inputs for rod selected.

11. Detector traverse is adjusted to 114 $\pm$ 2 inches, placing the detector lower position 24 inches below the lower core plate.

12. This function may be bypassed in the shutdown or refuel mode. If this function is inoperable at a time when operability is required the channel shall be tripped or administrative controls shall be immediately imposed to prevent control rod withdrawal.

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
RSCS Restraint	(1)	once/3 months	N/A
Scram Discharge Tank Water level High	Once/quarter	once/operating cycle	N/A

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.3 Reactivity Control	4.3 Reactivity Control
E. If Specifications 3.3.C and .D above cannot be met, an orderly shutdown shall be initiated and the reactor shall be in the shutdown condition within 24 hours.	E. Surveillance requirements are as specified in 4.3.C and .D, above.
F. Scram Discharge Volume The scram discharge volume drain and vent valves shall be operable any time that the Reactor Protection System scram function is required to be operable. When it is determined that one of these valves is inoperable at a time when operability is required, the reactor shall be in cold shutdown within 24 hours.	F. Scram Discharge Volume 1.a. The scram discharge volume drain and vent valves shall be verified open prior to each startup and monthly thereafter. The valves may be closed intermittently for testing not to exceed 1 hour in any 24 hour period during operation. b. The scram discharge volume drain and vent valves shall be demonstrated operable monthly.

3.3/4.3 BASES:

D. Reactivity Anomalies

During each fuel cycle excess operative reactivity varies as fuel depletes and as any burnable poison in supplementary control is burned. The magnitude of this excess reactivity may be inferred from the critical rod configuration. As fuel burnup progresses, anomalous behavior in the excess reactivity may be detected by comparison of the critical rod pattern at selected base states to the predicted rod inventory at that state. Power operating base conditions provide the most sensitive and directly interpretable data relative to core reactivity. Furthermore, using power operating base conditions permits frequent reactivity comparisons.

Requiring a reactivity comparison at the specified frequency assures that a comparison will be made before the core reactivity change exceeds $1\% \Delta k$. Deviations in core reactivity greater than $1\% \Delta k$ are not expected and require thorough evaluation. One percent reactivity into the core would not lead to transients exceeding design conditions of the reactor system.

F. Scram Discharge Volume

The nominal stroke time for the scram discharge volume vent and drain valves is $\leq$30 seconds following a scram. The purpose of these valves is to limit the quantity of reactor water discharged after a scram and no direct safety function is performed. The surveillance for the valves assures that system drainage is not impeded by a valve which fails to open and that the valves are operable and capable of closing upon a scram.

References

1. Generic Reload Fuel Application, Licensing Topical Report, NEDE-24011-P-A and Addenda.

UNIT 3
PROPOSED CHANGES

NOTES FOR TABLE 3.1.A

1. There shall be two operable or tripped trip systems for each function. If the minimum number of operable instrument channels per trip system cannot be met for both trip systems, the appropriate actions listed below shall be taken.

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

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

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

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

2. Scram discharge volume high bypass may be used in shutdown or refuel to bypass scram discharge volume scram with control rod block for reactor protection system reset.

3. Bypassed if reactor pressure < 1055 psig and mode switch not in run.

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

5. IRM's are bypassed when APRM's are onscale and the reactor mode switch is in the run position.

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

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

   A. Mode switch in shutdown

   B. Manual scram

   C. High flux IRM

   D. Scram discharge volume high level

   E. APRM 15% scram

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

9. Not required if all main steamlines are isolated.

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

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

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

	Group (2)	Functional Test	Minimum Frequency (3)
Mode Switch in Shutdown	A	Place Mode Switch in Shutdown	Each Refueling Outage
Manual Scram	A	Trip Channel and Alarm	Every 3 Months
IRM			
High Flux	C	Trip Channel and Alarm (4)	Once Per Week During Refueling and Before Each Startup
Inoperative	C	Trip Channel and Alarm (4)	Once Per Week During Refueling and Before Each Startup
APRM			
High Flux (15% scram)	C	Trip Output Relays (4)	Before Each Startup and Weekly When Required to be Operable
High Flux	B	Trip Output Relays (4)	Once/Week
Inoperative	B	Trip Output Relays (4)	Once/Week
Downscale	B	Trip Output Relays (4)	Once/Week
Flow Bias	B	(6)	(6)
High Reactor Pressure	A	Trip Channel and Alarm	Once/Month (1)
High Drywell Pressure	A	Trip Channel and Alarm	Once/Month (1)
Reactor Low Water Level (5)	A	Trip Channel and Alarm	Once/Month (1)
High Water Level in Scram Discharge Tank	A	Trip Channel and Alarm	Once/Month
Turbine Condenser Low Vacuum	A	Trip Channel and Alarm	Once/Month (1)

