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

September 20, 2022

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

SUBJECT: WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2 - ISSUANCE OF AMENDMENT NOS. 153 AND 62 REGARDING EXTENSION OF COMPLETION TIME FOR TECHNICAL SPECIFICATION 3.7.8 FOR INOPERABLE ESSENTIAL RAW COOLING WATER TRAIN (EPID L-2021-LLA-0174)

Dear Mr. Barstow:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment Nos. 153 and 62 to Facility Operating License Nos. NPF-90 and NPF-96, for Watts Bar Nuclear Power Plant (Watts Bar), Units 1 and 2, respectively. The amendments are in response to your application dated September 29, 2021, as supplemented by letter dated May 2, 2022.

The amendments revise Watts Bar, Units 1 and 2, Technical Specification (TS) 3.7.8, "Essential Raw Cooling Water (ERCW) System," to permanently extend the allowed Completion Time to restore one ERCW system train to operable status from 72 hours to 7 days. The amendments also revise the bounding temperature for the ultimate heat sink in Condition A from less than or equal to 71 degrees Fahrenheit to less than or equal to 78 degrees Fahrenheit.

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

Sincerely,

/RA/

Kimberly J. Green, 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. 153 to NPF-90
2. Amendment No. 62 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. 153
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 September 29, 2021, as supplemented by letter dated May 2, 2022, 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. 153 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 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

David J. Wrona

Digitally signed by David J. Wrona
Date: 2022.09.20 15:03:28 -04'00'

David J. Wrona, 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: September 20, 2022

ATTACHMENT TO AMENDMENT NO. 153

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. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

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	Insert Pages
3.7-19	3.7-19
3.7-20	3.7-20
3.7-20a	3.7-20a

(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. 153 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.

3.7 PLANT SYSTEMS

3.7.8 Essential Raw Cooling Water (ERCW) System

LCO 3.7.8 Two ERCW trains shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------NOTES---------- 1. Only applicable when Unit 2 is defueled. 2. Only applicable during planned maintenance of a Unit 2 6.9kV shutdown board and the associated 480V boards and motor control centers. ---------- A. One ERCW train inoperable.	A.1 ----------NOTES---------- 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources- Operating," for diesel generator made inoperable by ERCW. 2. Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops-MODE 4," for residual heat removal loops made inoperable by ERCW. ---------- Restore ERCW train to OPERABLE status. AND	7 days AND 24 hours from discovery of Condition A entry ≥ 48 hours concurrent with UHS temperature > 78°F.

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2 Verify UHS temperature is ≤ 78°F.	1 hour AND Once every 12 hours thereafter.
B. One ERCW train inoperable for reasons other than Condition A.	B.1 ----------NOTES---------- 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources- Operating," for emergency diesel generator made inoperable by ERCW. 2. Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops-MODE 4," for residual heat removal loops made inoperable by ERCW. ---------- Restore ERCW train OPERABLE status.	 72 hours
C. Required Action A.1 and associated Completion Time not met. OR Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.8.1	----------NOTE---------- Isolation of ERCW flow to individual components does not render the ERCW inoperable. ---------- Verify each ERCW 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.	In accordance with the Surveillance Frequency Control Program
SR 3.7.8.2	Verify each ERCW 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.	In accordance with the Surveillance Frequency Control Program
SR 3.7.8.3	Verify each ERCW pump starts automatically on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program

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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-391

WATTS BAR NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 62
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 September 29, 2021, as supplemented by letter dated May 2, 2022, 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-96 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. 62 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 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

David J. Wrona

Digitally signed by David J. Wrona
Date: 2022.09.20 15:04:01 -04'00'

David J. Wrona, 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: September 20, 2022

ATTACHMENT TO AMENDMENT NO. 62

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 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 revised pages. The revised pages are identified by amendment number and contain a marginal line indicating the area of change.

