November 24, 1989

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

Mr. Oliver D. Kingsley, Jr.
Senior Vice President, Nuclear Power
Tennessee Valley Authority
6N 38A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Dear Mr. Kingsley:

SUBJECT: TECHNICAL SPECIFICATION CHANGES INVOLVING THE HIGH PRESSURE COOLANT INJECTION SYSTEM AND THE REACTOR CORE ISOLATION COOLING SYSTEM (TAC NOS. 74215, 74216, 74217) (TS 274) - BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3

The Commission has issued the enclosed Amendment Nos. 173 , 176 , and 144 to Facility Operating License Nos. DPR-33, DPR-52 and DPR-68 for the Browns Ferry Nuclear Plant, Units 1, 2 and 3, respectively. These amendments are in response to your application dated August 9, 1989.

These changes revise the reactor pressure requirements at which the High Pressure Coolant Injection System and the Reactor Core Isolation Cooling System must be operable.

A copy of the Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's Bi-Weekly Federal Register Notice.

Sincerely,

Original signed by
Gerald E. Gears for

Suzanne Black, Assistant Director
for Projects
TVA Projects Division
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 173 to License No. DPR-33
2. Amendment No. 176 to License No. DPR-52
3. Amendment No. 144 to License No. DPR-68
4. Safety Evaluation

cc w/enclosures:
See next page

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Committee on Interior
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Washington, D.C. 20515

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AMENDMENT NO. 173 FOR BROWNS FERRY UNIT 1 - DOCKET NO. 50-259,
AMENDMENT NO. 176 FOR BROWNS FERRY UNIT 2 - DOCKET NO. 50-260, and
AMENDMENT NO. 144 FOR BROWNS FERRY UNIT 3 - DOCKET NO. 50-296
DATED: NOVEMBER 24, 1989

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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 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 173
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 August 9, 1989, 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-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. 173, 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 60 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Suzanne Black, Assistant Director
for Projects
TVA Projects Division
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: November 24, 1989

ATTACHMENT TO LICENSE AMENDMENT NO. 173

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.

REMOVE	INSERT
3.5/4.5-12	3.5/4.5-12*
3.5/4.5-13	3.5/4.5-13
3.5/4.5-14	3.5/4.5-14
3.5/4.5-15	3.5/4.5-15
3.5/4.5-30	3.5/4.5-30
3.5/4.5-31	3.5/4.5-31

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWS) (Continued) 4. One of the D1 or D2 RHRSW pumps assigned to the RHR heat exchanger supplying the standby coolant supply connection may be inoperable for a period not to exceed 30 days provided the OPERABLE pump is aligned to supply the RHR heat exchanger header and the associated diesel generator and essential control valves are OPERABLE. 5. The standby coolant supply capability may be inoperable for a period not to exceed 10 days. 6. If Specifications 3.5.C.2 through 3.5.C.5 are not met, an orderly shutdown shall be initiated and the unit placed in the COLD SHUTDOWN CONDITION within 24 hours. 7. There shall be at least 2 RHRSW pumps, associated with the selected RHR pumps, aligned for RHR heat exchanger service for each reactor vessel containing irradiated fuel.	4.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWS) (Continued) 4. No additional surveillance is required.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.5.D Equipment Area Coolers	4.5.D Equipment Area Coolers
1. The equipment area cooler associated with each RHR pump and the equipment area cooler associated with each set of core spray pumps (A and C or B and D) must be OPERABLE at all times when the pump or pumps served by that specific cooler is considered to be OPERABLE.	1. Each equipment area cooler is operated in conjunction with the equipment served by that particular cooler; therefore, the equipment area coolers are tested at the same frequency as the pumps which they serve.
2. When an equipment area cooler is not OPERABLE, the pump(s) served by that cooler must be considered inoperable for Technical Specification purposes.	
E. High Pressure Coolant Injection System (HPCIS)	E. High Pressure Coolant Injection System (HPCIS)
1. The HPCI system shall be OPERABLE whenever there is irradiated fuel in the reactor vessel and the reactor vessel pressure is greater than 150 psig, except as specified in Specification 3.5.E.2. OPERABILITY shall be determined within 12 hours after reactor steam pressure reaches 150 psig from a COLD CONDITION, or alternatively PRIOR TO STARTUP by using an auxiliary steam supply.	1. HPCI Subsystem testing shall be performed as follows:
	a. Simulated Automatic Actuation Test — Once/18 months
	b. Pump OPERABILITY — Per Specification 1.0.MM
	c. Motor Operated Valve OPERABILITY — Per Specification 1.0.MM
	d. Flow Rate at normal reactor vessel operating pressure — Once/3 months

