November 21, 2005

TVA-BFN-TS-454

10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop: OWFN P1-35
Washington, D.C. 20555-0001

Gentlemen:

| | | |
|---|---|---|
| In the Matter of | ) | Docket No. 50-260 |
| Tennessee Valley Authority | ) | |

**BROWNS FERRY NUCLEAR PLANT (BFN) UNIT 2 - TECHNICAL SPECIFICATIONS (TS) CHANGE TS-454 - ONE-TIME EXTENSION TO LOW PRESSURE EMERGENCY CORE COOLING SYSTEM COMPLETION TIME**

Pursuant to 10 CFR 50.90, Tennessee Valley Authority (TVA) is submitting a request for an emergency TS change (TS-454) to license DPR-52 for BFN Unit 2. The proposed change revises on a one-time basis the current Unit 2 low pressure Emergency Core Cooling System (ECCS) injection/spray completion time (CT) from 7 days to 14 days. The purpose of increasing the CT is to provide additional flexibility for corrective maintenance and repair of a Low Pressure Coolant Injection (LPCI) motor-generator (MG) set.

At 10:03 PM on November 16, 2005, TVA declared the Unit 2 Loop I Residual Heat Removal (RHR) subsystem inoperable for the LPCI function in accordance with TS Limiting Condition for Operations (LCO) 3.8.7.C due to the inoperability of LPCI MG set 2DN. Unit 2 Loop II RHR is operable. In accordance with TS LCO 3.5.1 Action A.1, TVA has 7 days (until 10:03 PM on November 23) to restore the Unit 2 Loop I subsystem to operable status. If the loop is not restored to operability by that time, TS LCO 3.5.1 Actions B.1 and B.2 require Unit 2 to be placed in Mode 3 within the succeeding 12 hours and Mode 4 within 36 hours, respectively.

Repair to the MG set had been on schedule for completion within the existing CT, however, the newly-purchased replacement motor was found to be defective on Sunday, November 20, 2005. It cannot be repaired within the remaining CT. If this motor had not been defective, it is expected that BFN would have exited the LCO before expiration of the existing CT. Efforts to instead repair the original motor are underway. As such, it is not known at this time if the necessary LPCI MG set repairs and requisite post-maintenance testing can be completed prior to reaching the end of the above described CT. Without approval of this proposed change, TVA may be required to begin shutdown of Unit 2 on Wednesday, November 23, 2005. Therefore, pursuant to 10 CFR 50.91(a)(5), TVA requests approval of this application on an emergency basis.

TVA has evaluated the proposed one-time extension of the Unit 2 low pressure ECCS injection/spray CT in TS LCO 3.5.1.A from 7 days to 14 days based upon both a deterministic evaluation and a risk-informed assessment. The results of the deterministic evaluation and risk-informed assessment provide a high degree of assurance that the ECCS will remain capable of performing its safety function with the proposed one-time 14-day CT.

TVA requests the amendment be approved by Wednesday, November 23, 2005, and that the implementation of the revised TS be within 1 day after receipt of NRC approval.

TVA has determined there are no significant hazards considerations associated with the proposed TS change and the change qualifies for a categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and attachments to the Alabama State Department of Public Health.

Enclosure 1 provides TVA's evaluation of the proposed change. Enclosure 2 provides a mark-up of the proposed TS changes.

There are no regulatory commitments associated with this submittal. If you have any questions about this amendment, please contact me at (256) 729-2636.

I declare under penalty of perjury that the foregoing is true and correct. Executed on November 21, 2005.

Sincerely,

William D. Crouch

William D. Crouch
Manager of Licensing
and Industry Affairs

Enclosures:
1. TVA Evaluation of Proposed Change
2. Proposed Technical Specification Changes (mark-up)

Enclosures
cc (Enclosures):
State Health Officer
Alabama Dept. of Public Health
RSA Tower - Administration
Suite 1552
P.O. Box 303017
Montgomery, AL 36130-3017

Enclosures
cc (Enclosures):

U.S. Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW, Suite 23T85
Atlanta, Georgia 30303-3415

Mr. Stephen J. Cahill, Branch Chief
U.S. Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW, Suite 23T85
Atlanta, Georgia 30303-8931

NRC Senior Resident Inspector
Browns Ferry Nuclear Plant
10833 Shaw Road
Athens, AL 35611-6970

Margaret Chernoff, Project Manager
U.S. Nuclear Regulatory Commission
(MS 08G9)
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852-2739

Eva A. Brown, Project Manager
U.S. Nuclear Regulatory Commission
(MS 08G9)
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852-2739

WDC:DTL:PSH:BAB
Enclosure
cc (Enclosure):
A. S. Bhatnagar, LP 6A-C
J. C. Fornicola, LP 6A-C
D. F. Helms, BR 4T-C
R. F. Marks, PAB 1C-BFN
N. M. Moon, LP 6A-C
R. G. Jones, NAB 1A-BFN
B. M. Aukland, POB 2C-BFN
J. R. Rupert, NAB 1A-BFN
K. W. Singer, LP 6A-C
B. J. O'Grady, PAB 1E-BFN
E. J. Vigluicci, ET 11A-K
NSRB Support, LP 5M-C
EDMS WT CA-K

s:lic/submit/TechSpec/TS-454

# Enclosure 1
# Browns Ferry Nuclear Plant (BFN) Unit 2
# Technical Specifications (TS) Change TS-454

## One-Time Revision to Emergency Core Cooling System (ECCS) Completion Time (CT)

### 1.0 DESCRIPTION

This letter requests an emergency amendment to Operating License DPR-52 for BFN Unit 2. The proposed change revises the current Unit 2 low pressure ECCS injection/spray CT from 7 days to 14 days. The increased CT will provide additional flexibility for corrective maintenance and repair of a Low Pressure Coolant Injection (LPCI) motor-generator (MG) set.

Without approval of this proposed change, TVA may be required to begin shutdown of Unit 2 on Wednesday, November 23, 2005. Therefore, pursuant to 10 CFR 50.91(a)(5), TVA requests approval of this application on an emergency basis.

### 2.0 PROPOSED CHANGE

The proposed change revises the current Unit 2 low pressure ECCS injection/spray CT from 7 days to 14 days on a one-time basis. The specific change is described below:

> Revise Unit 2 TS Page 3.5-1 Limiting Condition for Operation (LCO) 3.5.1:
>
> > The existing footnote at the bottom of page 3.5-1 is revised by changing the referenced date to November 30, 2005.

A mark-up of the TS showing the proposed change is provided in *Enclosure* 2.

### 3.0 BACKGROUND

### 3.1 <u>Reason for the Proposed Change</u>

The underlying reason for the Unit 2 TS change is to provide additional flexibility for corrective maintenance and repair of a LPCI MG set.

