November 21, 1988

Docket No. 50-260

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

Dear Mr. White:

SUBJECT: BROWNS FERRY NUCLEAR PLANT, (BFN) UNIT 2 - REACTOR WATER CLEANUP PIPETRENCH TEMPERATURE SENSOR (TAC 00439)(TS 250)

The Commission has issued the enclosed Amendment No. 156, to Facility Operating License No. DPR-52 for the Browns Ferry Nuclear Plant, Unit 2, respectively. This amendment is in response to your application dated August 3, 1988.

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

Suzanne Black, Assistant Director
for Projects
TVA Projects Division
Office of Special Projects

Enclosures:
1. Amendment No. 156 to License No. DPR-52
2. Safety Evaluation

cc w/enclosures:
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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. 156
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 3, 1988 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. 156, 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

Suzanne Black, Assistant Director
for Projects
TVA Projects Division
Office of Special Projects

Attachment:
Changes to the Technical
Specifications

Date of Issuance: November 21, 1988

ATTACHMENT TO LICENSE AMENDMENT NO. 156

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	INSERT
3.2/4.2-7	3.2/4.2-7*
3.2/4-2-8	3.2/4.2-8
3.2/4.2-42	3.2/4.2-42*
3.2.4.2-43	3.2/4.2-43
3.2/4.2-67	3.2/4.2-67
3.2/4.2-68	3.2/4.2-68*

TABLE 3.2.A
PRIMARY CONTAINMENT AND REACTOR BUILDING ISOLATION INSTRUMENTATION

Minimum No. Instrument Channels Operable Per Trip Sys(1)(11)	Function	Trip Level Setting	Action (1)	Remarks
2	Instrument Channel - Reactor Low Water Level(6) (LIS-3-203 A-D)	≥ 538" above vessel zero	A or (B and E)	1. Below trip setting does the following: a. Initiates Reactor Building Isolation b. Initiates Primary Containment Isolation c. Initiates SGTS
1	Instrument Channel - Reactor High Pressure	100 ± 15 psig	D	1. Above trip setting isolates the shutdown cooling suction valves of the RHR system.
2	Instrument Channel - Reactor Low Water Level (LIS-3-56A-D)	≥ 378" above vessel zero	A	1. Below trip setting initiates Main Steam Line Isolation
2	Instrument Channel - High Drywell Pressure (6) (PIS-64-56A-D)	≤ 2.5 psig	A or (B and E)	1. Above trip setting does the following: a. Initiates Reactor Building Isolation b. Initiates Primary Containment Isolation c. Initiates SGTS

TABLE 3.2.A (Continued)
PRIMARY CONTAINMENT AND REACTOR BUILDING ISOLATION INSTRUMENTATION

Minimum No. Instrument Channels Operable Per Trip Sys(1)(11)	Function	Trip Level Setting	Action (1)	Remarks
2	Instrument Channel - High Radiation Main Steam Line Tunnel (6)	≤ 3 times normal rated full power background	B	1. Above trip setting initiates Main Steam Line Isolation
2	Instrument Channel - Low Pressure Main Steam Line (PIS-1-72, 76, 82, 86)	≥ 825 psig (4)	B	1. Below trip setting initiates Main Steam Line Isolation
2(3)	Instrument Channel - High Flow Main Steam Line (PdIS-1-13A-D, 25A-D, 36A-D, 50A-D)	≤ 140% of rated steam flow	B	1. Above trip setting initiates Main Steam Line Isolation
2(12)	Instrument Channel - Main Steam Line Tunnel High Temperature	≤ 200°F	B	1. Above trip setting initiates Main Steam Line Isolation.
2(14)	Instrument Channel - Reactor Water Cleanup System Floor Drain High Temperature	160 - 180°F	C	1. Above trip setting initiates Isolation of Reactor Water Cleanup Line from Reactor and Reactor Water Return Line.
2	Instrument Channel - Reactor Water Cleanup System Space High Temperature	160 - 180°F	C	1. Same as above
2	Instrument Channel - Reactor Water Cleanup System Pipe Trench	≤ 150° F	C	1. Same as above
1	Instrument Channel - Reactor Building Ventilation High Radiation - Reactor Zone	≤ 100 mr/hr or downscale	G	1. 1 upscale or 2 downscale will a. Initiate SGTS b. Isolate reactor zone and refueling floor. c. Close atmosphere control system.