Remove Pages	Insert Pages
3.7-18	3.7-18
3.7-18a	3.7-18a

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 3459 megawatts thermal.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A as revised through Amendment No. 62 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) FULL SPECTRUM LOCA Methodology shall be implemented when 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:

3.7 PLANT SYSTEMS

3.7.8 Essential Raw Cooling Water (ERCW) System

LCO 3.7.8 Two ERCW trains shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------NOTES---------- 1. Only applicable when Unit 1 is defueled. 2. Only applicable during planned maintenance of a Unit 1 6.9 kV shutdown board and the associated 480 V boards and motor control centers. ---------- A. One ERCW train inoperable.	A.1 ----------NOTES---------- 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources - Operating," for diesel generator made inoperable by ERCW. 2. Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops - MODE 4," for residual heat removal loops made inoperable by ERCW. ---------- Restore ERCW train to OPERABLE status. AND	7 days AND 24 hours from discovery of Condition A entry ≥ 48 hours concurrent with UHS temperature > 78 °F

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.2	Verify UHS temperature is ≤ 78° F.	1 hour AND Once every 12 hours thereafter
B. One ERCW train inoperable for reasons other than Condition A.	B.1	----------NOTES---------- 1. Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources- Operating," for diesel generator made inoperable by ERCW. 2. Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops-MODE 4," for residual heat removal loops made inoperable by ERCW. ---------- Restore ERCW train to OEPRABLE status.	 72 hours
C. Required Action A.1 and associated Completion Time not met. OR Required Action and associated Completion Time of Condition B not met.	C.1 AND C.2	Be in MODE 3. Be in MODE 5.	6 hours 36 hours

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 153 AND 62

TO FACILITY OPERATING LICENSE NOS. NPF-90 AND NPF-96

TENNESSEE VALLEY AUTHORITY

WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-390 AND 50-391

1.0 INTRODUCTION

By application dated September 29, 2021 (Agencywide Documents Access and Management System Accession No. ML21273A046), as supplemented by letter dated May 2, 2022 (ML22122A248), the Tennessee Valley Authority (TVA, the licensee) submitted a license amendment request (LAR) for the Watts Bar Nuclear Plant (Watts Bar or WBN), Units 1 and 2. The proposed amendments would revise Watts Bar, Units 1 and 2, Technical Specification (TS) 3.7.8, "Essential Raw Cooling Water (ERCW) System," to permanently extend the allowed Completion Time (CT) to restore one ERCW system train to operable status from 72 hours to 7 days, on a permanent basis, to support maintenance on the shutdown boards (SDBDs) and associated 480 volt (V) boards and motor control centers (MCCs). The proposed amendments would also revise the bounding temperature for the ultimate heat sink (UHS) in Condition A to from less than or equal to 71 degrees Fahrenheit (°F) to less than or equal to 78 °F.

The supplemental letter dated May 2, 2022, 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 or Commission) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* (FR) on December 28, 2021 (86 FR 73820).

2.0 REGULATORY EVALUATION

2.1 Essential Raw Cooling Water System Description

As discussed in Section 9.2.1 of the Watts Bar Updated Final Safety Analysis Report (UFSAR) (ML20323A303) and Amendment No. 35 to Facility Operating License No. NPF-96, dated February 21, 2020 (ML20024F835), the ERCW system supports both Unit 1 and Unit 2. The ERCW system consists of two trains (Train A and Train B) that are shared between the units and eight 50-percent capacity pumps (four pumps per train) with each train having the capability to provide the minimum required cooling water flowrate for both units under any credible plant condition. Two ERCW headers associated with the same ERCW train (i.e., 1A and 2A, or 1B

and 2B) may be cross connected to provide greater flexibility. The ERCW pumps are powered from four 6.9 kilovolt (kV) SDBDs with two pumps aligned to each SDBD. The ERCW system draws water directly from the Tennessee River (Chickamauga Reservoir).

When either unit is operating in Modes 1, 2, 3, and 4, TS 3.7.8 requires two ERCW pumps in each train to be operable, with no more than one ERCW pump powered from each SDBD. Therefore, four SDBDs are required to be operable to meet TS 3.7.8.

2.2 Requested Technical Specification Changes

The licensee proposed the following changes to each unit's TSs as described below. The specific requested changes are shown in redline/strikeout in Attachment 1 to the Enclosure of the supplement to the LAR (ML22122A248).