In general, the seven day CT in the current Unit 2 TS is adequate for planned and unplanned maintenance necessary to support the operation of Unit 2. However, on November 16, 2005 at 10:03 PM, TVA declared Unit 2 Loop I Residual Heat Removal (RHR) inoperable for LPCI in accordance with TS Limiting Condition for Operations (LCO) 3.8.7.C due to the inoperability of LPCI MG set 2DN. Unit 2 Loop II RHR is operable. In accordance with TS LCO 3.5.1 Action A.1, TVA has 7 days (until 10:03 pm on November 23) to restore the Unit 2 Loop I subsystem to operable status for LPCI purposes. If the loop is not restored to operability by that time, TS LCO 3.5.1 Actions B.1 and B.2 require Unit 2 to be placed in Mode 3 within the succeeding 12 hours and Mode 4 within 36 hours, respectively.

Repair to the MG set had been on schedule for completion within the existing CT, however, the newly-purchased replacement motor was found to be defective on Sunday, November 20, 2005. It cannot be repaired within the remaining CT. If this motor had not been defective, it is expected that BFN would have exited the LCO before expiration of the existing CT. Efforts to instead repair the original motor are underway. As such, it is not known at this time if the necessary LPCI MG set repairs and requisite post-maintenance testing can be completed prior to reaching the end of the above described CT. Without approval of this proposed change, TVA may be required to begin shutdown of Unit 2 on Wednesday, November 23, 2005.

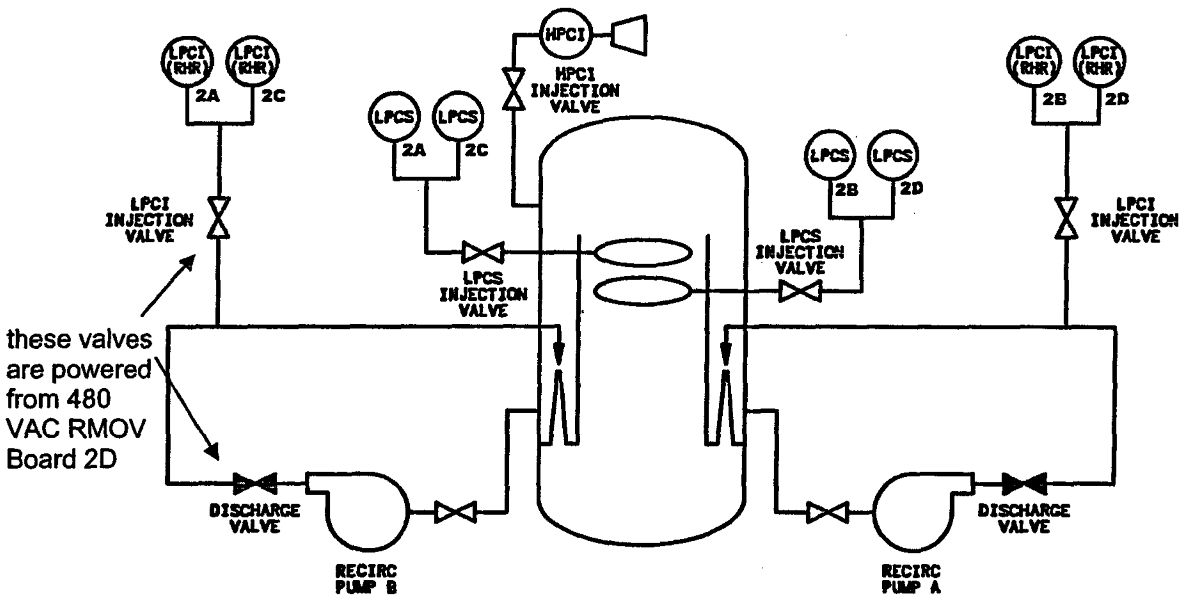
## 3.2 Description of Emergency Core Cooling System

The BFN ECCS consists of the following:

- High Pressure Coolant Injection (HPCI),
- Automatic Depressurization System (ADS),
- Low Pressure Core Spray (LPCS) (note 1), and
- Low Pressure Coolant Injection (LPCI), which is one of the operating modes of RHR (note 2)

Note 1: No LPCS equipment is affected by the current condition involving LPCI MG set 2DN and RMOV Board 2D.
Note 2: RHR also provides other operational functions, such as shutdown cooling, containment spray, suppression pool cooling, and supplemental fuel pool cooling. These functions are not impacted by the current condition involving LPCI MG set 2DN and RMOV Board 2D.

The ECCS subsystems are designed to limit clad temperature over the complete spectrum of possible break sizes in the nuclear system process barrier, including the design basis break. A simplified diagram showing the ECCS flow paths after an initiation signal is provided on the next page.




Assumed analysis flow rates:
- One Core Spray loop (Two pumps) = 5600 gpm
- One LPCI pump in one loop = 9700 gpm
- HPCI = 4500 gpm
- Two LPCI pumps in one loop = 18,000 gpm

NOTE: Both Core Spray pumps in a loop must operate for the loop to be considered available.

TS LCO 3.5.1 Condition A applies to Loops I and II of RHR and Loops I and II of LPCS. Because the change being requested is a one-time CT extension to address a specific, temporary situation, the extended CT will not be available for use with RHR Loop II or the LPCS loops. However, for completeness, descriptions of LPCI, containment cooling, shutdown cooling, and LPCS are provided below.

### 3.3 Low Pressure Coolant Injection

LPCI is an operating mode of RHR. There are two LPCI subsystems, each consisting of two motor driven pumps, piping, and valves that transfer water from the suppression pool to the reactor vessel through the corresponding recirculation loop. LPCI operates to restore and maintain the coolant inventory in the reactor vessel after a loss-of-coolant accident (LOCA) so that the core is sufficiently cooled to preclude fuel clad temperatures in excess of 2200°F and subsequent energy release due to a metal-water reaction. The LPCI subsystem operates in conjunction with HPCI, ADS, and the LPCS system to achieve this goal.

