

MAY 9 1975

Docket Nos. 50-259  
and 50-260

Tennessee Valley Authority  
ATTN: Mr. James E. Watson  
Manager of Power  
818 Power Building  
Chattanooga, Tennessee 37201

Gentlemen:

The Commission has issued the enclosed Amendment No. 9 to Facility License No. DPR-33 and Amendment No. 6 to Facility License No. DPR-52 for the Browns Ferry Nuclear Plant, Units 1 and 2. These amendments include Change No. 10 to the respective Technical Specifications and are in response to your request dated May 8, 1975.

The amendments revise the Technical Specifications, taking into account the present condition of plant systems, so as to ensure that the two units will remain in a safe and stable posture during the shutdown time interval between now and our subsequent authorization for the start of repair and restoration of the facility.

Copies of the related Safety Evaluation and the Federal Register Notice are also enclosed.

Sincerely,

Original signed by:  
Robert A. Purple

Robert A. Purple, Chief  
Operating Reactors Branch #1  
Division of Reactor Licensing

Enclosures:

1. Amendment No. 9 to License No. DPR-33
2. Amendment No. 6 to License No. DPR-52
3. Safety Evaluation
4. Federal Register Notice

cc w/enclosures:  
See next page

NER
<i>[Signature]</i>
BCRusche
5/9/75

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DATE →	5/08/75	5/7/75	5/9/75	5/8/75	5/9/75	5/9/75

May 9, 1975

cc w/enclosures:  
Robert H. Marquis  
General Counsel  
629 New Sprinkle Building  
Knoxville, Tennessee 37919

Athens Public Library  
South and Forrest  
Athens, Alabama 35611

Mr. Thomas Lee Hammons  
Chairman, Limestone County Board  
of Revenue  
Athens, Alabama 35611

Anthony Z. Roisman, Esquire  
Berlin, Roisman & Kessler  
1712 N Street, NW  
Washington, D.C. 20036

cc w/ enclosures & incoming  
Ira L. Myers, M.D.  
State Health Officer  
State Department of Public Health  
State Office Building  
Montgomery, Alabama 36104

Mr. Dave Hopkins  
Environmental Protection Agency  
1421 Peachtree Street, NE  
Atlanta, Georgia 30309

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-259

BROWNS FERRY NUCLEAR PLANT UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 9  
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 May 8, 1975, 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; and
  - 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.
2. Accordingly, the license is amended by a change to the Technical Specifications as indicated in the attachment to this license amendment and Paragraph 2.C.(2) of Facility License No. DPR-33 is hereby amended to read as follows:

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"(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications, as revised by issued changes thereto through Change No. 10."

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

FOR THE NUCLEAR REGULATORY COMMISSION

Original signed by:  
Robert A. Purple

Robert A. Purple, Chief  
Operating Reactors Branch #1  
Division of Reactor Licensing

Attachment:  
Change No. 10 to Technical  
Specifications

Date of Issuance: MAY 9 1975

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TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-260

BROWNS FERRY NUCLEAR PLANT UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 6  
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 May 8, 1975, 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; and
  - 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.
2. Accordingly, the license is amended by a change to the Technical Specifications as indicated in the attachment to this license amendment and Paragraph 2.C.(2) of Facility License No. DPR-52 is hereby amended to read as follows:

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"(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications, as revised by issued changes thereto through Change No. 10."

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

FOR THE NUCLEAR REGULATORY COMMISSION

Original signed by:  
Robert A. Purple

Robert A. Purple, Chief  
Operating Reactors Branch #1  
Division of Reactor Licensing

Attachment:  
Change No. 10 to Technical  
Specifications

Date of Issuance: MAY 9 1975

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ATTACHMENT TO LICENSE AMENDMENT NO. 9 TO LICENSE NO. DRR-33

AND LICENSE AMENDMENT NO. 6 TO LICENSE NO. DPR-52

(CHANGE NO. 10 TO THE TECHNICAL SPECIFICATIONS)

DOCKET NOS. 50-259 AND 50-260

Revise Appendix A as indicated.

