



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

April 19, 1994

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

Mr. Oliver D. Kingsley, Jr.
President, TVA Nuclear and
Chief Nuclear Officer
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Dear Mr. Kingsley:

SUBJECT: ISSUANCE OF TECHNICAL SPECIFICATION AMENDMENTS FOR THE BROWNS FERRY
NUCLEAR PLANT UNITS 1, 2, AND 3 (TAC NOS. M85255, M85256, AND
M85257) (TS 328)

The Commission has issued the enclosed Amendment Nos. 204, 223, and 177 to Facility Operating Licenses Nos. DPR-33, DPR-52, and DPR-68 for the Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3, respectively. These amendments are in response to your application dated December 23, 1992, and supplemented on August 12, 1993 and January 21, 1994, requesting changes to the BFN Technical Specifications to revise operability requirements for the low pressure coolant injection mode of the residual heat removal system with the reactor shut down.

In its letter of January 21, 1994, TVA committed to installation of electrical interlocks between the shutdown cooling pump suction valves and the corresponding suppression pool return line valves prior to the restart of BFN Units 1 and 3. The enclosed safety evaluation is based, in part, on the ability of these interlocks to prevent large drainage paths from the reactor vessel. Therefore, the staff expects these interlocks to be installed and operational prior to loading fuel in BFN Units 1 and 3. Accordingly, the staff requests that TVA revise the Technical Specification Bases for BFN Units 1 and 3 to document the need for the interlocks prior to fuel loading, and that procedural controls be provided to ensure the interlocks are operational when required.

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Mr. Oliver D. Kingsley, Jr.

- 2 -

April 19, 1994

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

Sincerely,

ORIGINAL SIGNED BY:

Joseph F. Williams, Project Manager
Project Directorate II-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 204 to License No. DPR-33
2. Amendment No. 223 to License No. DPR-52
3. Amendment No. 177 to License No. DPR-68
4. Safety Evaluation

cc w/enclosures:
See next page

OFC	PDII-4/LA	PDII-4/PM	PDII-4/PM	SRXB*	OTSB
NAME	BClayton	JWilliams	DTrimble	TCollins	CGrimes #4-75
DATE	3/29/94	3/29/94	3/29/94	03/15/94	4/19/94
OFC	OGC	PDII-4/D			
NAME	M. Grimes	F. Heddon			
DATE	3/29/94	4/19/94			

DOCUMENT NAME: G:\BFN\TS328.AMD

Mr. Oliver D. Kingsley, Jr.
Tennessee Valley Authority

cc:

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ET 12A
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BROWNS FERRY NUCLEAR PLANT

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Chairman
Limestone County Commission
P.O. Box 188
Athens, AL 35611

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

AMENDMENT NO. 204 FOR BROWNS FERRY UNIT 1 - DOCKET NO. 50-259
AMENDMENT NO. 223 FOR BROWNS FERRY UNIT 2 - DOCKET NO. 50-260
AMENDMENT NO. 177 FOR BROWNS FERRY UNIT 3 - DOCKET NO. 50-296
DATED: April 19, 1994

Distribution

Docket File

NRC & Local PDRs

BFN Reading

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OGC

15-B-18

D. Hagan

MNBB-3206

G. Hill (2)

T-5-C-3

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11-E-22

ACRS (10)

OPA

OC/LFDCB

T. Collins

J. Johnson

RII

M. Lesser

RII

J. Jaudon

RII

C. Patterson

RII

cc: Plant Service List



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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-259

BROWNS FERRY NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 204
License No. DPR-33

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Tennessee Valley Authority (the licensee) dated December 23, 1992, and supplemented August 12, 1993 and January 21, 1994, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

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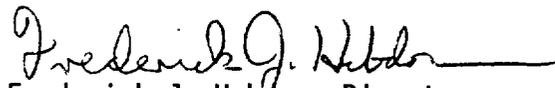
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-33 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 204, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Frederick J. Heblon, Director
Project Directorate II-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: April 19, 1994

ATTACHMENT TO LICENSE AMENDMENT NO. 204

FACILITY OPERATING LICENSE NO. DPR-33

DOCKET NO. 50-259

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change. Overleaf* pages are provided to maintain document completeness.

