



1101 Market Street, Chattanooga, Tennessee 37402

CNL-25-083

June 5, 2025

10 CFR 50.12
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ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Watts Bar Nuclear Plant, Unit 2
Facility Operating License No. NPF-96
NRC Docket No. 50-391

Subject: **Emergency Request for Amendment to Watts Bar Nuclear Plant Unit 2
Technical Specification – Reactor Trip System (RTS) Instrumentation
Level Transmitter Inoperable (WBN-TS-25-08)**

In accordance with the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.90, "Application for amendment of license, construction permit, or early site permit," and 10 CFR 50.91(a)(5), "Notice for public comment; State consultation," Tennessee Valley Authority (TVA) is submitting an emergency request for an amendment to Facility Operating License No. NPF-96 for the Watts Bar Nuclear Plant (WBN) Unit 2 for Nuclear Regulatory Commission (NRC) approval.

WBN Unit 2 Technical Specification (TS) 3.3.1, "Reactor Trip System (RTS) Instrumentation," Condition X states with one channel inoperable, the channel must either be placed in a trip condition within 72 hours (Required Action X.1) OR reduce THERMAL POWER to <P7 (Required Action X.2). Condition X applies to Function 8, "Pressurizer Pressure Low," and Function 9, "Pressurizer Water Level-High," in TS Table 3.3.1-1, "Reactor Trip System Instrumentation."

On June 1, 2025, at approximately 0720 hours Eastern Daylight Time (EDT), WBN Unit 2 experienced a failure of pressurizer water level indicator 2-LI-68-320, which placed the unit in TS 3.3.1, Condition X. On June 3, 2025, troubleshooting efforts determined that the cause of the failure of 2-LI-68-320 was due to problems with level transmitter 2-LT-68-320. Specifically, rack 2-R-9 was providing power to the transmitter and the rack was not receiving expected transmitter output, which indicated that 2-LT-68-320 had failed. This was confirmed through inspection of the level transmitter in the WBN Unit 2 lower containment.

The inoperability of level transmitter 2-LT-68-320 was entered into the TVA Corrective Action Program. TVA's troubleshooting and investigation as to the failure of 2-LT-68-320 is ongoing.

As noted above, TS 3.3.1 Condition X requires either placing level transmitter 2-LT-68-320 in the trip condition or a reduction in thermal power (down powering to less than ten percent power). Currently, TVA has two of the seven nuclear units off-line which is limiting the generation capacity available to supply electricity to the people of the Tennessee Valley. This condition is also being compounded by increased demand due to the higher summer temperatures. The weather forecast for the next ten days predicts highs in the upper eighties. On June 4, 2025, at approximately 0200 hours EDT, level transmitter 2-LT-68-320 was placed in the trip condition in conformance with TS 3.3.1, Required Action X.1.

Repair efforts for 2-LT-68-320 require onsite Westinghouse Electric Company support, which is not expected until at least June 6, 2025. Unique challenges associated with repair effort are:

- work location (components are located in upper and lower containment),
- one of the sensing lines is a capillary filled tube and requires outside vendor support to correctly backfill, and
- there are design change impacts due to the replacement transmitter that is available.

Keeping 2-LT-68-320 in the trip condition for any length of time places WBN Unit 2 in a single point vulnerability condition. Specifically, if WBN Unit 2 experienced an automatic reactor trip due to an additional pressurizer level channel transmitter failing or Eagle-21 rack 2-R-1 or 2-R-5 failing, meeting the power demand would become increasingly difficult.

This proposed emergency license amendment request (LAR) requests NRC approval of a one-time change to WBN Unit 2 TS 3.3.1, Condition X, to allow placing 2-LT-68-320 in the bypass condition until repairs are completed and it is returned to Operable status. The proposed new Note to TS 3.3.1, Required Action X.1 states that level transmitter 2-LT-68-320 may be bypassed during the repair/replacement of this transmitter. Compensatory measures detailed within Enclosure 1 of this letter shall be implemented and shall remain in effect during the extended Completion Time period for Condition X.1. This extended Completion Time expires no later than July 1, 2025, or until level transmitter 2-LT-68-320 is returned to OPERABLE status, whichever is earliest.

TVA requests NRC approval of the proposed LAR as soon as possible, but no later than 2300 EDT on June 8, 2025, and that the implementation of the revised TS be effective immediately to avoid any unnecessary operational transient that could result in a plant shutdown.