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SAFETY EVALUATION BY THE DIVISION OF REACTOR LICENSING  
 SUPPORTING AMENDMENT NO. 9 TO FACILITY LICENSE NO. DPR-33  
 AND AMENDMENT NO. 6 TO FACILITY LICENSE NO. DPR-52  
 (CHANGE NO. 10 TO TECHNICAL SPECIFICATIONS)

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR POWER PLANT, UNITS 1 AND 2

DOCKET NOS. 50-259 AND 50-260

INTRODUCTION

On March 22, 1975, a fire at the Browns Ferry facility resulted in substantial damage to power, control, and instrumentation wiring. The facility is not operational and is in a cold shutdown condition with fuel in the core and the vessel vented to the containment atmosphere. Although many systems were damaged, the facility has been maintained in a safe and stable condition utilizing a substantial number of systems and components. In fact, the functioning systems exceed the minimum number usually required for a facility in cold shutdown condition.

In order to prepare the facility for repair of the fire damage, vital equipment to protect the core from damage is being reconnected, or rerouted or verified to be free from the fire affected wiring or systems. Many of these vital systems are being modified to manual control rather than automatic control to isolate them from spurious operation resulting from interconnection with fire damaged wiring or systems. Some systems or components are being disconnected or locked in a safe configuration. The primary system mode switch is, by administrative control, locked in the "shutdown" mode.

Before any repair and removal of cables and systems from the fire affected zone can be authorized, all of the necessary vital systems must be protected, isolated, or verified as free from interconnection with any of the systems or cabling which is to be removed. These activities of rerouting, reconnecting, verification, and isolating systems from potential interaction with systems or wiring to be removed are presently in progress.

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The available systems and components to provide plant safety under present conditions, while the facility is in cold shutdown and the plant is being configured into a condition protected against possible adverse interaction resulting from repairs and restoration, have been reviewed and appropriate technical specifications governing this period have been established through conferences between the staff and the licensee and submitted for approval by the licensee. This safety evaluation describes the protection required to provide adequate safety during present conditions. It does not address or authorize cable removal, cutting, or repair of the fire affected zone. Any such authorization will be addressed in a subsequent safety evaluation.

EVALUATION

1. Nuclear Safety

The control rods are each fully inserted in the core. The reactor mode switch is locked in the shutdown position, the control rod directional control valves, which provide the drive fluid to withdraw the rods, have been electrically disconnected, and the manual valves in the drive water supply lines have been closed. In this condition the core is subcritical and cannot be made critical. Under the present low pressure, low temperature conditions, there are no equipment malfunctions or single operator errors which could cause any control rod to withdraw. Nonetheless, rod position is to be verified in the fully-in position on a regular basis. The control rod position indicator full-in switches will be operable or the control rod position will be verified to be full-in by a continuity check of the full-in limit switches at the local panel.

In addition, the electrically disconnected condition of the control rod directional control valves will be verified by visual observation, along with visual observation of the closed position of the manual valve in the drive water supply lines.

In addition to the manual scram, an automatic alarm and scram function has been added for the operable source range monitors, even though this is not ordinarily a function of this system. This system will detect any approach to criticality and will both alarm and automatically cause scram action to drive the

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control rods in if for any unforeseen reason they might have moved outward. The control rod accumulators will be maintained in a fully charged condition. A standby supply of borated water is available for injection into the reactor to further ensure a subcritical core. These systems provide a high degree of assurance that the facility is protected against the occurrence of criticality under present conditions.

2. Core Cooling and Water Inventory

Under present conditions, the fuel remains in the core under cold shutdown conditions (less than 212 F and atmospheric pressure). Core cooling is presently being provided by the operation of one residual heat removal (RHR) pump and associated heat exchanger. Decay heat which must be removed to prevent fuel damage is very small, amounting to less than one-fourth of the heat exchanger capacity of one RHR system. Nonetheless, two RHR pumps and heat exchangers are required to be operational by the technical specifications and at least three RHR pumps and heat exchangers are presently available on each unit. The low decay heat level provides ample time for manual operation of backup equipment. The RHR pumps take suction from a recirculation loop and pump water through the RHR heat exchangers in which reactor decay heat is transferred to a separate RHR service water system. In the event that the RHR pump providing flow should fail, the second RHR system for the unit is functioning and can provide ample cooling. In the event of the failure of the single valve in the suction line, heat removal can be accomplished by the generation of steam in the core which is vented to the containment through the open vent valves or backup relief valves. The condensed steam returns to the torus which can be cooled by either of the RHR systems operating in a torus cooling mode which does not depend on the failed suction valve. Makeup coolant to the core in this mode of operation could be provided by either of the RHR pumps or the core spray pump taking suction from the torus.