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.5.E High Pressure Coolant Injection System (HPCIS)	4.5.E High Pressure Coolant Injection System (HPCIS)
	4.5.E.1 (Cont'd)
	e. Flow Rate at 150 psig — Once/18 months The HPCI pump shall deliver at least 5000 gpm during each flow rate test.
	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
2. If the HPCI system is inoperable, the reactor may remain in operation for a period not to exceed 7 days, provided the ADS, CSS, RHRS (LPCI), and RCICS are OPERABLE.	2. No additional surveillances are required.
3. If Specifications 3.5.E.1 or 3.5.E.2 are not met, an orderly shutdown shall be initiated and the reactor vessel pressure shall be reduced to 150 psig or less within 24 hours.	* 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.
F. Reactor Core Isolation Cooling System (RCICS)	F. Reactor Core Isolation Cooling System (RCICS)
1. The RCICS shall be OPERABLE whenever there is irradiated fuel in the reactor vessel and the reactor vessel pressure is above 150 psig, except as specified in 3.5.F.2. OPERABILITY shall	1. RCIC Subsystem testing shall be performed as follows:
	a. Simulated Automatic Actuation Test — Once/18 months

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.5.F. Reactor Core Isolation Cooling System (RCICS)	4.5.F Reactor Core Isolation Cooling System (RCICS)
3.5.F.1 (Cont'd)	4.5.F.1 (Cont'd)
be determined within 12 hours after reactor steam pressure reaches 150 psig from a COLD CONDITION or alternatively PRIOR TO STARTUP by using an auxiliary steam supply.	b. Pump OPERABILITY — Per Specification 1.0.MM c. Motor-Operated Valve OPERABILITY — Per Specification 1.0.MM d. Flow Rate at normal reactor vessel operating pressure — Once/3 months e. Flow Rate at 150 psig — Once/18 months The RCIC pump shall deliver at least 600 gpm during each flow test. f. Verify that each valve (manual, power-operated, or automatic) in the injection flowpath that is not locked, sealed, or otherwise secured in position, is in its correct* position. — Once/Month
2. If the RCICS is inoperable, the reactor may remain in operation for a period not to exceed 7 days if the HPCIS is OPERABLE during such time.	2. No additional surveillances are required.
3. If Specifications 3.5.F.1 or 3.5.F.2 are not met, an orderly shutdown shall be initiated and the reactor shall be depressurized to less than 150 psig within 24 hours.	* Except that an automatic valve capable of automatic return to its normal position when a signal is present may be in a position for another mode of operation.

3.5.E. High Pressure Coolant Injection System (HPCIS)

The HPCIS is provided to assure that the reactor core is adequately cooled to limit fuel clad temperature in the event of a small break in the nuclear system and loss of coolant which does not result in rapid depressurization of the reactor vessel. The HPCI system permits the reactor to be shut down while maintaining sufficient reactor vessel water level inventory until the vessel is depressurized. The HPCIS continues to operate until reactor vessel pressure is below the pressure at which LPCI operation or Core Spray system operation maintains core cooling. The capacity of the system is selected to provide the required core cooling. The HPCI pump is designed to pump 5000 gpm at reactor pressures between 1120 and 150 psig. The HPCIS is not required to be operable below 150 psig since this is well within the range of the low pressure cooling systems and below the pressure of any events for which HPCI is required to provide core cooling.

The HPCIS is not designed to operate at full capacity until reactor pressure exceeds 150 psig and the steam supply to the HPCI turbine is automatically isolated before reactor pressure decreases below 100 psig. The ADS, CSS, and RHRS (LPCI) must be OPERABLE when starting up from a Cold Condition. Steam pressure is sufficient at 150 psig to run the HPCI turbine for operability testing yet, still below the shutoff head of the CSS and RHRS pumps so they will inject water into the vessel if required. The ADS provides additional backup to reduce pressure to the range where the CSS and RHRS will inject into the vessel if necessary. Considering the low reactor pressure, the redundancy and availability of CSS, RHRS, and ADS during startup from a Cold Condition, twelve hours is allowed as a reasonable time to demonstrate HPCI operability once sufficient steam pressure becomes available. The alternative to demonstrate HPCI operability prior to startup using auxiliary steam is provided for plant operating flexibility.

With the HPCIS inoperable, a seven-day period to return the system to service is justified based on the availability of the ADS, CSS, RHRS (LPCI) and the RCICS. The availability of these redundant and diversified systems provides adequate assurance of core cooling while HPCIS is out of service.