TABLE 3.3.C
INSTRUMENTATION THAT INITIATES ROD BLOCKS

Minimum No. Operable Per Trip Sys (5)	Function	Trip Level Setting
2(1)	APRM Upscale (Flow Bias)	$\leq$0.66W+42% (2)
2(1)	APRM Upscale (Startup Mode) (8)	$\leq$12%
2(1)	APRM Downscale (9)	$\geq$3%
2(1)	APRM Inoperative	(10b)
1(7)	RBM Upscale (Flow Bias)	$\leq$ 0.66W+40% (2)
1(7)	RBM Downscale (9)	$\geq$ 3%
1(7)	RBM Inoperative	(10c)
3(1)	IRM Upscale (8)	$\leq$ 108/125 of full scale
3(1)	IRM Downscale (3) (8)	$\geq$ 5/125 of full scale
3(1)	IRM Detector not in Startup Position (8)	(11)
3(1)	IRM Inoperative (8)	(10a)
2(1) (6)	SRM Upscale (8)	$\leq 1 \times 10^5$ counts/sec.
2(1) (6)	SRM Downscale (4) (8)	$\geq$ 3 counts/sec.
2(1) (6)	SRM Detector not in Startup Position (4) (8)	(11)
2(1) (6)	SRM Inoperative (8)	(10a)
2(1)	Flow Bias Comparator	$\leq$ 10% difference in recirculation flows
2(1)	Flow Bias Upscale	$\leq$110% recirculation flow
1(1)	Rod Block Logic	N/A
2(1)	RSCS Restraint (PS-85-61A and PS-85-61B)	147 psig turbine first-stage pressure
1(12)	Scram Discharge Tank Water Level High	$\leq$25 gal.

(3) Circuit boards not in circuit.

b. APRM

(1) Local "operate-calibrate" switch not in operate.

(2) Less than 14 LPRM inputs.

(3) Circuit boards not in circuit.

c. RBM

(1) Local "operate-calibrate" switch not in operate.

(2) Circuit boards not in circuit.

(3) RBM fails to null.

(4) Less than required number of LPRM inputs for rod selected.

11. Detector traverse is adjusted to 114 ± 2 inches, placing the detector lower position 24 inches below the lower core plate.

12. This function may be bypassed in the shutdown or refuel mode. If this function is inoperable at a time when operability is required the channel shall be tripped or administrative controls shall be immediately imposed to prevent control rod withdrawal.

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
RSCS Restraint	(1)		once/3 months	N/A
Scram Discharge Tank Water Level High	once/quarter		once/operating cycle	N/A

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.3 REACTIVITY CONTROL	4.3 REACTIVITY CONTROL
D. Reactivity Anomalies The reactivity equivalent of the difference between the actual critical rod configuration and the expected configuration during power operation shall not exceed 1% Δk. If this limit is exceeded, the reactor will be shut down until the cause has been determined and corrective actions have been taken as appropriate.	D. Reactivity Anomalies During the startup test program and startup following refueling outages, the critical rod configurations will be compared to the expected configurations at selected operating conditions. These comparisons will be used as base data for reactivity monitoring during subsequent power operation throughout the fuel cycle. At specific power operating conditions, the critical rod configuration will be compared to the configuration expected based upon appropriately corrected past data. This comparison will be made at least every full power month.
E. Reactivity Control If Specifications 3.3.C and .D above cannot be met, an orderly shutdown shall be initiated and the reactor shall be in the shutdown condition within 24 hours.	E. Reactivity Control Surveillance requirements are as specified in 4.3.C and .D, above.
F. Scram Discharge Volume The scram discharge volume drain and vent valves shall be operable any time that the Reactor Protection System scram function is required to be operable. When it is determined that one of these valves is inoperable at a time when operability is required, the reactor shall be in cold shutdown within 24 hours.	F. Scram Discharge Volume 1.a. The scram discharge volume drain and vent valves shall be verified open prior to each startup and monthly thereafter. The valves may be closed intermittently for testing not to exceed 1 hour in any 24 hour period during operation. b. The scram discharge volume drain and vent valves shall be demonstrated operable monthly.