Enclosure 1 to this letter provides a description of the proposed changes, technical evaluation of the proposed changes, regulatory evaluation, and a discussion of risk and environmental considerations. Attachment 1 to Enclosure 1 provides the existing WBN Unit 2 TS pages marked-up to show the proposed changes. Attachment 2 to Enclosure 1 provides the proposed WBN Unit 2 TS pages retyped to show the changes incorporated. Attachment 3 to Enclosure 1 provides a marked-up version of the WBN Unit 2 TS Bases. Changes to the existing TS Bases are provided for information only and will be implemented under the Technical Specification Bases Control Program.

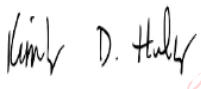
TVA believes special circumstances exist that warrant submitting this LAR under emergency conditions in accordance with 10 CFR 50.91(a)(5). Accordingly, in support of this LAR, Enclosure 2 provides an exemption request from the provisions of 10 CFR 50.91(a)(5).

TVA has determined that there are no significant hazard considerations associated with the proposed change and that the change qualifies for a categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and the enclosures to the Tennessee Department of Environment and Conservation.

There are no new regulatory commitments contained in this submittal. Please address any questions regarding this submittal to Amber V. Aboulfaida, Senior Manager, Fleet Licensing, at avaboulfaida@tva.gov.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 5th day of June 2025.

Respectfully,



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Kimberly D. Hulvey
General Manager, Nuclear Regulatory Affairs and Emergency Preparedness

Enclosures: 1. Description and Assessment of the Proposed Change
 2. Exemption Request from 10 CFR 50.91(a)(5)

cc (w/Enclosures):

NRC Regional Administrator – Region II
NRC Senior Resident Inspector – Watts Bar Nuclear Plant
NRC Project Manager – Watts Bar Nuclear Plant
Director, Division of Radiological Health – Tennessee State Department of
Environment and Conservation

Enclosure 1

Description and Assessment of the Proposed Change

Subject: Emergency Request for Amendment to Watts Bar Nuclear Plant Unit 2 Technical Specification – Reactor Trip System (RTS) Instrumentation Level Transmitter Inoperable (WBN-TS-25-08)

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Attachments

1. Proposed TS Changes (Markups) for WBN Unit 2
2. Proposed TS Pages (Final Retyped) for WBN Unit 2
3. Proposed TS Bases Changes (Markup) for WBN Unit 2 (For Information Only)

1.0 SUMMARY DESCRIPTION

Pursuant to Title 10 of the Code of Federal Regulations (10 CFR) 50.90, "Application for amendment of license, construction permit, or early site permit," and 10 CFR 50.91(a)(5), "Notice for public comment; State consultation," Tennessee Valley Authority (TVA) is requesting an emergency license amendment the Watts Bar Nuclear Plant (WBN) Unit 2 Technical Specifications (TS). This proposed emergency license amendment request (LAR) requests Nuclear Regulatory Commission (NRC) approval of a one time change to WBN Unit 2 TS 3.3.1, "Reactor Trip System (RTS) Instrumentation," Condition X, to allow placing level transmitter 2-LT-68-320 in the bypass condition until level transmitter 2-LT-68-320 is returned to OPERABLE status or until July 1, 2025, which ever occurs earlier.

The rationale for requesting an emergency LAR is explained further in this enclosure.

2.0 DETAILED DESCRIPTION

2.1 Current TS Requirements

WBN Unit 2 TS 3.3.1 Condition X currently states:

X. One channel inoperable.	-----NOTE----- One channel may be bypassed for up to 12 hours for surveillance testing. ----- X.1 Place channel in trip. <u>OR</u> X.2 Reduce THERMAL POWER to < P-7.	72 hours 78 hours
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Enclosure 1

2.2 Proposed Technical Specification Change

TVA is proposing the following one-time change to WBN Unit 2 TS 3.3.1 Condition X:

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
X. One channel inoperable.	-----NOTES----- 1. One channel may be bypassed for up to 12 hours for surveillance testing. 2. Level transmitter 2-LT-68-320 may be bypassed until the transmitter is restored to OPERABLE status. Compensatory measures detailed within Tennessee Valley Authority letter CNL-25-083, shall be implemented and shall remain in effect during the extended Completion Time period for Condition X.1. This extended Completion Time expires no later than July 1, 2025, or until level transmitter 2-LT-68-320 is returned to OPERABLE status, whichever is earliest. -----	
	X.1 Place channel in trip.	72 hours
	<u>OR</u> X.2 Reduce THERMAL POWER to < P-7.	78 hours

(continued)

2.3 Condition Intended to Resolve

Repair efforts for 2-LT-68-320 require onsite Westinghouse Electric Company support, which is not expected until at least June 6, 2025. Unique challenges associated with the repair effort are:

- work location (components are located in upper and lower containment),
- one of the sensing lines is a capillary filled tube and requires outside vendor support to correctly backfill, and
- there are design change impacts also due to the replacement transmitter that is available.

