

April 1, 2004

Mr. J. A. Scalice  
Chief Nuclear Officer and  
Executive Vice President  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2 AND 3 - ISSUANCE OF  
AMENDMENTS REGARDING THE EMERGENCY CORE COOLING SYSTEMS  
(TAC NOS. MB8423, MB8424 AND MB8425) (TS-424)

Dear Mr. Scalice:

The Commission has issued the enclosed Amendment Nos. 250, 289, and 248 to Facility Operating Licenses 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 April 11, 2003, as supplemented by a letter dated February 20, 2004, regarding the reduction in the number of emergency core cooling subsystems that are available in response to certain design basis loss-of-coolant accident scenarios. The amendments revise Technical Specification Table 3.3.5.1-1, "Emergency Core Cooling System Instrumentation," and will result in a change to the Updated Final safety Analysis Report, Table 6.5-3.

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

Sincerely,

*/RA/*

Kahtan N. Jabbour, Senior Project Manager, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

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

Enclosures: 1. Amendment No. 250 to License No. DPR-33  
2. Amendment No. 289 to License No. DPR-52  
3. Amendment No. 248 to License No. DPR-68  
4. Safety Evaluation

cc w/Enclosures: See next page

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BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2 AND 3 - ISSUANCE OF AMENDMENTS  
REGARDING THE EMERGENCY CORE COOLING SYSTEMS (TAC NOS. MB8423, MB8424  
AND MB8425) (TS-424)

Dated: April 1, 2004

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TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-259

BROWNS FERRY NUCLEAR PLANT UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 250  
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 April 11, 2003, as supplemented February 20, 2004, 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. 250, 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

/RA/

William F. Burton, Acting Chief, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications

Date of Issuance: April 1, 2004

ATTACHMENT TO LICENSE AMENDMENT NO. 250

FACILITY OPERATING LICENSE NO. DPR-33

DOCKET NO. 50-259

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE

3.3-44

B 3.3-143

B 3.3-144

INSERT

3.3-44

B 3.3-143

B 3.3-144

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-260

BROWNS FERRY NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 289  
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 April 11, 2003, as supplemented February 20, 2004, 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. 289, 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 during the Unit 2, Cycle 13 Refueling Outage.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

William F. Burton, Acting Chief, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications

Date of Issuance: April 1, 2004

ATTACHMENT TO LICENSE AMENDMENT NO. 289

FACILITY OPERATING LICENSE NO. DPR-52

DOCKET NO. 50-260

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE

3.3-45

B 3.3-146

B 3.3-147

INSERT

3.3-45

B 3.3-146

B 3.3-147

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-296

BROWNS FERRY NUCLEAR PLANT, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 248  
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 April 11, 2003, as supplemented February 20, 2004, 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. 248, 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 during the Unit 3, Cycle 12 Refueling Outage.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

William F. Burton, Acting Chief, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications

Date of Issuance: April 1, 2004

ATTACHMENT TO LICENSE AMENDMENT NO. 248

FACILITY OPERATING LICENSE NO. DPR-68

DOCKET NO. 50-296

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE

3.3-45

B 3.3-146

B 3.3-147

INSERT

3.3-45

B 3.3-146

B 3.3-147

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 250 TO FACILITY OPERATING LICENSE NO. DPR-33  
AMENDMENT NO. 289 TO FACILITY OPERATING LICENSE NO. DPR-52  
AMENDMENT NO. 248 TO FACILITY OPERATING LICENSE NO. DPR-68  
TENNESSEE VALLEY AUTHORITY  
BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3  
DOCKET NOS. 50-259, 50-260, AND 50-296

## 1.0 INTRODUCTION

By letter dated April 11, 2003 (Reference 1), the Tennessee Valley Authority (TVA or the licensee) submitted a request for changes to the Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3, Technical Specifications (TSs). The modifications allowed by these changes reduce the number of low-pressure emergency core cooling (ECC) subsystems that are available in response to certain design basis loss-of-coolant accident (LOCA) scenarios, and will result in a change to the Updated Final Safety Analysis Report (UFSAR), Table 6.5-3. The proposed changes are needed to support the restart of BFN Unit 1 and the simultaneous operation of the three units. A meeting was held on October 2, 2003 (Reference 2), between the U. S. Nuclear Regulatory Commission (NRC) and TVA staffs to discuss this issue. Also, by letter dated February 20, 2004, the licensee responded to the NRC staff's request for additional information. The April 11, 2003, letter requested a revision to TS Table 3.3.5.1-1, "Emergency Cooling System Instrumentation," for all three units, to modify the required number of channels for the low-pressure coolant injection (LPCI) pump start time delay relays. The licensee stated that the change was requested to eliminate the potential for overloading a 4KV shutdown board shared between Units 1 and 2 or a diesel generator (DG) when both Units 1 and 2 are in service.