HPCI is a high-head, low-flow system which pumps water into the reactor vessel when the nuclear system is at high pressure. If

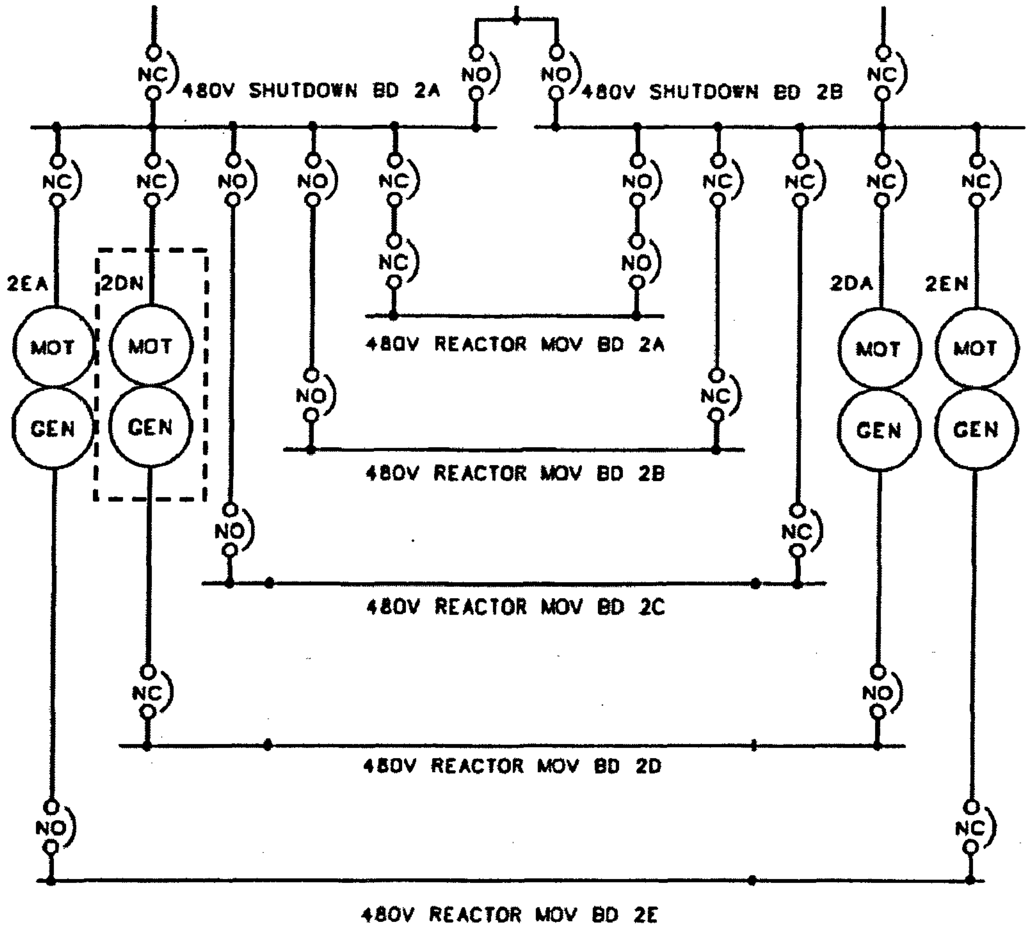
HPCI fails to maintain the required level of water in the reactor vessel, ADS functions to reduce nuclear system pressure so that the low head, high flow systems (LPCI and LPCS) can inject water into the pressure vessel. These operations are carried out automatically. LPCI is designed to reflood the reactor vessel to at least two-thirds core height and to maintain this level. After the core has been flooded to this height, the capacity of one RHR pump is more than sufficient to maintain the level.

During LPCI operation, the RHR pumps take suction from the pressure suppression pool and discharge to the reactor vessel into the core region through both of the recirculation loops. Two pumps discharge to each recirculation loop header, assuring flooding of the vessel through at least one loop. Any spillage through a break in the lines within the primary containment returns to the pressure suppression pool through the pressure suppression vent lines.

To help ensure the reliability of the injection capability of LPCI into both recirculation loops, the recirculation pump discharge isolation valve and the LPCI injection valve are powered from electrical boards which have an automatic supply transfer capability. This automatic supply transfer helps ensure the affected valves retain motive power under certain postulated electrical system failures. In order to provide adequate isolation between these electrical boards and their supplies, MG sets are utilized.

In the normal electrical system alignment, the 2D and 2E 480 VAC Reactor Motor Operated Valve (RMOV) Boards are powered from a normal supply MG set with automatic transfer capability to an alternate MG set. In this way, the 2D and 2E RMOV boards can be supplied from either the 2A or 2B 480 VAC Shutdown Boards. When an MG set is out-of-service, the automatic board supply transfer capability is lost, therefore, in accordance with the BFN licensing basis, the associated RMOV board is considered inoperable. In the case at hand, with the LPCI MG set 2DN out-of-service, 480 VAC RMOV Board 2D is considered inoperable, and Unit 2 TS LCO 3.8.7.C requires declaring the associated RHR loop inoperable. RMOV Board 2D is currently powered by its alternate MG set 2DA.

The figure below is a simplified sketch of the Unit 2 480 VAC electrical distribution:




Additional information regarding the requirements and response of the LPCI equipment which operates during a LOCA is provided in Section 4.8.6.3, Low Pressure Coolant Injection, and Chapter 6.0, Emergency Core Cooling Systems, of the Updated Final Safety Analysis Report (UFSAR).

## 3.4 Containment Cooling

Note: The plant condition involving LPCI MG set 2DN and RMOV Board 2D prompting this one-time TS amendment request does not impact the containment cooling function of RHR. The discussion below is included only to provide a more complete description of the function of RHR at BFN.

The containment cooling subsystem is an integral part of RHR and is placed in operation to limit the temperature of the water in the pressure suppression pool. With RHR in the suppression pool cooling mode of operation, the RHR pumps are aligned to pump water from the pressure suppression pool through the RHR heat exchangers where cooling takes place by transferring heat to the RHR service water system. For adequate containment cooling, a minimum of two RHR pumps and associated heat exchangers must remain available for several hours after a design basis LOCA. The pressure suppression pool cooling mode of RHR is also used occasionally during routine plant power operation to restore pressure suppression pool temperatures to within allowed limits.

The containment spray cooling mode of operation provides additional redundancy to the ECCS for post-accident conditions. The water pumped through the RHR heat exchangers may be directed to spray headers in the drywell and above the pressure suppression pool. Spray in the drywell from these headers condenses any steam that may exist in the drywell, thereby lowering containment pressure. The spray collects in the bottom of the drywell until the water level rises to the level of the pressure suppression vent lines, where it overflows and drains back to the pressure suppression pool.

## 3.5 Shutdown Cooling

Note: The plant condition involving LPCI MG set 2DN and RMOV Board 2D prompting this one-time TS amendment request does not impact the shutdown cooling function of RHR. The discussion below is included only to provide a more complete description of the function of RHR at BFN.

The shutdown cooling subsystem is an integral part of RHR and is placed in operation during a normal shutdown and cooldown. The initial phase of nuclear system cooldown is accomplished by dumping steam from the reactor vessel to the main condenser with the main condenser acting as the heat sink. RHR is placed in the shutdown cooling mode of operation when reactor vessel pressure has decreased sufficiently to clear the interlocks associated with the shutdown cooling suction valves.

Reactor coolant is pumped by the RHR pumps from one of the recirculation loops through the RHR heat exchangers, where cooling takes place by transferring heat to the RHR service water system. Reactor coolant is returned to the reactor vessel via either recirculation loop.