Keeping 2-LT-68-320 in the trip condition for any length of time places WBN Unit 2 in a single point vulnerability condition. Specifically, when 2-LT-68-320 is placed in the trip condition, in order to comply with Condition X of TS 3.3.1, WBN Unit 2 will be in a half trip condition for either of the remaining two transmitters failing/drifted high (trip is 92% level). If WBN Unit 2 experienced an automatic reactor trip due to either an additional pressurizer level channel

Enclosure 1

transmitter failing or Eagle-21 rack 2-R-1 or 2-R-5 failing (see below Eagle-21 rack failures in 2-R-1 and 2-R-5 that would result in the associated bistables tripping), meeting the Tennessee Valley power demand would become increasingly difficult.

The following Eagle-21 rack failures in 2-R-1 or 2-R-5 would result in the associated bistables tripping on the redundant transmitters:

- A Loop Calculation Processor (LCP) failure
- Loss of Vital AC to Channel 1 or Channel 2 Eagle-21
- Loss of LCP DC Power Supply
- LCP Digital to Digital Converter (DDC) failure
- Eagle-21 Analog Input (EAI)
- Eagle-21 Partial Trip (EPT) failure

Furthermore, TVA has two of the seven nuclear units off-line which is limiting the generation capacity available to supply electricity to the people of the Tennessee Valley. A trip of WBN Unit 2 would greatly compound this challenge in meeting electricity demand.

2.4 Justification for the Change

On June 1, 2025, at approximately 0720 EDT, 2-LI-68-320 failed to ~5%. This failure was diagnosed as a discreet failure with the associated level loop. TS 3.3.1 Conditions A and X were entered for this channel and this failure was entered into the TVA Corrective Action Program. Initial troubleshooting concluded rack 2-R-9 was appropriately providing power to the transmitter and the rack was not receiving expected transmitter output, which indicated that level transmitter 2-LT-68-320 had likely failed. Further troubleshooting on June 2, 2025, and June 3, 2025, inspected the transmitter in the WBN Unit 2 lower containment (seal table), which confirmed the failed transmitter. TS 3.3.1 Required Action X.1 requires that the inoperable channel be placed in the trip condition within 72 hours. Therefore, on June 4, 2025, at approximately 0200 hours EDT, level transmitter 2-LT-68-320 was placed in the trip condition in compliance with TS 3.3.1 Required Action X.1.

3.0 Technical Evaluation

As provided for in 10 CFR 50.91(a)(5), TVA is required to explain why this emergency situation occurred and why it could not avoid this situation. TVA could not have reasonably avoided this situation as discussed below.

1. Failure of 2-LT-68-320 pressurizer level transmitter was not a foreseeable occurrence. This transmitter had no prior indications of failing. This transmitter was recently calibrated successfully on May 5, 2025, so failure of the transmitter would not have been expected.
2. Previous outage calibrations were reviewed and no deficiencies were identified. Furthermore, there are no open corrective maintenance work orders on this transmitter. This transmitter is replaced on a 15-year frequency with the next replacement due in 2029. Redundant level transmitters 2-LT-68-335 and 2-LT-68-339 are also within calibration frequency with no open deficiencies documented against them.
3. The loss of two other generating units in the TVA fleet was also not a foreseeable occurrence, as issues developed quickly.
4. Events in items 1, 2, and 3 occurring in a period where hot weather has moved into the Tennessee Valley was also not a foreseeable occurrence, placing a significant strain on generating resources.

Due to the energy supply in the region versus demand, a trip of WBN Unit 2 now poses a risk to grid stability and could foreseeably result in a loss of power to some residents of the Tennessee

Valley. A shutdown or accepting the risk of a single point vulnerability can be avoided by placing the 2-LT-68-320 back in bypass with the proposed LAR.