REMOVE

3.5/4.5-3
3.5/4.5-4
3.5/4.5-7
3.5/4.5-8

INSERT

3.5/4.5-3*
3.5/4.5-4
3.5/4.5-7
3.5/4.5-8*

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.A Core Spray System (CSS)

- * 5. When irradiated fuel is in the reactor vessel and the reactor vessel head is removed, core spray is not required to be OPERABLE provided the cavity is flooded, the fuel pool gates are open and the fuel pool water level is maintained above the low level alarm point, and provided one RHRSW pump and associated valves supplying the standby coolant supply are OPERABLE.

- * When work is in progress which has the potential to drain the vessel, manual initiation capability of either 1 CSS Loop or 1 RHR pump, with the capability of injecting water into the reactor vessel, and the associated diesel generator(s) are required.

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

4.5.B. Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

1. The RHRS shall be OPERABLE #:
- (1) PRIOR TO STARTUP from a COLD CONDITION; or
- (2) when there is irradiated fuel in the reactor vessel and when the reactor vessel pressure is greater than atmospheric, except as specified in Specifications 3.5.B.2, through 3.5.B.7.

1. a. Simulated Automatic Actuation Test Once/Operating Cycle
- b. Pump OPERABILITY Per Specification 1.0.MM
- c. Motor Operated valve OPERABILITY Per Specification 1.0.MM
- d. Pump Flow Rate Once/3 months
- e. Test Check Valve Per Specification 1.0.MM
- f. Verify that each valve (manual, power-operated, or automatic) in the injection flow-path that is not locked, sealed, or otherwise secured in position, is in its correct* position. Once/Month
- g. Verify LPCI subsystem cross-tie valve is closed and power removed from valve operator. Once/Month

Low pressure coolant injection (LPCI) may be considered OPERABLE during alignment and operation for shutdown cooling with reactor steam dome pressure less than 105 psig in HOT SHUTDOWN, if capable of being manually realigned and not otherwise inoperable.

* Except that an automatic valve capable of automatic return to its ECCS position when an ECCS signal is present may be in a position for another mode of operation.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

3.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

8. If Specifications 3.5.B.1 through 3.5.B.7 are not met, an orderly shutdown shall be initiated and the reactor shall be placed in the COLD SHUTDOWN CONDITION within 24 hours.
9. When the reactor vessel pressure is atmospheric and irradiated fuel is in the reactor vessel, at least one RHR loop with two pumps or two loops with one pump per loop shall be OPERABLE. The pumps' associated diesel generators must also be OPERABLE. Low pressure coolant injection (LPCI) may be considered OPERABLE during alignment and operation for shutdown cooling, if capable of being manually realigned and not otherwise inoperable.
10. If the conditions of Specification 3.5.A.5 are met, LPCI and containment cooling are not required.
11. When there is irradiated fuel in the reactor and the reactor is not in the COLD SHUTDOWN CONDITION, 2 RHR pumps and associated heat exchangers and valves on an adjacent unit must be OPERABLE and capable of supplying cross-connect capability except as specified in Specification 3.5.B.12 below. (Note: Because cross-connect capability is not a short-term requirement, a component is not considered inoperable if cross-connect capability can be restored to service within 5 hours.)

SURVEILLANCE REQUIREMENTS

4.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

8. No additional surveillance required.
9. When the reactor vessel pressure is atmospheric, the RHR pumps and valves that are required to be OPERABLE shall be demonstrated to be OPERABLE per Specification 1.0.MM.
10. No additional surveillance required.
11. The RHR pumps on the adjacent units which supply cross-connect capability shall be demonstrated to be OPERABLE per Specification 1.0.MM when the cross-connect capability is required.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