The October 2, 2003, meeting, and the February 20, 2004, letter, provided clarifying information that did not change the scope of the original request or the initial proposed no significant hazards consideration determination.

## 2.0 BACKGROUND

The three BFN units were shut down by TVA in 1985, and currently, Units 2 and 3 are in operation. On May 16, 2002, TVA decided to restart Unit 1 in 2007; the proposed changes are needed to support its restart and the simultaneous operation of the three units. Four DGs are shared between Units 1 and 2; Unit 3 has four DGs.

In 1986, an internal Condition Adverse to Quality report documented a concern that the electrical systems and the initiation logic for the ECC systems could not accommodate various

combinations of spurious and valid accident signals if Units 1 and 2 were both in service. To address this condition, TVA requested the above-mentioned license amendment to revise the TSs and the design basis which is described in the UFSAR. The evaluation below discusses the adequacy of the ECC systems as revised to address the design basis scenario which is the LOCA coincident with loss of offsite power (LOOP) and a spurious accident signal originated from one of the nonaccident units.

### 3.0 EVALUATION

#### 3.1 System Analysis

##### 3.1.A Regulatory Evaluation

The regulatory requirements for the ECC systems are contained in Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.46. In addition, 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 35, "Emergency Core Cooling," states, in part, that "Suitable redundancy in components and features, and suitable interconnections . . . shall be provided to assure that for onsite electrical power system operation (assuming offsite power is not available) and for offsite electrical power system operation (assuming onsite power is not available) the system function can be accomplished, assuming a single failure."

##### 3.1.B Technical Evaluation

###### 3.1.B.1 Current Licensing Basis

The following assumptions are part of the current licensing basis:

- (a) Only one unit is in a LOCA or post-accident recovery mode at any point in time.
- (b) During LOCA scenarios that assume LOOP, a spurious accident signal could originate from one of the nonaccident units. This accident signal is considered to be the postulated single failure. No other single failures are assumed to occur and this accident signal could occur before, during, or after the real signal.

###### 3.1.B.2 Configuration of ECC Systems

The ECC systems for the three BFN units are similar. They consist of the high-pressure coolant injection (HPCI) system, the automatic depressurization system (ADS), the core spray (CS) system, and the LPCI mode of the residual heat removal (RHR) system. The description of these systems is discussed in the BFN UFSAR and the April 11, 2003, submittal.

###### 3.1.B.3 DG loading of ECC Systems

As stated earlier, there are eight DGs for all three units. Four DGs are shared by Units 1 and 2 and the remaining four DGs are assigned to Unit 3. DGs-A and -B supply power to Division I and DGs-C and -D supply power to Division II. LPCI-A and CS-A pumps are started by DG-A, LPCI-C and CS-C pumps are started by DG-B, LPCI-B and CS-B pumps are started by DG-C and LPCI-D, CS-D pumps are started by DG-D. LPCI pumps start after a 0.1-second delay and the CS pumps start after a 7-second delay after DG breakers close and the unit starting logic for the ECC systems has initiated.

The current initiation logic (for LOCA + LOOP) for the ECC systems for Units 1, 2, and 3 also sends a start signal to one additional LPCI pump to ensure that at least one pump is operating in the LPCI mode in addition to the pumps of the ECC systems started from the same division. The proposed changes will eliminate this feature. When the proposed changes are implemented, Division I pumps will be dedicated to Unit 1 and Division II pumps will be dedicated to Unit 2. Unit 3 power supply is unaffected.

#### 3.1.B.4 Single Failures

The following single failures were considered in the LOCA analysis:

- (a) Battery
- (b) Opposite Unit False LOCA Signal
- (c) LPCI System Injection Valve
- (d) Diesel Generator
- (e) HPCI

The most limiting single failure for BFN is the battery failure during the recirculation suction break. The operation of the ECC systems for that limiting event is unchanged by the proposed amendment. The number of ECC subsystems actually available to mitigate the consequences of a LOCA is being reduced for the following four analyzed cases.

- (1) Recirculation suction break coupled with the battery as the single failure

Instead of three RHR pumps operating and injecting water through two LPCI loops, the revised licensing basis will have two RHR pumps operating and injecting water through one LPCI loop.