3.1 System Description

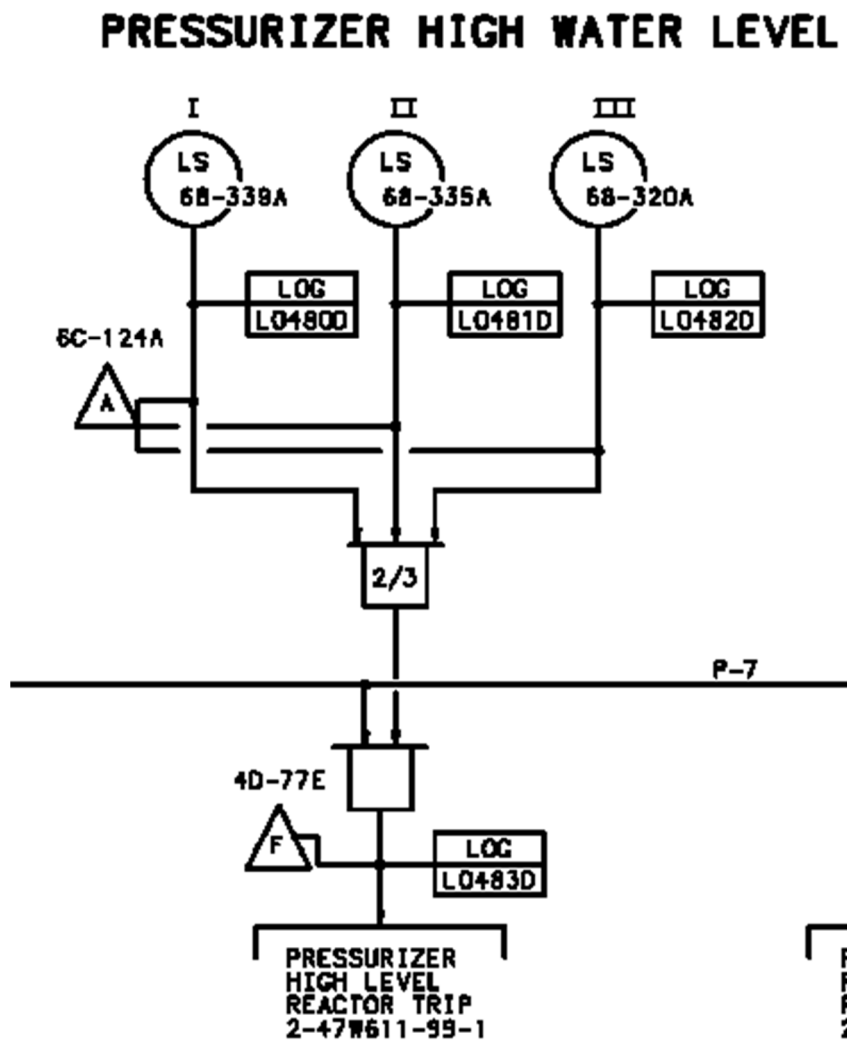
Three pressurizer water level channels are used to generate a reactor trip condition based on two-out-of-three logic and serve to prevent water discharge through the pressurizer safety relief valves. The pressurizer level channels also provide isolated output signals to the distributed control system (DCS) for pressurizer water level control. A median signal selector in the DCS selects the median of the three pressurizer level signals so that a spurious signal from any one channel will not cause a control action. If a failed channel is detected by the DCS, it will not be used in the control algorithm and the average of the two remaining signals will be used for control.

During reactor operation, dissolved hydrogen can accumulate in the system (reference leg) creating error in the level measurement system. In a rapid reactor coolant system (RCS) depressurization event, dissolution of the hydrogen gas could force condensate out of the system. A bellows seal assembly is used to minimize the measurement error for this event. Leaks of the reference leg to atmosphere will be immediately detectable by off-scale indication and alarms on the control board. A closed pressurizer level instrument shutoff valve would be detected by comparing the level indications from the redundant level channels (three channels). There is no single instrument valve which could affect more than one of the three level channels.

The high water level trip setpoint provides sufficient margin such that the undesirable condition of discharging liquid coolant through the safety valves is avoided. Even at full power conditions, which would produce the worst thermal expansion rates, a failure of water level control would not lead to any liquid discharge through the safety valves. This is due to the automatic high pressurizer pressure reactor trip actuating at a pressure sufficiently below the safety valve setpoint.