<u>LIMITING CONDITIONS FOR OPERATION</u>	<u>SURVEILLANCE REQUIREMENTS</u>
<p>3.5.B <u>Residual Heat Removal System (RHRS)</u> (LPCI and Containment Cooling)</p> <p>12. If one RHR pump or associated heat exchanger located on the unit cross-connection in the adjacent unit is inoperable for any reason (including valve inoperability, pipe break, etc.), the reactor may remain in operation for a period not to exceed 30 days provided the remaining RHR pump and associated diesel generator are OPERABLE.</p> <p>13. If RHR cross-connection flow or heat removal capability is lost, the unit may remain in operation for a period not to exceed 10 days unless such capability is restored.</p> <p>14. All recirculation pump discharge valves shall be OPERABLE PRIOR TO STARTUP (or closed if permitted elsewhere in these specifications).</p>	<p>4.5.B <u>Residual Heat Removal System (RHRS)</u> (LPCI and Containment Cooling)</p> <p>12. No additional surveillance required.</p> <p>13. No additional surveillance required.</p> <p>14. All recirculation pump discharge valves shall be tested for OPERABILITY during any period of COLD SHUTDOWN CONDITION exceeding 48 hours, if OPERABILITY tests have not been performed during the preceding 31 days.</p>



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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-260

BROWNS FERRY NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 223
License No. DPR-52

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Tennessee Valley Authority (the licensee) dated December 23, 1992, and supplemented August 12, 1993 and January 21, 1994, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

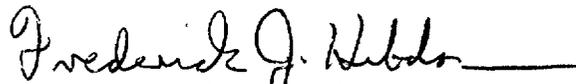
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-52 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 223, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Frederick J. Hebden, Director
Project Directorate II-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: April 19, 1994

ATTACHMENT TO LICENSE AMENDMENT NO. 223

FACILITY OPERATING LICENSE NO. DPR-52

DOCKET NO. 50-260

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change. Overleaf* pages are provided to maintain document completeness.

REMOVE

3.5/4.5-3
3.5/4.5-4
3.5/4.5-7
3.5/4.5-8

INSERT

3.5/4.5-3*
3.5/4.5-4
3.5/4.5-7
3.5/4.5-8*

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.A Core Spray System (CSS)

- * 5. When irradiated fuel is in the reactor vessel and the reactor vessel head is removed, core spray is not required to be OPERABLE provided the cavity is flooded, the fuel pool gates are open and the fuel pool water level is maintained above the low level alarm point, and provided one RHRSW pump and associated valves supplying the standby coolant supply are OPERABLE.

- * When work is in progress which has the potential to drain the vessel, manual initiation capability of either 1 CSS Loop or 1 RHR pump, with the capability of injecting water into the reactor vessel, and the associated diesel generator(s) are required.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

3.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

1. The RHRS shall be OPERABLE #:
 - (1) PRIOR TO STARTUP from a COLD CONDITION; or
 - (2) when there is irradiated fuel in the reactor vessel and when the reactor vessel pressure is greater than atmospheric, except as specified in Specifications 3.5.B.2, through 3.5.B.7.

Low pressure coolant injection (LPCI) may be considered OPERABLE during alignment and operation for shutdown cooling with reactor steam dome pressure less than 105 psig in HOT SHUTDOWN, if capable of being manually realigned and not otherwise inoperable.

SURVEILLANCE REQUIREMENTS

4.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

1. a. Simulated Automatic Actuation Test Once/Operating Cycle
- b. Pump OPERABILITY Per Specification 1.0.MM
- c. Motor Operated valve OPERABILITY Per Specification 1.0.MM
- d. Pump Flow Rate Once/3 months
- e. Testable Check Valve Per Specification 1.0.MM
- f. Verify that each valve (manual, power-operated, or automatic) in the injection flow-path that is not locked, sealed, or otherwise secured in position, is in its correct* position. Once/Month
- g. Verify LPCI subsystem cross-tie valve is closed and power removed from valve operator. Once/Month

* Except that an automatic valve capable of automatic return to its ECCS position when an ECCS signal is present may be in a position for another mode of operation.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