Analyses have been performed to demonstrate that in excess of 15 hours is available to restore core cooling if for some unforeseen reason cooling is interrupted. Studies were performed to show that backup systems could be manually placed in operation in less than 1 hour. Considerable margin is, therefore, available for manual actuation.

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The decay heat removal cooling water requirements for two units in the cold shutdown condition can be conservatively met by the operation of one RHRSW pump or one heat exchanger on each unit. One RHRSW pump is required for each unit if the units are using heat exchangers which are not on the same service water header. Four RHRSW pumps are presently available and capable of delivering flow to meet this requirement. Less than one-half the flow delivery capability of each pump is needed to remove the present decay heat for each unit. The low decay heat level and ample flow delivery capability allows ample time for manual operation in accordance with established operating instructions.

The standby emergency equipment cooling water (EECW) requirements for two units in the cold shutdown condition can be adequately met by the operation of one RHRSW pump on an EECW header. The EECW system is not required for normal plant shutdown operation because the required cooling water is supplied by the plant raw cooling water system. The principal immediate need for EECW flow is in the event that a diesel engine should be started. In this case, EECW flow must be established at once. To meet this requirement, two RHRSW pumps assigned to EECW service are running continuously with each assigned to a separate supply header. Either header will supply all EECW requirements. In addition, two other RHRSW pumps are available and capable of delivering flow by manual operations in accordance with established operating instructions. The two RHRSW pumps which are running continuously are assigned to 4.16 kV shutdown boards which have associated operable diesel generators and the pumps are arranged with automatic restart provisions in the event that board undervoltage should occur.

In the present cold shutdown vented condition, with no pressure and low temperature in the primary system, there is no source to cause piping damage. Loss of coolant through inadvertent draining is minimized by locking valve positions so that water cannot be drained from the vessel. However, even in the event of loss of coolant inventory either of the RHR pumps or the core spray pump are capable of taking suction on the torus and providing water to the vessel. Even beyond these pumps there are additional RHR pumps, core spray pumps, and even hotwell and condensate booster

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pumps capable of supplying coolant to the vessel. Although the technical specifications do not require that these pumps be kept functioning, the technical specifications do provide that the licensee will not deliberately remove any of the pumps or any other component capable of achieving the objectives of the technical specifications from service except for maintenance required to prevent a substantial increase in the risk of failures to the component or other functioning system.

3. Electrical Power

The electrical energy to operate the systems required to maintain adequate cooling of the core is provided by redundant offsite and onsite power supplies. The offsite power is available through two 161 kV circuits connected from the power grid to redundant shutdown buses which in turn supply power to all four 4.16 kV emergency buses. To provide power in the event of loss of the offsite power supply, three of the four plant diesels are functioning along with their associated emergency buses. Only two of the three are required to supply a sufficient amount of electrical energy to power vital equipment. The emergency diesels are cooled through the emergency coolant water system which is presently continuously operating and has been configured to automatically transfer to diesel load in the event of loss of offsite power to assure that these pumps automatically provide sufficient coolant to the diesels to protect against overheating. Redundant 250 V batteries and their associated distribution systems are available to provide DC control power as necessary to the required system.

4. Minimum Shift Crew Considerations

As a result of the damage created by the fire to various Unit 1 and 2 cables, a number of safety systems cannot be operated from the control room. Equipment monitoring and operation is now required from various positions located through the facility. Analyses have shown that in excess of 15 hours are available to perform various tasks involved in transferring to the various functioning backup systems. Manual operation of equipment for which the most degradation is experienced could be achieved in

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a time interval of several hours, and the licensee has indicated that these operations could easily be accomplished by a shift crew of 10 men. We have required a shift crew of 14 men. The additional four men required provide margin, as well as to allow for continued monitoring during performance of these manual actions. It is expected that two of these four men would be used for that purpose.