Figure 1 shows the channel logic for the pressurizer level transmitters. The figure depicts the pressurizer level transmitters and their trip logic. Three channels feed into a two-out-of-three trip logic circuit to generate a reactor trip. This trip logic is fixed at two-out-of-three. In the current station condition, 2-LT-68-320 has been placed in the trip condition; therefore, any other channel going to a trip status will satisfy the two-out-of-three logic and generate a reactor trip. Once 2-LT-68-320 is placed in the bypass condition, this transmitter will no longer be able to generate a trip signal, with the effect that the remaining two pressurize level transmitters will both have to go into a trip status to generate a reactor trip signal. Thus, while this is a two-out-of-three logic check, logically it will effectively become a two-out-of-two condition.

Figure 1



The Pressurizer Water Level - High trip Function provides a backup signal for the Pressurizer Pressure - High trip function and also provides protection against water relief through the pressurizer safety valves. These valves are designed to pass steam in order to achieve their design energy removal rate. A reactor trip is actuated prior to the pressurizer becoming water solid. The TS 3.3.1 Limiting Condition for Operation (LCO) requires three channels of Pressurizer Water Level - High to be operable. The pressurizer level channels are used as input to the Pressurizer Level Control System. The level channels do not actuate the safety valves, and the high pressure reactor trip is set below the safety valve setting. Therefore, with the slow rate of charging available, pressure overshoot due to level channel failure cannot cause the safety valve to lift before reactor high pressure trip.

If a second pressurizer level transmitter were to fail in an as-is condition or a low condition (this could be postulated as the worst single failure), the reactor trip signal, which requires two out of the three high pressurizer level channel inputs, would be defeated. If allowed to continue, the charging flow could produce the same consequences as an inadvertent operation of the ECCS

(above). There are no automatic reactor protection or safety systems available to mitigate these events; therefore, it is necessary to shut off the charging flow manually.

Pressurizer level transmitters 2-LT-68-339 and 2-LT-68-335 are powered from separate Eagle-21 racks and each of these racks has a separate power supply.

3.2 Repair Considerations

Troubleshooting of the impacted component has included scope to verify that the power supply and all impacted circuitry in the Reactor Trip System are working as designed. Currently, troubleshooting has indicated that the transmitter is not responding which could be multiple failure items contained in the transmitter internals. Due to the transmitter electronics and the transmitter being qualified as one component for Post Accident Monitoring, it is not applicable to change one component that could have failed internally. Once the transmitter is removed, TVA will send it to the manufacturer for failure analysis.

Current in progress troubleshooting includes valving out the high and low side of the transmitter for verification that isolation can be obtained for replacement of the level transmitter online. Expected completion of that evolution is approximately June 5, 2025. If isolation can be obtained, WBN Maintenance will move forward with replacement of the component.

The design change for installing the new transmitter that uses a different scale signal is complete from engineering with work instructions being completed for field scope to be performed. The materials are on site at WBN and the qualified technicians to perform the work are available.

3.3 Personnel Safety - Working Conditions

Repair efforts will take place in the WBN Unit 2 containment incore instrument room and in the Unit 2 upper containment, both of which are mild environmental and radiological conditions. These are normal work areas, and no special hazards are present due to the work area.

Replacement of the transmitter will involve work on tubing running to this transmitter, and will involve two valve isolation from the RCS, providing adequate personnel protection from the system and meeting isolation requirements for high pressure/high temperature systems.

3.4 Risk Considerations

The WBN full power internal events including internal flooding (IEIF) model of record (MOR), the WBN Fire Probabilistic Risk Assessment (PRA) and the WBN Seismic PRA Model are at-power models (i.e., each directly addresses plant configurations during plant operation Modes 1 and 2). The models include both core damage frequency (CDF) and large early release frequency (LERF).

Full-scope Peer Reviews have been conducted for each of the PRA Models (Internal Events with Internal Flooding, Fire, and Seismic). Finding Closure Peer Reviews have also been performed using the process documented in the Nuclear Energy Institute (NEI) letter to the NRC "Final Revision of Appendix X to NEI 05-04/07-12/12-16, Close-Out of Facts and Observations (F&O)," (ML17086A431) as accepted by the NRC (ML17079A427). As a result, all finding level F&Os have been closed for each of the PRA models.

Failure to generate a reactor trip signal for pressurizer high pressure uses a three-out-of-four logic (a successful high pressure reactor trip signal requires two of four comparator/bistables).

With one level transmitter in bypass, failure of the reactor trip signal due to pressurizer high level requires the success of two of the two operable level transmitters to send a high level signal. To properly model this condition using the pressurizer high pressure reactor trip logic, two surrogate basic events representing Eagle-21 bistables/comparators were failed in the model. In this condition, failure of either pressure transmitter would fail the signal to trip the reactor (two of two operational pressure transmitters required for success).