TABLE 4.2.A (Cont'd)
SURVEILLANCE REQUIREMENTS FOR PRIMARY CONTAINMENT AND REACTOR BUILDING ISOLATION INSTRUMENTATION

Function	Functional Test	Calibration Frequency	Instrument Check
Group 1 (Initiating) Logic	Checked during channel functional test. No further test required.(11)	N/A	N/A
Group 1 (Actuation) Logic	Once/operating cycle (21)	N/A	N/A
Group 2 (Initiating) Logic	Checked during channel functional test. No further test required.	N/A	N/A
Group 2 (RHR Isolation-Actuation) Logic	Once/operating cycle (21)	N/A	N/A
Group 8 (Tip-Actuation) Logic	Once/operating cycle (21)	N/A	N/A
Group 2 (Drywell Sump Drains-Actuation) Logic	Once/operating cycle (21)	N/A	N/A
Group 2 (Reactor Building and Refueling floor, and Drywell Vent and Purge-Actuation) Logic	Once/operating cycle (21)	N/A	N/A
Group 3 (Initiating) Logic	Checked during channel functional test. No further test required.	N/A	N/A
Group 3 (Actuation) Logic	Once/operating cycle (21)	N/A	N/A

TABLE 4.2.A (Cont'd)
SURVEILLANCE REQUIREMENTS FOR PRIMARY CONTAINMENT AND REACTOR BUILDING ISOLATION INSTRUMENTATION

Function	Functional Test	Calibration Frequency	Instrument Check
Group 6 Logic	Once/operating cycle (18)	N/A	N/A
Group 8 (Initiating) Logic	Checked during channel functional test. No further test required.	N/A	N/A
Reactor Building Isolation (refueling floor) Logic	Once/6 months (18)	(6)	N/A
Reactor Building Isolation (reactor zone) Logic	Once/6 months (18)	(6)	N/A
SGTS Train A Logic	Once/6 months (19)	N/A	N/A
SGTS Train B Logic	Once/6 months (19)	N/A	N/A
SGTS Train C Logic	Once/6 months (19)	N/A	N/A
Instrument Channel - Reactor Cleanup System Floor Drain High Temperature	(1)	Once/operating cycle	N/A
Instrument Channel - Reactor Cleanup System Space High Temperature	(1)	Once/operating cycle	N/A
Instrument Channel - Reactor Water Cleanup System Pipe Trench High Temperature	(1)	Once/operating cycle	N/A

steam line isolation valve closure, fission product release is limited so that 10 CFR 100 guidelines are not exceeded for this accident. Reference Section 14.6.2 FSAR. An alarm with a nominal setpoint of 1.5 x normal full power background is provided also.

Pressure instrumentation is provided to close the main steam isolation valves in RUN Mode when the main steam line pressure drops below 825 psig.

The HPCI high flow and temperature instrumentation are provided to detect a break in the HPCI steam piping. Tripping of this instrumentation results in actuation of HPCI isolation valves. Tripping logic for the high flow is a 1-out-of-2 logic, and all sensors are required to be OPERABLE.

High temperature in the vicinity of the HPCI equipment is sensed by four sets of four bimetallic temperature switches. The 16 temperature switches are arranged in two trip systems with eight temperature switches in each trip system.

The HPCI trip settings of 90 psi for high flow and 200°F for high temperature are such that core uncovery is prevented and fission product release is within limits.

The RCIC high flow and temperature instrumentation are arranged the same as that for the HPCI. The trip setting of 450" H_2O for high flow and 200°F for temperature are based on the same criteria as the HPCI.