5. Quality Assurance

In connection with the work of configuring the plant so various systems and components are free of potential interaction during fire damage removal and facility restoration, the QA procedures have recently been clarified to focus on this work to assure that they conform to the approved QA program. The previously approved QA program itself has not been modified.

6. Unit 3 Construction Activities

As a result of interfaces between Unit 3 and Unit 1 and 2, the technical specifications do not permit operations, tests, and other activities associated with the construction of Unit 3 that could affect the safety of either Unit 1 or 2.

7. Summary

In its present cold shutdown condition, the facility has been protected from damage to the core by disarming control rods so that no mechanism is available which could result in core criticality. The available functioning equipment is adequate to provide ample coolant flow to keep the core cooled and exceeds the minimum required for cold shutdown by the technical specifications governing facility operation prior to the fire.

The technical specification changes associated with this amendment reflect the changes that are necessary to account for the present condition of the plant. Certain additional controls and equipment requirements not required in the pre-fire technical specifications have been added to provide additional assurance that the plant will be maintained in a safe and stable shutdown

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condition during the present activities of preparing for the restoration program. The technical specifications associated with this amendment include these added controls and equipment requirements.

Except as necessitated by the physical realities that exist due to fire damage, no safety limit, limiting condition for operation, or surveillance requirement in the pre-fire technical specifications that is pertinent to the present cold shutdown condition of the plant has been modified, relaxed, or deleted by this amendment. The resulting technical specifications continue to provide adequate protection to the health and safety of the public and, by accounting for the actual existing condition of the plant systems and components, they minimize potentially unsafe conditions or actions. With the plant locked into a shutdown condition and considering the very low amount of decay heat generation from the shutdown core, the probability of any accident involving the release of radioactivity from the site is very low and the potential consequences of any accident are correspondingly low. In view of the foregoing, we conclude that the issuance of these amendments does not involve a significant hazards consideration.

CONCLUSION

The changes in technical specifications authorized in connection with this evaluation result in enhancement of safety under present conditions, as discussed above. Based on these considerations, we have concluded that: (1) because the change does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the change does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

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UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NOS. 50-259 AND 50-260

TENNESSEE VALLEY AUTHORITY

NOTICE OF ISSUANCE OF AMENDMENTS TO FACILITY OPERATING LICENSES

Notice is hereby given that the U.S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 9 to Facility Operating License No. DPR-33 and Amendment No. 6 to Facility Operating License No. DPR-52 issued to Tennessee Valley Authority which revised Technical Specifications for operation of the Browns Ferry Nuclear Plant, Units 1 and 2, located in Limestone County, Alabama. The amendments are effective as of their date of issuance.

The amendments revise the Technical Specifications, taking into account the present condition of plant systems, so as to assure that the two units will remain in a safe and stable posture during the period of plant shutdown resulting from damage due to a fire which occurred on March 22, 1975. The amendments do not authorize removal of fire damaged components or systems or restoration of the facility to operable conditions. This will be subsequently considered.

The application for these amendments complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter 1, which are set forth in the license amendments. Prior public notice of these amendments is not required since the amendments do not involve a significant hazards consideration.

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For further details with respect to this action, see (1) the application for amendment dated May 8, 1975, (2) Amendment No. 9 to License No. DPR-33 and Amendment No. 6 to License No. DPR-52 with Change No. 10, and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, NW., Washington, D.C. and at the Athens Public Library, South and Forrest, Athens, Alabama 35611.

A copy of items (2) and (3) may be obtained upon request addressed to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of Reactor Licensing.

Dated at Bethesda, Maryland, this MAY 9 1975

FOR THE NUCLEAR REGULATORY COMMISSION

Original signed by:  
Robert A. Purple

Robert A. Purple, Chief  
Operating Reactors Branch #1  
Division of Reactor Licensing

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