The average test and maintenance WBN PRA One Top Multi-Hazard Model (OTMHM) which includes the IEIF, Fire and Seismic PRA Models was used for the PRA analysis. The average test and maintenance were conservatively used to quantify the change in risk while accounting for undefined maintenance for the next 30 days. The unavailability of the level transmitter results in an incremental conditional core damage probability (ICCDP) of $1.00\text{E-}11$ and a negligible Incremental conditional large early release probability (ICLERP) for a duration of 30 days. A sensitivity study was performed whereby three of the comparator / bistables were failed to estimate the impact of a common cause failure of multiple pressurizer level transmitters. This sensitivity results in a ICCDP of $1.28\text{E-}10$ and a negligible ICLERP for a duration of 30 days. The obtained results fall below Regulatory Guide 1.177 Section 2.4 values for Tier 1 and are considered to be very small.

WBN follows 10 CFR 50.65 (a)(4) and assesses and manages risk prior to taking a maintenance configuration. To ensure the contribution to risk associated with additional component unavailabilities simultaneous with the surrogate component unavailabilities, the online risk monitor will have the surrogate basic events set to a probability of 1.00.

3.5 Safety Assessment Evaluation

The high pressurizer water level trip is not credited in any WBN dual-unit Updated Final Safety Analysis Report (UFSAR) Chapter 15 accident analyses and is a backup to the high pressurizer pressure trip.

The Pressurizer Water Level—High trip Function provides a backup signal only for the Pressurizer Pressure-High trip and also provides protection against water relief through the pressurizer safety valves. These valves are designed to pass steam in order to achieve their design energy removal rate. A reactor trip is actuated prior to the pressurizer becoming water solid.

The LCO requires three channels of Pressurizer Water Level—High to be OPERABLE. The pressurizer level channels are used as input to the Pressurizer Level Control System. A fourth channel is not required to address control/protection interaction concerns. The level channels do not actuate the safety valves, and the high pressure reactor trip is set below the safety valve setting. Therefore, with the slow rate of charging available, pressure overshoot due to level channel failure cannot cause the safety valve to lift before reactor high pressure trip.

In MODE 1, when there is a potential for overfilling the pressurizer, the Pressurizer Water Level—High trip must be OPERABLE. This trip Function is automatically enabled on increasing power by the P-7 interlock. On decreasing power, this trip Function is automatically blocked below P-7. Below the P-7 setpoint, transients that could raise the pressurizer water level will be slow and the operator will have sufficient time to evaluate unit conditions and take corrective actions.

3.6 Compensatory Measures

TVA has taken or will take the following actions during the time the subject instruments are out of service.

- Conduct Operation's shift briefs focusing on initiating event response and loss of potentially affected system, structures, and components (SSCs).
- Develop standing order focusing on initiating event response and loss of potentially affected SSCs.
- Prepare operators and maintenance to respond to additional failures.
- Monitor redundant channels at a sufficient frequency and expand monitoring to alternate indications:
 - 2-LT-68-339 and 2-LT-68-335 are operable redundant transmitters that are monitored shiftly under surveillance instruction. 2-LT-68-339 is monitored hourly using station procedures for monitoring plant parameters by the operator at the controls (OAC). The frequency of monitoring is sufficient for this condition.
 - A temporary integrated control system (ICS) alarm will be established for level deviation at 2%, supporting increased monitoring ahead of the established 5% deviation alarm in Ronan.
 - 2-LT-68-321 cold-calibrated pressurizer level will be used in transient conditions or channel deviation assessment, for qualitative trending purposes.
 - Suspend or minimize activities on systems affecting the out-of-service component and no work or testing will be conducted on redundant pressurizer level channels, 2-LT-68-339 and 2-LT-68-335.
- Ensure that Fire Safe Shutdown Mitigation Strategy is maintained for configuration with component out of service.
- Perform the following for fire zones supporting protected channels:
 - Confirm Functionality of Detection and Suppression in affected Fire Area(s), or compensatory measures in place.
 - Confirm no impaired barriers in affected Fire Area(s) or compensatory measures are in place.
 - Reschedule Surveillances / PMs that could potentially affect FP equipment in the Fire Area(s) or establish appropriate compensatory measures.
 - Minimize work in affected Fire Area(s) / limit personnel access to area.