Currently, for the battery failure during a recirculation suction break, ADS, one CS loop (two pumps) and three LPCI pumps will be available. Battery failure will take out two LPCI pumps, two CS pumps, and HPCI. Since one LPCI pump is started from the other division, three LPCI pumps will be operable. The proposed change will eliminate the additional pump start from the other division. The current LOCA analysis takes credit only for two LPCI pumps with injection into one loop, one CS loop, and ADS. Because the minimum equipment requirements of the current licensing basis are still met, the proposed change is acceptable.

- (2) Recirculation suction break coupled with the Opposite Unit False LOCA Signal (Units 1 and 2 only) as the single failure

Instead of two RHR pumps operating and injecting water through two LPCI loops in each unit (one pump in each loop), the proposed amendment will have RHR pumps injecting water through one LPCI loop in each unit. Currently, for a spurious accident single failure coupled with a recirculation suction break, ADS, one CS loop (two pumps), and two LPCI pumps are available. The current preferred pump logic for the ECC systems will start only two LPCI pumps and two CS pumps. HPCI is unaffected.

The proposed change will not start one LPCI pump from the other division. However, there is no change in the total number of LPCI and CS pumps. The current LOCA analysis for the limiting case takes credit only for two LPCI pumps with injection into one loop, one CS loop (two

pumps), HPCI, and ADS. Because the minimum equipment requirements of the current licensing basis are still met, the proposed change is acceptable.

(3) Recirculation discharge break coupled with battery as the single failure

Instead of one RHR pump operating and injecting water through a LPCI loop, the proposed amendment will have no RHR pumps available for LPCI. At present, for the battery failure during a recirculation discharge break, ADS, one CS (two pumps), and only one LPCI pump are available. Battery failure will take out two LPCI pumps, two CS pumps, and HPCI. The remaining two LPCI pumps will be injecting through the broken discharge break into the drywell, bypassing the reactor. Since one LPCI pump is started from the other division, one LPCI loop will be operable. The proposed change will eliminate the additional pump start from the other division. Hence, no LPCI pump will be available to mitigate the recirculation line break LOCA. Only ADS and one CS loop (two CS pumps) will be available. The current LOCA analysis for the recirculation discharge break takes credit only for one CS loop (two CS pumps) and ADS. Because the minimum equipment requirements of the current licensing basis are still met, the proposed change is acceptable.

(4) Recirculation discharge break coupled with Opposite Unit False LOCA Signal as the single failure (Units 1 and 2 only)

Instead of one RHR pump operating and injecting water through a LPCI loop, the proposed amendment will have no RHR pumps available for LPCI. At present, for a spurious accident single failure during a recirculation discharge break, ADS, one CS (two pumps), and two LPCI pumps are available. The current preferred pump logic for the ECC systems will start only two LPCI and two CS pumps. For the proposed change, two LPCI pumps which are started will be injecting through the broken discharge break into the drywell bypassing the reactor. No LPCI pumps will be available. HPCI is unaffected. The proposed change will not start one LPCI pump from the other division. However, there is no change in the total number of LPCI and CS pumps compared to the limiting case which is a battery failure. The current LOCA analysis takes credit only for one CS loop (two CS pumps), HPCI, and ADS. Because the minimum equipment requirements of the current licensing basis are still met, the proposed change is acceptable.

### 3.1.B.5 Summary

The NRC staff confirmed that the licensee evaluated the plant response to a large break LOCA using NRC-approved evaluation models SAFER and GESTR (Reference 4). A summary of BFN SAFER/GESTR-LOCA analyses results for the recirculation breaks are given in Table 5-1 of Reference 4. The peak cladding temperature for the most limiting case, battery failure with recirculation break, is 1572 degrees F (°F) which is less than the acceptance criterion of 2200 °F specified in 10 CFR 50.46 and, hence, is acceptable.

TVA is preparing to use fuel assemblies from Framatome at BFN. As part of TVA's transition to Framatome fuel, the performance of the ECC systems is being reanalyzed using Framatome's approved methodology. The same complement of subsystems assumed to be available in this proposed revision is being utilized by Framatome as part of the reload analyses with the new fuel. Both fuel vendors (General Electric (GE) and Framatome) perform their LOCA analyses for all three units at BFN using the same available equipment of the ECC systems. LOCA analyses are updated by the fuel vendor for each new core design using NRC-approved topical

reports. Each change in core design is also evaluated in accordance with 10 CFR 50.59. The analyses and results are required to satisfy 10 CFR 50.46 and Appendix K requirements.