During a nuclear system shutdown and cooldown, any one of the four RHR shutdown cooling subsystems can provide the required decay heat removal function and maintain or reduce the reactor coolant temperature as required.

### 3.6 Low Pressure Core Spray

Note: The plant condition involving LPCI MG set 2DN and RMOV Board 2D prompting this one-time TS amendment request does not impact the LPCS function. The discussion below is included only to provide a more complete description of the ECCS function at BFN.

Two independent loops are provided as a part of the LPCS System. Each loop consists of two 50 percent-capacity centrifugal pumps driven by electric motors, a spray sparger in the reactor vessel above the core, piping and valves to convey water from the pressure suppression pool to the sparger, and the associated controls and instrumentation.

In the case of low-low-low water level in the reactor vessel or high pressure in the drywell plus low reactor vessel pressure, the LPCS System, when reactor vessel pressure is low enough, automatically sprays water onto the top of the fuel assemblies in time and at a sufficient flow rate to cool the core and limit fuel cladding temperature. The LPCS System provides protection to the core for large breaks in the nuclear system where the control rod drive water pumps, RCIC, and HPCI are unable to maintain reactor vessel water level. The protection provided by the LPCS System, in conjunction with ADS operation, also extends to small breaks in which the control rod drive water pumps, RCIC, and HPCI are all unable to maintain the reactor vessel water level.

### 3.7 Applicability of the Maintenance Rule

TVAN Standard Programs and Processes (SPP) 6.6, "Maintenance Rule Performance Indicator Monitoring, Trending and Reporting - 10 CFR 50.65," and Technical Instruction 0-TI-346, "Maintenance Rule Performance Indicator Monitoring, Trending, And Reporting - 10CFR50.65," provide guidance for analysis, retrieval, trending, and reporting of data relative to plant level, function specific, and repetitive preventable functional failure indicators of performance required by the Maintenance Rule. The requirements of these procedures are in compliance with 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," and NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." Specific performance criteria have been developed for the following RHR system functions:

- Providing core cooling (LPCI mode);

- Providing containment cooling (suppression pool and drywell spray):
- Removing decay and residual heat from the core (shutdown cooling mode).

The condition at hand involves the physical inoperability of LPCI MG set 2DN and the resulting TS inoperability of 480 VAC RMOV Board 2D. However, because the 2D RMOV Board remains energized from its alternate source, there is no actual unavailability of the RHR function.

## 4.0 TECHNICAL ANALYSIS

TVA has evaluated the proposed one-time extension of the Unit 2 low pressure ECCS injection/spray CT from 7 days to 14 days both deterministically and through a risk-informed assessment. As discussed below, the proposed CT extension complies with all regulatory requirements and TVA commitments.

Since a single failure is not considered while a plant is in an LCO Action Statement, the operable redundant equipment is capable of performing its required function and to maintain the plant design basis. Thus, the requested action will not alter the assumptions relative to the mitigation of a design basis accident or transient. Margin exists in the ECCS performance analysis (i.e., the calculated peak clad temperature is below regulatory limits), and additional ECCS equipment beyond that credited in the ECCS performance analysis is available to mitigate the consequences of the worst case design basis accident.

TVA has evaluated the risk impacts of having one RHR Loop inoperable for an additional seven days. This is a very conservative evaluation, since in actuality the loop is available for all design functions, with its only limitation being that, during this interval, the electrical distribution board supplied by LPCI MG set 2DN is powered from its alternate source without automatic transfer capability. The resulting increase in core damage frequency (CDF) and large early release frequency (LERF) are small and consistent with the intent of the Commission's Safety Goal Policy Statement and the regulatory position contained in Regulatory Guides 1.174 and 1.177. In addition, BFN uses a proceduralized risk-based approach for scheduling maintenance which limits removal of risk sensitive equipment from service during ECCS subsystem outages.

When taken together, the results of the deterministic evaluation and risk-informed assessment provide a high degree of assurance that the ECCS will remain capable of performing its safety function within the one-time duration of the proposed CT.

## 4.1 Compliance with Current Regulations and Commitments

The RHR system complies with the applicable NRC General Design Criteria and AEC/NRC Safety/Regulatory Guides as described in the Safety Evaluation of the TVA BFN Units 1, 2 and 3, dated June 26, 1972, as supplemented, and Chapters 4, 6, 7 and 14 of the UFSAR. The proposed one-time extension of the Unit 2 low pressure ECCS injection/spray CT does not add or delete any safety-related systems, equipment, or loads, or alter the design or function of the RHR system. Therefore, compliance with the applicable NRC General Design Criteria and AEC/NRC Safety/Regulatory Guides as described in the above correspondence is not affected by this proposed change. TVA has reviewed its Licensing Basis and determined that no commitments are affected by this proposed change.

## 4.2 Deterministic Engineering Evaluation

### 4.2.1 Defense-in-Depth

As described below, the impact of the proposed one-time extension of the Unit 2 low pressure ECCS injection/spray TS CT was evaluated and is consistent with the defense-in-depth philosophy and ensures the protection of the public health and safety. The limited unavailability a LPCI subsystem does not significantly change the balance among the defense-in-depth principles of prevention of core damage, prevention of containment failure, and consequence mitigation. The BFN ECCS subsystems are robust and diverse. Administrative controls ensure system redundancy. Independence and diversity are maintained during the duration of the increased CT. The potential for a common cause failure is not increased and the independence of physical barriers is not degraded. Defenses against human errors are maintained. Compliance with the applicable NRC General Design Criteria and AEC/NRC Safety/RGs is not affected by this proposed change.

#### 4.2.1.1 Overall Philosophy

The impact of the proposed one-time extension of the Unit 2 low pressure ECCS injection/spray CT was evaluated and determined to be consistent with the defense-in-depth philosophy. The limited unavailability of a LPCI subsystem does not significantly change the balance among the defense-in-depth principles of prevention of core damage, prevention of containment failure, and consequence mitigation. The proposed change does not introduce the possibility of new accidents or transients nor increase the likelihood of an accident or transient.

#### 4.2.1.2 Strength of Overall Plant Design

The proposed one-time extension of the Unit 2 low pressure ECCS injection/spray CT is not being requested to compensate for a weakness in plant design. The robustness of the ECCS is demonstrated by the ability of the plant to mitigate the consequences of a design basis accident coupled with a single failure. The following single failures are considered in the BFN design basis LOCA analysis:

1. Battery
2. Opposite Unit False LOCA Signal
3. LPCI System Injection Valve
4. Diesel Generator
5. HPCI

ECCS cooling performance must be calculated in accordance with an acceptable evaluation model and must be calculated for a number of postulated LOCAs of different sizes, locations, and other properties sufficient to provide assurance that the most severe postulated LOCAs are calculated.