4.0 REGULATORY ANALYSIS

4.1 Regulations

Subpart 10 CFR 50.36 sets forth the regulatory requirements for the content of the TS. This regulation requires, in part, that the TS contain Surveillance Requirements (SRs). Subpart 10 CFR 50.36(c)(3), states that SRs to be included in the TS are those relating to test, calibration, or inspection, which assure that the necessary quality of systems and components are maintained, that facility operation will be within safety limits, and that the TS LCO will be met.

4.2 General Design Criteria

As noted in the WBN dual-unit UFSAR Section 3.1.1, WBN was designed to meet the intent of the "Proposed General Design Criteria for Nuclear Power Plant Construction Permits" published in July 1967. The WBN construction permit was issued in January 1973. The WBN dual-unit UFSAR, however, addresses the NRC General Design Criteria (GDC) published as Appendix A to 10 CFR 50 in July 1971, including Criterion 4 as amended October 27, 1987.

The General Design Criteria (GDC) contained in Appendix A of 10 CFR 50 establish minimum requirements for the principal design criteria for water-cooled nuclear power plants. Conformance with the GDC is described in Section 3.1.2 of the WBN dual-unit UFSAR. The relevant GDC are described below.

Criterion 20—Protection System Functions. The protection system shall 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.

Conformance with GDC 20 is described in Section 3.1.2.3 of the WBN dual-unit UFSAR.

Criterion 21 - Protection System Reliability and Testability. The protection system shall be designed for high functional reliability and inservice testability commensurate with the safety functions to be performed. Redundancy and independence designed into the protection system shall be sufficient to assure that (1) no single failure results in loss of protection function and (2) removal from service of any component or channel does not result in a loss of the required minimum redundancy unless the acceptable reliability of operation of the protection can be otherwise demonstrated. The protection system shall be designed to permit periodic testing of its functioning when the reactor is in operation, including a capability to test channels independently to determine failures and losses of redundancy that may have occurred.

Conformance with GDC 21 is described in Section 3.1.2.3 of the WBN dual-unit UFSAR.

Criterion 22—Protection System Independence. The protection system shall be designed to assure that the effects of natural phenomena, and of normal operating, maintenance, testing, and postulated accident conditions on redundant channels do not result in loss of the protection function, or shall be demonstrated to be acceptable on some other defined basis. Design techniques, such as functional diversity or diversity in component design and principles of operation, shall be used to the extent practical to prevent loss of the protection function.

Conformance with GDC 22 is described in Section 3.1.2.3 of the WBN dual-unit UFSAR.

Regulatory Guide 1.22 discusses an acceptable method of satisfying GDC-20 and GDC-21 regarding the periodic testing of protection system actuation functions. These periodic tests

should duplicate, as closely as practicable, the performance that is required of the actuation devices in the event of an accident.

4.3 Precedent

TVA was unable to locate any relevant precedent.

4.4 No Significant Hazards Consideration

In accordance with the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.90, "Application for amendment of license, construction permit, or early site permit," and 10 CFR 50.91(a)(5), "Notice for public comment; State consultation," Tennessee Valley Authority (TVA) is submitting an emergency request for an amendment to Facility Operating License No. NPF-96 for the Watts Bar Nuclear Plant (WBN) Unit 2.

The proposed emergency license amendment request (LAR) requests NRC approval of a one-time change to WBN Unit 2 Technical Specification (TS) 3.3.1, "Reactor Trip System (RTS) Instrumentation," Condition X, to allow placing level transmitter 2-LT-68-320 in the bypass condition until level transmitter 2-LT-68-320 is returned to OPERABLE status or until July 1, 2025, whichever occurs earlier.

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

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

Response: No

The proposed one-time change to the TS does not affect the initiators of any analyzed accident. In addition, operation in accordance with the proposed TS change will continue to ensure that the previously evaluated accidents will be mitigated as analyzed. Thus, the proposed change will continue to provide an acceptable anticipatory trip signal, and the offsite dose potential is not affected by this change.

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

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

Response: No.

The proposed change will not alter any plant equipment or operating practices that could create the possibility of a new or different kind of accident. The proposed change does not involve a physical alteration of the plant (no new or different type of equipment will be installed). The proposed change does not create any new failure modes for existing equipment or any new limiting single failures. Additionally, the proposed change does not involve a change in the methods governing normal plant operation and all safety functions will continue to perform as previously assumed in accident analyses. Thus, the proposed change does not adversely affect the design

function or operation of any structures, systems, and components important to safety.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

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

Response: No.