The surveillance requirements, which are based on industry codes and standards, provide adequate assurance that the HPCIS will be OPERABLE when required.

3.5.F Reactor Core Isolation Cooling System (RCICS)

The RCICS functions to provide core cooling and makeup water to the reactor vessel during shutdown and isolation from the main heat sink and for certain pipe break accidents. The RCICS provides its design flow between 150 psig and 1120 psig reactor pressure. Below 150 psig, RCICS is not required to be operable since this pressure is substantially below that for any events in which RCICS is required to provide core cooling. RCICS will continue to operate below 150 psig at reduced flow until it automatically isolates at greater than or equal to 50 psig reactor steam pressure. 150 psig is also below the shutoff head of the CSS and RHRS, thus, considerable overlap exists with the cooling systems that provide core cooling at low reactor pressure.

The ADS, CSS, and RHRS (LPCI) must be OPERABLE when starting up from a Cold Condition. Steam pressure is sufficient at 150 psig to run the RCIC turbine for operability testing, yet still below the shutoff head of the CSS and RHRS pumps so they will inject water into the vessel if required. Considering the low reactor pressure and the availability of the low pressure coolant systems during startup from a Cold Condition, twelve hours is allowed as a reasonable time to demonstrate RCIC operability once sufficient steam pressure becomes available. The alternative to demonstrate RCIC operability prior to startup using auxiliary steam is provided for plant operating flexibility.

With the RCICS inoperable, a seven-day period to return the system to service is justified based on the availability of the HPCIS to cool the core and upon consideration that the average risk associated with failure of the RCICS to cool the core when required is not increased.

The surveillance requirements, which are based on industry codes and standards, provide adequate assurance that the RCICS will be OPERABLE when required.

3.5.G Automatic Depressurization System (ADS)

This specification ensures the operability of the ADS under all conditions for which the depressurization of the nuclear system is an essential response to station abnormalities.

The nuclear system pressure relief system provides automatic nuclear system depressurization for small breaks in the nuclear system so that the low-pressure coolant injection (LPCI) and the core spray subsystems can operate to protect the fuel barrier. Note that this specification applies only to the automatic feature of the pressure relief system.

Specification 3.6.D specifies the requirements for the pressure relief function of the valves. It is possible for any number of the valves assigned to the ADS to be incapable of performing their ADS functions because of instrumentation failures, yet be fully capable of performing their pressure relief function.

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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-260

BROWNS FERRY NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 176
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 August 9, 1989, 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. 176, 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 60 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Gerard E. Gears for

Suzanne Black, Assistant Director
for Projects
TVA Projects Division
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: November 24, 1989

ATTACHMENT TO LICENSE AMENDMENT NO. 176

FACILITY OPERATING LICENSE NO. DPR-52

DOCKET NO. 50-260

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

REMOVE	INSERT
3.5/4.5-12	3.5/4.5-12*
3.5/4.5-13	3.5/4.5-13
3.5/4.5-14	3.5/4.5-14
3.5/4.5-15	3.5/4.5-15
3.5/4.5-28	3.5/4.5-28
3.5/4.5-29	3.5/4.5-29

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWS) (Continued) 4. Three of the D1, D2, B1, B2 RHRSW pumps assigned to the RHR heat exchanger supplying the standby coolant supply connection may be inoperable for a period not to exceed 30 days provided the OPERABLE pump is aligned to supply the RHR heat exchanger header and the associated diesel generator and essential control valves are OPERABLE. 5. The standby coolant supply capability may be inoperable for a period not to exceed 10 days. 6. If Specifications 3.5.C.2 through 3.5.C.5 are not met, an orderly shutdown shall be initiated and the unit placed in the COLD SHUTDOWN CONDITION within 24 hours. 7. There shall be at least 2 RHRSW pumps, associated with the selected RHR pumps, aligned for RHR heat exchanger service for each reactor vessel containing irradiated fuel.	4.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWS) (Continued) 4. No additional surveillance is required.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.5.D Equipment Area Coolers	4.5.D Equipment Area Coolers
1. The equipment area cooler associated with each RHR pump and the equipment area cooler associated with each set of core spray pumps (A and C or B and D) must be OPERABLE at all times when the pump or pumps served by that specific cooler is considered to be OPERABLE.	1. Each equipment area cooler is operated in conjunction with the equipment served by that particular cooler; therefore, the equipment area coolers are tested at the same frequency as the pumps which they serve.
2. When an equipment area cooler is not OPERABLE, the pump(s) served by that cooler must be considered inoperable for Technical Specification purposes.	
E. High Pressure Coolant Injection System (HPCIS)	E. High Pressure Coolant Injection System (HPCIS)
1. The HPCI system shall be OPERABLE whenever there is irradiated fuel in the reactor vessel and the reactor vessel pressure is greater than 150 psig, except as specified in Specification 3.5.E.2. OPERABILITY shall be determined within 12 hours after reactor steam pressure reaches 150 psig from a COLD CONDITION, or alternatively PRIOR TO STARTUP by using an auxiliary steam supply.	1. HPCI Subsystem testing shall be performed as follows:
	a. Simulated Automatic Actuation Test — Once/18 months
	b. Pump OPERABILITY — Per Specification 1.0.MM
	c. Motor Operated Valve OPERABILITY — Per Specification 1.0.MM
	d. Flow Rate at normal reactor vessel operating pressure — Once/3 months