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 the sensor and circuit delays after which the pilot scram solenoid deenergizes and 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.

In order to perform scram time testing as required by specification 4.3.C.1, the relaxation of certain restraints in the rod sequence control system is required. Individual rod bypass switches may be used as described in specification 4.3.C.1.

The position of any rod bypassed must be known to be in accordance with rod withdrawal sequence. Bypassing of rods in the manner described in specification 4.3.C.1 will allow the subsequent withdrawal of any rod scrammed in the 100 percent to 50 percent rod density groups; however, it will maintain group notch control over all rods in the 50 percent to 0 percent rod density groups. In addition, RSCS will prevent movement of rods in the 50 percent density to a preset power level range until the scrammed rod has been withdrawn.

D. Reactivity Anomalies

During each fuel cycle excess operative reactivity varies as fuel depletes and as any burnable poison in supplementary control is burned. The magnitude of this excess reactivity may be inferred from the critical rod configuration. As fuel burnup progresses, anomalous behavior in the excess reactivity may be detected by comparison of the critical rod pattern at selected base states to the predicted rod inventory at that state. Power operating base conditions provide the most sensitive and directly interpretable data relative to core reactivity. Furthermore, using power operating base conditions permits frequent reactivity comparisons.

Requiring a reactivity comparison at the specified frequency assures that a comparison will be made before the core reactivity change exceeds 1% ΔK. Deviations in core reactivity greater than 1% ΔK are not expected and require thorough evaluation. One percent reactivity limit is considered safe since an insertion of the reactivity into the core would not lead to transients exceeding design conditions of the reactor system.

3.3/4.3 BASES:

F. Scram Discharge Volume

The nominal stroke time for the scram discharge volume vent and drain valves is $\leq$30 seconds following a scram. The purpose of these valves is to limit the quantity of reactor water discharged after a scram and no direct safety function is performed. The surveillance for the valves assures that system drainage is not impeded by a valve which fails to open and that the valves are operable and capable of closing upon a scram.

References

1. Generic Reload Fuel Application, Licensing Topical Report, NEDE-24011-P-A and Addenda.

ENCLOSURE 2

REFERENCE TO PREVIOUS CHANGES TO
TECHNICAL SPECIFICATIONS
(TVA BFNP TS 153)

Unit 2, page 134

The change of the reference to the Generic Reload Fuel Application was proposed in requested change TVA BFNP TS 140 dated July 14, 1980.

Unit 3, page 136a

The change of the reference to the Generic Reload Fuel Application was proposed in requested change TVA BFNP TS 148 dated August 27, 1980.

Unit 3, page 136

The changes regarding scram insertion times, section 3.3/4.3.C.3, were proposed in requested change TVA BFNP TS 151 dated September 24, 1980.

APPENDIX C

TENNESSEE VALLEY AUTHORITY LETTER OF NOVEMBER 18, 1981

WITH

RESPONSE TO RAI REGARDING

BROWNS FERRY NUCLEAR PLANT UNITS 1, 2, AND 3

TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

November 18, 1981

Director of Licensing
Attention: Mr. Thomas A. Ippolito, Chief
Operating Reactors Branch No. 2
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Ippolito:

In the Matter of the) Docket No. 50-259
Tennessee Valley Authority) 50-260
50-296

Your letter to H. G. Parris dated October 2, 1981 requested that TVA provide additional information regarding proposed technical specifications for scram discharge volume surveillance requirements (TVA BFNP TS 153). We have reviewed the Franklin Research Center request which was provided as an enclosure to your October 12, 1981 letter and are enclosing our response to the three items identified as requiring additional information.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Regulation and Safety

Subscribed and sworn to before
me this 18th day of November 1981.

