



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

April 27, 2017

Mr. J. W. Shea
Vice President, Nuclear Licensing
Tennessee Valley Authority
1101 Market Street, LP 3R-C
Chattanooga, TN 37402-2801

SUBJECT: WATTS BAR NUCLEAR PLANT, UNIT 1 – ISSUANCE OF AMENDMENT
REGARDING APPLICATION TO MODIFY TECHNICAL SPECIFICATIONS
REGARDING USE OF AN ALTERNATE COMPONENT COOLING SYSTEM
PUMP TO SUPPORT COMPONENT COOLING SYSTEM TRAIN B
OPERABILITY (CAC NO. MF7997)

Dear Mr. Shea:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 113 to Facility Operating License No. NPF-90 for the Watts Bar Nuclear Plant, Unit 1. This amendment is in response to your application dated June 7, 2016.

The amendment revises Technical Specification (TS) 3.7.7, Component Cooling System (CCS), to allow increased flexibility in maintaining CCS operability when the normally aligned C-S pump is inoperable for maintenance, which is consistent with Unit 2 TS 3.7.7.

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

If you have any questions regarding this letter, please contact me at (301) 415-6020.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert G. Schaaf".

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

Docket No. 50-390

Enclosures:

1. Amendment No. 113 to NPF-90
2. Safety Evaluation

cc w/enclosures: Distribution via 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. 113
License No. NPF-90

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Tennessee Valley Authority (TVA, the licensee) dated June 7, 2016, 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.

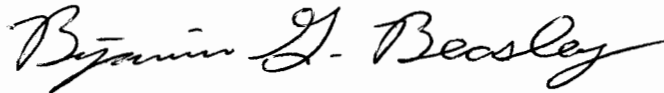
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-90 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A as revised through Amendment No. 113 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 no later than 60 days from the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Benjamin G. Beasley, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Facility Operating License
and Technical Specifications

Date of Issuance: April 27, 2017

ATTACHMENT TO AMENDMENT NO. 113

WATTS BAR NUCLEAR PLANT, UNIT 1

FACILITY OPERATING LICENSE NO. NPF-90

DOCKET NO. 50-390

Replace Page 3 of Facility Operating License NPF-90 with the attached Page 3. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

Replace the following page of the Appendix A Technical Specifications with the attached page. The revised page is identified by amendment number and contains vertical lines indicating the area of change.

REMOVE
3.7-18

INSERT
3.7-18

- (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. 113 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.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.7.1	Verify that the alternate feeder breaker to the C-S pump is open.	7 days
SR 3.7.7.2	<p>-----NOTE----- Isolation of CCS flow to individual components does not render the CCS inoperable. -----</p> <p>Verify each CCS manual, power operated, and automatic valve in the flow path servicing safety related equipment, that is not locked, sealed, or otherwise secured in position, is in the correct position.</p>	31 days
SR 3.7.7.3	Verify each CCS automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	18 months
SR 3.7.7.4	<p>-----Note----- Verification of CCS pump 2B-B automatic start on Unit 1 SI is not required when CCS Pump 2B-B is supporting CCS Train B OPERABILITY. -----</p> <p>Verify each CCS pump starts automatically on an actual or simulated actuation signal.</p>	18 months
SR 3.7.7.5	<p>-----Note----- Only required to be met when CCS Pump 2B-B is supporting CCS Train B OPERABILITY. -----</p> <p>Verify CCS pump 2B-B is aligned to CCS Train B and is in operation.</p>	12 hours



UNITED STATES
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 113 TO FACILITY OPERATING LICENSE NO. NPF-90

TENNESSEE VALLEY AUTHORITY

WATTS BAR NUCLEAR PLANT, UNIT 1

DOCKET NO. 50-390

1.0 INTRODUCTION

By letter dated June 7, 2016 (Agency Documents Access and Management System Accession No. ML16159A403), the Tennessee Valley Authority (the licensee) requested changes to Technical Specification (TS) 3.7.7, "Component Cooling System (CCS)" for the Watts Bar Nuclear Plant (Watts Bar or WBN), Unit 1.

This proposed change would modify Watts Bar Unit 1 TS 3.7.7 to allow the use of CCS pump 2B-B to support Watts Bar Unit 1 Train 1B operability when the normal CCS pump C-S is removed from service.