For peak cladding temperature for General Electric (GE) fuel, the limiting break is a 4.2 square foot break in a recirculation suction line as documented in NEDC-32484P-A. For Framatome ANP (FANP) fuel, the limiting break is a 0.5 square foot split in a recirculation discharge line as documented in EMF-2950P[1]. Information on GE LOCA models currently in use is given in NEDO-205669 and NEDC-32484P-A. LOCA models used for FANP reload fuel analyses are described in EMF-3145(P)[2]. Plant specific information on models used and results of the LOCA analysis for the current operating

1 EMF-2950(P) Revision 0, Browns Ferry Units 1, 2, and 3 Extended Power Uprate LOCA Break Spectrum Analysis, December 2003.

2 EMF-3145(P) Revision 0, Browns Ferry Units 1, 2, and 3 Extended Power Uprate LOCA-ECCS Analysis MAPLHGR Limit for ATRIUM ™-10 Fuel, Framatome ANP, December 2004.

cycle are given in a separate document prepared in conjunction with the reload licensing amendments. Additional information on the sequence of events during a LOCA and the response of the primary containment during a LOCA is given in NEDC-32484P-A and NEDO-10320(3). TVA has recently submitted(4) the results of its current ECCS performance analysis for Unit 2:

| FUEL VENDOR | FUEL TYPE | PCT |
|---|---|---|
| Global Nuclear Fuels | GE13 | 1810 |
| Global Nuclear Fuels | GE14 | 1760 |
| Framatome Advanced Nuclear Power* | ATRIUM-10 | 2007 |

* - Note that the value for Framatome fuel was calculated for Extended Power Uprate operation (3,952 MWt). The calculation is bounding for the current Unit 2 thermal power of 3,458 MWt.

The most limiting single failure for BFN is the battery failure. The current LOCA analysis for a recirculation suction break takes credit only for ADS, 1 LPCS loop and 2 LPCI pumps (2 pumps into 1 recirculation loop). Whereas, ADS, 1 LPCS and 3 LPCI (3 pumps into 2 loops) would actually be available in the worst-case battery failure. Similar robustness is also found for the battery failure scenario during the recirculation discharge line break. The current LOCA analysis takes credit only for ADS and 1 LPCS loop. Whereas, ADS, 1 LPCS loop and 1 LPCI pump (1 pump into 1 recirculation loop) would actually be available. A summary of the ECCS performance was recently submitted to NRC as part of TS-424 (Reference 1) and approved by NRC in Reference 2.

### 4.2.1.3 System Redundancy, Independence and Diversity

As described below, administrative controls ensure system redundancy, independence, and diversity are maintained commensurate with the expected frequency and consequences of challenges to the on-site standby power system:

A. Restrictions are placed on simultaneous equipment outages that would erode the principles of redundancy and diversity;

3 The General Electric Pressure Suppression Containment Analytical Model, NEDO-10320.

4 TVA letter to NRC, dated April 8, 2005, "Report of Emergency Core Cooling System (ECCS) Evaluation Model Changes.

B. Voluntary removal of equipment from service is not scheduled when adverse weather conditions are predicted or at times when the plant may be subjected to other abnormal conditions.

These administrative controls are described in more detail below:

A. TVA uses proceduralized risk-based approaches for scheduling maintenance for all modes of plant operation, which limits removal of risk sensitive equipment from service.

SPP 7.1, "Work Control Process", defines the risk assessment methodology that is used for power operations (Mode 1) and startup (Mode 2). For on-line maintenance, a risk assessment is performed before implementation and emergent work is evaluated against the assessed scope. For those structures, systems, and components (SSCs) modeled in the probabilistic safety assessment (PSA), the following risk thresholds are established with approval/actions described below. RED configurations entail the highest levels of increased risk, and GREEN configurations the lowest.

- Incremental core damage probability (ICDP) greater than 1E-05 should not be entered voluntarily (RED);

- ICDP greater than 5E-06 but less than 1E-05, assess non-quantifiable factors, establish risk management actions per 3.5.2.1 (ORANGE);

- ICDP greater than 1E-06 but less than 5E-06, assess non-quantifiable factors, establish risk management actions (YELLOW); and

- ICDP less than 1E-06, no separate risk management plans or approval are required (GREEN).

Activities requiring risk management actions include, as appropriate, actions to provide risk awareness and control, actions to reduce duration, and actions to reduce magnitude of risk increase. These actions might include:

- Discussion of the activity with operating shift approval of planned evolution;

- Pre-job briefing of maintenance personnel emphasizing the risk aspects of the evolution;

- Presence of appropriate technical personnel for appropriate portions of the activity;
- Pre-staging of parts and materials;
- Walk down tagout and activity prior to conducting maintenance;
- Conduct of training and mock ups to familiarize personnel with the activity;
- Perform activity around the clock;
- Establish contingency plans to restore the out of service rapidly, if needed;
- Minimizing other work in areas that could affect event initiators to decrease the frequency of initiating events mitigated by the safety function served by the out-of-service SSC;
- Minimize work in areas that could affect other redundant systems such that there is continued likelihood of the availability of the safety functions served by the SSCs in those areas;
- Establishment of alternate success paths for performance of the safety function of the out of service SSC (note; this equipment does not necessarily have to be in the scope of the Maintenance Rule per SPP-6.6); and

Risk management plans are required to be approved by senior plant management.

B. Administrative controls ensure that voluntary removal of equipment from service is not scheduled when adverse weather conditions are predicted or at times when the plant may be subjected to other abnormal conditions.

SPP 7.1, "Work Control Process", requires an assessment of scheduled activities be performed before implementation of a work window. The assessment includes external event considerations involving the potential impacts of weather or other external conditions relative to the proposed maintenance evolution if these external impacts (e.g., weather, external flooding, and other external impacts) are imminent or have a high probability of occurring during the planned out-of-service duration.

#### 4.2.1.4 Potential for Common Cause Failures

The proposed one-time extension of the Unit 2 low pressure ECCS injection/spray TS CT does not add or delete any safety-related systems, equipment, or loads, or alter the design or function of the RHR system. Therefore, the potential for a common cause failure is not increased.

#### 4.2.1.5 Independence of Physical Barriers

The proposed one-time extension of the Unit 2 low pressure ECCS injection/spray TS CT does not affect fuel cladding, primary coolant systems, or containment. Therefore, the independence of physical barriers is not degraded.

#### 4.2.1.6 Defense against Human Error

The proposed one-time extension of the Unit 2 low pressure ECCS injection/spray TS CT does not affect any operator response to a postulated event. Therefore, defenses against human errors are maintained.

#### 4.2.1.7 Compliance with General Design Criteria

The affect of the proposed one-time extension of the Unit 2 low pressure ECCS injection/spray TS CT has no impact on compliance with General Design Criteria as discussed in Section 4.1, Compliance with Current Regulations and Commitments.

