



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
WASHINGTON, D.C. 20555-0001

June 7, 2019

Mr. Joseph W. Shea
Vice President, Nuclear Regulatory Affairs
and Support Services
Tennessee Valley Authority
1101 Market Street, LP 4A
Chattanooga, TN 37402-2801

**SUBJECT: WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2 – ISSUANCE OF
AMENDMENTS REGARDING TECHNICAL SPECIFICATION CHANGES
PERTAINING TO 120-VOLT ALTERNATING CURRENT VITAL BUSES
(EPID L-2018-LLA-0050)**

Dear Mr. Shea:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 126 to Facility Operating License No. NPF-90 for Watts Bar Nuclear Plant (Watts Bar), Unit 1, and Amendment No. 29 to Facility Operating License No. NPF-96 for Watts Bar, Unit 2. These amendments are in response to your application dated February 28, 2018, as supplemented by letters dated November 9, 2018, and March 21, 2019.

These amendments modify Technical Specification 3.8.9 to add a new Condition C with an 8-hour completion time for performing maintenance on the opposite unit's vital bus when the opposite unit is in Mode 5, Mode 6, or defueled.

A copy of the related safety evaluation is also enclosed. Notice of issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert G. Schaaf", is positioned above the typed name.

Robert G. Schaaf, Senior Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-390 and 50-391

Enclosures:

1. Amendment No. 126 to NPF-90
2. Amendment No. 29 to NPF-96
3. Safety Evaluation

cc: Listserv



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-390

WATTS BAR NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 126
License No. NPF-90

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Tennessee Valley Authority (TVA, the licensee) dated February 28, 2018, and supplemented by letters dated November 9, 2018, and March 21, 2019, 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.

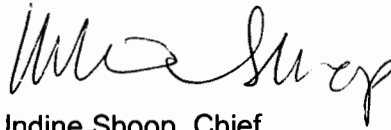
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-90 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A as revised through Amendment No. 126 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. TVA shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read 'Undine Shoop', is written over the typed name.

Undine Shoop, Chief
Plant Licensing Branch II-2
Division of operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Operating License
and Technical Specifications

Date of Issuance: June 7, 2019

ATTACHMENT TO AMENDMENT NO. 126

WATTS BAR NUCLEAR PLANT, UNIT 1

FACILITY OPERATING LICENSE NO. NPF-90

DOCKET NO. 50-390

Replace page 3 of Facility Operating License No. NPF-90 with the attached revised page 3.

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

Remove Pages

3.8-41

3.8-42

Insert Pages

3.8-41

3.3-42

- (4) TVA, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required, any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis, instrument calibration, or other activity associated with radioactive apparatus or components; and
- (5) TVA, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect, and is subject to the additional conditions specified or incorporated below.

(1) Maximum Power Level

TVA is authorized to operate the facility at reactor core power levels not in excess of 3459 megawatts thermal.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A as revised through Amendment No. 126 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. TVA shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Safety Parameter Display System (SPDS) (Section 18.2 of SER Supplements 5 and 15)

Prior to startup following the first refueling outage, TVA shall accomplish the necessary activities, provide acceptable responses, and implement all proposed corrective actions related to having the Watts Bar Unit 1 SPDS operational.

(4) Vehicle Bomb Control Program (Section 13.6.9 of SSER 20)

During the period of the exemption granted in paragraph 2.D.(3) of this license, in implementing the power ascension phase of the approved initial test program, TVA shall not exceed 50% power until the requirements of 10 CFR 73.55(c)(7) and (8) are fully implemented. TVA shall submit a letter under oath or affirmation when the requirements of 73.55(c)(7) and (8) have been fully implemented.

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems - Operating

LCO 3.8.9 Train A and Train B AC, four channels of vital DC, and four channels of AC vital bus electrical power distribution subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION		REQUIRED ACTION	COMPLETION TIME
A.	One or more AC electrical power distribution subsystems inoperable.	A.1 Restore AC electrical power distribution subsystem to OPERABLE status.	8 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
B.	One or more AC vital buses in one channel inoperable for reasons other than Condition C.	B.1 Restore AC vital bus(es) to OPERABLE status.	2 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
<p>-----NOTES-----</p> <p>1. Only applicable during planned maintenance of AC vital bus 2-I, 2-II, 2-III, or 2-IV.</p> <p>2. Only applicable when Unit 2 is in MODE 5, MODE 6, or defueled.</p> <p>-----</p>			
C.	AC vital bus 2-I, 2-II, 2-III, or 2-IV inoperable.	C.1 Restore AC vital bus to OPERABLE status.	8 hours

(continued)

ACTIONS (continued)

CONDITION		REQUIRED ACTION	COMPLETION TIME
D.	One or more vital DC electrical power distribution buses inoperable.	D.1 Restore DC electrical power distribution bus to OPERABLE status.	2 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
E.	Required Action and associated Completion Time not met.	E.1 Be in MODE 3. <u>AND</u> E.2 Be in MODE 5.	6 hours 36 hours
F.	Two trains with one or more inoperable distribution subsystems that result in a loss of safety function.	F.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.9.1	Verify correct breaker alignments and voltage to required AC, vital DC, and AC vital bus electrical power distribution subsystems.	7 days



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
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TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-391

WATTS BAR NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 29
License No. NPF-96

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Tennessee Valley Authority (TVA, the licensee) dated February 28, 2018, and supplemented by letters dated November 9, 2018, and March 21, 2019, 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, Facility Operating License No. NPF-96 is amended as indicated in the attachment to this license amendment, and paragraph 2.C.(2) is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A as revised through Amendment No. 29 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. TVA shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Undine Shoop, Chief
Plant Licensing Branch II-2
Division of operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Operating License
and Technical Specifications

Date of Issuance: June 7, 2019

ATTACHMENT TO AMENDMENT NO. 29
WATTS BAR NUCLEAR PLANT, UNIT 2
FACILITY OPERATING LICENSE NO. NPF-96
DOCKET NO. 50-391

Replace page 3 of Facility Operating License No. NPF-96 with the attached revised page 3.

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

Remove Pages

3.8-37
3.8-38

Insert Pages

3.8-37
3.8-38

- C. The license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act, and to the rules, regulations, and orders of the Commission now or hereafter in effect, and is subject to the additional conditions specified or incorporated below.

(1) Maximum Power Level

TVA is authorized to operate the facility at reactor core power levels not in excess of 3411 megawatts thermal.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A as revised through Amendment No. 29 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. TVA shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

- (3) TVA shall implement permanent modifications to prevent overtopping of the embankments of the Fort Loudon Dam due to the Probable Maximum Flood by June 30, 2018.
- (4) PAD4TCD may be used to establish core operating limits until the WBN Unit 2 steam generators are replaced with steam generators equivalent to the existing steam generators at WBN Unit 1.
- (5) By December 31, 2019, the licensee shall report to the NRC that the actions to resolve the issues identified in Bulletin 2012-01, "Design Vulnerability in Electrical Power System," have been implemented.
- (6) The licensee shall maintain in effect the provisions of the physical security plan, security personnel training and qualification plan, and safeguards contingency plan, and all amendments made pursuant to the authority of 10 CFR 50.90 and 50.54(p).
- (7) TVA shall fully implement and maintain in effect all provisions of the Commission approved cyber security plan (CSP), including changes made pursuant to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The TVA approved CSP was discussed in NUREG-0847, Supplement 28, as amended by changes approved in License Amendment No. 7.
- (8) TVA shall implement and maintain in effect all provisions of the approved fire protection program as described in the Fire Protection Report for the facility, as described in NUREG-0847, Supplement 29, subject to the following provision:

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems - Operating

LCO 3.8.9 Train A and Train B AC, four channels of vital DC, and four channels of AC vital bus electrical power distribution subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more AC electrical power distribution subsystems inoperable.	A.1 Restore AC electrical power distribution subsystem to OPERABLE status.	8 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
B. One or more AC vital buses in one channel inoperable for reasons other than Condition C.	B.1 Restore AC vital bus(es) to OPERABLE status.	2 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
<p>-----NOTES-----</p> <p>1. Only applicable during planned maintenance of AC vital bus 1-I, 1-II, 1-III, or 1-IV.</p> <p>2. Only applicable when Unit 1 is in MODE 5, MODE 6, or defueled.</p> <p>-----</p>		
C. AC vital bus 1-I, 1-II, 1-III, or 1-IV inoperable.	C.1 Restore AC vital bus to OPERABLE status.	8 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more vital DC electrical power distribution buses inoperable.	D.1 Restore DC electrical power distribution bus to OPERABLE status.	2 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3. <u>AND</u> E.2 Be in MODE 5.	6 hours 36 hours
F. Two trains with one or more inoperable distribution subsystems that result in a loss of safety function.	F.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.8.9.1 Verify correct breaker alignments and voltage to required AC, vital DC, and AC vital bus electrical power distribution subsystems.	7 days



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 126 TO FACILITY OPERATING LICENSE NO. NPF-90
AND AMENDMENT NO. 29 TO FACILITY OPERATING LICENSE NO. NPF-96
TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2
DOCKET NOS. 50-390 AND 50-391

1.0 INTRODUCTION

By letter February 28, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18060A337), as supplemented by letters dated November 9, 2018 and March 21, 2019 (ADAMS Accession Nos. ML18313A214, and ML19098A857, respectively), Tennessee Valley Authority (the licensee) submitted a license amendment request (LAR) for Facility Operating License Nos. NPF-90 for Watts Bar Nuclear Plant (Watts Bar, WBN), Unit 1 and NPF-96 for Watts Bar, Unit 2. The proposed amendments would revise Technical Specification (TS) 3.8.9, "Distribution Systems – Operating," completion times (CTs) for restoring one inoperable alternating current (AC) vital bus of the opposite unit in one channel to operable status. Specifically, the proposed changes would add to TS 3.8.9 one new Condition C with an 8-hour CT for performing maintenance on the opposite unit's AC vital bus when the opposite unit is in Mode 5, Mode 6, or defueled.

The supplemental letters dated November 9, 2018, and March 21, 2019, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the U.S. Nuclear Regulatory Commission (NRC, the Commission) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on November 20, 2018 (83 FR 58619).

2.0 REGULATORY EVALUATION

2.1 System Description

According to the Watts Bar Updated Final Safety Analysis Report (UFSAR), Chapter 8, Section 8.3, "Onsite (Standby) Power System" (ADAMS Accession No. ML17334A173), the onsite AC power system is a Class 1E system consisting of the standby AC power system and the 120-volt (V) vital AC system.

The safety function of the standby AC power system is to supply power to components and systems required to assure that (1) fuel design limits and reactor coolant pressure boundary design conditions are not exceeded due to anticipated operational occurrences, and (2) the

core is cooled and vital functions are maintained in the event of a postulated accident in one unit and to safely shut down the other unit, subject to loss of the preferred power system and subject to any single failure in the standby power system. The standby AC power system continuously supplies power for energizing all AC-powered electrical devices essential to safety. Power continuity to the 6.9 kilo-V shutdown boards is maintained by automatic transfer from the preferred (normal or alternate offsite) sources to the standby (onsite) source. The standby power system serving each unit is divided into two redundant load groups' power trains (Train A and Train B for each unit), which supply power to all safety-related equipment.

The safety functions of the 120-V vital AC system is to supply power continuously to reactor protection, instrumentation, and control systems; engineered safety features instrumentation and control systems; and other safety-related components and systems, subject to loss of offsite and standby AC power sources and any single failure within the vital AC system. Each unit has four identical vital AC channels (designated as Channels I, II, III, and IV), with the equipment of each channel being electrically and physically independent from the equipment of other channels. Each channel includes a unit inverter (uninterruptible power supply) and distribution panels (or buses), which are mounted on an AC vital board. Each channel has access to a spare inverter, which can be manually aligned to replace either unit inverter but cannot be used to supply both units simultaneously. Each channel supplies the following loads: reactor protection system, reactor systems instrumentation, separations and interlock relay panels, and other panels and equipment associated with reactor instrumentation and control systems.

The unit inverter system for each channel consists of four major subassemblies: a direct current (DC) power supply, an auctioneering circuit, a regulated transformer bypass source circuit, and an inverter circuit. The DC power supply converts the 480-V AC normal inverter input to DC. The auctioneering circuit accepts the DC power supply (normal supply) and battery (emergency supply) inputs and permits a switchless bidirectional transfer between them in the event of a 480-V AC supply failure and restoration. The DC output of the auctioneering circuit is converted to DC by the inverter circuit. The regulated transformer bypass circuit on the unit inverters receives power derived from the same 480-V AC shutdown board system as the normal inverter AC input and provides a 120-V AC output to the distribution panels by bypassing the inverter via an automatic static switch or manual transfer switch. The spare inverter for each channel has all the same subassemblies as the unit inverter except for the regulated transformer bypass source circuit.

Watts Bar Unit 1 and Unit 2 include safety-related systems that are shared between the units. Some plant common loads (or shared systems) are supplied from Unit 1, Channels I and II, and other plant common loads are supplied from Unit 2, Channels III and IV. In no case does the sharing inhibit the safe shutdown of one unit while the other unit is experiencing an accident. All shared systems are sized to carry all credible combinations of normal and accident loads. The shared safety systems are designed so that one load group (Train 1A & 2A or Train 1B & 2B) can mitigate a design-basis accident in one unit and accomplish an orderly shutdown of the other unit.

Current Watts Bar Units 1 and 2 TS 3.8.9 requires that "Train A and Train B AC, four channels of vital DC, and four channels of AC vital bus electrical power distribution subsystems shall be OPERABLE." TS 3.8.9 is applicable during Modes 1 through 4. TS 3.8.9, Condition B applies when one or more 120-V AC vital buses in one channel is (are) inoperable. The Required Action (RA) for Condition B is to restore the 120-V AC vital bus(es) to operable status with a CT

of 2 hours and 16 hours from discovery of failure to meet the limiting condition for operation (LCO).

2.2 Proposed Changes

The licensee proposed to modify TS 3.8.9 to add a new Condition C with an 8 hour CT to restore inoperable AC vital bus(es) to operable status when performing maintenance on the opposite unit's vital bus when the opposite unit is in Mode 5, Mode 6, or defueled. This will allow the licensee to perform planned maintenance on an inoperable AC vital bus in the opposite unit when that unit is in a shutdown or defueled condition. The licensee stated that the basis for the change is that the current 2-hour CT of Condition B poses an undue burden when performing maintenance on the AC vital buses while one unit is operating and the other unit is in Mode 5, Mode 6, or defueled.

Specifically, the licensee proposes to make the following changes to TS 3.8.9:

Unit 1

- Revise Condition B to read as follows (addition shown in underlined text):

B. One or more AC vital buses in one channel inoperable for reasons other than Condition C.
- Create new Condition C and associated RA and CT to read as follows:

CONDITION	REQUIRED ACTION	COMPLETION TIME
-----NOTES-----		
1. Only applicable during planned maintenance of AC vital bus 2-I, 2-II, 2-III, or 2-IV.		
2. Only applicable when Unit 2 is in MODE 5, MODE 6, or defueled.		
C. AC vital bus 2-I, 2-II, 2-III, or 2-IV inoperable.	C.1 Restore AC vital bus to OPERABLE status.	8 hours

- Renumber current Conditions C, D, and E; and RAs C.1, D.1, D.2, and E.1, based on the insertion of new Condition C.

Unit 2

- Revise Condition B to read as follows (addition shown in underlined text):

B. One or more AC vital buses in one channel inoperable for reasons other than Condition C.

- Create new Condition C and associated RA and CT to read as follows:

CONDITION	REQUIRED ACTION	COMPLETION TIME
-----NOTES-----		
1. Only applicable during planned maintenance of AC vital bus 1-I, 1-II, 1-III, or 1-IV.		
2. Only applicable when Unit 1 is in MODE 5, MODE 6, or defueled.		
C. AC vital bus 1-I, 1-II, 1-III, or 1-IV inoperable.	C.1 Restore AC vital bus to OPERABLE status.	8 hours

- Renumber current Conditions C, D, and E; and RAs C.1, D.1, D.2, and E.1, based on the insertion of new Condition C.

2.3 Applicable Regulatory Requirements

The NRC staff applied the following requirements to evaluate the LAR:

Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.36(a)(1) states, in part, that each applicant for an operating license shall include in the application proposed TSs in accordance with the requirements of 10 CFR 50.36, "Technical specifications."

Section 50.36(c) of 10 CFR requires that the TSs include items in the following categories related to station operation: (1) safety limits, limiting safety system settings, and limiting control settings; (2) LCOs; (3) surveillance requirements; (4) design features; and (5) administrative controls.

Section 50.36(c)(2)(i) of 10 CFR states, in part, that LCOs are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When an LCO of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TSs until the condition can be met.

Appendix A to 10 CFR Part 50, "General Design Criteria [GDC] for Nuclear Power Plants," establishes the minimum requirements for the principal design criteria for water-cooled nuclear power plants. According to Section 3.1.1 of the WBN UFSAR (ADAMS Accession No. ML17334A168), the WBN plant was designed to meet the intent of the "Proposed General Design Criteria for Nuclear Power Plant Construction Permits" published in the *Federal Register* in July 1967. The Section 3.1.1 of the UFSAR further states that UFSAR addresses the GDC published as Appendix A to 10 CFR Part 50 in July 1971, with any exceptions to the 1971 GDC resulting from earlier commitments identified in Section 3.1.2. The following GDC was used to evaluate this LAR.

GDC 17, "Electric Power Systems," requires, in part, that an onsite electric power system and an offsite electric power system be provided to permit functioning of structures, systems, and components important to safety. The safety function for each system (assuming the other system is not functioning) shall be to provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and design conditions of the reactor coolant

pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents. The onsite electric power supplies, including the batteries, and the onsite electric distribution system, shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure.

Section 50.65 (a)(4) of 10 CFR, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," states, in part, that before performing maintenance activities, the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities.

3.0 TECHNICAL EVALUATION

The NRC staff evaluated the licensee's application to determine if the proposed changes are consistent with the regulations, plant-specific design, and licensing basis information discussed in Section 2.3 of this safety evaluation (SE).

3.1 Evaluation of Proposed TS Changes

The existing TS 3.8.9 is similar for both Watts Bar Units 1 and 2, and the proposed changes to both units' TS 3.8.9 are similar except for the numbering of the units. Therefore, the evaluation below applies to both units.

3.1.2 Revised Watts Bar Units 1 and 2 TS 3.8.9, Condition B

The existing Watts Bar TS 3.8.9, Condition B applies when one or more AC vital bus(es) in one channel in either Watts Bar unit is (are) inoperable. The existing Condition B would be revised by adding the statement "for reasons other than Condition C." Condition C refers to the licensee's proposed new Condition C, evaluated below.

The licensee proposed to add a new Condition C to TS 3.8.9 to address the inoperability of one opposite unit AC vital bus in shutdown conditions. Thus, the proposed addition to Condition B, which states "for reasons other than Condition C," reflects the addition of the proposed new Condition C to the TS 3.8.9. The NRC staff finds the proposed revised Condition B acceptable, because the proposed change clarifies the applicability of Condition B, but does not change the intent of Condition B.

3.1.3 New Watts Bar Units 1 and 2 TS 3.8.9 Condition C with Associated RA and CT

The proposed new Condition C would apply when one AC vital bus in the opposite Watts Bar unit (i.e., AC vital bus 1-I, 1-II, 1-III, or 1-IV for Watts Bar Unit 2; and AC vital bus 2-I, 2-II, 2-III, or 2-IV for Watts Bar Unit 1) is inoperable. The proposed new Condition C would have two Notes, an RA, and an associated CT as described in Section 2.2 of this SE.

The licensee stated in its letter dated February 28, 2018, in Section 3.1, "System Description of Electrical Power Distribution System," that the AC electrical power subsystems from both units, which supply power to required shared loads, are required to be operable to satisfy TS LCO 3.8.9. This results in all eight AC vital buses (four buses per unit) being required by each Watts Bar unit in Modes 1, 2, 3, and 4. However, the current TS LCO 3.8.9 for each Watts Bar unit could be read to apply to only the four AC vital buses from that unit, as described in UFSAR Section 8.3, and to not include the four AC vital buses from the opposite Watts Bar unit.

The NRC staff requested that the licensee clarify the apparent discrepancy in each Watts Bar unit TS LCO 3.8.9. In its response dated March 21, 2019, the licensee stated that the 120-V AC vital distribution system is divided into four channels with eight inverters (and four spare inverters) that supply power to the 120-V AC vital instrumentation system for both Watts Bar units. The licensee clarified that each 120-V AC channel includes two AC vital buses (one AC vital bus per unit). This makes a total of eight AC vital buses (four buses per unit) in all four 120-V AC channels. Thus, the TS LCO 3.8.9 for each Watts Bar unit requires the operability of "eight AC vital buses" in "four channels of AC vital bus." Based on the information provided in the licensee's response dated March 21, 2019, the NRC staff finds that the licensee provided adequate information to clarify the requirements for the AC vital buses required to be operable for each Watts Bar unit.

In its letter dated March 21, 2019, the licensee noted that the UFSAR needed clarification regarding the description of the 120V vital AC system. The licensee provided a commitment to revise the UFSAR prior to implementation of the approved TS 3.8.9 license amendments to "reflect that the 120V AC vital system is shared between Watts Bar Units 1 and 2 and that the 120V AC vital system is composed of four channels with two vital inverters and two vital buses per channel."

The proposed new TS 3.8.9 Condition C for each Watts Bar unit would include two Notes to indicate that the new Condition C would only apply (1) during planned maintenance of an AC vital bus in the opposite Watts Bar unit and (2) when the Watts Bar opposite unit is in Mode 5, Mode 6, or defueled.

In its March 21, 2019 letter, the licensee stated that when one of the opposite Watts Bar unit's AC vital buses is inoperable, the Notes in the proposed new Condition C would allow the plant configuration to be aligned to minimize features being inoperable and would limit the applicability of the new Condition C to when the opposite Watts Bar unit is in shutdown conditions. The NRC staff finds the Notes acceptable because they limit the use of the 8 hour CT for an inoperable AC vital bus to only a plant configuration that minimizes the impact of the planned maintenance activities on the operating Watts Bar unit.

The RA C.1 for the proposed new Condition C would require restoring the inoperable AC vital bus to operable status with a CT of 8 hours, instead of the CT of 2 hours in the existing Condition B. In its letter dated February 28, 2018, Section 3.2.1, "Assessment of Maintenance of the 120 V AC Vital Buses," the licensee stated that the proposed 8-hour CT for an inoperable AC vital bus would enable planned maintenance on as many as four breakers at a time, rather than on one breaker at a time that is necessitated by the current 2-hour CT. The licensee provided representative timeline for performing maintenance on four breakers mounted on an AC vital bus. Based on this timeline, the licensee estimated that approximately 6 hours are needed, including contingent repair time, to perform the maintenance activities reliably and efficiently, which supports the request to extend the CT to 8 hours. The licensee also noted a relevant 2015 Work Order where maintenance on the vital buses took approximately 5 hours, which is more than the current CT of 2 hours. The NRC staff finds that past Watts Bar operational experience and the estimated timeline for performing maintenance on an AC vital bus support the proposed 8-hour CT.

In its letter dated February 28, 2018, Section 3.2.2, "Assessment of Affected Technical Specifications," the licensee performed an assessment of the TS RAs that would be affected when an opposite unit's AC vital power bus is inoperable. In Section 3.2.2, Table 1, "WBN

Safety Related Major Loads,” of the Enclosure to its February 28, 2018, letter, the licensee described the unit and train relationship of the overall electrical power to safety-related systems, identifying a list of safety-related common loads, including eight safety-related 120-V vital inverters shared between the units. Section 3.2.2, Table 2 “WBN Unit 1 and Unit 2 Common System Applicable Technical Specifications,” shows the TS applicable to the safety related common systems and provides the TS CTs for each of the common system loads that would be affected by the inoperability of an opposite unit’s AC vital bus. The licensee stated that the safety-related common loads fed from the 120-V AC vital boards are encompassed by the common systems shown in Table 2.

Note 8 of Table 1 indicated that the TS for the safety-related common system loads associated with four of the eight shared vital inverters are provided in Table 2. The NRC staff requested that the licensee discuss the common system loads fed from the remaining four shared vital inverters associated with the AC vital system, and the TS CTs applicable to each inoperable common system load. In its March 21, 2019, letter, the licensee clarified that the TS safety-related common system loads shared by both Watts Bar units are currently supplied by the Watts Bar Unit 1 AC vital buses 1-I and 1-II, and not from the AC vital buses 1-III, 1-IV, 2-I, 2-II, 2-III, and 2-IV. In addition, in its March 21, 2019, letter, the licensee updated the list of the common system loads and the associated TS LCO and CTs that were originally provided in Tables 1 and 2 of the February 28, 2018, letter. The additional common loads noted by the licensee are: Emergency Gas Treatment System (EGTS) (TS LCO 3.6.9), Control Room Emergency Ventilation System (CREVS) (TS LCO 3.7.10), Control Room Temperature Control System (CREATCS) (TS LCO 3.7.11), Auxiliary Building Gas Treatment System (ABGTS) (TS LCO 3.7.12), Atmospheric Dump Valves (TS LCO 3.7.4), and Auxiliary Feedwater System (AFW) (TS LCO 3.7.5). The NRC staff notes that the inoperability of either AC vital bus 1-I or 1-II in the Watts Bar Unit 1 affects the operability of one train of each of the above-mentioned common system loads in the TS for both Watts Bar units. The TS CTs for one inoperable train of each affected common system load are all greater than the proposed 8-hour CT for an inoperable opposite AC vital bus 1-I or 1-II (the proposed new Condition C for Watts Bar Unit 2 TS 3.8.9).

The NRC staff reviewed the licensee’s response and the Watts Bar TS for the affected common system loads and finds that the proposed 8-hour CT for planned maintenance on the inoperable Watts Bar Unit 1 AC vital bus 1-I or 1-II is acceptable for Watts Bar Unit 2, because the 8-hour CT is bounded by the Watts Bar Unit 2 TS CT for each train of the affected common system load normally supplied by AC vital bus 1-I or 1-II. The NRC staff also finds that since there are no common system loads fed from the Unit 2 AC vital buses, planned maintenance activities on an inoperable Watts Bar Unit 2 AC vital bus (proposed new Condition C for Watts Bar Unit 1 TS 3.8.9) will not impact the Watts Bar Unit 1 operation.

In its letter dated February 28, 2018, the licensee provided the following justifications for the proposed changes to TS 3.8.9:

- The opposite unit’s AC vital buses are not as critical to the operating unit (fewer operating unit loads) as the operating unit’s AC vital buses.
- With an opposite unit vital bus in one channel inoperable and the opposite unit in either Mode 5, Mode 6, or defueled, the remaining operable AC vital buses are capable of supporting the minimum safety functions necessary to shut down the plant and maintain it in the safe shutdown condition for analyzed events.

- The plant equipment reliability and safety increase by reducing the number of entries into numerous TS applicable Conditions and RAs and providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected equipment.

The NRC staff notes that during entry into the 8-hour CT for the proposed new Condition C (one opposite unit AC vital bus inoperable), an additional AC vital bus failure in the operating unit could result in a loss of safety function in the operating unit. The NRC staff requested that the licensee discuss the case when another AC vital bus in the operating Watts Bar unit fails concurrent with the worst-case design-basis event (DBE) during the proposed 8-hour CT for maintenance on an inoperable AC vital bus. In its March 21, 2019 letter, the licensee stated that a loss of safety function could occur for each of the affected common system loads (EGTS, CREVS, CREATCS, ABGTS, and AFW) required to mitigate a DBE if a loss of the AC vital bus supplying the opposite train of common system loads were to occur during the 8-hour CT for maintenance on AC vital bus 1-I or 1-II. The licensee described actions they will take to mitigate the potential failure of the second AC vital bus (1-I or 1-II) feeding the opposite train of the common system loads during maintenance on one AC vital channel 1-I or 1-II:

- During maintenance on AC vital channel 1-I or 1-II, the respective opposite train AC vital buses will be protected for the operating unit by site-specific administrative barriers (e.g., signage) in accordance with site and corporate procedures.
- The maintenance activity on AC vital channels results in loss of the seismic qualification of the 120 V AC vital panel while the panel cover is removed. During maintenance on the AC vital channels, the 120 V AC vital panel under maintenance will be continuously manned and can be restored to an operable status, if a seismic event or DBE occurs.

The NRC staff reviewed the licensee's response and finds that the above mitigation actions are consistent with actions typically performed by licensees to ensure compliance with the requirements of 10 CFR 50.65(a)(4) to assess and manage increases in risk that may result from maintenance activities. These actions provide additional assurance of the availability of one train of common loads during maintenance on the Watts Bar Unit 1 AC vital channel 1-I or 1-II, because the opposite train AC vital bus (i.e., AC vital bus 1-II or 1-I) will be protected.

In summary, as discussed above, the NRC staff finds that the Notes, RA C.1 and 8-hour CT for the proposed new Condition C are acceptable because they will allow a reasonable amount of time to perform planned maintenance activities on the opposite Watts Bar unit's AC vital bus with minimum impact to the operating Watts Bar unit. In addition, the NRC staff finds that there is reasonable assurance that one train of the safety-related common loads shared by both Watts Bar units would be available to mitigate a DBE during maintenance on the AC vital buses 1-I or 1-II. Therefore, the NRC staff finds that the proposed Condition C, with its associated Notes, RA and CT, provides acceptable remedial actions to restore operability of the opposite unit AC vital bus to meet the Watts Bar LCO 3.8.9.

3.1.4 Renumbering of existing Watts Bar Unit 1 and Unit 2 TS 3.8.9 Conditions C, D, and E with respective RAs

The licensee also proposed to renumber the existing Watts Bar Units 1 and 2 TS 3.8.9 Conditions C, D, and E as Conditions D, E, and F, respectively. The NRC staff finds that the renumbering is an editorial change that does not change the intent of the conditions, and is, therefore, acceptable.

3.2 Technical Conclusion

The NRC staff reviewed the proposed changes to Watts Bar Units 1 and 2, TS 3.8.9 regarding inoperable AC vital buses. The changes would add a new Condition C with an 8-hour CT for performing planned maintenance on the opposite Watts Bar unit's AC vital bus when the opposite Watts Bar unit is in Modes 5, Mode 6, or defueled.

The NRC staff concludes that the proposed TS changes are acceptable because they (1) provide acceptable remedial actions that restore the operability of the channels of AC vital bus within an acceptable time to meet the Watts Bar TS LCO 3.8.9; and (2) ensure that the AC vital buses are returned to service to perform their safety functions and to meet the redundancy of the AC vital system, as required by GDC 17. Therefore, the revised TS 3.8.9 will provide reasonable assurance that the health and safety of the public will not be endangered.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Tennessee State official was notified of the proposed issuance of the amendments on April 10, 2019. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change 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 amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission previously issued a proposed finding that the amendments involve no significant hazards consideration, published in the *Federal Register* on November 20, 2018 (83 FR 58619), and there has been no public comment on such finding. Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 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) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Adakou Foli

Date: June 7, 2019

SUBJECT: WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2 – ISSUANCE OF
AMENDMENTS REGARDING TECHNICAL SPECIFICATION CHANGES
PERTAINING TO 120-VOLT ALTERNATING CURRENT VITAL BUSES
(EPID L-2018-LLA-0050) DATED JUNE 7, 2019

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