Watts Bar, Unit 1:

Add new Condition A and associated NOTES, Required Actions A.1 and associated NOTES and CT, and Required Action A.2 and associated CT, for when one ERCW train is inoperable.

Add a bounding UHS temperature of less than or equal to (≤) 78 °F as Required Action A.2 to new Condition A.

Renumber existing Condition A and associated Required Action A.1 to Condition B and associated Required Action B.1.

Revise renumbered Condition B to add, "for reasons other than Condition A."

Renumber existing Condition B and associated Required Actions B.1 and B.2 to Condition C and Required Actions C.1 and C.2.

Revise renumbered Condition C to add A.1 the first to part of the condition, and add, "OR Required Action and associated Completion Time of Condition B not met."

Watts Bar, Unit 2:

Revise the Note for Condition A to eliminate the one-time condition for applicability; renumber existing Notes 2 and 3 as Notes 1 and 2; and revise renumbered Note 2 to limit applicability to only during planned maintenance of a Unit 1 6.9 kV shutdown board and associated 480 V boards and motor control centers.

Revise Required Action A.2 to increase the UHS temperature from less than or equal to 71 degrees Fahrenheit to less than or equal to 78 degrees Fahrenheit.

Revise the Completion Time for Required Action A.1 to increase the UHS temperature from greater than 71 °F to greater than 78 °F.

2.3 Regulatory Requirements and Guidance

During its review, the NRC staff referred to the following regulations and regulatory guidance:

Under 10 CFR 50.90, “Application for amendment of license, construction permit, or early site permit,” whenever a holder of a license wishes to amend the license, including TSs in the license, an application for amendment must be filed, fully describing the changes desired. Under 10 CFR 50.92(a), determinations on whether to grant an applied-for license amendment are to be guided by the considerations that govern the issuance of initial licenses to the extent applicable and appropriate.

Both the common standards for licenses in 10 CFR 50.40(a), and those specifically for issuance of operating licenses in 10 CFR 50.57(a)(3), provide that there must be reasonable assurance that the activities at issue will not endanger the health and safety of the public, and that the applicant will comply with the Commission's regulations.

Pursuant to 10 CFR 50.36, “Technical specifications,” TSs for operating reactors are required, in part, to include items in the following five specific categories: (1) safety limits, limiting safety system settings, and limiting control settings; (2) LCOs; (3) surveillance requirements (SRs); (4) design features; and (5) administrative controls.

Paragraph 50.36(c)(2)(i) of 10 CFR states that LCOs are the lowest functional capability or performance levels of equipment required for safe operation of the facility, and when an LCO of a 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.

Watts Bar, Units 1 and 2 were designed to meet the intent of the “Proposed General Design Criteria for Nuclear Power Plant Construction Permits” published in July 1967. The dual-unit UFSAR addresses the U.S. Nuclear Regulatory Commission (NRC) General Design Criteria (GDCs) published as Appendix A to 10 CFR Part 50 in July 1971. Conformance with the GDCs is described in section 3.1.2 of the UFSAR (ML20323A314). The NRC staff considered the following applicable GDCs during its review:

> *Criterion 5 - Sharing of Structures, Systems, and Components.* Structures, systems, and components important to safety shall not be shared among nuclear power units unless it is shown that such sharing will not impair significantly 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.
>
> *Criterion 44 - Cooling Water.* A system to transfer heat from structures, systems, and components important to safety, to an UHS shall be provided. 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.

The NRC's guidance for the format and content of the Watts Bar TSs can be found in NUREG-1431, Volume 1, "Standard Technical Specifications - Westinghouse Plants: Specifications," Revision 5 (ML21259A155).

The NRC staff's guidance for review of the TSs and TS changes is in Chapter 16, "Technical Specifications," of NUREG-0800, "Standard Review Plan [SRP]," Revision 3, dated March 2010 (ML100351425).

3.0 TECHNICAL EVALUATION

In Amendment No. 35 to Facility Operating License Nos. NPF-96 (ML20024F835), the NRC approved a change to Watts Bar, Unit 2, TS 3.7.8, "Essential Raw Cooling Water (ERCW) System," to extend the allowed CT to restore one ERCW system train to operable status from 72 hours to 7 days, on a one-time basis, to support maintenance on the Watts Bar, Unit 1 6.9 kV SDBD 1A-A and associated 480 V boards and MCCs. The new Condition A limited the maintenance to be performed only when the UHS temperature was ≤ 71 ºF.

By comparing the proposed TS changes in the LAR (ML21273A046) with the approved changes in Amendment No 35 for Unit 2 (ML20024F835), the NRC staff has determined that the proposed TS changes as described in section 2.2 above are to make Watts Bar, Unit 1, TS 3.7.8 consistent with the previously approved, one-time changes to Unit 2, TS 3.7.8. The NRC staff determined that the proposed changes for Unit 1, TS 3.7.8, for Conditions A, B, and C are like the previously approved Unit 2, TS 3.7.8, to support maintenance on the Unit 1 SDBDs, with the following differences:

1. The proposed changes are permanent.
2. The bounding UHS temperature in proposed Condition A is ≤ 78 °F; and
3. The proposed changes as described in section 2.2 of this safety evaluation (SE) for the operating unit are applicable when the other unit is defueled for SDBD maintenance.

The NRC staff's evaluation of the first two items are described below. The third item is an administrative change and would be acceptable if the first two exceptions are found acceptable.

3.1 Evaluation of Permanent Change of Completion Time from 72 Hours to 7 Days

The ERCW system consists of two shared trains each of which is designed to supply 100 percent of ERCW cooling to both units simultaneously. Technical Specification 3.7.8 requires two ERCW trains to be operable in MODES 1, 2, 3, and 4. The second operable train provides redundant cooling capability. The purpose of the proposed change to the CT is to allow a relaxation of redundancy from 72 hours to 7 days to perform necessary SBDB maintenance before a reactor shutdown would be required.

As indicated in the LAR, taking one SDBD out of service to perform maintenance renders one ERCW system train inoperable. In this condition, TS 3.7.8 allows 72 hours to return the ERCW train to an operable status. However, the licensee indicated that 72 hours is not an adequate amount of time to safely inspect and perform maintenance on an SDBD and associated 480 V boards and MCCs. Therefore, an extension of the completion time from 72 hours to 7 days to restore an ERCW system train to operable status is needed to facilitate safe inspection of a set of electrical boards and perform maintenance without having to shut down both units. The need for extending the CT exists every time the SDBD maintenance is performed.

Attachment 4 to the Enclosure of the LAR states that under design basis accident conditions with one unit in Mode 6 for more than 100 hours and one SDBD out of service, a single ERCW pump can supply the highest flow/decay heat demand of one unit in Cold Shutdown and the other in loss of coolant accident (LOCA), assuming the UHS temperature is less than or equal to 78 °F.

For the proposed TS Bases, B 3.7.8 Actions A.1 and A.2, the LAR provides the following justifications for the 7-day CT:

- Low probability of a design basis accident occurring during that time.
- Heat load on the ERCW system is substantially lower than assumed for the design basis accident with the opposite unit defueled.
- Redundant capabilities afforded by the OPERABLE train.

The licensee addressed defense-in-depth (DID) of equipment protection in Section 3.2.3, "Equipment Protection," of the Enclosure to the LAR. Section 3.2.3 of the LAR states that because ERCW is a shared system, the DID strategies address both the outage unit and the operating unit. There are procedures to direct operators to perform DID assessment that define the work management process including the assessment of plant risk, maximizing plant reliability. In addition, sections 3.2.4 through 3.2.8 of the enclosure to the LAR provides thermal and hydraulic analyses of different cases of component failures that justify the ERCW system alignment under the proposed changes to be consistent with the single failure criterion specified in GDC 44.

The NRC staff reviewed the licensee's information on its DID procedures to determine if the licensee will have adequate strategies in place to protect the units' systems and components needed to perform required safety functions. The staff determined that the DID measures that will be taken are adequate to ensure that protected equipment is not jeopardized during the proposed extended completion time.

Based on its review of the DID procedures described above and the thermal and hydraulic analyses assuming a single failure evaluated in SE section 3.3, the NRC staff finds that permanently extending the CT from 72 hours to 7 days for SDBD maintenance is acceptable because the licensee will have measures in place to protect the equipment needed to ensure that the required safety functions will be maintained.

3.2 Evaluation of the Change to the UHS Temperature in TS 3.7.8, Condition A

Section 2.3 of the Enclosure to the LAR states that the key difference between the TS changes in the previously approved LAR and those in the proposed LAR is the increase of the UHS temperature from 71 ºF to 78 ºF in TS 3.7.8, Condition A. This UHS temperature limit is the ERCW intake temperature. The justifications for the increase in the UHS temperature and associated changes of heat removal capability under the single failure assumption are provided in sections 3.2.1 through 3.2.8 of the Enclosure to the LAR.

Section 3.2.1 of the Enclosure to the LAR states the following:

> The planned maintenance requires the removal of two ERCW pumps from service (both powered from a 6.9 kV SDBD). Removing the ERCW pumps from service to support the planned maintenance leaves two available ERCW pumps in the affected train. However, Emergency Diesel Generator (EDG) capacity and

> load sequencing support only one ERCW pump per EDG. A specific ERCW pump is preselected by the operators for automatic sequencing onto each EDG. Consequently, with a SDBD out of service and the postulated loss of the opposite train of emergency power, only one ERCW pump is automatically available. The UHS temperature limit of ≤ 78 °F and the requirement for the outage unit to be in a defueled condition, significantly reduces the cooling water demands on the ERCW system and component cooling system (CCS) to allow the performance of planned maintenance on a 6.9 kV SDBD and associated 480 V boards and MCCs. Furthermore, in accordance with WBN Units 1 and 2 TS 3.9.10, "Decay Time," the shutdown unit will be subcritical for at least 100 hours prior to entering the operating unit TS 3.7.8, Condition A.

Section 3.2.4 of the Enclosure to the LAR states that the ERCW, CCS, and spent fuel pool cooling system (SFPCS) are shared systems supporting dual-unit operation. Four SDBDs power the safety-related equipment on both units, which are to support the shared ERCW, CCS, and SFPCS safety functions. At the current design basis and Watts Bar TS UHS temperature limit of 85 °F supplying the ERCW system for both units in operation, a dual-unit outage is necessary to perform periodic maintenance on the boards for one unit because of the shared systems.

The proposed maintenance of SDBDs would require only a single-unit outage and the TS UHS temperature limit of ≤ 78 °F. The licensee's thermal and hydraulic analyses were developed to demonstrate that the heat removal capabilities of the remaining shared equipment are sufficient to support the operation of the other unit or to mitigate a postulated design basis LOCA. The licensee stated that concurrent with the LOCA, a loss of offsite power (LOOP) and a worst case single active failure of the emergency power train (SDBDs and EDGs) opposite to the train supplying the out of service SDBD is assumed, leaving one SDBD and associated EDG to supply power to the engineered safety features and components. The assumptions and component alignments are reviewed in section 3.3 below.

As shown in Figure 1 of the enclosure to the LAR, the ERCW spring and fall seasonal maximum temperatures remain well below the proposed UHS limit of 78 °F. During any outage where a SDBD is removed from service, the licensee stated that it monitors the UHS temperature daily. The licensee further declared that if the UHS temperature exceeds 78 °F during the performance of the planned maintenance, it will take the appropriate actions in accordance with Watts Bar, Units 1 and 2, TS 3.7.8.

Attachment 4 to the Enclosure to the LAR states that under design basis accident conditions with one unit in Mode 6 for more than 100 hours and one 6.9 kV SDBD out of service, a single ERCW pump can supply the highest flow/decay heat demand of one unit in cold shutdown and the other in LOCA-recirculation with the UHS temperature ≤ 78 °F.

The NRC staff reviewed the system descriptions provided in both this LAR and the previous LAR. Based on its review of this information, staff finds that the sharing of the key components of EDGs and ERCWs between the operating unit and the defueled unit to perform the intended safety function of removing heat from CCS and SFPCS is consistent with GDC 5 and was found acceptable in the SE on the previous LAR (ML20024F835) with one exception. The exception is the increased UHS temperature limit of 78 ºF from 71 ºF, which is discussed in the following section.

3.3 Thermal and Hydraulic Analyses

The UHS temperature limit is one of the important parameters to meet GDC 44 for the adequacy of component cooling capability. The proposed UHS temperature limit in Condition A is changed from 71 ºF to 78 ºF. This change affects the adequacy of the ERCW heat removal capability, which prompts the need for a re-evaluation to confirm continued compliance with GDC 44.

Section 3.2.4 of the Enclosure to the LAR describes the evaluation method and approach. The licensee's thermal and hydraulic analyses determined the available ERCW flow to each engineered safety feature component when each SDBD is out of service, and then determined the maximum allowable ERCW temperature at the respective available flow rate for each essential component to transfer its design basis heat load. The licensee then compared the limiting ERCW component temperature to the historical spring and fall seasonal maximum UHS temperature data to demonstrate the available UHS margin, allowing one SDBD to be removed from service for up to seven days during either a spring or fall refueling outage.

Section 3.2.5 of the Enclosure to the LAR describes the hydraulic model for flow distribution to obtain the available ERCW flow for different components. All special system alignments modeled by this analysis are in place prior to board outage and do not involve additional operator burden. The licensee developed the following four analysis scenarios for each of the four SDBDs being alternately removed from service for maintenance.

- Case 2F1AA - Unit 2 LOCA, LOOP, loss of Train B (LOTB) and Unit 1 cold in shutdown (CSD) > 48 hours with 1A-A SDBD out of service (OOS)

- Case 1F2AA - Unit 1 LOCA, LOOP, LOTB and Unit 2 in CSD > 48 hours with 2A-A SDBD OOS

- Case 2D1BB - Unit 2 LOCA, LOOP, loss of Train A (LOTA) and Unit 1 in CSD > 48 hours with 1B-B SDBD OOS

- Case 1D2BB - Unit 1 LOCA, LOOP, LOTA and Unit 2 in CSD > 48 hours with 2B-B SDBD OOS

Section 3.2.6 of the Enclosure to LAR describes the thermal models to determine the maximum allowable temperature for each component under the reduced ERCW flow rate derived in section 3.2.5.

Section 3.2.7 describes analysis assumptions and conservatism. For further clarification, the licensee provided additional information in a supplemental submittal (ML22122A248) to clarify the methodology and to describe all the assumptions of the analysis for the proposed LAR. In attachment 3 of the supplemental submittal, the licensee provided the bases and justifications for all the differences in assumptions and design input for the thermal and hydraulic analyses between the proposed LAR and previously approved LAR in 2021. The staff reviewed these assumptions and conservatisms and determined them to be reasonable.

The results of the thermal and hydraulic analyses are shown in Table 1 through Table 9 of the Enclosure to the LAR. According to the licensee, these results demonstrate that one ERCW pump operating at minimum performance will supply adequate cooling water flow to all essential

components on the operating unit following a postulated design basis LOCA, as well as the shutdown unit after entering a defueled condition, when the UHS temperature is limited to ≤ 78 ºF.

Therefore, in addition to the capability of ERCW Train A or B to perform the ERCW safety functions, the licensee concluded that when the ERCW system is aligned to the assumed configuration for planned maintenance and the UHS temperature satisfies the maximum temperature limit, ERCW Train A or B would provide redundant capability with one ERCW pump. With this additional capability, the ERCW system safety functions could be satisfied considering a single failure that disables one ERCW train concurrent with one SDBD out of service for maintenance. The four analysis scenarios described above include either Unit 1 or Unit 2 SDBD maintenance.

Section 3.2.8 of the Enclosure to the LAR describes the system alignments. Section 3.2.8.1 states that all shutdown unit, non-essential cooling loads including the containment upper compartment coolers, lower compartment coolers, control rod drive coolers, and reactor coolant pump motor coolers, must be isolated prior to and in preparation for removal of the SDBD from service. Attachment 4 to the Enclosure describes the proposed detailed component configurations needed to support the specific system alignments necessary for removing a specific SDBD from service.

The NRC staff reviewed the licensee's analysis model description, assumptions, and results described in the LAR and the Supplement. The staff also reviewed the four scenarios analyzed to determine the available ERCW flow to the required components. The staff determined that thermal and hydraulic analyses correctly model the system alignments that would be allowed under the proposed TS. Moreover, the system alignments are verified by surveillance requirement SR 3.7.8.1. Therefore, the NRC staff finds that the proposed TS changes will continue to comply with GDC 5, because the system alignments of sharing of the key components of EDGs and ERCWs between the operating unit and the defueled unit are properly incorporated in the thermal and hydraulic analyses and to be verified by the surveillance requirement.

In addition, the results shown in Table 8 (Loss of Train B) and Table 9 (Loss of Train A) of the Enclosure to the LAR demonstrate that cooling capability for the proposed alignments will be adequate (with margins between 6 and 31 percent) for removing heat from components by the UHS with temperature limit of 78 °F such that the component design temperature limits will not be exceeded. Therefore, the NRC staff finds that the results of analyses demonstrate that there will be adequate component cooling capability and, thus, the proposed TS changes will continue to comply with GDC 44.

In summary, the NRC staff reviewed the licensee's analysis methodology and assumptions described above, including the following: (1) the hydraulic model for flow distribution, (2) four different scenarios for SDBDs being alternately removed from service for maintenance, (3) thermal models to determine the maximum allowable temperature for each component under the reduced ERCW flow rate, (4) assumptions and conservatism. Based on the above review, the staff finds the thermal and hydraulic analyses methodology and assumptions acceptable.

3.4 Technical Conclusion

In summary, the NRC staff finds the change of UHS temperature limit to 78 °F from 71 °F acceptable based on the foregoing staff evaluation of the licensee's results of thermal and

hydraulic analyses. Furthermore, the staff has reviewed the licensee's thermal and hydraulic analyses methodology, assumptions, justifications for the differences from the previously analyses, and the results of the analyses. These different analysis scenarios include either Unit 1 or Unit 2 SDBD maintenance. Based on the above evaluation, the NRC staff determined the analyses to be acceptable because (1) sufficient margins on component heat removal capability are demonstrated in the results of the analyses to support adequate cooling capability for the UHS temperature limit of 78 °F; (2) the analyses show the proposed system alignments comply with GDC 5 on sharing of components; and (3) the analyses demonstrate continued compliance with GDC 44 for sufficient cooling capability and single failure assumption.

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 May 25, 2022. 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, "Standards for Protection Against Radiation." 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 previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding published in the *Federal Register* on December 28, 2021 (86 FR 73820). 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: C. Li, NRR

Date: September 20, 2022

SUBJECT: WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2 - ISSUANCE OF AMENDMENT NOS. 153 AND 62 REGARDING EXTENSION OF COMPLETION TIME FOR TECHNICAL SPECIFICATION 3.7.8 FOR INOPERABLE ESSENTIAL RAW COOLING WATER TRAIN (EPID L-2021-LLA-0174) DATED SEPTEMBER 20, 2022

DISTRIBUTION:
PUBLIC
PM File Copy
RidsACRS_MailCTR Resource
RidsNrrDorlLpl2-2 Resource
RidsNrrPMWattsBar Resource
RidsNrrLARButler Resource
RidsRgn2MailCenter Resource
CLi, NRR
CJackson, NRR
AFoli, NRR
JWilson, NRR
NChien, NRR

ADAMS Accession No.: ML22187A181

OFFICE	NRR/DORL/LPL2-2/PM	NRR/DORL/LPL2-2/LA	NRR/DSS/SCPB/BC
NAME	KGreen	RButler	BWittick
DATE	7/1/2022	7/12/2022	5/25/2022
OFFICE	NRR/DSS/SNSB/BC	NRR/DSS/STSB/BC	NRR/DEX/EEEB/BC
NAME	SKrepel (CPeabody for)	VCusumano	WMorton (SRay for)
DATE	7/6/2022	7/13/2022	7/7/2022
OFFICE	OGC - NLO	NRR/DORL/LPL2-2/BC	NRR/DORL/LPL2-2/PM
NAME	LShrum	DWrona	KGreen
DATE	8/9/2022	9/20/2022	9/20/2022

OFFICIAL RECORD COPY