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.5.E High Pressure Coolant Injection System (HPCIS)	4.5.E High Pressure Coolant Injection System (HPCIS)
	4.5.E.1 (Cont'd)
	e. Flow Rate at 150 psig — Once/18 months The HPCI pump shall deliver at least 5000 gpm during each flow rate test.
	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
2. If the HPCI system is inoperable, the reactor may remain in operation for a period not to exceed 7 days, provided the ADS, CSS, RHRS (LPCI), and RCICS are OPERABLE.	2. No additional surveillances are required.
3. If Specifications 3.5.E.1 or 3.5.E.2 are not met, an orderly shutdown shall be initiated and the reactor vessel pressure shall be reduced to 150 psig or less within 24 hours.	* 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.
F. Reactor Core Isolation Cooling System (RCICS)	F. Reactor Core Isolation Cooling System (RCICS)
1. The RCICS shall be OPERABLE whenever there is irradiated fuel in the reactor vessel and the reactor vessel pressure is above 150 psig, except as specified in 3.5.F.2. OPERABILITY shall	1. RCIC Subsystem testing shall be performed as follows: a. Simulated Automatic Actuation Test — Once/18 months

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.5.F. Reactor Core Isolation Cooling System (RCICS)	4.5.F Reactor Core Isolation Cooling System (RCICS)
3.5.F.1 (Cont'd)	4.5.F.1 (Cont'd)
be determined within 12 hours after reactor steam pressure reaches 150 psig from a COLD CONDITION or alternatively PRIOR TO STARTUP by using an auxiliary steam supply.	b. Pump OPERABILITY — Per Specification 1.0.MM c. Motor-Operated Valve OPERABILITY — Per Specification 1.0.MM d. Flow Rate at normal reactor vessel operating pressure — Once/3 months e. Flow Rate at 150 psig — Once/18 months The RCIC pump shall deliver at least 600 gpm during each flow test. f. Verify that each valve (manual, power-operated, or automatic) in the injection flowpath that is not locked, sealed, or otherwise secured in position, is in its correct* position. — Once/Month
2. If the RCICS is inoperable, the reactor may remain in operation for a period not to exceed 7 days if the HPCIS is OPERABLE during such time.	2. No additional surveillances are required.
3. If Specifications 3.5.F.1 or 3.5.F.2 are not met, an orderly shutdown shall be initiated and the reactor shall be depressurized to less than 150 psig within 24 hours.	* Except that an automatic valve capable of automatic return to its normal position when a signal is present may be in a position for another mode of operation.

3.5.E. High Pressure Coolant Injection System (HPCIS)

The HPCIS is provided to assure that the reactor core is adequately cooled to limit fuel clad temperature in the event of a small break in the nuclear system and loss of coolant which does not result in rapid depressurization of the reactor vessel. The HPCI system permits the reactor to be shut down while maintaining sufficient reactor vessel water level inventory until the vessel is depressurized. The HPCIS continues to operate until reactor vessel pressure is below the pressure at which LPCI operation or Core Spray system operation maintains core cooling. The capacity of the system is selected to provide the required core cooling. The HPCI pump is designed to pump 5000 gpm at reactor pressures between 1120 and 150 psig. The HPCIS is not required to be operable below 150 psig since this is well within the range of the low pressure cooling systems and below the pressure of any events for which HPCI is required to provide core cooling.