3.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

8. If Specifications 3.5.B.1 through 3.5.B.7 are not met, an orderly shutdown shall be initiated and the reactor shall be placed in the COLD SHUTDOWN CONDITION within 24 hours.
9. When the reactor vessel pressure is atmospheric and irradiated fuel is in the reactor vessel, at least one RHR loop with two pumps or two loops with one pump per loop shall be OPERABLE. The pumps' associated diesel generators must also be OPERABLE. Low pressure coolant injection (LPCI) may be considered OPERABLE during alignment and operation for shutdown cooling, if capable of being manually realigned and not otherwise inoperable.
10. If the conditions of Specification 3.5.A.5 are met, LPCI and containment cooling are not required.
11. When there is irradiated fuel in the reactor and the reactor is not in the COLD SHUTDOWN CONDITION, 2 RHR pumps and associated heat exchangers and valves on an adjacent unit must be OPERABLE and capable of supplying cross-connect capability except as specified in Specification 3.5.B.12 below. (Note: Because cross-connect capability is not a short-term requirement, a component is not considered inoperable if cross-connect capability can be restored to service within 5 hours.)

SURVEILLANCE REQUIREMENTS

4.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

8. No additional surveillance required.
9. When the reactor vessel pressure is atmospheric, the RHR pumps and valves that are required to be OPERABLE shall be demonstrated to be OPERABLE per Specification 1.0.MM.
10. No additional surveillance required.
11. The RHR pumps on the adjacent units which supply cross-connect capability shall be demonstrated to be OPERABLE per Specification 1.0.MM when the cross-connect capability is required.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

12. If three RHR pumps or associated heat exchangers located on the unit cross-connection in the adjacent units are inoperable for any reason (including valve inoperability, pipe break, etc.), the reactor may remain in operation for a period not to exceed 30 days provided the remaining RHR pump and associated diesel generator are OPERABLE.
13. If RHR cross-connection flow or heat removal capability is lost, the unit may remain in operation for a period not to exceed 10 days unless such capability is restored.
14. All recirculation pump discharge valves shall be OPERABLE PRIOR TO STARTUP (or closed if permitted elsewhere in these specifications).

4.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

12. No additional surveillance required.
13. No additional surveillance required.
14. All recirculation pump discharge valves shall be tested for OPERABILITY during any period of COLD SHUTDOWN CONDITION exceeding 48 hours, if OPERABILITY tests have not been performed during the preceding 31 days.



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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-296

BROWNS FERRY NUCLEAR PLANT, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 177
License No. DPR-68

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Tennessee Valley Authority (the licensee) dated December 23, 1992, and supplemented August 12, 1993, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

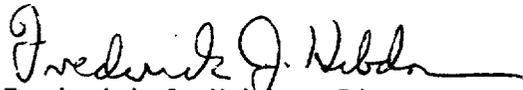
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-68 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 177, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Frederick J. Heddon, Director
Project Directorate II-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: April 19, 1994

ATTACHMENT TO LICENSE AMENDMENT NO. 177

FACILITY OPERATING LICENSE NO. DPR-68

DOCKET NO. 50-296

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change. Overleaf* pages are provided to maintain document completeness.

REMOVE

3.5/4.5-3
3.5/4.5-4
3.5/4.5-7
3.5/4.5-8

INSERT

3.5/4.5-3*
3.5/4.5-4
3.5/4.5-7
3.5/4.5-8*

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.A Core Spray System (CSS)

- * 5. When irradiated fuel is in the reactor vessel and the reactor vessel head is removed, core spray is not required to be OPERABLE provided the cavity is flooded, the fuel pool gates are open and the fuel pool water level is maintained above the low level alarm point, and provided one RHRSW pump and associated valves supplying the standby coolant supply are OPERABLE.

- * When work is in progress which has the potential to drain the vessel, manual initiation capability of either 1 CSS Loop or 1 RHR pump, with the capability of injecting water into the reactor vessel, and the associated diesel generator(s) are required.

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

4.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

1. The RHRS shall be OPERABLE #:

- 1. a. Simulated Automatic Actuation Test Once/ Operating Cycle
- b. Pump OPERABILITY Per Specification 1.0.MM
- c. Motor Operated valve OPERABILITY Per Specification 1.0.MM
- d. Pump Flow Rate Once/3 months
- e. Testable Check Valve Per Specification 1.0.MM
- f. Verify that each valve (manual, power-operated, or automatic) in the injection flow-path that is not locked, sealed, or otherwise secured in position, is in its correct* position. Once/Month
- g. Verify LPCI subsystem cross-tie valve is closed and power removed from valve operator. Once/Month

- (1) PRIOR TO STARTUP from a COLD CONDITION; or
- (2) when there is irradiated fuel in the reactor vessel and when the reactor vessel pressure is greater than atmospheric, except as specified in Specifications 3.5.B.2, through 3.5.B.7.