### 4.2.2 Safety Margins

#### 4.2.2.1 Codes and Standards

The proposed one-time extension of the Unit 2 low pressure ECCS injection/spray TS CT remains consistent with the codes and standards applicable to the Browns Ferry.

#### 4.2.2.2 Safety Analysis and Final Safety Analysis Report Acceptance Criteria

The proposed one-time extension of the Unit 2 low pressure ECCS injection/spray TS CT is consistent with the safety analysis and UFSAR acceptance criteria.

## 4.3 Evaluation of Risk Impact

### 4.3.1 Three Tiered Approach

In Regulatory Guide 1.177, the NRC staff identified a three-tiered approach for licensees to evaluate the risk associated with proposed TS CT changes.

Tier 1 is an evaluation of the impact on plant risk of the proposed TS change as expressed by the change in CDF, the incremental conditional core damage probability (ICCDP), and, when appropriate, the change in LERF and the incremental conditional large early release probability (ICLERP).

Tier 2 is an identification of potentially high-risk configurations that could exist if equipment in addition to that associated with the change were to be taken out of service simultaneously, or other risk-significant operational factors such as concurrent system or equipment testing were also involved. The objective of this part of the evaluation is to ensure that appropriate restrictions on dominant risk-significant configurations associated with the change are in place.

Tier 3 is the establishment of an overall configuration risk management program to ensure that other potentially lower probability, but nonetheless risk-significant configurations resulting from maintenance and other operational activities are identified and appropriate compensation taken. If the Tier 2 assessment demonstrates, with reasonable assurance, that there are no risk-significant configurations involving the subject equipment, the application of Tier 3 to the proposed TS CT may not be necessary. Although defense in depth is protected to some degree by most current TS, application of the three-tiered approach to risk-informed TS CT changes discussed below provides additional assurance that defense in depth will not be significantly impacted by such changes to the licensing basis. TVA has evaluated the proposed extension of the TS CT using the guidance of Regulatory Guide 1.177 and the results are provided below.

A. Tier 1, PSA Capability and Insights

Tier 1 is an evaluation of the impact on plant risk of the proposed TS change as expressed by the change in CDF, the ICCDP, and when appropriate, the change in the LERF and ICLERP. The validity of the PSA, the PSA insights and findings, and a discussion of the uncertainty associated with these results are presented below.

Validity of the PSA

Regulatory Guide 1.174 provides the guidance framework for using PSA in risk-informed decisions for plant-specific changes to the licensing basis. The acceptance guidelines consider the baseline CDF and LERF values as well as the changes to them. The guidance included in Regulatory Guide 1.174 provides a framework in assisting in the interpretation of the numerical results of the PSA.

As stated in Regulatory Guide 1.174:

- "When the calculated increase in CDF is in the range of $10^{-6}$ per reactor year to $10^{-5}$ per reactor year, applications will be considered only if it can be reasonably shown that the total CDF is less than $10^{-4}$ per reactor year (Region II)."

- "When the calculated increase in LERF is in the range of $10^{-7}$ per reactor year to $10^{-6}$ per reactor year, applications would be considered only if it can be reasonably shown that the total CDF is less than $10^{-5}$ per reactor year (Region II)."

In order to model the impact of the proposed CT extension, the PSA model was run as described below:

> RHR Loop 1 Model (One low pressure ECCS injection/spray subsystem [LPCI] inoperable) - The base case model was revised to reflect RHR Loop I to be unavailable for 14 days. As has been stated previously, this is a very conservative assumption, since the containment cooling modes of operation are not impacted by the current plant condition, and the TS inoperable LPCI mode itself is functional except for unlikely single failures.

No model run was performed related to LPCS, since this is a one-time CT extension, and any emergent inoperability of LPCS coincident with the LPCI MG set inoperability will result in a Unit 2 shutdown in accordance with BFN LCO 3.0.3.

Insights and Findings

BFN's RISKMAN software was used to quantify the Unit 2 model for the requested 14-day CT case for CDF and LERF.

The zero maintenance baseline annual CDF and LERF for Unit 2 were determined. These values are used because, during the LCO interval, elective maintenance on other significant equipment will be suspended to keep such equipment in service. The configuration specific annual CDF and LERF were then determined - in this case conservatively assuming that the whole of RHR Loop I is unavailable for an entire year. The CDF/LERF values for the zero maintenance baseline were then subtracted from the higher CDF/LERF values for the RHR Loop I out-of-service condition being evaluated. This difference is then prorated for the actual 14 day CT duration versus the annual values.

These results are tabulated below:

**UNIT 2 CDF**

| Equipment Out of Service | *Zero Maintenance Base CDF ($CDF_{ZM}$) | *Configuration Specific CDF ($CDF_{CS}$) | Change $CDF_{AOT}$ - CDF) | CT (days) | ICDP or ICCDP ($CDF_{CS}$-CDF)*CT/365 | RG 1.174 Criteria Met Change < 1E-6 |
|---|---|---|---|---|---|---|
| RHR Loop I | 8.21E-07 | 4.41E-06 | 3.59E-06 | 14 | 1.38E-07 | YES |

**UNIT 2 LERF**

| Equipment Out of Service | *Zero Maintenance Base LERF ($LERF_{ZM}$) | *Configuration Specific LERF ($LERF_{CS}$) | Change ($LERF_{AOT}$ - LERF) | CT (days) | ILERP or ICLERP ($LERF_{CS}$-LERF)*CT/365 | RG 1.174 Criteria Met Change < 1E-7 |
|---|---|---|---|---|---|---|
| RHR Loop I | 2.01E-07 | 1.44E-06 | 1.24E-06 | 14 | 4.75E-08 | YES |

(1) The changes in CDF and LERF are below the Regulatory Guide 1.174 guidelines of 1E-6 for CDF and 1E-7 for LERF.

(2) The value for ICCDP is below the Regulatory Guide 1.177 guideline for acceptability of 5.0E-7.

(3) The value for ICLERP is below the Regulatory Guide 1.177 guideline for acceptability of 5.0E-8.

As can be seen from the above table, the change due to an extension of the Unit 2 low pressure ECCS injection/spray CT from 7 days to 14 days is not risk significant and is below the NRC acceptance criteria specified in Regulatory Guides 1.174 and 1.177.

Since the preceding risk analysis assumed unavailability for all of RHR Loop I, the quantitative values above are in themselves conservatively determined. In actuality the loop is available for all design functions, with its only limitation being that during this interval 480 VAC RMOV Board 2D is powered from its alternate source (LPCI MG set 2DA) without automatic transfer capability.

B. Tier 2: Avoidance of Risk Significant Configurations

As described in Section 4.2.1.3, administrative controls ensure that system redundancy, independence and diversity are maintained commensurate with the expected frequency and consequences of challenges to the ECCS:

- Restrictions are placed on simultaneous equipment outages that would erode the principles of redundancy and diversity;
- Voluntary removal of equipment from service is not scheduled when adverse weather conditions are predicted or at times when the plant may be subjected to other abnormal conditions.