The HPCIS is not designed to operate at full capacity until reactor pressure exceeds 150 psig and the steam supply to the HPCI turbine is automatically isolated before reactor pressure decreases below 100 psig. The ADS, CSS, and RHRS (LPCI) must be OPERABLE when starting up from a Cold Condition. Steam pressure is sufficient at 150 psig to run the HPCI turbine for operability testing yet still below the shutoff head of the CSS and RHRS pumps so they will inject water into the vessel if required. The ADS provides additional backup to reduce pressure to the range where the CSS and RHRS will inject into the vessel if necessary. Considering the low reactor pressure, the redundancy and availability of CSS, RHRS, and ADS during startup from a Cold Condition, twelve hours is allowed as a reasonable time to demonstrate HPCI operability once sufficient steam pressure becomes available. The alternative to demonstrate HPCI operability prior to startup using auxiliary steam is provided for plant operating flexibility.

With the HPCIS inoperable, a seven-day period to return the system to service is justified based on the availability of the ADS, CSS, RHRS (LPCI) and the RCICS. The availability of these redundant and diversified systems provides adequate assurance of core cooling while HPCIS is out of service.

The surveillance requirements, which are based on industry codes and standards, provide adequate assurance that the HPCIS will be OPERABLE when required.

3.5.F Reactor Core Isolation Cooling System (RCICS)

The RCICS functions to provide core cooling and makeup water to the reactor vessel during shutdown and isolation from the main heat sink and for certain pipe break accidents. The RCICS provides its design flow between 150 psig and 1120 psig reactor pressure. Below 150 psig, RCICS is not required to be operable since this pressure is substantially below that for any events in which RCICS is required to provide core cooling. RCICS will continue to operate below 150 psig at reduced flow until it automatically isolates at greater than or equal to 50 psig reactor steam pressure. 150 psig is also below the shutoff head of the CSS and RHRS, thus, considerable overlap exists with the cooling systems that provide core cooling at low reactor pressure.

The ADS, CSS, and RHRS (LPCI) must be OPERABLE when starting up from a Cold Condition. Steam pressure is sufficient at 150 psig to run the RCIC turbine for operability testing, yet still below the shutoff head of the CSS and RHRS pumps so they will inject water into the vessel if required. Considering the low reactor pressure and the availability of the low pressure coolant systems during startup from a Cold Condition, twelve hours is allowed as a reasonable time to demonstrate RCIC operability once sufficient steam pressure becomes available. The alternative to demonstrate RCIC operability prior to startup using auxiliary steam is provided for plant operating flexibility.

With the RCICS inoperable, a seven-day period to return the system to service is justified based on the availability of the HPCIS to cool the core and upon consideration that the average risk associated with failure of the RCICS to cool the core when required is not increased.

The surveillance requirements, which are based on industry codes and standards, provide adequate assurance that the RCICS will be OPERABLE when required.

3.5.G Automatic Depressurization System (ADS)

This specification ensures the operability of the ADS under all conditions for which the depressurization of the nuclear system is an essential response to station abnormalities.

The nuclear system pressure relief system provides automatic nuclear system depressurization for small breaks in the nuclear system so that the low-pressure coolant injection (LPCI) and the core spray subsystems can operate to protect the fuel barrier. Note that this specification applies only to the automatic feature of the pressure relief system.

Specification 3.6.D specifies the requirements for the pressure relief function of the valves. It is possible for any number of the valves assigned to the ADS to be incapable of performing their ADS functions because of instrumentation failures, yet be fully capable of performing their pressure relief function.

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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-296

BROWNS FERRY NUCLEAR PLANT, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 144
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 August 9, 1989 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. 144, 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 60 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Suzanne Black, Assistant Director
for Projects
TVA Projects Division
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: November 24, 1989

ATTACHMENT TO LICENSE AMENDMENT NO. 144

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.

REMOVE	INSERT
3.5/4.5-12	3.5/4.5-12*
3.5/4.5-13	3.5/4.5-13
3.5/4.5-14	3.5/4.5-14
3.5/4.5-15	3.5/4.5-15
3.5/4.5-31	3.5/4.5-31
3.5/4.5-32	3.5/4.5-32