Low pressure coolant injection (LPCI) may be considered OPERABLE during alignment and operation for shutdown cooling with reactor steam dome pressure less than 105 psig in HOT SHUTDOWN, if capable of being manually realigned and not otherwise inoperable.

* Except that an automatic valve capable of automatic return to its ECCS position when an ECCS signal is present may be in a position for another mode of operation.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

3.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

8. If Specifications 3.5.B.1 through 3.5.B.7 are not met, an orderly shutdown shall be initiated and the reactor shall be placed in the COLD SHUTDOWN CONDITION within 24 hours.
9. When the reactor vessel pressure is atmospheric and irradiated fuel is in the reactor vessel, at least one RHR loop with two pumps or two loops with one pump per loop shall be OPERABLE. The pumps' associated diesel generators must also be OPERABLE. Low pressure coolant injection (LPCI) may be considered OPERABLE during alignment and operation for shutdown cooling, if capable of being manually realigned and not otherwise inoperable.
10. If the conditions of Specification 3.5.A.5 are met, LPCI and containment cooling are not required.
11. When there is irradiated fuel in the reactor and the reactor is not in the COLD SHUTDOWN CONDITION, 2 RHR pumps and associated heat exchangers and valves on an adjacent unit must be OPERABLE and capable of supplying cross-connect capability except as specified in Specification 3.5.B.12 below. (Note: Because cross-connect capability is not a short-term requirement, a component is not considered inoperable if cross-connect capability can be restored to service within 5 hours.)

SURVEILLANCE REQUIREMENTS

4.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

8. No additional surveillance required.
9. When the reactor vessel pressure is atmospheric, the RHR pumps and valves that are required to be OPERABLE shall be demonstrated to be OPERABLE per Specification 1.0.MM.
10. No additional surveillance required.
11. The B and D RHR pumps on unit 2 which supply cross-connect capability shall be demonstrated to be OPERABLE per Specification 1.0.MM when the cross-connect capability is required.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

12. If one RHR pump or associated heat exchanger located on the unit cross-connection in unit 2 is inoperable for any reason (including valve inoperability, pipe break, etc.), the reactor may remain in operation for a period not to exceed 30 days provided the remaining RHR pump and associated diesel generator are OPERABLE.
13. If RHR cross-connection flow or heat removal capability is lost, the unit may remain in operation for a period not to exceed 10 days unless such capability is restored.
14. All recirculation pump discharge valves shall be OPERABLE PRIOR TO STARTUP (or closed if permitted elsewhere in these specifications).

4.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

12. No additional surveillance required.
13. No additional surveillance required.
14. All recirculation pump discharge valves shall be tested for OPERABILITY during any period of COLD SHUTDOWN CONDITION exceeding 48 hours, if OPERABILITY tests have not been performed during the preceding 31 days.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 204 TO FACILITY OPERATING LICENSE NO. DPR-33

AMENDMENT NO. 223 TO FACILITY OPERATING LICENSE NO. DPR-52

AMENDMENT NO. 177 TO FACILITY OPERATING LICENSE NO. DPR-68

TENNESSEE VALLEY AUTHORITY

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

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

1.0 INTRODUCTION

By letter dated December 23, 1992, and supplemented August 12, 1993 and January 21, 1994, the Tennessee Valley Authority (the licensee) submitted a request for changes to the technical specifications for the Browns Ferry Nuclear Plant (BFN) Units 1, 2, and 3. The requested changes would revise operability requirements for the Residual Heat Removal (RHR) system operating in the Low Pressure Coolant Injection (LPCI) mode for low pressure and temperature conditions. The proposed changes permit an RHR loop to be considered operable for LPCI if it can be manually realigned and is not otherwise inoperable.