High temperature at the Reactor Water Cleanup (RWCU) System floor drain in the space near the RWCU System or in the space near the pipe trench containing RWCU piping could indicate a break in the cleanup system. When high temperature occurs, the cleanup system is isolated.

The instrumentation which initiates CSCS action is arranged in a dual bus system. As for other vital instrumentation arranged in this fashion, the specification preserves the effectiveness of the system even during periods when maintenance or testing is being performed. An exception to this is when logic functional testing is being performed.

The control rod block functions are provided to prevent excessive control rod withdrawal so that MCPR does not decrease to 1.07. The trip logic for this function is 1-out-of-n: e.g., any trip on one of six APRMs, eight IRMs, or four SRMs will result in a rod block.

The minimum instrument channel requirements assure sufficient instrumentation to assure the single failure criteria is met. The minimum instrument channel requirements for the RBM may be reduced by one for maintenance, testing, or calibration. This does not significantly increase the risk of an inadvertent control rod withdrawal, as the other channel is available, and the RBM is a backup system to the written sequence for withdrawal of control rods.

The APRM rod block function is flow biased and prevents a significant reduction in MCPR, especially during operation at reduced flow. The APRM provides gross core protection; i.e., limits the gross core power increase from withdrawal of control rods in the normal withdrawal sequence. The trips are set so that MCPR is maintained greater than 1.07.

The RBM rod block function provides local protection of the core; i.e., the prevention of critical power in a local region of the core, for a single rod withdrawal error from a limiting control rod pattern.

If the IRM channels are in the worst condition of allowed bypass, the sealing arrangement is such that for unbypassed IRM channels, a rod block signal is generated before the detected neutrons flux has increased by more than a factor of 10.

A downscale indication is an indication the instrument has failed or the instrument is not sensitive enough. In either case the instrument will not respond to changes in control rod motion and thus, control rod motion is prevented.

The refueling interlocks also operate one logic channel, and are required for safety only when the mode switch is in the refueling position.

For effective emergency core cooling for small pipe breaks, the HPCI system must function since reactor pressure does not decrease rapid enough to allow either core spray or LPCI to operate in time. The automatic pressure relief function is provided as a backup to the HPCI in the event the HPCI does not operate. The arrangement of the tripping contacts is such as to provide this function when necessary and minimize spurious operation. The trip settings given in the specification are adequate to assure the above criteria are met. The specification preserves the effectiveness of the system during periods of maintenance, testing, or calibration, and also minimizes the risk of inadvertent operation; i.e., only one instrument channel out of service.

Two post treatment off-gas radiation monitors are provided and, when their trip point is reached, cause an isolation of the off-gas line. Isolation is initiated when both instruments reach their high trip point or one has an upscale trip and the other a downscale trip or both have a downscale trip.

Both instruments are required for trip but the instruments are set so that the instantaneous stack release rate limit given in Specification 3.8 is not exceeded.

Four radiation monitors are provided for each unit which initiate Primary Containment Isolation (Group 6 isolation valves) Reactor Building Isolation and operation of the Standby Gas Treatment System. These instrument channels monitor the radiation in the reactor zone ventilation exhaust ducts and in the refueling zone.

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

SAFETY EVALUATION BY THE OFFICE OF SPECIAL PROJECTS

SUPPORTING AMENDMENT NO. 156 TO FACILITY OPERATING LICENSE NO. DPR-52

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNIT 2

DOCKET NO. 50-260

1.0 INTRODUCTION

By letter dated August 3, 1988, (Reference 1) Tennessee Valley Authority (TVA) proposed to change the Technical Specifications (TS) for Browns Ferry Nuclear Plant, Unit 2. The TS affected are those dealing with primary containment and reactor building isolation instrumentation, more specifically temperature sensing instruments with trip level settings for isolation of the Reactor Water Cleanup Line from the Reactor and Reactor Water Return Line.

The TS change will add surveillance requirements (SR) and trip level settings for new temperature switches being added near a pipe trench containing Reactor Water Cleanup (RWCU) System piping. The added instrumentation is used to indicate leaks or pipe breaks and to automatically isolate the RWCU System.