2.0 REGULATORY EVALUATION

2.1 Description of the Component Cooling System

The licensee's application states:

The CCS is designed for operation during all phases of plant operation and shutdown. The CCS serves to remove residual and sensible heat from the RCS [reactor coolant system] via the RHR [residual heat removal] system during plant cooldown; cool the spent fuel pool water and the letdown flow of the chemical and volume control system; provide cooling to dissipate waste heat from various plant components; and provide cooling for safeguard loads after an accident.

The CCS is a shared system with Unit 2 and consists of five CCS pumps, two thermal barrier booster pumps per unit, three HXs [heat exchangers], two surge tanks, one CCS pump seal water collection unit, and associated valves, piping and instrumentation serving both units.... The CCS pumps are designated as 1A-A, 1B-B, C-S, 2A-A, and 2B- B.

Typically one CCS pump is in operation per train. Train 1A can be supplied by either CCS pump 1A-A or CCS pump 1B-B with the non-operating pump in standby. Train 2A can be supplied by either CCS pump 2A-A or CCS pump 2B-B with the non-operating pump in standby. Trains 1B and 2B is [sic] normally supplied by the C-S pump. Although B Train CCS pumps can supply either Unit's Train A, the A Train CCS pump must be operable to consider the Unit's A Train operable.

WBN Units 1 and 2 are served by two cooling system trains (A and B) serving ESF [engineered safety feature] equipment, with CCS Train A also serving miscellaneous non-safety-related components. Except for the RHR HXs, both trains of the safeguards equipment of both units served by the CCS are normally aligned and supplied with CCS water and continue to be supplied with CCS water in a Loss of Coolant Accident (LOCA). However, the RHR HXs may be aligned with CCS water flowing through the HXs during normal operation to meet CCS flow requirements. In the event of an accident, non-safety-related components are not required; therefore, CCS flow to these components may be manually isolated. Prior to the switchover from injection to recirculation phase of SI [safety injection], the CCS valves are manually opened at the RHR HXs of the accident unit in order to supply these HXs with cooling water.

Emergency diesel generators (EDGs) 1A, 1B, 2A, and 2B power the respective 6.9-kilovolt (kV) Shutdown Boards (SDBs), which in turn power the respective 480-Volt (V) SDBs. A SI signal in either unit will start all four EDGs. Table 1 lists the power supplies for each CCS pump.

Table 1	
Component Cooling System Pump Power Supplies	
CCS Pump	480-Volt Shutdown Board (SDB)
1A-A	1A1-A
1B-B	1B1-B
C-S	Normal - 2B2-B Alternate - 1A2-A
2A-A	2A1-A
2B-B	2B1-B

2.2 Description of the Proposed Change

Watts Bar Unit 1 Surveillance Requirement (SR) 3.7.7.4 currently states:

SURVEILLANCE	FREQUENCY
SR 3.7.7.4 Verify each CCS pump starts automatically on an actual or simulated actuation signal.	18 months

This license amendment request (LAR) revises SR 3.7.7.4 as follows:

SURVEILLANCE	FREQUENCY
SR 3.7.7.4 -----NOTE----- Verification of CCS pump 2B-B automatic start on Unit 1 SI is not required when CCS pump 2B-B is supporting CCS Train B OPERABILITY. ----- Verify each CCS pump starts automatically on an actual or simulated actuation signal.	18 months

This LAR also adds new SR 3.7.7.5 as follows:

SURVEILLANCE	FREQUENCY
SR 3.7.7.5 -----NOTE----- Only required to be met when CCS pump 2B-B is supporting CCS Train B OPERABILITY. ----- Verify CCS pump 2B-B is aligned to CCS Train B and is in operation.	12 hours

As listed above, the change adds a note to SR 3.7.7.4 that deletes the requirement to verify CCS pump 2B-B automatically starts on an SI signal when CCS pump 2B-B is supporting CCS Train B OPERABILITY. The change also adds SR 3.7.7.5 as shown above.

2.3 Regulatory Review

The U.S. Nuclear Regulatory Commission (NRC) considered the following regulatory requirements, guidance, and licensing and design basis information during its review of the proposed change.

Title 10 of the *Code of Federal Regulations* (10 CFR), Paragraph 50.36(c)(3), states Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation [LCOs] will be met.

As stated in 10 CFR, 50.36(c)(2)(ii)(C), Criterion 3, the regulations require that TS LCOs be established for: A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

In 10 CFR 50.36(a)(1), the regulations require each applicant for a license to include a summary statement of the bases or reasons for proposed TSS, however, the bases shall not become part of the TSSs.