The NRC staff requested additional information regarding this proposed change in a letter dated June 9, 1993. On August 12, 1993, the licensee responded to this request. The licensee also provided additional information in a letter dated January 21, 1994. The additional information provided in these letters is within the scope of the staff's proposed finding of no significant hazards considerations. Therefore, the staff's proposed finding of no significant hazards considerations remains valid.

2.0 EVALUATION

2.1 Background

On two occasions during BFN Unit 2 Cycle 6 operations (February 25, 1992 and September 28, 1992), the licensee requested temporary waivers of compliance from requirements of technical specification Limiting Conditions for Operation (LCO) 3.5.B.9. This specification requires, in part, two RHR pumps in one loop, or one RHR pump in each of two loops, to be operable in LPCI mode when the reactor system pressure is atmospheric and there is fuel in the core. On the first occasion, the licensee needed to repair a leaking RHR valve. In the second case, a similar situation arose when the licensee identified a leaking 3/4-inch RHR test line requiring repair. However, these repairs would render one RHR loop inoperable while the other RHR loop would be required to operate in shutdown cooling (SDC) mode. Therefore, the RHR system would be unable to automatically operate in the LPCI mode, and LCO 3.5.B.9 could not be

satisfied. The waivers were granted by the staff, as documented in letters dated February 26 and September 28, 1992.

To avoid similar problems in the future, the licensee committed to submit a request to revise the technical specifications, clarifying the RHR functional requirements. The submittal of December 23, 1992 fulfilled this commitment.

2.2 Discussion

Appendix A to 10 CFR Part 50 defines General Design Criteria for nuclear power plants. Criterion 35 requires an emergency core cooling system (ECCS) which is capable of transferring heat from the reactor core following any loss of coolant accident at a rate sufficient to prevent fuel and cladding damage and limit metal-water reactions to negligible amounts. The ECCS is also required to be able to perform its function, assuming a single failure and a loss of offsite power.

The changes requested by the licensee consist of revisions to LCO 3.5.B, "Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)." A footnote is proposed to be added to LCO 3.5.B.1, stating that:

Low pressure coolant injection (LPCI) may be considered OPERABLE during alignment and operation for shutdown cooling with reactor steam dome pressure less than 105 psig in HOT SHUTDOWN, if capable of being manually realigned and not otherwise inoperable.

Similar wording is proposed to be added to LCO 3.5.B.9, which applies when reactor vessel pressure is atmospheric, and irradiated fuel is in the reactor vessel.

The current BFN technical specifications also include requirements for the operability of the core spray system (CSS). The CSS and the RHR system are the two safety-grade cooling water sources if the reactor coolant inventory is reduced by a postulated accident during hot shutdown or cold shutdown conditions. LCO 3.5.A.1 requires the two CSS loops to be operable with fuel in the core when reactor vessel pressure is greater than atmospheric pressure, except as specified by LCO 3.5.A.2, which allows continued operation for up to 7 days with one CSS loop inoperable. LCO 3.5.A.4 requires one operable CSS loop when reactor vessel pressure is atmospheric. These requirements are not affected by the proposed amendment.

When the reactor system is pressurized between atmospheric pressure and 105 psig, the proposed amendment, combined with existing CSS requirements, requires that at least four RHR pumps (per LCO 3.5.B.1) and four core spray pumps (per LCO 3.5.A.1) are operable. These specifications also require the diesel generators associated with these pumps to be operable. The proposed amendment extends the definition of operable RHR pumps for LPCI to allow alignment of these pumps for shutdown cooling.

The proposed change to LCO 3.5.B.1 applies only in hot shutdown, so the reactor will be subcritical with the mode switch in shutdown. Therefore, core heat generation is limited to decay heat generated by the irradiated fuel.

The required combination of pumps and diesel generators for this condition ensures, assuming the worst single failure, that at least one CSS pump will be available for automatic coolant injection for a postulated loss of coolant accident. One CSS pump provides sufficient flow to assure core cooling for this operating condition. No operator action is required to mitigate this event. Therefore, the requirements of General Design Criterion 35 are satisfied, and the proposed change to LCO 3.5.B.1 is acceptable.