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWS) (Continued) 4. One of the B1 or B2 RHRSW pumps assigned to the RHR heat exchanger supplying the standby coolant supply connection may be inoperable for a period not to exceed 30 days provided the OPERABLE pump is aligned to supply the RHR heat exchanger header and the associated diesel generator and essential control valves are OPERABLE. 5. The standby coolant supply capability may be inoperable for a period not to exceed 10 days. 6. If Specifications 3.5.C.2 through 3.5.C.5 are not met, an orderly shutdown shall be initiated and the unit placed in the COLD SHUTDOWN CONDITION within 24 hours. 7. There shall be at least 2 RHRSW pumps, associated with the selected RHR pumps, aligned for RHR heat exchanger service for each reactor vessel containing irradiated fuel.	4.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWS) (Continued) 4. No additional surveillance is required.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.5.D Equipment Area Coolers	4.5.D Equipment Area Coolers
1. The equipment area cooler associated with each RHR pump and the equipment area cooler associated with each set of core spray pumps (A and C or B and D) must be OPERABLE at all times when the pump or pumps served by that specific cooler is considered to be OPERABLE.	1. Each equipment area cooler is operated in conjunction with the equipment served by that particular cooler; therefore, the equipment area coolers are tested at the same frequency as the pumps which they serve.
2. When an equipment area cooler is not OPERABLE, the pump(s) served by that cooler must be considered inoperable for Technical Specification purposes.	
E. High Pressure Coolant Injection System (HPCIS)	E. High Pressure Coolant Injection System (HPCIS)
1. The HPCI system shall be OPERABLE whenever there is irradiated fuel in the reactor vessel and the reactor vessel pressure is greater than 150 psig, except as specified in Specification 3.5.E.2. OPERABILITY shall be determined within 12 hours after reactor steam pressure reaches 150 psig from a COLD CONDITION, or alternatively PRIOR TO STARTUP by using an auxiliary steam supply.	1. HPCI Subsystem testing shall be performed as follows: a. Simulated Automatic Actuation Test — Once/18 months b. Pump OPERABILITY — Per Specification 1.0.MM c. Motor Operated Valve OPERABILITY — Per Specification 1.0.MM d. Flow Rate at normal reactor vessel operating pressure — Once/3 months

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.5.E High Pressure Coolant Injection System (HPCIS)	4.5.E High Pressure Coolant Injection System (HPCIS)
	4.5.E.1 (Cont'd)
	e. Flow Rate at 150 psig — Once/18 months The HPCI pump shall deliver at least 5000 gpm during each flow rate test.
	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
2. If the HPCI system is inoperable, the reactor may remain in operation for a period not to exceed 7 days, provided the ADS, CSS, RHRS (LPCI), and RCICS are OPERABLE.	2. No additional surveillances are required.
3. If Specifications 3.5.E.1 or 3.5.E.2 are not met, an orderly shutdown shall be initiated and the reactor vessel pressure shall be reduced to 150 psig or less within 24 hours.	* 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.
F. Reactor Core Isolation Cooling System (RCICS)	F. Reactor Core Isolation Cooling System (RCICS)
1. The RCICS shall be OPERABLE whenever there is irradiated fuel in the reactor vessel and the reactor vessel pressure is above 150 psig, except as specified in 3.5.F.2. OPERABILITY shall	1. RCIC Subsystem testing shall be performed as follows:
	a. Simulated Automatic Actuation Test — Once/18 months

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.5.F. Reactor Core Isolation Cooling System (RCICS)	4.5.F Reactor Core Isolation Cooling System (RCICS)
3.5.F.1 (Cont'd)	4.5.F.1 (Cont'd)
be determined within 12 hours after reactor steam pressure reaches 150 psig from a COLD CONDITION or alternatively PRIOR TO STARTUP by using an auxiliary steam supply.	b. Pump OPERABILITY — Per Specification 1.0.MM c. Motor-Operated Valve OPERABILITY — Per Specification 1.0.MM d. Flow Rate at normal reactor vessel operating pressure — Once/3 months e. Flow Rate at 150 psig — Once/18 months The RCIC pump shall deliver at least 600 gpm during each flow test. f. Verify that each valve (manual, power-operated, or automatic) in the injection flowpath that is not locked, sealed, or otherwise secured in position, is in its correct* position. — Once/Month
2. If the RCICS is inoperable, the reactor may remain in operation for a period not to exceed 7 days if the HPCIS is OPERABLE during such time.	2. No additional surveillances are required.
3. If Specifications 3.5.F.1 or 3.5.F.2 are not met, an orderly shutdown shall be initiated and the reactor shall be depressurized to less than 150 psig within 24 hours.	* Except that an automatic valve capable of automatic return to its normal position when a signal is present may be in a position for another mode of operation.

3.5.E. High Pressure Coolant Injection System (HPCIS)

The HPCIS is provided to assure that the reactor core is adequately cooled to limit fuel clad temperature in the event of a small break in the nuclear system and loss of coolant which does not result in rapid depressurization of the reactor vessel. The HPCI system permits the reactor to be shut down while maintaining sufficient reactor vessel water level inventory until the vessel is depressurized. The HPCIS continues to operate until reactor vessel pressure is below the pressure at which LPCI operation or Core Spray system operation maintains core cooling. The capacity of the system is selected to provide the required core cooling. The HPCI pump is designed to pump 5000 gpm at reactor pressures between 1120 and 150 psig. The HPCIS is not required to be operable below 150 psig since this is well within the range of the low pressure cooling systems and below the pressure of any events for which HPCI is required to provide core cooling.