The Watts Bar plant was designed to meet the intent of the "Proposed General Design Criteria for Nuclear Power Plant Construction Permits" published in July 1967. The Watts Bar construction permit was issued in January 1973. However, in its Updated Final Safety Analysis Report (UFSAR), the licensee addresses the NRC General Design Criteria (GDC) published as Appendix A to 10 CFR Part 50 in July 1971.

In UFSAR Section 3.1.2.1, "Overall Requirements," the licensee describes how the plants meet Criterion 5, "Sharing of structures, systems, and components," which states that structures, systems, and components important to safety shall not be shared among nuclear power units unless it can be shown that such sharing will not significantly impair their ability to perform their safety functions, including, in the event of an accident in one unit, an orderly shutdown and cooldown of the remaining units.

In UFSAR Section 3.1.2.4, "Fluid Systems," the licensee describes how the plants meet Criterion 44, "Cooling water," which states in part, that the system safety function shall be to transfer the combined heat load of these structures, systems, and components under normal operating and accident conditions. Suitable redundancy in components and features, and suitable interconnections, leak detection, and isolation capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure.

In UFSAR Section 3.1.2.4, "Fluid Systems," the licensee describes how the plants meet Criterion 46, "Testing of Cooling Water Systems," which states in part that the cooling water system be designed to permit appropriate functional testing to assure, the operability and the performance of the active components of the system, and the operability of the system as a whole and, under conditions as close to design as practical, the performance of the full operational sequence that brings the system into operation for reactor shutdown and for LOCAs, including operation of applicable portions of the protection system and the transfer between normal and emergency power sources.

Standard Review Plan (SRP) for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition – Auxiliary Systems (NUREG-0800, Chapter 9.2.2, Reactor Auxiliary Cooling Water Systems) provides guidance for staff on how regulatory requirements may be met.

3.0 TECHNICAL EVALUATION

3.1 Method of Review

The NRC staff reviewed the licensee's amendment request by comparing the proposed TS change against the requirements and guidelines of 10 CFR 50.36, GDC 5, GDC 44, and GDC 46 as discussed in UFSAR Section 3.1.2, the current TSSs, SRP 9.2.2, and UFSAR Chapter 9.2.2.

3.2 Technical Review

The CCS system is a shared system with CCS Train 1B/2B supplying both units. CCS Train 1A and CCS Train 2A are separated by isolation valves and do not share components. CCS

pumps 1A-A and 1B-B are normally aligned to the CCS Train 1A header (one pump running and the non-operating pump on standby). CCS pump C-S is normally supplying water to the CCS Train 1B/2B header. This configuration meets the LCO of Unit 1 TS 3.7.7 and meets the CCS design requirements of GDC 5 and 44 as expressed in UFSAR Section 3.1.2. CCS water flow independence is established by a valve lineup as shown in Figure 1 of the LAR.

The CCS system design allows for the alignment of either CCS pump 1B-B or 2B-B to the CCS Train 1B/2B header as a replacement for CCS pump C-S. When CCS pump 2B-B is used as an alternate for CCS pump C-S, CCS Train 1B independence with CCS Train 1A is maintained because CCS pump 2B-B is powered from the 2B1-B 480-V SDB, while CCS pump 1A-A is powered by the 1A1-A 480-V SDB. CCS water flow independence is established by a valve lineup as shown in Figure 2 of the LAR.

The most common reason for substituting CCS pump 2B-B for CCS pump C-S would be the need to remove CCS pump C-S from service for maintenance. However, if CCS pump 2B-B is aligned to CCS Train 1B, the current SR 3.7.7.4 for Unit 1 cannot be satisfied since CCS pump 2B-B will not automatically start on an SI actuation signal in Unit 1. If SR 3.7.7.4 were not met, the LCO of TS 3.7.7 would not be met according to SR 3.0.1, which requires SRs to be met to meet the LCO. Therefore, the licensee proposed a revision to SR 3.7.7.4 with the addition of SR 3.7.7.5 to enable this alignment to meet TS LCO 3.7.7 for Unit 1. The licensee's proposed changes to the SRs do not change the design of the CCS, but would allow a deviation from normal operation when using CCS pump 2B-B to replace CCS pump C-S. The Unit 2 CCS Train 2A would not be adversely affected as long as CCS pump 2A is OPERABLE. With the licensee's proposed changes, the LCO of TS 3.7.7 would be satisfied by meeting the intent of Unit 1 SR 3.7.7.4 by adding an exception note for pump 2B-B and adding SR 3.7.7.5. The exception note excludes verifying CCS pump 2B-B will start automatically on an actual or simulated SI actuation signal in Unit 1 when using CCS Pump 2B-B to replace CCS pump C-S. By adding SR 3.7.7.5, the licensee ensures Pump 2B-B will run during an SI in Unit 1 by requiring that Pump 2B-B be aligned to CCS Train B and be in operation. Even with the proposed changes, SR 3.7.7.4 would continue to require verification of an automatic start of CCS pump 2B-B on a simulated or actual loss of the offsite power actuation signal. With the proposed changes, in the event of an SI signal on Unit 1 without a loss of offsite power (LOOP), CCS pump 2B-B will continue to run and provide cooling water to CCS Train 1B.