Currently, Unit 1 is defueled and is scheduled to restart in 2007. However, the proposed amendment and the UFSAR revision are applicable to the three units. TVA stated that the fuel supplier for Unit 1 has not been selected and may include any qualified vendor. If TVA decides to use a fuel vendor other than GE Nuclear Energy/Global Nuclear Fuel for Unit 1, a license amendment will be required and a TS change similar to the one approved for Units 2 and 3 will have to be submitted. The staff finds this acceptable.

The proposed revision in the number of ECC subsystems that are available for all the scenarios is consistent with and bounded by the current approved LOCA analysis results, and conforms to 10 CFR 50.46 and Appendix K. Therefore, it is acceptable.

### 3.2 Initiation Logic

#### 3.2.A Regulatory Evaluation

The regulatory basis for the staff evaluation is provided in 10 CFR 50.55a(h)(2) which states: "For nuclear power plants with construction permits issued before January 1, 1971, protection systems must be consistent with their licensing basis or may meet the requirements of IEEE [Institute of Electrical and Electronics Engineers] Std. 603-1971 and the correction sheet dated January 30, 1995." The licensee's submittal listed 10 CFR Part 50, Appendix A, GDC 17, "Electric power systems," and the guidelines in Regulatory Guide (RG) 1.9, "Selection, Design, Qualification, and Testing of Emergency Diesel Generator Units used as Class IE Onsite Electric Power Systems at Nuclear Power Plants."

#### 3.2.B Technical Evaluation

The proposed TS changes reduce the actual number of ECC subsystems that are available in response to certain design basis LOCA scenarios. The licensee has re-analyzed the bounding LOCA cases that have been previously analyzed and has determined that the proposed revision in the number of ECC subsystems that are available for these LOCA scenarios is consistent with and bounded by the current approved LOCA analysis results and conforms to 10 CFR 50.46 and Appendix K.

The current initiation logic for the ECC systems provides a start signal from Division I logic to the ECC subsystems (e.g., LPCI subsystem) associated with Division II and vice versa. However, the initiation logic of the ECC systems proposed in this amendment deletes the crosstie between the two divisions. In the event of an accident and a spurious accident signal from the nonaccident unit, the loads of Division I ECC systems are assigned to Unit 1 and the loads of Division II ECC systems are assigned to Unit 2. The reduction in the number of ECC subsystems actually available to mitigate the consequences of a LOCA will be a reduction in redundancy. This reduction was evaluated in Section 3.1 of this SE and found acceptable.

For Unit 1, the licensee has changed the required number of channels for LPCI system pumps A, B, C, and D with DG power from six to four and also deleted note (e) which specifies the number of relays per pump. The licensee has also changed the required number of channels

for pumps A and B of the LPCI system with normal power from two to one (one per trip system). The licensee has made this change because pumps A and B no longer receive the initiation signal from the redundant division. This simplifies the logic as the licensee does not have to meet requirements imposed by the previous LOCA analysis on a pump in one division receiving initiation signal from the redundant division. In response to the NRC staff's request for additional information dated February 2, 2004, the licensee has confirmed that the proposed modifications are in conformance with 10 CFR 50.55a(h)(2) and the BFN licensing basis, and that these systems are designed to meet the intent of the IEEE Std. 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations." The licensee has also confirmed that the proposed amendment does not affect load sequencing, time delays, or loads on the DGs and, therefore, has no impact on the DG loading analysis. On this basis, the NRC staff concludes that the proposed revision continues to meet the requirements of 10 CFR 50.55a(h)(2), and does not alter compliance with the requirements of 10 CFR Part 50, Appendix A, GDC 17, and RG 1.9. Therefore, it is acceptable.

### 3.3 Risk Analysis

#### 3.3.A Regulatory Evaluation

This evaluation follows the NRC guidance in the Standard Review Plan, Chapter 19, Appendix D, on the use of risk information in the review of non-risk-informed license amendment requests. The NRC staff finds that the licensee's proposed changes do not reveal an unforeseen hazard or a substantially greater potential for a known hazardous event to occur. The staff did not identify "special circumstances" that, if reviewed on a risk-informed basis, might warrant attaching conditions to or denying the proposed changes.