The HPCIS is not designed to operate at full capacity until reactor pressure exceeds 150 psig and the steam supply to the HPCI turbine is automatically isolated before reactor pressure decreases below 100 psig. The ADS, CSS, and RHRS (LPCI) must be OPERABLE when starting up from a Cold Condition. Steam pressure is sufficient at 150 psig to run the HPCI turbine for operability testing, yet still below the shutoff head of the CSS and RHRS pumps so they will inject water into the vessel if required. The ADS provides additional backup to reduce pressure to the range where the CSS and RHRS will inject into the vessel if necessary. Considering the low reactor pressure, the redundancy and availability of CSS, RHRS, and ADS during startup from a Cold Condition, twelve hours is allowed as a reasonable time to demonstrate HPCI operability once sufficient steam pressure becomes available. The alternative to demonstrate HPCI operability prior to startup using auxiliary steam is provided for plant operating flexibility.

With the HPCIS inoperable, a seven-day period to return the system to service is justified based on the availability of the ADS, CSS, RHRS (LPCI) and the RCICS. The availability of these redundant and diversified systems provides adequate assurance of core cooling while HPCIS is out of service.

The surveillance requirements, which are based on industry codes and standards, provide adequate assurance that the HPCIS will be OPERABLE when required.

3.5.F Reactor Core Isolation Cooling System (RCICS)

The RCICS functions to provide core cooling and makeup water to the reactor vessel during shutdown and isolation from the main heat sink and for certain pipe break accidents. The RCICS provides its design flow between 150 psig and 1120 psig reactor pressure. Below 150 psig, RCICS is not required to be operable since this pressure is substantially below that for any events in which RCICS is required to provide core cooling. RCICS will continue to operate below 150 psig at reduced flow until it automatically isolates at greater than or equal to 50 psig reactor steam pressure. 150 psig is also below the shutoff head of the CSS and RHRS, thus, considerable overlap exists with the cooling systems that provide core cooling at low reactor pressure.

The ADS, CSS, and RHRS (LPCI) must be OPERABLE when starting up from a Cold Condition. Steam pressure is sufficient at 150 psig to run the RCIC turbine for operability testing, yet still below the shutoff head of the CSS and RHRS pumps so they will inject water into the vessel if required. Considering the low reactor pressure and the availability of the low pressure coolant systems during startup from a Cold Condition, twelve hours is allowed as a reasonable time to demonstrate RCIC operability once sufficient steam pressure becomes available. The alternative to demonstrate RCIC operability prior to startup using auxiliary steam is provided for plant operating flexibility.

With the RCICS inoperable, a seven-day period to return the system to service is justified based on the availability of the HPCIS to cool the core and upon consideration that the average risk associated with failure of the RCICS to cool the core when required is not increased.

The surveillance requirements, which are based on industry codes and standards, provide adequate assurance that the RCICS will be OPERABLE when required.

3.5.G Automatic Depressurization System (ADS)

This specification ensures the operability of the ADS under all conditions for which the depressurization of the nuclear system is an essential response to station abnormalities.

The nuclear system pressure relief system provides automatic nuclear system depressurization for small breaks in the nuclear system so that the low-pressure coolant injection (LPCI) and the core spray subsystems can operate to protect the fuel barrier. Note that this specification applies only to the automatic feature of the pressure relief system.

Specification 3.6.D specifies the requirements for the pressure relief function of the valves. It is possible for any number of the valves assigned to the ADS to be incapable of performing their ADS functions because of instrumentation failures, yet be fully capable of performing their pressure relief function.

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

ENCLOSURE 4

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 173 TO FACILITY OPERATING LICENSE NO. DPR-33

AMENDMENT NO. 176 TO FACILITY OPERATING LICENSE NO. DPR-52

AMENDMENT NO. 144 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

The Tennessee Valley Authority (TVA or the licensee) requested by letter dated August 9, 1989 that the Browns Ferry Nuclear Plant (BFN) Technical Specifications (TS) be revised to reflect the design capabilities of the High Pressure Coolant Injection (HPCI) system and Reactor Core Isolation Cooling (RCIC) system. In addition, the licensee proposes to change the language of the surveillance requirements for the HPCI and RCIC systems from 'once/operating cycle' to 'once/18 months'. The expected length of an operating cycle at BFN is 18 months.