When the reactor system is at atmospheric pressure, the proposed amendment for LPCI operability, combined with existing CSS requirements, ensures that at least two RHR pumps (per LCO 3.5.B.9) and one core spray pump (per LCO 3.5.A.4) are operable. Under the proposed amendment, the RHR pumps may be operating in SDC mode. These specifications also require the diesel generators associated with these pumps to be operable. In this mode, the limiting event is a postulated inadvertent draindown of the reactor coolant system. The licensee stated in its letter of August 12, 1993, that upon receipt of the reactor vessel low water level scram/isolation signal, operators are assumed to begin manually realigning the available RHR system to LPCI mode. This realignment is expected to take about 3.5 minutes. Once complete, this system is available for automatic injection if reactor vessel level decreases to the initiation setpoint, or for manual initiation in accordance with the BFN Emergency Operating Instructions.

The licensee also stated that the reactor draindown would be terminated by operation of the SDC isolation valves upon reaching the primary containment isolation system (PCIS) isolation setpoint based upon reactor water level. However, PCIS is not required to be operable for these conditions, and so should not be credited to terminate the draindown. Therefore, the licensee was requested to provide information describing the interlocks which preclude large drainage paths, and to demonstrate that small drainage paths cannot uncover the reactor fuel before the operator can realign the RHR system to LPCI mode.

Information describing the interlocks and the time to drain the reactor for various drain path sizes was provided in the licensee's letter of January 21, 1994. The licensee described three paths which credit interlocks to preclude draining the reactor vessel. These paths are summarized as follows:

1. If an RHR SDC pump suction valve is open, the suppression pool suction valve for that same pump cannot be opened.
2. If an RHR SDC pump suction valve is open, the corresponding RHR suppression pool return line valve cannot be opened. This interlock is presently installed on BFN Unit 2. TVA has committed to install the interlocks on BFN Units 1 and 3 before these reactors restart.
3. Operating procedures require the reactor operator to bypass the minimum flow logic for the RHR minimum flow valve prior to placing RHR in SDC mode, ensuring that this path is not available for reactor vessel drainage when the RHR pumps are operating in SDC mode. The RHR minimum flow valves are also interlocked to close if a SDC suction valve is not fully closed, and neither pump on the

corresponding loop is operating. This interlock prevents passive drainage of the reactor vessel when the RHR pumps are idle.

The licensee's letter of January 21, 1994 states that the other potential drainage paths are small (no larger than one-inch). The licensee presented results of calculations which show that the time required to drain the reactor vessel to the top of active fuel for these small paths (over 30 minutes) is much longer than the time required for manual realignment of RHR to LPCI mode (approximately 3.5 minutes).

The staff finds that the licensee has demonstrated that the large reactor drain paths are adequately controlled by procedures and electrical interlocks to preclude loss of reactor coolant through these paths. The staff also finds that the licensee has demonstrated that the remaining leak paths cannot uncover the fuel before the operator can complete realignment of the RHR system from SDC to LPCI mode; therefore, manual operator action to perform this realignment is an adequate substitute for automatic RHR initiation in LPCI mode. If a single-failure of the RHR system is postulated, the core can be kept covered by the independent core spray pump required by LCO 3.5.A.4. Therefore, the proposed change to LCO 3.5.B.9 satisfies GDC 35 and is acceptable.

Since the discussion above relies upon interlocks to prevent large drainage paths from the reactor vessel, the staff expects these interlocks to be installed before fuel is loaded in BFN Units 1 and 3. This expectation is consistent with TVA's January 21, 1994 commitment to install the interlocks prior to restart of BFN Units 1 and 3.

2.3 Summary

The licensee has proposed changes to residual heat removal system requirements for low pressure coolant injection capability for shutdown conditions. The proposed changes ensure that the requirements for single-failure tolerant core cooling given by General Design Criterion 35 are maintained. Therefore, the proposed changes are acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Alabama State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no

public comment on such finding (58 FR 16873). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

5.0 CONCLUSION

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

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Date: April 19, 1994