In the event of a LOOP with or without an SI signal, CCS pump 2B-B will automatically sequence onto the emergency diesel generator bus and provide cooling water to CCS Train 1B. This is so because as stated in the LAR, the Watts Bar 6.9-kV SDB load-shedding and sequencing circuitry actuates on a sustained degraded voltage condition or loss of voltage on its specific SDB. Table 1 lists the normal power supply for CSS pump C-S as 480-V SDB 2B2-B and the power supply for CSS pump 2B-B as 480-V SDB 2B1-B. Figure 3 shows that both 480-V SDBs 2B2-B and 2B1-B are powered from 6.9-kV SDB 2B-B, which on a LOOP is powered from DG 2B-B. Therefore, because load shedding and sequencing of CCS pump 2B-B are specific to the SDB and independent of which CCS train the pump is aligned to, any voltage condition that would affect CCS pump 2B-B would load shed the pump and subsequently sequence the pump to operate. Figure 4, Figure 5, and Figure 6, "Component Cooling Pump C-S Wiring Diagram," of the LAR show the CCS pump's power supply and controls.

Therefore, to achieve OPERABILITY of CCS Train 1B as described above, a note will be added to SR 3.7.7.4 to exclude verification of CCS pump 2B-B starting on Unit 1 SI signal when the pump is supporting CCS Train 1B OPERABILITY. SR 3.7.7.4 continues to require verification of an automatic start on a simulated or actual LOOP actuation signal. A new SR 3.7.7.5 requiring CCS

pump 2B-B to be aligned to CCS Train B and be operating will be added for this configuration. Thus, OPERABILITY of both CCS Trains 1A and 1B will be maintained, and the CCS system for Unit 1 will continue to satisfy the LCO for TS 3.7.7 and GDC 5, 44 and 46.

In accordance with Watts Bar Fire Protection Report (FPR) Operating Requirements, CCS pump 2B-B must be aligned to the CCS 2A header. The FPR allows a deviation from this lineup for 30 days. Therefore, the FPR is consistent with the licensee's proposed change, but limits the time that this configuration can be maintained to no more than 30 days.

3.3 Summary

Unit 1 SR 3.7.7.4 assures that the pumping power for each train of CCS actuates for an SI and/or a LOOP in Unit 1. When CCS pump 2B-B is used to replace CCS pump C-S for the CCS Train 1B, CCS Train 1B will not have an assured supply of CCS water during an SI actuation in Unit 1 unless CCS pump 2B-B is aligned to CCS Train B and is in operation. An exception note to SR 3.7.7.4 and a new SR 3.7.7.5 has been added to achieve the intended purpose. Since the design of the CCS is not changed, GDC 5, 44, and 46 continue to be met as discussed in UFSAR Section 3.1.2. The proposed changes to the SRs ensure that TS LCO 3.7.7 and the lowest functional capability of the CCS for safe operation of Unit 1 is met when CCS pump 2B-B is substituted for CCS pump C-S, thus continuing to satisfy 10 CFR 50.36. Therefore, the NRC staff concludes that the proposed change meets the applicable regulatory requirements, and is therefore acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Tennessee State official was notified of the proposed issuance of the amendment on April 10, 2017. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts and no significant change in the types of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (81 FR 62932; September 13, 2016). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

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 amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Gerard J. Purciarello

Date: April 27, 2017

SUBJECT: WATTS BAR NUCLEAR PLANT, UNIT 1 – ISSUANCE OF AMENDMENT REGARDING APPLICATION TO MODIFY TECHNICAL SPECIFICATIONS REGARDING USE OF AN ALTERNATE COMPONENT COOLING SYSTEM PUMP TO SUPPORT COMPONENT COOLING SYSTEM TRAIN B OPERABILTIY (CAC NO. MF7997) DATED APRIL 27, 2017

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