The current BFN TS require the HPCI/RCIC pumps to be demonstrated operable when reactor pressure is greater than 122 psig. The proposed TS would change these requirements to demonstrate HPCI/RCIC operability after reactor vessel pressure reaches 150 psig. In addition, operability of HPCI/RCIC would be permitted to be demonstrated within 12 hours after reactor pressure reaches 150 psig.

2.0 EVALUATION

The accidents and operational transients for which the HPCI and RCIC systems are required to provide core cooling are generally analyzed for occurrence at full reactor power and pressure. During these events, the HPCI/RCIC systems intended functions are to maintain adequate reactor vessel water level until reactor pressure decreases to the injection range of the Core Spray (CS) or Residual Heat Removal systems (Low Pressure Coolant Injection mode, (RHR/LPCI)). The CS/LPCI systems can inject reactor cooling water when the reactor vessel pressure is greater than 150 psig in addition to providing all reactor core cooling requirements for those conditions below 150 psig. The BFN Final Safety Analysis Report (FSAR), Chapters 6 and 14, describe the performance of HPCI and RCIC systems over the pressure range from 150 to 1120 psig for those events where HPCI/RCIC are required to perform their intended function. Both of these systems provide full design flow in this reactor pressure range. These systems

will continue to operate at a reduced flow below 150 psig until they automatically isolate due to low steam pressure. The CS/LPCI will begin injecting into the vessel at approximately 230 psig and continue providing flow down to zero reactor pressure. This provides sufficient overlap with the HPCI/RCIC systems to ensure that adequate water inventory is provided to the reactor core below 150 psig. This change would bring the TS into conformance with the design capabilities of the HPCI and RCIC turbine/pump combinations as well as the analyzed accident/transient demands for these systems over the range of 150 to 1120 psig reactor pressure.

The proposed change would also require that the HPCI/RCIC pumps be demonstrated operable within 12 hours after the reactor pressure has reached 150 psig. The HPCI/RCIC pumps are not designed to operate at full capacity until reactor pressure reaches 150 psig. This proposed change would permit certain operational flexibility during startup. The BFN TSs currently require that the Automatic Depressurization System (ADS), Core Spray (CS), and LPCI systems be operable when starting up from a Cold Condition (0 psig). Steam pressure is sufficient at 150 psig to run the HPCI/RCIC turbines for operability testing. This is still below the shutdown head of the CS and LPCI pumps (approximately 230 psig) so they will inject water into the vessel if required during this 12 hour period until the HPCI/RCIC systems are demonstrated to be operable. The ADS provides additional backup to reduce pressure to the range where the CS and LPCI will inject into the vessel if necessary. Therefore, these systems would be available during the 12-hours before HPCI/RCIC are declared operable.

Based upon the above, the staff finds the proposed changes acceptable. In addition, considering the overlap and availability of CS, LPCI and ADS during startup from a cold shutdown, a twelve hour period to demonstrate HPCI/RCIC operability once sufficient steam pressure (150 psig) becomes available is an acceptable time period.

The TS surveillance periods are being changed from once/operating cycle to once/18 months. Operating cycles at Browns Ferry extend from one refueling to the next. The operating cycle at Browns Ferry is usually expected to be 18 months in duration. Longer operating cycles could result from operating at lower power levels, numerous reactor mini outages, and other extenuating circumstances. BFN TS 1.0.LL allows a maximum extension of a surveillance requirement not to exceed 25% of the surveillance interval. This would allow a maximum of 22.5 months to perform the above surveillances. Specifically, this time would be the period that the unit is shutdown (tripped) to start the refueling to just prior to startup for the subsequent cycle of operation as defined in BFN TS 1.0.D. Changing the surveillance interval provides consistency with the BFN TS, industry practices, and NRC guidance. Based on this, changing the surveillance interval to read once every 18 months is acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

The amendments involve a change to a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes to the surveillance requirements. The 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 these amendments involve no significant hazards consideration and there has been no public comment on such finding. 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 nor environmental assessment need be prepared in connection with the issuance of these amendments.

4.0 CONCLUSION

The Commission made a proposed determination that the amendment involves no significant hazards consideration which was published in the Federal Register (54 FR 40934) on October 4, 1989 and consulted with the State of Alabama. No public comments were received and the State of Alabama did not have any comments.

The staff 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, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendments will not be inimical to the common defense and security nor to the health and safety of the public.

Principal Contributor: G. Gears

Dated: November 24, 1989