Paulette H. White
Notary Public

My Commission Expires 9-5-84

Enclosure

A001
S1/1

ENCLOSURE

REQUEST FOR ADDITIONAL INFORMATION
BROWNS FERRY NUCLEAR PLANT
TVA BFNP TS 153

In response to your letter dated October 2, 1981 to H. G. Parris which transmitted Franklin Research Center's (FRC) request for information regarding TS 153, the FRC requests and each request's resolution are identified below.

Item

Provide a reference to that section of the Technical Specifications for Browns Ferry Nuclear Power Station Units 1, 2, and 3 which indicates that the reactor protection system SDV water level-high consists of 2 OPERABLE channels containing two limit switches per trip system, for a total of 4 OPERABLE channels containing 4 limit switches per two trip system, making 1-out-of-2 taken twice logic.

Response

Browns Ferry Technical Specification Section 3.1 in conjunction with Table 3.1.A and Note 1 to Table 3.1.A indicate that the SDV water level high reactor scram function consists of four operable channels containing four switches for two trip systems, making 1-out-of-2 twice logic.

Item

1. Provide a reference to the pages of the Technical Specifications where CHANNEL CALIBRATION operations each refueling outage is specified, or

2. Provide technical bases why the CHANNEL CALIBRATION operations each refueling outage should not be performed.

Response

Browns Ferry Technical Specifications Table 4.1.B and Note 5 to that table require physical inspection and actuation of each channel once each operating cycle. Physical actuation upon the presence of liquid at the switch serves the purpose of a calibration.

Item

Since the number of the operable channels per trip function is less than requested in the Model Technical Specifications, provide technical bases for it.

Response

Browns Ferry Technical Specification Table 3.2.C and Note 1 to this table require that there shall be two operable or tripped channels for each function. There is one switch per trip system with two trip systems. One of these switches may be inoperable for up to seven days while remaining in the untripped condition. These seven days are justified since the other operable channel must be functionally tested daily thereafter. Note 12 of Table 3.2.C allows this function to be bypassed in shutdown on refuel mode. In these modes, control rod withdrawal is limited to a maximum of one rod at one time and thus the requirements for a scram discharge volume are greatly reduced.

UNITED STATES NUCLEAR REGULATORY COMMISSION

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

TENNESSEE VALLEY AUTHORITY

NOTICE OF ISSUANCE OF AMENDMENTS TO FACILITY OPERATING LICENSES

The U.S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 83 to Facility Operating License No. DPR-33, Amendment No. 80 to Facility Operating License No. DPR-52, and Amendment No. 54 to Facility Operating License No. DPR-68 issued to Tennessee Valley Authority (the licensee), which revised Technical Specifications for operation of the Browns Ferry Nuclear Plant, Units 1, 2, and 3, located in Limestone County, Alabama. The amendments are effective as of the date of issuance.

These amendments change the Technical Specifications to provide additional surveillance requirements for the scram discharge volume (SDV) vent and drain valves and additional limiting conditions for operation and surveillance requirements on the SDV limit switches as requested by NRC's generic letter of July 7, 1980 to all licensees of operating boiling water reactors.

The application for the amendments complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendments. Prior public notice of these amendments was not required since the amendments do not involve a significant hazards consideration.

The Commission has determined that the issuance of these amendments will not result in any significant environmental impact and that pursuant to 10 CFR 51.5(d)(4) an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with issuance of these amendments.

For further details with respect to this action, see (1) the application for amendments dated October 16, 1980, as supplemented by letter dated November 18, 1981, (2) Amendment No. 83 to License No. DPR-33, Amendment No. 80 to License No. DPR-52, and Amendment No. 54 to License No. DPR-68, and (3) the Commission's related Safety Evaluation including the Franklin Research Center Report TER-C-5506-67/71/76 enclosed therewith. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C., and at the Athens Public Library, South and Forrest, Athens, Alabama 35611. A copy of items (2) and (3) may be obtained upon request addressed to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of Licensing.

Dated at Bethesda, Maryland, this 19th day of May 1982.

FOR THE NUCLEAR REGULATORY COMMISSION

Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing