



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

April 7, 2017

Mr. Joseph 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 2 – ISSUANCE OF AMENDMENT
REGARDING ONE-TIME EXTENSION OF INTERVALS FOR SPECIFIED
SURVEILLANCE REQUIREMENTS (CAC NO. MF8869)

Dear Mr. Shea:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 10 to Facility Operating License No. NPF-96 for the Watts Bar Nuclear Plant, Unit 2. This amendment consists of changes to the license in response to your license amendment request dated November 23, 2016, as supplemented by letter dated February 16, 2017.

The amendment revises the Technical Specification Surveillance Requirement (SR) 3.0.2 to allow a one-time interval extension for SRs listed in Attachments 8, 10, and 11 to Enclosure 1 of the license amendment request. These SRs are normally performed on an 18-month frequency in conjunction with a refueling outage. The interval extension of SRs listed in the license amendment request, Enclosure 1, Attachments 6, 7, 9, 12, 13, 14, 15, 16, and 17, are currently being reviewed and are not affected by this amendment.

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

If you have any questions regarding this matter, please contact me at (301) 415-6020 or Robert.Schaaf@nrc.gov.

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. 50-391

Enclosures:

1. Amendment No. 10 to NPF-96
2. Safety Evaluation

cc w/enclosures: Distribution via Listserv



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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-391

WATTS BAR NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 10
License No. NPF-96

1. The U.S. Nuclear Regulatory Commission (the Commission) has found, with respect to surveillance requirements listed in Attachments 8, 10, and 11 to Enclosure 1 of the application, that:
 - A. The application for amendment by the Tennessee Valley Authority (TVA or the licensee) dated November 23, 2016, as supplemented by letter dated February 16, 2017, 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, 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. 10 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 7 days of 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 7, 2017

ATTACHMENT TO LICENSE AMENDMENT NO. 10

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 pages 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

3.0-6

INSERT

3.0-6

3.0-7

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. 10 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 February 1, 2017.

(4) PAD4TCD may be used to establish core operating limits for Cycles 1 and 2 only. PAD4TCD may not be used to establish core operating limits for subsequent reload cycles.

(5) By December 31, 2017, 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 by 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:

3.0 SR APPLICABILITY (continued)

Table SR 3.0.2-1		
Surveillance Requirement (SR)	Description of SR Requirement	Frequency Extension Limit
3.3.2.10, Table 3.3.2-1, Function 1.c	Verify ESFAS RESPONSE TIMES are within limit for the Safety Injection Containment Pressure – High Function	10/31/17
3.3.2.10, Table 3.3.2-1, Function 1.d	Verify ESFAS RESPONSE TIMES are within limit for the Safety Injection Pressurizer Pressure – Low Function	10/31/17
3.3.2.10, Table 3.3.2-1, Function 1.e	Verify ESFAS RESPONSE TIMES are within limit for the Safety Injection Steam Line Pressure - Low Function	10/31/17
3.3.2.10, Table 3.3.2-1, Function 2.c	Verify ESFAS RESPONSE TIMES are within limit for the Containment Pressure – High High Function	10/31/17
3.3.2.10, Table 3.3.2-1, Function 3.b(3)	Verify ESFAS RESPONSE TIMES are within limit for the Containment Isolation Phase B Isolation Containment Pressure – High High Function	10/31/17
3.3.2.10, Table 3.3.2-1, Function 6.b	Verify ESFAS RESPONSE TIMES are within limit for the Auxiliary Feedwater SG Water Level – Low Low Coincident with: 1) Vessel ΔT Equivalent to power \leq 50% RTP With a time delay (Ts) if one SG is affected or A time delay (Tm) if two or more SGs are affected OR 2) Vessel ΔT equivalent to power $>$ 50% RTP with no time delay (Ts and Tm = 0) Function	10/31/17
3.3.2.10, Table 3.3.2-1, Function 6.e	Verify ESFAS RESPONSE TIMES are within limit for the Auxiliary Feedwater Trip of all Turbine Driven Main Feedwater Pumps Function	10/31/17
3.3.2.10, Table 3.3.2-1, Function 7.b	Verify ESFAS RESPONSE TIMES are within limit for the Automatic Switchover to Containment Sump Refueling Water Storage Tank (RWST) Level - Low Coincident with Safety Injection and Coincident with Containment Sump Level - High Function	10/31/17
3.3.3.3, Table 3.3.3-1, Function 11	Perform TADOT of the Containment Isolation Valve Position Function	10/31/17
3.3.4.2, Table 3.3.4-1, Function 2.b	Verify each required control circuit and transfer switch is capable of performing the intended function for the Reactor Coolant System (RCS) Pressure Control Pressurizer Power Operated Relief Valve (PORV) Control and Pressurizer Block Valve Control Function	10/31/17
3.3.4.2, Table 3.3.4-1, Function 2.c	Verify each required control circuit and transfer switch is capable of performing the intended function for the Reactor Coolant System (RCS) Pressure Control Pressurizer Heater Control Function	10/31/17
3.3.4.2, Table 3.3.4-1, Function 3.b	Verify each required control circuit and transfer switch is capable of performing the intended function for the RCS Inventory Control Charging and Letdown Flow Control and Indication Function	10/31/17

3.0 SR APPLICABILITY (continued)

Table SR 3.0.2-1		
Surveillance Requirement (SR)	Description of SR Requirement	Frequency Extension Limit
3.3.4.2, Table 3.3.4-1, Function 4.b	Verify each required control circuit and transfer switch is capable of performing the intended function for the Decay Heat Removal via Steam Generators (SGs) AFW Controls Function	10/31/17
3.3.4.2, Table 3.3.4-1, Function 4.c	Verify each required control circuit and transfer switch is capable of performing the intended function for the Decay Heat Removal via Steam Generators (SGs) SG Pressure Indication and Control Function	10/31/17
3.3.4.2, Table 3.3.4-1, Function 5.a	Verify each required control circuit and transfer switch is capable of performing the intended function for the Decay Heat Removal via RHR System RHR Flow Control Function	10/31/17
3.3.4.3, Table 3.3.4-1, Function 2.b	Perform CHANNEL CALIBRATION for each required instrumentation channel for the Reactor Coolant System (RCS) Pressure Control Pressurizer Power Operated Relief Valve (PORV) Control and Pressurizer Block Valve Control Function	10/31/17
3.3.4.3, Table 3.3.4-1, Function 2.c	Perform CHANNEL CALIBRATION for each required instrumentation channel for the Reactor Coolant System (RCS) Pressure Control Pressurizer Heater Control Function	10/31/17
3.3.4.3, Table 3.3.4-1, Function 4.c	Perform CHANNEL CALIBRATION for each required instrumentation channel for the Decay Heat Removal via Steam Generators (SGs) SG Pressure Indication and Control Function	10/31/17
3.3.4.3, Table 3.3.4-1, Function 4.e	Perform CHANNEL CALIBRATION for each required instrumentation channel for the Decay Heat Removal via Steam Generators (SGs) SG Tsat Indication Function	10/31/17
3.6.11.2	Verify total weight of stored ice is greater than or equal to 2,750,700 lb by: a. Weighing a representative sample of ≥ 144 ice baskets and verifying each basket contains greater than or equal to 1415 lb of ice; and b. Calculating total weight of stored ice, at a 95 percent confidence level, using all ice basket weights determined in SR 3.6.11.2.a.	10/31/17
3.6.11.3	Verify azimuthal distribution of ice at a 95 percent confidence level by subdividing weights, as determined by SR 3.6.11.2.a, into the following groups: a. Group 1-bays 1 through 8; b. Group 2-bays 9 through 16; and c. Group 3-bays 17 through 24. The average ice weight of the sample baskets in each group from radial rows 1, 2, 4, 6, 8, and 9 shall be greater than or equal to 1415 lb.	10/31/17



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 10 TO FACILITY OPERATING LICENSE NO. NPF-96

TENNESSEE VALLEY AUTHORITY

WATTS BAR NUCLEAR PLANT, UNIT 2

DOCKET NO. 50-391

1.0 INTRODUCTION

By letter dated November 23, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16333A250), as supplemented by letter dated February 16, 2017, ADAMS Accession No. ML17055B168), Tennessee Valley Authority (TVA, the licensee), submitted a license amendment request (LAR) for Watts Bar Nuclear Plant (Watts Bar), Unit 2.

The LAR proposes to revise Technical Specification (TS) Surveillance Requirement (SR) 3.0.2 to extend, on a one-time basis, 52 specified SRs that are normally performed on an 18-month frequency in conjunction with a refueling outage. The proposed change extends the due dates for these SRs from their current due dates (i.e., 18 months from the last surveillance plus the 25 percent extension allowed by SR 3.0.2) to October 31, 2017, which would allow these SRs to be performed during the first refueling outage for Watts Bar, Unit 2. This will be accomplished by adding entries to existing TS Table SR 3.0.2-1 for each function of each extended SR.

Due to the approaching due dates for certain SRs, the U.S. Nuclear Regulatory Commission (NRC, the Commission) staff has split its review into two separate groups. Group 1, which includes SRs 3.3.2.10; 3.3.3.3, Function 11; 3.3.4.2; and 3.3.4.3, and are included in LAR Enclosure 1, Attachments 8, 10, and 11, are reviewed in this safety evaluation. Group 1 contains TS SRs that currently must be accomplished by as early as April 2017, or would otherwise require plant shutdown. Group 2 will include the SRs that are included in Attachments 5, 6, 7, 9, 12, 13, 14, 15, 16, and 17, and will be evaluated later.

The supplemental letter dated February 16, 2017, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on January 17, 2017 (82 FR 4932), with respect to the Group 1 amendment.

2.0 REGULATORY EVALUATION

2.1 Background Related to the Proposed Amendment

TVA received the NRC-approved Facility Operating License No. NPF-96 for Watts Bar, Unit 2, on October 22, 2015. After receiving the operating license, startup began and included completion of required TS SRs and additional power ascension testing (PAT) to confirm the unit operated as designed. However, delays in startup caused a delay in commercial operation until October 19, 2016. This resulted in a delay of the first refueling outage to October 14, 2017.

2.2 Licensee's Proposed Changes

The licensee is proposing a one-time change to Watts Bar, Unit 2, TS SR 3.0.2, extending the test intervals for SRs 3.3.2.10; 3.3.3.3, Function 11; 3.3.4.2; and 3.3.4.3 to expire on October 31, 2017, so they may be accomplished during the rescheduled first refueling outage. This will be accomplished by including the affected SRs in a proposed TS SR Table 3.0.2-1 update with a SR due date of October 31, 2017. Text in SR 3.0.2 states that the specified frequency of the SRs shown in TS SR Table 3.0.2-1 is met if the SRs are performed prior to the dates listed in SR Table 3.0.2-1.

2.3 Regulatory Review

The regulatory requirements and guidance that the NRC staff considered in its review of the application are as follows:

- Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50 establishes the fundamental regulatory requirements with respect to the domestic licensing of nuclear production and utilization facilities. Specifically, Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50 provides, in part, the necessary design, fabrication, construction, testing, and performance requirements for structures, systems, and components important to safety.
- General Design Criteria (GDC)-13, "Instrumentation and control," requires that instrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety, including those variables and systems that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems. Appropriate controls shall be provided to maintain these variables and systems within prescribed operating ranges.
- GDC-20, "Protective system functions," requires the protection system be designed (1) to initiate automatically the operation of appropriate systems, including the reactivity control systems, to assure that specified acceptable fuel design limits are not exceeded as a result of anticipated operational occurrences, and (2) to sense accident conditions and to initiate the operation of systems and components important to safety.
- GDC-21, "Protection system reliability and testability," requires that the system be designed for high functional reliability and inservice testability, with redundancy and independence sufficient to preclude loss of the protection function from a single failure

and preservation of minimum redundancy, despite removal from service of any component or channel.

- GDC-22, "Protection system independence," requires that the system be designed so that natural phenomena, normal operating, maintenance, testing, and postulated accident conditions do not result in loss of the protection function.
- 10 CFR 50.36 sets forth the requirements for the content of the TSs. This regulation requires, in part, that the TSs contain SRs. Specifically 10 CFR 50.36(c)(3) states that, "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 will be met."

3.0 TECHNICAL EVALUATION

The NRC staff reviewed each of the proposed TS SR 3.3.2.10; 3.3.3.3, Function 11; 3.3.4.2; and 3.3.4.3 changes (from LAR Enclosure 1, Attachments 8, 10, and 11) to ensure they do not impact compliance with regulations listed in Section 2.0 of this safety evaluation. The following are evaluations for each of these TS SR changes in the order they were presented in the LAR.

3.1 SR 3.3.2.10 – Verify Engineered Safety Features Actuation System (ESFAS) Response Times are Within Limit

Attachment 8 to Enclosure 1 of the LAR discusses the proposed one-time SR frequency extension for SR 3.3.2.10. This SR verifies that the individual channel engineered safety feature equipment performance response times are less than, or equal to, the maximum values assumed in the accident analyses. This SR is performed every 18 months on a staggered test basis so that both trains are tested at least once every 36 months.

The Watts Bar, Unit 2, SR 3.3.2.10, TS Bases, state:

Response times may be verified by actual response time tests in any series of sequential, overlapping, or total channel measurements, or by the summation of allocated sensor, signal processing, and actuation logic response times with actual response time tests on the remainder of the channel. ... Testing of the final actuation devices, which make up the bulk of the response time, is included in the testing of each channel. The final actuation device in one train is tested with each channel.

The SR extension, which applies to the following functions listed in TS Table 3.3.2-1, "Engineered Safety Feature Actuation System Instrumentation," will be accomplished by adding an entry with a short description to Table SR 3.0.2-1 for each function to extend the completion date to October 31, 2017:

Function	Description	Date SR 3.3.2.10 was Last Performed	SR 3.3.2.10 Due Date plus 25%
1.c	Safety Injection, "Containment Pressure – High" (3 channels)	9/04/2015	7/22/2017
1.d	Safety Injection, "Pressurizer Pressure – Low" (3 channels)	9/04/2015	7/22/2017
1.e	Safety Injection, "Steam Line Pressure – Low" (3 per steam line)	9/04/2015	7/22/2017
2.c	Containment Spray, "Containment Pressure – High High" (4 channels)	9/07/2015	7/25/2017
3.b.3)	Containment Isolation Phase B Isolation, "Containment Pressure – High High" (4 channels)	7/27/2015	6/13/2017
6.b	AFW, "SG Water Level – Low Low" (3 per steam generator (SG))	9/07/2015	7/25/2017
6.e	AFW, "Trip of all Turbine Driven Main Feedwater Pumps" (1 per pump)	9/07/2015	7/25/2017
7.b	Automatic Switchover to Containment Sump, "Refueling Water Storage Tank (RWST) Level – Low"	9/04/2015	7/22/2017

The SR 3.3.2.10 functions listed above have a completion date ranging from June 13, 2017, to July 25, 2017 (including the 25 percent allowance of SR 3.0.2), which is up to 140 days before the requested surveillance extension date of October 31, 2017.

To justify allowing this interval extension, the licensee states in the LAR that although the requested surveillance interval extension is not within the requirement to test one train in 22.5 months (18 months plus the 25 percent allowance of SR 3.0.2) of the test of the other train, it is within the normal interval of 36 months between successive tests of the channels within each train. Because of this, the licensee explains the functions associated with SR 3.3.2.10 for which an extension is requested can operate as long as 36 months between surveillances. As shown in the table above, these functions have been surveilled within 36 months of the proposed extension date of October 31, 2017.

Two other surveillance tests, SR 3.3.2.2 and SR 3.3.2.3, were cited as providing an alternate means of partially satisfying the TS SRs.

The first of these tests, SR 3.3.2.2, requires an actuation logic test to be performed on the ESFAS instrumentation. The Watts Bar, Unit 2, SR 3.3.2.2 TS Bases state:

The train being tested is placed in the bypass condition, thus preventing inadvertent actuation. Through the semiautomatic tester, all possible logic combinations, with and without applicable permissives, are tested for each protection function. In addition, the master relay coil is pulse tested for continuity. This verifies that the logic modules are OPERABLE and that there is an intact voltage signal path to the master relay coils.

This surveillance is performed every 92 days on a staggered test basis.

The second test, SR 3.3.2.3, requires a master relay test to be performed on the ESFAS instrumentation. The Watts Bar, Unit 2, SR 3.3.2.3, TS Bases state:

The MASTER RELAY TEST is the energizing of the master relay, verifying contact operation and a low voltage continuity check of the slave relay coil. Upon master relay contact operation, a low voltage is injected to the slave relay coil. This voltage is insufficient to pick up the slave relay, but large enough to demonstrate signal path continuity.

This surveillance is performed every 92 days on a staggered test basis.

Additionally, Enclosure 2 of the LAR contains a commitment to perform SR 3.3.2.10 for both trains of Functions 1.c, 1.d, 1.e, 2.c, 3.b.3), 6.b, 6.e, and 7.b, during the first Watts Bar, Unit 2, refueling outage.

Conclusion

Based on each train being surveilled within 36 months of the proposed extension date and the satisfactory completion of SR 3.3.2.2 and SR 3.3.2.3, the NRC staff has determined that there is reasonable assurance that these components will remain operable during the extended surveillance interval period.

3.2 SR 3.3.3.3, Function 11 – Perform a Trip Actuating Device Operational Test (TADOT) of Post-Accident Monitoring (PAM) System Instrumentation, Containment Isolation Valve (CIV) Position

Attachment 10 to Enclosure 1 of the LAR discusses the proposed one-time SR frequency extension for SR 3.3.3.3. This SR exercises, to the accident position, each of the TS 3.3.3 required CIVs with position indication. Each valve is required to be observed both locally and in the control room during the test. The test acceptance criteria requires that the open and closed positions are correctly indicated in the main control room (MCR), as compared to the local position of the valve. This SR is performed every 18 months.

The SR extension applies to Function 11, "Containment Isolation Valve Position," of TS Table 3.3.3-1, "Post Accident Monitoring Instrumentation." It will be accomplished by adding a single entry to Table SR 3.0.2-1 for SR 3.3.3.3 to extend the completion date to October 31, 2017. The SR extension applies to the following valves:

	Component ID	Component Description
1	2-FCV-62-61-B	Chemical Volume Control System (CVCS) Seal Water Return Header Isolation
2	2-FCV-62-63-A	CVCS Seal Water Return Header Isolation
3	2-FCV-62-72-A	CVCS Letdown Orifice A Isolation
4	2-FCV-62-73-A	CVCS Letdown Orifice B Isolation
5	2-FCV-62-74-A	CVCS Letdown Orifice C Isolation
6	2-FCV-62-76-A	CVCS Letdown Orifice Isolation
7	2-FCV-62-77-B	CVCS Low Pressure Letdown Isolation
8	2-FCV-63-111	Cold Leg 2 and 3 Residual Heat Removal (RHR) Check Valve Leak Test Isolation
9	2-FCV-63-112	Cold Leg 1 and 4 RHR Check Valve Leak Test Isolation
10	2-FCV-63-121	Safety Injection Pump to Cold Leg Check Valve Leak Test Isolation
11	2-FCV-63-158	RHR Hot Leg 1 and 3 Check Valve Leak Test Isolation
12	2-FCV-63-167	Hot Leg 2 and 4 Safety Injection System (SIS) Check Valve Leak Test Isolation
13	2-FCV-63-174	Boron Injection to Cold Legs Check Valve Leak Test Isolation
14	2-FCV-63-185	RHR Supply 2-FCV-74-2 Leak Test Line Isolation
15	2-FCV-63-21	Safety Injection Pump (SIP) 2A-A Hot Leg 1 and 3 Check Valve Leak Test Isolation
16	2-FCV-63-23-B	Cold Leg Accumulator Fill from SIP 2Aa-A Isolation Valve
17	2-FCV-63-64-A	SIS Accumulator N2 Header Inlet Valve
18	2-FCV-63-71-A	SIS Check Valve Test Line Holdup Tank Isolation
19	2-FCV-63-72-A	Containment Sump to RHR Pump 2A-A Isolation
20	2-FCV-63-73-B	Containment Sump to RHR Pump 2B-B Isolation
21	2-FCV-63-84-B	SIS Check Valve Leak Test Holdup Tank Isolation
22	2-FCV-70-100-A	Reactor Coolant Pump (RCP) Oil Coolers Component Cooling System (CCS) Supply
23	2-FCV-70-134-B	Thermal Barrier CCS Supply
24	2-FCV-70-140-B	RCP Oil Cooler CCS Supply
25	2-FCV-70-143-A	Excess Letdown Heat Exchanger (Hx) CCS Supply
26	2-FCV-70-85-B	Excess Letdown Hx CCS Outlet
27	2-FCV-70-87-B	Thermal Barrier CCS Return
28	2-FCV-70-89-B	RCP Oil Cooler CCS Ret Header
29	2-FCV-70-90-A	Thermal Barrier CCS Return
30	2-FCV-70-92-A	RCP Oil Cooler CCS Return
31	2-FCV-72-44-A	Containment Sump to Containment Spray (CS) Pump 2A-A Suction
32	2-FCV-72-45-B	Containment Sump to CS Pump 2B-B Suction
33	2-FCV-74-2-B	Loop 4 Hot Leg to RHR Suction
34	2-FCV-74-8-A	2-FCV-74-2 Bypass RHR Suction

The SR 3.3.3.3 completion date for the valves listed above is June 6, 2017 (including the 25 percent allowance of SR 3.0.2), which is 147 days before the requested surveillance extension date of October 31, 2017.

Two other tests, SR 3.3.3.1 and inservice testing (IST), were cited as providing an alternate means of partially satisfying the TS SRs, and as justification for allowing the interval extension. In its February 16, 2017, response to the NRC staff's Request for Additional Information (RAI) RAI-MF8966-EICB-01.a, the licensee noted that these two tests provide further assurance of operability of the valve position indication functions by verifying that the valve position indicator lights are operable and that the valve is fully stroked to both its open and closed position within the stroke time acceptance criteria. The licensee also noted that none of the CIVs for Function 11 of TS Table 3.3.3-1 have failed their monthly channel checks as required by SR 3.3.3.1 or their ISTs.

The first of these tests, SR 3.3.3.1, requires a channel check to be performed for each required PAM instrumentation channel that is normally energized to identify deviations between redundant parameters. This surveillance is performed monthly (every 31 days). In response to RAI-MF8966-EICB-01.a, the licensee explained the channel check process, which verifies that the CIV position indicators are functioning by performing a lamp test of the containment isolation status panel. The channel check is successful if both bulbs for each CIV position indicator illuminate when tested. The SR 3.3.3.1 TS Bases note that, "Performance of the CHANNEL CHECK once every 31 days ensures that a gross instrumentation failure has not occurred."

In response to RAI-MF8966-EICB-01.c, the licensee stated that in the event a CIV fails the channel check, the shift manager/unit supervisor is immediately notified, and the cause of the failure is investigated. If it is determined that the CIV position function is inoperable, then the appropriate action(s) of TS 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," is entered.

The second test, IST, verifies the CIV position indication. The licensee stated that the difference in acceptance criteria between SR 3.3.3.3 and the IST verification is that the IST program does not require local verification of valve position during the exercising of the valve to the accident position. In response to RAI-MF8966-EICB-01.e, the licensee described that the IST valve stroke testing acceptance criteria include (1) measuring the stroke time of the valve when the valve is cycled, and (2) that for those CIVs that require a local leak-rate test (LLRT) in accordance with 10 CFR Part 50, Appendix J, the LLRT is performed in accordance with the SRs and surveillance instructions (SIs) associated with TS 3.6.1, "Containment"; TS 3.6.3, "Containment Isolation Valves"; and TS 5.7.2.19, "Containment Leakage Rate Testing Program." However, the stroking of the valve to its accident position exercises the valve and provides confirmation in the control room that the limit switches have changed their state. During a January 19, 2017, clarification call that included a discussion of draft RAI-MF8966-EICB-01.e, the licensee explained that when the valve moves to its intended accident position, the indication lights at the hand switch and on the PAMS instrument panel may be observed to change state from their fully open or closed indication through an intermediate state, to their final intended accident position, indicating that the limit switches on the valve are still functioning as intended. If, during this stroke testing, the valve failed to fully operate to the intended safety position, then an intermediate position light indication would identify any issues.

In the LAR, and as supplemented in response to RAI-MF8966-EICB-01.b, the licensee identified when the IST was performed for the 34 CIVs for which an SR 3.3.3.3 extension is requested, consistent with the following:

- There are 16 CIVs that cannot be tested while the plant is online. For two of these valves, the SR 3.3.3.3 was performed as part of the IST full stroke exercise between January and February of 2016. For the other 14 valves, the last SR 3.3.3.3 was performed between

August and November of 2015; however, they were successfully stroked under the IST program between January and February of 2016.

- The remaining 18 CIVs can be tested while the plant is running. Of these, 11 valves were successfully stroked on a quarterly basis using the MCR indication for stroke time and valve position indication. The remaining 7 valves were cycled in support of emergency core cooling system (ECCS) check valve testing in early 2016 and as needed for monthly ECCS venting activities. All of these 18 valves have passed IST testing within 18 months of the requested SR 3.3.3.3 extension date and are tested on a quarterly basis.

In response to RAI-MF8966-EICB-01.c, the licensee described the actions that are taken if a CIV fails an IST stroke test as follows:

If a valve meets its required limiting value of full stroke time, but is outside the stroke time acceptance criterion, one of the following actions is taken:

1. Initiate corrective actions, declare the valve inoperable, and evaluate the effects on system operability in accordance with the applicable TS, or
2. Retest the valve immediately. [The results from the retest will determine if the valve is operable or inoperable, and what additional analysis and/or corrective actions are initiated.]

If a valve stroke time falls outside the limiting value of full stroke time, corrective actions are initiated, the valve is declared inoperable, and the effect on system operability is evaluated in accordance with the applicable TSs.

In its February 16, 2017, response to the NRC staff's RAI, the licensee noted that while developing the RAI response, it discovered the error below in the SIs for performing SR 3.3.3.3, Function 11.

For the 34 CIVs identified, SR 3.3.3.3, Function 11 is performed pursuant to the SIs for the stroke valve tests and position indication when the unit is in Mode 5 (cold shutdown) or Mode 6 (defueled). When the stroke test is performed, the SIs require the licensee to verify the CIV's position both locally and on the hand switch in the control room. However, the SIs, as written, did not require verifying the CIV's position on the PAM instrumentation panels that is needed to satisfy SR 3.3.3.3, Function 11. The licensee has entered this oversight in the TVA Corrective Action Program (CAP). This oversight is mitigated by the following:

- The valve positions for the components monitored on the PAM instrumentation panels were verified to match the plant process indications and switch positions for Watts Bar, Units 1 and 2.
- The PAM instrumentation panels are operated by the same limit switch as the CIV hand switches, whose position indications are verified as part of the IST stroke tests.
- The licensee performed a stroke test of the CIVs for which a SR 3.3.3.3 extension is requested that can be tested online and verified that the hand switch position indicator light matches that on the PAM instrumentation table.

- In accordance with the requirements of SR 3.0.3, a risk evaluation was performed that determined the PAM panel position indication is not necessary for any action modeled in the Watts Bar probabilistic risk assessment. The licensee stated that the risk significance of its omission of this CIV position verification is negligible.

The licensee determined that the valve position indicators, as required by SR 3.3.3.3, Function 11, are properly functioning and operable.

Conclusion

Based on the satisfactory completion of SR 3.3.3.1 and successful stroking under the IST program, the NRC staff has determined there is reasonable assurance these components will remain operable during the extended surveillance interval period.

3.3 SR 3.3.4.2 – “Verify Each Required Control Circuit and Transfer Switch is Capable of Performing the Intended Function,” and SR 3.3.4.3 – “Perform Channel Calibration for Each Required Instrumentation Channel”

Attachment 11 to Enclosure 1 of the LAR discusses the proposed one-time SR frequency extension for SR 3.3.4.2 and SR 3.3.4.3.

Both of these SRs are performed every 18 months. The SR extension would add an entry for each of the ten functions of SRs 3.3.4.2 and 3.3.4.3 to Table SR 3.0.2-1 to extend the completion date to October 31, 2017. The SR extension applies to the following SRs and associated TS Table 3.3.4-1, “Remote Shutdown System (RSS) Instrumentation and Controls,” functions:

	Surveillance Requirement (SR)/Function	Description	Date SR was Last Performed
1	SR 3.3.4.2, Function 2.b	Pressurizer (PZR) Power-Operated Relief Valve (PORV) Control and Block Valve Control	7/16/2015
2	SR 3.3.4.2, Function 2.c	PZR Heater Control	7/16/2015
3	SR 3.3.4.2, Function 3.b	Charging and Letdown Flow Control and Indication	7/16/2015
4	SR 3.3.4.2, Function 4.b	AFW Controls	7/16/2015
5	SR 3.3.4.2, Function 4.c	SG Pressure Indication and Control	6/03/2015
6	SR 3.3.4.2, Function 5.a	RHR Flow Control	7/16/2015
7	SR 3.3.4.3, Function 2.b	PZR PORV Control and Block Valve Control	9/17/2015
8	SR 3.3.4.3, Function 2.c	PZR Heater Control	9/17/2015
9	SR 3.3.4.3, Function 4.c	SG Pressure Indication and Control	6/03/2015
10	SR 3.3.4.3, Function 4.e	SG T _{sat} Indication	6/03/2015

3.3.1 SR 3.3.4.2

SR 3.3.4.2 verifies each required RSS control circuit and transfer switch performs the intended function. This verification is performed from the auxiliary control room (ACR) and locally, as appropriate. Operation of the equipment from the remote shutdown panel is not necessary.

The SR 3.3.4.2 completion date for TS Table 3.3.4-1, Functions 2.b, 2.c, 3.b, 4.b, and 5.a, is June 2, 2017 (including the 25 percent allowance of SR 3.0.2), which is 151 days before the requested surveillance extension date of October 31, 2017. For Function 4.c, the SR 3.3.4.2 completion date is April 20, 2017 (including the 25 percent allowance of SR 3.0.2), which is 194 days before the requested surveillance extension date of October 31, 2017.

The licensee stated that the switches associated with SR 3.3.4.2 are simple switches that are either in one position or another and cannot drift. Two other tests (SR 3.3.4.3 and PAT) were cited as providing an alternate means of partially satisfying the TS SRs and as justification for allowing the interval extension.

The first of these tests, SR 3.3.4.3, requires a channel calibration to be performed for each instrumentation channel. In response to RAI-MF8966-EICB-02.a, the licensee provided a summary table of available Watts Bar, Unit 1, calibration as-found data for SR 3.3.4.3, Functions 2.b, 2.c, 3.b, 4.b, 4.c, and 5.a. The table compares the as-found to the as-left data for Watts Bar, Unit 1, and identified where these values were the same or differed. In the cases where the as-found was not the same as the as-left, both the as-left and as-found values were within their tolerance criteria, with the exception of Function 5.a for loop 1-LPF-63-173C. In this case, the as-found readings for the two lowest points were below their Lo limit tolerance criteria by 33 percent.

The second test, PAT for shutdown from outside the control room, was performed on August 3, 2016. In this test, the remote shutdown transfer switches associated with SR 3.3.4.2 were successfully operated. The LAR states that the PAT demonstrated the functionality of the switches and showed that the unit could be taken to, and maintained in, hot standby from outside the control room while at 30 percent power. The NRC staff notes that the requested SR extension date falls within 18 months of the last PAT testing performed.

The licensee also identified that operability of the RSS is demonstrated through performance of SR 3.3.4.1, which performs a monthly channel check of the RSS to ensure that a gross failure of instrumentation has not occurred.

Conclusion

Based on the Watts Bar, Unit 1, SR 3.3.4.3 as-found calibration data for TS Table 3.3.4-1, Functions 2.b, 2.c, 3.b, 4.b, 4.c, and 5.a, the date of the last PAT test, and the performance of monthly channel checks, the NRC staff has determined that there is reasonable assurance these components will remain operable during the extended surveillance interval period.

3.3.2 SR 3.3.4.3

SR 3.3.4.3 verifies that each specified channel is calibrated to perform a complete check of the instrument loop and the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

The SR 3.3.4.3 completion date for TS Table 3.3.4-1, Functions 2.b and 2.c, is August 4, 2017 (including the 25 percent allowance of SR 3.0.2), which is 88 days before the requested surveillance extension date of October 31, 2017. The SR 3.3.4.3 completion date for TS Table 3.3.4-1, Functions 4.c and 4.e, is April 20, 2017 (including the 25 percent allowance of SR 3.0.2), which is 194 days before the requested surveillance extension date of October 31, 2017.

As justification of the SR 3.3.4.3 one-time extension, the licensee provided in the LAR, with corrections identified in response to RAI-MF8966-EICB-02.c, the following instrument drift information for the following functions:

- For SR 3.3.4.3, Functions 2.b and 2.c, the Rosemount 1152 pressure transmitters have a manufacturer's drift specification of 6 pounds per square inch gauge (psig) (0.2 percent of upper range limit of 3,000 psig over 30 months), which provides a significant margin over the allowable drift of 13 psig over 22.5 months assigned to the device. This margin provides assurance that the transmitters will remain within limits during the period of the extended surveillance. Furthermore, the pressure indicators are monitored monthly for deviations, with a maximum channel deviation of 50 psig between the MCR and ACR instrumentation. The operation of the separation relays for the automatic operation of the heaters, power-operated relief valves (PORVs), and auxiliary spray were not tested during the recent shutdown test from the ACR. The separation relays are normally deenergized and are similar to relays utilized in the same application at Watts Bar, Units 1 and 2.
- For SR 3.3.4.3, Function 4.c, the Rosemount 3051 pressure transmitters have a manufacturer's drift specification of 4 psig (0.2 percent of upper range limit of 2,000 psig over 10 years), which provides a significant margin over the allowable drift of 10 psig over 22.5 months assigned to the device. This margin provides assurance that the transmitter will remain within limits during the period of the extended surveillance. The SG PORVs have been operationally cycled from the MCR, providing assurance that the valves themselves function. The pressure indicators are monitored monthly for deviations, with a maximum channel deviation of 80 psig between the MCR and ACR instrumentation to allow for early identification of a failing component. A review of calibration records for other loops where the same type of isolator (Moore Industry SCT/4-20/4-20) was used indicated that the isolators did not require adjustment over the past two Watts Bar, Unit 1, operating cycles, demonstrating high reliability with minimal drift.
- For SR 3.3.4.3, Function 4.e, the T_{sat} loops are shared with the SG pressure loop, with the ACR indicators having both pressure and saturation temperature on each indicator. Therefore, all necessary components are already included in SR 3.3.4.3 – [Function] 4.c, and no further justification is required.

With regard to SR 3.3.4.3, Function 4.e, in response to RAI-MF8966-EICB-02.b, the licensee explained that the SG pressure transmitter provides input to an indicator with dual scaling that displays both pressure and corresponding saturation temperature. Therefore, any drift associated with saturation temperature results from the pressure transmitter input.

With regard to SR 3.3.4.3, Functions 2.b, 2.c, and 4.c, in response to RAI-MF8966-EICB-02.c, the licensee explained that the deviation limit between channels is based on the as-found tolerances for the instruments. The licensee stated that the pressurizer pressure has an as-left

tolerance of +12 psig from the desired indication, and an as-found tolerance of +25 psig from the desired indication, while the SG pressure has an as-found tolerance of +20 psig from the desired indication, and an as-found tolerance of +40 psig from the desired indication.

The NRC staff finds that the pressure transmitters' drift specifications provide sufficient margin to allow the instruments to remain operating within their as-found tolerances during the extended surveillance interval period. Additionally, the staff finds that the monthly channel deviation check between MCR and ACR instrumentation provides an acceptable means to identify if there is an error in the loop.

Conclusion

Based on the identified instrument drift, and on demonstrated successful past performance of the affected components, the NRC staff has determined there is reasonable assurance that these components will remain operable during the extended surveillance interval period.

3.4 Technical Conclusion

Based on demonstrated successful past performance of the affected components, identified instrument data, satisfactory completion of SRs, successful stroking under the IST program, and performance of monthly channel checks, the NRC staff concludes that the proposed surveillance extension request discussed in Attachments 8, 10, and 11 to Enclosure 1 of the LAR meets the requirements of 10 CFR Part 50, Appendix A; GDC 13; GDC 20; GDC 21; GDC 22; and 10 CFR 50.36(c)(3).

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 March, 13, 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 SRs. 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 this finding published in the *Federal Register* on January 17, 2017 (82 FR 4932). 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 Contributors: S. Darbali
D. Warner

Date: April 7, 2017

SUBJECT: WATTS BAR NUCLEAR PLANT, UNIT 2 – ISSUANCE OF AMENDMENT REGARDING ONE-TIME EXTENSION OF INTERVALS FOR SPECIFIED SURVEILLANCE REQUIREMENTS (CAC NO. MF8869) DATED APRIL 7, 2017

DISTRIBUTION:

Public	RidsNrrDorlLpl2-2 Resource	RidsNrrPMWattsBar Resource
LPL2-2 R/F	RidsNrrLABClayton Resource	RidsACRS_MailCTR Resource
RidsNrrDssSrxsb Resource	RidsRgn2MailCenter Resource	PBuckberg, NRR
RidsNrrDssStsb Resource	RidsNrrDeEmcb Resource	RidsNrrDssSbpb Resource
RidsNrrDeEicb Resource	SDarbali, NRR	DWarner, NRR

ADAMS Accession No.: ML17074A501

*by e-mail **by memorandum

OFFICE	NRR/DORL/LPL2-2/PM	NRR/DORL/LPL2-2/LA	NRR/DE/EICB/BC**	NRR/DSS/STSB/BC*
NAME	PBuckberg (RSchaaf for)	BClayton	MWaters	AKlein
DATE	04/07/2017	04/07/2017	03/13/2017	03/21/2017
OFFICE	NRR/DSS/SRXB/BC*	NRR/DSS/SBPB/BC*	NRR/DE/EMCB/BC*	OGC – NLO
NAME	EOesterle	RDennig	JQuichocho (RHsu for)	STurk
DATE	03/18/2017	03/20/2017	03/20/2017	03/29/2017
OFFICE	NRR/DORL/LPL2-2/BC	NRR/DORL/LPL2-2/PM		
NAME	BBeasley	RSchaaf		
DATE	04/04/2017	04/07/2017		

OFFICIAL RECORD COPY