2.0 EVALUATION

This proposed TS change will revise the Browns Ferry Nuclear Plant, Unit 2, TS Table 3.2.A, "Primary Containment and Reactor-Building Isolation Instrumentation," Table 4.2.A, "Surveillance Requirements for Primary Containment and Reactor Building Isolation Instrumentation," and Section 3.2, of the Bases. Table 3.2.A contains the operability requirements and trip level settings for the instrumentation that initiates primary containment and reactor building isolation. Table 4.2.A contains the complementary SR for Primary Containment and Reactor Building Isolation Instrumentation," and Section 3.2, Bases. Section 3.2 is being changed to indicate that RWCU System pipe break detection instrumentation is available for the pipe trench containing the RWCU System piping.

The addition of four temperature switches and associated wiring provides leak detection and automatic RWCU System isolation for an RWCU pipe break in the pipe trench above the drywell equipment hatch and near the ceiling of the reactor building elevation 565. This TS change adds the function of these temperature switches to Table 3.2.A. The minimum operability requirements and the trip level setting range is specified. Also the action required for a condition with less than the minimum operability requirements being met is

specified and a description of the automatic actions which occur when the trip level settings are surpassed is included. Table 4.2.A specifies the required surveillance frequencies for the new devices. Section 3.2 Bases is being changed on page 3.2/4.2-67 to correctly describe the plant configuration after the temperature switches are added.

The RWCU System does not have a safety function; it maintains high reactor-water purity to limit chemical and corrosive action, thereby limiting fouling and depositing on heat transfer surfaces. The RWCU System removes corrosion products to limit impurities available for activation by neutron flux and resultant radiation from depositing of irradiated corrosion products. The system also provides a means for removal of reactor water during heatup (Reference Final Safety Analysis Report (FSAR) Section 4.9.1). The RWCU System provides continuous purification of a portion of the recirculation flow. The system is normally in service. The RWCU System does contain primary containment isolation valves which have a safety function of closing upon receipt of a low reactor pressure vessel (RPV) water level or detection of high temperatures in RWCU System spaces. The intent is to isolate the vessel in case of a RWCU line break outside primary containment or to prevent the release of radioactive material in the event of fuel damage following some other line break either inside or outside primary containment.

A trip level setting of less than or equal to 150°F was established for the new temperature switches for equipment environmental qualification purposes. The added instrumentation will help protect safety-related equipment in the reactor building from damage caused by high temperature resulting from a postulated RWCU System pipe break in the pipe trench. A setpoint of 150°F was established from the analysis of the temperature transient that occurs in the reactor building following a break in the 4-inch RWCU System return line in the pipe trench. TVA has concluded that if the setpoint were set at $\leq$ 150°F, the environmental conditions in the areas affected by the pipe break would be within the environmental conditions to which safety-related equipment contained in that area have been qualified. FSAR Section 7.3.4.7.14 requires that the high temperature isolation setting be selected far enough above the anticipated normal area temperature to avoid spurious operation, but low enough to provide timely detection of a RWCU System line break. The maximum normal operational limit for the vicinity of the RWCU System pipetrench is 90°F and the maximum abnormal temperature is 100°F. A setpoint of less than or equal to 150°F lies within the safety limits for the variable being monitored and will satisfy the applicable Updated FSAR requirements and is, therefore, acceptable to the staff. The field setpoint will be set high enough to avoid spurious isolations of the RWCU System but below the 150° F limit being added to the TS by this amendment.

Four temperatures switches are being added near the pipe trench containing the nonmonitored portion of the RWCU piping. The switches are to be wired in series with existing reactor water cleanup (RWCU) leak detection temperature switches. Including these devices in the TS for the plant ensures that they are periodically tested in accordance with the plant surveillance program. The minimum number of instrument channels required to be operable per trip system will be the same as for the existing instrumentation and the action statement will be the same as for the existing instrumentation. These changes are, therefore, found to be 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. 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 (53 FR 39177) on October 5, 1988 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 Contributors: D. Moran and A. Marinos

Dated: November 21, 1988