#### 3.3.B Technical Evaluation

The current UFSAR and TSs require the automatic start and alignment of a greater number of ECC subsystems than the most limiting design basis scenario (failure of a battery) requires. TVA's proposed changes will modify the UFSAR and the TSs to reduce the number of required ECC subsystems to those required for the most limiting design basis scenario. The proposed amendment will allow changes to the DG loads and load sequencing for Units 1 and 2, such that a DG or a 4KV shutdown board would no longer become overloaded when responding to the design basis large-break LOCA (LBLOCA)/LOOP and a spurious LOCA signal from another unit. [It should be noted that the LBLOCA discussed in the section is the same as the design basis LOCA discussed in previous sections of this safety evaluation (SE).] The change will also mean that, for some LBLOCA/LOOP scenarios, one less ECC subsystem of LPCI will be automatically started and aligned to provide injection into the primary coolant system of the unit with the LBLOCA/LOOP.

According to References 1 and 2, two scenarios will be affected by the proposed amendment. Both scenarios start with a LBLOCA and LOOP coupled with (1) failure of a battery, or (2) spurious LOCA signal from one of the other units. For these two scenarios, and only these scenarios, one LPCI will be automatically started and aligned. Additional, independent equipment failures would be required to further reduce the cooling provided by the ECC systems before a core-damage event occurs.

A reasonable generic estimate for boiling-water reactor LBLOCA frequency is about 3E-5/year in NUREG/CR-5750, "Rates of Initiating Events at U. S. Nuclear Power Plants: 1987-1995." A

reasonable generic estimate for coincident (e.g., conditional) LOOP probabilities following a reactor trip is about  $1E-2$ /demand in NUREG-1784, "Operating Experience Assessment - Effects of Grid Events on Nuclear Power Plant Performance." Without considering the probability of additional failure such as the spurious LOCA signal generation or failures of the ECC subsystems available to mitigate the LOCA, the likelihood of the LBLOCA/LOOP scenario is very small (less than  $1E-7$ /year). The maximum increase in risk associated with authorizing the reduction of ECC subsystems available to respond to these scenarios can be estimated by conservatively assuming that the current configuration represents zero risk.

The maximum increase in risk caused by the proposed modifications is expected to be less than  $1E-7$ /year and significantly less than the risk acceptance guidelines in RG 1.174, "An Approach for Using Probabilistic Risk assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis." Therefore, the NRC staff concludes that there are no issues related to the amendment request that could impact the adequate protection.

#### 4.0 TS CHANGES

The licensee has proposed the following changes to TS Table 3.3.5.1-1, Function 2.f, Low Pressure Coolant Injection Pump Start-Time Delay Relay:

- a. For Units 1 and 2, pumps A, B, C, D (with diesel power), the revision changed the required number of channels from six to four, and also deleted note (e) which specified the number of relays for each pump. For Unit 3, pumps A, B, C, D (with diesel power), the revision changed the required number of channels from eight to four, and also deleted note (e) which stated that pumps A, B, C, and D have two relays each (one per trip system).
- b. For Unit 1, pumps A and B (with normal power), the revision changed the required number of channels from two to one, and also deleted one per trip system. For Unit 2, pumps C and D (with normal power), the revision changed the required number of channels from two to one, and also deleted one per trip system. For Unit 3, pumps A, B, C, D (with normal power), the revision changed the required number of channels from two to one, and also deleted one per trip system.

Based on the discussion above in Section 3 of this SE, the staff finds these TS changes are acceptable.

#### 5.0 STATE CONSULTATION

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

#### 6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes 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 NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (68 FR 28857). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental

impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

## 7.0 CONCLUSION

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

## 8.0 REFERENCES

- (1) Letter from T.E. Abney, TVA, to the NRC, "Browns Ferry Nuclear Plant (BFN) - Units 1, 2, and 3 - License Amendment Request -Technical Specification (TS) Change 424 - REVISION IN THE NUMBER OF EMERGENCY CORE COOLING SYSTEMS REQUIRED IN RESPONSE TO A LOSS OF ACCIDENT," April 11, 2003.
- (2) Summary of October 2, 2003, meeting regarding the ECC subsystems for BFN (ML032830023, ML032870348).
- (3) Letter from T.E. Abney, TVA, to NRC, "Browns Ferry Nuclear Plant (BFN) - Units 1, 2, and 3 - License Amendment Request -Technical Specification (TS) changes - RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING A REVISION IN THE NUMBER OF EMERGENCY CORE COOLING SYSTEMS REQUIRED IN RESPONSE TO A LOSS-OF-COOLANT ACCIDENT (TS-424)," February 20, 2004.
- (4) NEDC-32484P, "Browns Ferry Nuclear Plant Units 1, 2 and 3, SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis," January 2002.

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