In summary, TVA's administrative controls and evaluations provide reasonable assurance that risk-significant plant equipment outage configurations will not occur as a result of the proposed extension of the Unit 2 low pressure ECCS injection/spray CT.

C. Tier 3: Risk-Informed Configuration Risk Management

Regulatory Guide 1.177 recommends that a formal Tier 3 Configuration Risk Management Program (CRMP) be developed and implemented for systems for which a PSA CT extension has been granted to identify possible risk significant configurations under Tier 2 that could be encountered over extended periods of time. BFN complies with 10 CFR 50.65(a)(4),"Requirements for monitoring the effectiveness of maintenance at nuclear power plants," which requires that risk assessments be performed on safety-related systems and other systems important to the safe operation of the plant as part of the maintenance process. The requirements for complying with 10 CFR 50.65(a)(4) are incorporated into SPP-7.1, "Work Control Process" as discussed in Section 4.2.1.3 and are equivalent to the recommended CRMP. Hence, BFN's compliance with 10

CFR 50.65(a)(4), which applies to RHR and many other systems, supersedes the need to have a separate CRMP which applies solely to RHR.

Regulatory Guide 1.177 recommends for the Tier 3 program there be an evaluation of compensatory measures. As described in Section 4.2.1.3, administrative controls ensure that system redundancy, independence and diversity are maintained commensurate with the expected frequency and consequences of challenges to the low pressure ECCS subsystems:

- Restrictions are placed on simultaneous equipment outages that would erode the principles of redundancy and diversity;
- Voluntary removal of equipment from service is not scheduled when adverse weather conditions are predicted or at times when the plant may be subjected to other abnormal conditions.

BFN has not identified additional TS restrictions or compensatory measures required to avoid potential risk significant configurations due to the proposed one-time extension of the current Unit 2 low pressure ECCS injection/spray CT from 7 days to 14 days.

### 4.3.2 <u>Evaluation of PSA Quality</u>

The Unit 2 and 3 PSA models are maintained and were updated as recently as early 2003. TVA procedures provide the details describing the use of the PSA at Browns Ferry to support the Maintenance Rule. The PSA assists in establishing performance criteria, balancing unavailability and reliability for risk significant SSCs and goal setting and provides input to the onsite Expert Panel for the risk significance determination process when revisions to the PSA take place. Functions are potentially considered risk significant if any of the following conditions are satisfied:

- Functions modeled in the level 1 PSA have a risk achievement worth greater than or equal to 2.0;
- Functions modeled in the level 1 PSA have a risk reduction worth of less than or equal to 0.995; or

- Functions modeled in the level 1 PSA have a cumulative contribution of 90% of the CDF.

Because the PSAs are actively used at BFN, a formal process is in place to evaluate and resolve PSA model-related issues as they are identified. The PSA Update Report is evaluated for updating every other refueling outage.

During November 1997, TVA participated in a PSA Peer Review Certification of the Browns Ferry Unit 2 and 3 PSAs administered under the auspices of the BWROG Peer Certification Committee. The purpose of the peer review process is to establish a method of assessing the technical quality of the PSA for its potential applications.

The Peer Review evaluation process utilized a tiered approach using standardized checklists allowing a detailed review of the elements and the sub-elements of the Browns Ferry PSAs to identify strengths and areas that need improvement. The review methodology allowed the Peer Review team to focus on technical issues and to issue their assessment results in the form of a "grade" of 1 through 4 on a PSA sub-element level. To reasonably span the spectrum of potential PSA applications, the four grades of certification as defined by the BWROG document "Report to the Industry on PSA Peer Review Certification Process - Pilot Plant

The BFN Unit 2 and 3 Peer Review resulted in a consistent evaluation across all elements and sub-elements. Also, during the Unit 2 and 3 PSAs updates in 2003, the significant findings (i.e., designated as Level A or B) from the Peer Certification were resolved, resulting in the PSA elements now having a minimum certification grade of 3. A copy of the significant peer findings and their disposition was provided in Reference 3.

In summary, TVA concludes the BFN PSA model used for evaluating the risk change in this one-time Unit 2 TS CT extension request is appropriate and adequate to support the request. NRC has accepted the BFN PSA in previous actions, such as an extension to the Units 2 and 3 Diesel Generator CT (Reference 4) and Risk Informed Inservice Inspection program (Reference 5).

### 4.4 Summary and Conclusion

TVA has evaluated the proposed one-time extension of the Unit 2 low pressure ECCS injection/spray seven day CT from 7 days to 14 days both deterministically and through a risk-informed assessment. The deterministic evaluation concluded the proposed change is consistent with the defense-in-depth philosophy, in that:

- TVA's ECCS is diverse, reliable, has redundancy, and is capable of compensating for a single out-of-service LPCI subsystem.
- BFN uses a proceduralized risk-based approach for scheduling maintenance, which limits removal of risk sensitive equipment from service during outages.

The deterministic evaluation concluded that the proposed one-time change to the Unit 2 low pressure ECCS injection/spray CT will not adversely affect any of the safety analyses assumptions or conclusions described in the UFSAR. This ensures the protection of the public health and safety.

The risk-informed assessment concluded the increase in plant risk is small. The proposed change results in small increases, within acceptable guidelines, in the Unit 2 Conditional Core Damage Probability and the Conditional Large Early Release Probability. The proposed change is consistent with:

- The NRC's "Safety Goals for the Operations of Nuclear Power Plants; Policy Statement," Federal Register, Volume 51, Page 30028 (51 FR 30028), dated August 4, 1996;
- Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," Revision 1; and
- Regulatory Guide 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," Revision 1.

When taken together, the results of the deterministic evaluation and risk-informed assessment provide a high degree of assurance the equipment required to safely shutdown the plant and mitigate the effects of a design basis accident or transient will remain capable of performing its safety function when a Unit 2 low pressure ECCS injection/spray subsystem is out-of-service for maintenance or repairs in accordance with the proposed CT.

## 5.0 REGULATORY SAFETY ANALYSIS

The Tennessee Valley Authority (TVA) is submitting an amendment request to license DPR-52 for the Browns Ferry Nuclear Plant Unit 2.

The proposed change seeks to extend on a one-time basis the current Unit 2 low pressure Emergency Core Cooling System (ECCS) injection/spray completion time (CT) from 7 days to 14 days. The proposed change provides additional flexibility for corrective maintenance and repair of a Low Pressure Coolant Injection (LPCI) motor-generator (MG) set.

### 5.1 No Significant Hazards Consideration

TVA has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment", as discussed below:

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   The low pressure ECCS subsystems are designed to reflood the reactor vessel after a design basis Loss-of-Coolant Accident (LOCA). The proposed 14 day CT does not change the conditions, operating configurations, or minimum amount of operating equipment assumed in the safety analysis for accident mitigation. No changes are proposed in the manner in which the ECCS provides plant protection or which create new modes of plant operation. In addition, a Probabilistic Safety Assessment (PSA) evaluation concluded that the risk contribution of the CT extension is non-risk significant.

The proposed request will not affect the probability of any event initiators. There will be no degradation in the performance of, or an increase in the number of challenges imposed on, safety related equipment assumed to function during an accident situation. There will be no change to normal plant operating parameters or accident mitigation performance.

Therefore, the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No

   There are no hardware changes nor are there any changes in the method by which any plant system performs a safety function. This request does not affect the normal method of plant operation.

   The proposed amendment does not introduce new equipment, which could create a new or different kind of accident.

   No new external threats, release pathways, or equipment failure modes are created. No new accident scenarios, transient precursors, failure mechanisms, or limiting single failures are introduced as a result of this request. Therefore, the implementation of the proposed amendment will not create a possibility for an accident of a new or different type than those previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

   Response: No

   BFN's ECCS is designed with sufficient redundancy such that a low pressure ECCS subsystem may be removed from service for maintenance or testing. The remaining subsystems are capable of providing water and removing heat loads to satisfy the UFSAR requirements for accident mitigation or unit safe shutdown.

A PSA evaluation concluded that the risk contribution of the CT extension is non-risk significant. There will be no change to the manner in which safety limits or limiting safety system settings are determined nor will there be any change to those plant systems necessary to assure the accomplishment of protection functions. There will be no change to post-LOCA peak clad temperatures. For these reasons, the proposed amendment does not involve a significant reduction in a margin of safety.

Based on the above, TVA concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

## 5.2 Applicable Regulatory Requirements/Criteria

The performance of the ECCS was analyzed using the approved LOCA application methodology. The requirements of 10 CFR 50.46 and Appendix K are met.

Browns Ferry was constructed before the General Design Criteria (GDC) of 10 CFR 50 were promulgated. However, the applicable GDC to this proposed change are:

- GDC 35, "Emergency Core Cooling," requires that a system be provided for abundant emergency core cooling. The GDC requires redundancy be provided such that the safety function of the ECCS shall be met while energized from either offsite or onsite power, assuming a single failure.

- GDC 36, "Inspection of Emergency Core Cooling System," requires the ECCS to be designed to permit periodic inspections.

- GDC 37, "Testing of Emergency Core Cooling System," requires the ECCS to be designed to permit periodic demonstrations of the full operational sequence that brings the system into operation.

There have been no changes to the ECCS design such that conformance to any of the above regulatory requirements and criteria would be changed. This emergency amendment application revises the current Unit 2 low pressure ECCS injection/spray seven day CT to 14 days. The discussions under Section 4.0, *Safety Analysis*, provide the justification for granting this emergency amendment application.

ECCS system maintenance activities are appropriately controlled as required by 10 CFR 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants." SPP 6.6, "Maintenance Rule Performance Indicator Monitoring, Trending and Reporting - 10 CFR 50.65," Technical Procedure NETP-100, "Emergency Diesel Generator Reliability Program" and Technical Instruction 0-TI-346, "Maintenance Rule Performance Indicator Monitoring, Trending, And Reporting - 10 CFR 50.65," provide guidance for analysis, retrieval, trending, and reporting of data relative to plant level, function specific, and repetitive preventable functional failure indicators of performance required by the Maintenance Rule. The requirements of these procedures are in compliance with 10 CFR 50.65, and NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants."

RGs 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis", and 1.177, "An Approach for Using Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications" provide NRC guidance regarding the use of PSA to support TS changes for extended TS CT and extended surveillance test intervals.

BFN has an active and comprehensive risk management program. For on-line maintenance, risk is controlled through a 12-week rolling schedule. A schedule of sequenced work windows is established for on-line periods when combinations of plant systems can acceptably be out-of-service to perform preventative maintenance and surveillance activities. The predetermined work windows incorporate risk assessments to determine potential impacts to the safe and reliable operation of the unit and assure long-term maintenance activities are performed within required frequencies to maximize plant equipment availability.

In conclusion, based on the considerations discussed above, (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 the health and safety of the public.

## 6.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in

10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

## 7.0 REFERENCES

1. TVA letter to NRC, dated April 11, 2003, Browns Ferry Nuclear Plant (BFN) - Units 1, 2 and 3 - License Amendments and Technical Specification Changes - Revision in the Number of Emergency Core Cooling Systems Required in Response to a Loss of Coolant Accident (TS-424).

2. NRC letter to TVA, dated April 1, 2004, 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).

3. TVA letter to NRC, "Browns Ferry Nuclear Plant (BFN) - Unit 1 - Response to Request for Additional Information to Generic Letter 88-20, Individual Plant Examination for Severe Accident Vulnerability (TAC No. MC1895)," August 17, 2004.

4. NRC letter to TVA, "Brown Ferry Nuclear Amendments Regarding Authorization of 14-Day Allowable Outage Time for Emergency Diesel Generators (TAC Nos. M98205 and M98206)," August 2, 1999.

5. NRC letter to TVA, "Browns Ferry Nuclear Plant (BFN) - Unit 2 - American Society of Mechanical Engineers (ASME) Section XI, Inservice Inspection and System Pressure Test Programs for the Third Ten-Year Inspection Interval (TAC No. MB0400)," February 5, 2001.

Enclosure 2

Browns Ferry Nuclear Plant (BFN) Unit 2
Technical Specifications (TS) Change TS-454

One-Time Revision to
Emergency Core Cooling System (ECCS)
Completion Time (CT)

Proposed Technical Specification Changes (mark-up)

# 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS) AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

## 3.5.1 ECCS - Operating

LCO 3.5.1 Each ECCS injection/spray subsystem and the Automatic Depressurization System (ADS) function of six safety/relief valves shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2 and 3, except high pressure coolant injection (HPCI) and ADS valves are not required to be OPERABLE with reactor steam dome pressure ≤ 150 psig.

ACTIONS

-----------------------------------------NOTE-----------------------------------------
LCO 3.0.4.b is not applicable to HPCI.
-------------------------------------------------------------------------------------------

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| A. One low pressure ECCS injection/spray subsystem inoperable.<br><br>OR<br><br>One low pressure coolant injection (LPCI) pump in both LPCI subsystems inoperable. | A.1 | Restore low pressure ECCS injection/spray subsystem(s) to OPERABLE status. | 7 days [1] |

(continued)

[1] - This Completion Time may be extended to 14-days on a one-time basis. This temporary approval expires ~~June 1, 2005~~ ***November 30, 2005.*** ← ***The expiration date in the existing note is changed***