The proposed change will not adversely affect the operation of plant equipment or the function of equipment assumed in the accident analyses. The proposed one-time change to the RTS requirements do not change the RTS design and capability to perform the required safety functions consistent with the assumptions of the applicable safety analyses. In addition, operation in accordance with the proposed TS change will continue to ensure that the previously evaluated accidents will be mitigated as analyzed.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, TVA concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

4.4 Conclusion

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

ATTACHMENT 1

Proposed TS Changes (Mark-Ups) for WBN Unit 2

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
V. One Vessel ΔT channel inoperable.	-----NOTE----- One channel may be bypassed for up to 12 hours for surveillance testing. -----	
	V.1 Set the Trip Time Delay threshold power level for (T_s) and (T_m) to 0% power.	72 hours
	<u>OR</u>	
	V.2 Be in MODE 3.	78 hours
W. One channel inoperable.	-----NOTE----- One channel may be bypassed for up to 12 hours for surveillance testing. -----	
	W.1 Place channel in trip.	72 hours
	<u>OR</u>	
	W.2 Be in MODE 3.	78 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
X. One channel inoperable.	-----NOTES----- 1. One channel may be bypassed for up to 12 hours for surveillance testing. 2. Level transmitter 2-LT-68-320 may be bypassed until the transmitter is restored to OPERABLE status. Compensatory measures detailed within Tennessee Valley Authority letter CNL-25-083, shall be implemented and shall remain in effect during the extended Completion Time period for Condition X.1. This extended Completion Time expires no later than July 1, 2025, or until level transmitter 2-LT-68-320 is returned to OPERABLE status, whichever is earliest. -----	
	X.1 Place channel in trip.	72 hours
	<u>OR</u>	
	X.2 Reduce THERMAL POWER to < P-7.	78 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
Y. One, two or three Turbine Stop Valve Closure channels inoperable.	Y.1 Place channel(s) in trip.	72 hours
	<u>OR</u> Y.2 Reduce THERMAL POWER to < P-9.	76 hours

SURVEILLANCE REQUIREMENTS

-----NOTE-----
Refer to Table 3.3.1-1 to determine which SRs apply for each RTS Function.

SURVEILLANCE	FREQUENCY
SR 3.3.1.1 Perform CHANNEL CHECK.	In accordance with the Surveillance Frequency Control Program
SR 3.3.1.2 -----NOTES----- 1. Adjust NIS channel if absolute difference is > 2%. 2. Required to be performed within 12 hours after THERMAL POWER is $\geq$ 15% RTP. ----- Compare results of calorimetric heat balance calculation to Nuclear Instrumentation System (NIS) channel output.	In accordance with the Surveillance Frequency Control Program

(continued)

ATTACHMENT 2

Proposed TS Pages (Final Retyped) for WBN Unit 2

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
V. One Vessel ΔT channel inoperable.	-----NOTE----- One channel may be bypassed for up to 12 hours for surveillance testing. -----	
	V.1 Set the Trip Time Delay threshold power level for (T_s) and (T_m) to 0% power.	72 hours
	<u>OR</u>	
	V.2 Be in MODE 3.	78 hours
W. One channel inoperable.	-----NOTE----- One channel may be bypassed for up to 12 hours for surveillance testing. -----	
	W.1 Place channel in trip.	72 hours
	<u>OR</u>	
	W.2 Be in MODE 3.	78 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
X. One channel inoperable.	-----NOTES----- 1. One channel may be bypassed for up to 12 hours for surveillance testing. 2. Level transmitter 2-LT-68-320 may be bypassed until the transmitter is restored to OPERABLE status. Compensatory measures detailed within Tennessee Valley Authority letter CNL-25-083, shall be implemented and shall remain in effect during the extended Completion Time period for Condition X.1. This extended Completion Time expires no later than July 1, 2025, or until level transmitter 2-LT-68-320 is returned to OPERABLE status, whichever is earliest.	

	X.1 Place channel in trip.	72 hours
	<u>OR</u> X.2 Reduce THERMAL POWER to < P-7.	78 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
Y. One, two or three Turbine Stop Valve Closure channels inoperable.	Y.1 Place channel(s) in trip.	72 hours
	<u>OR</u> Y.2 Reduce THERMAL POWER to < P-9.	76 hours

SURVEILLANCE REQUIREMENTS

-----NOTE-----
Refer to Table 3.3.1-1 to determine which SRs apply for each RTS Function.

SURVEILLANCE	FREQUENCY
SR 3.3.1.1 Perform CHANNEL CHECK.	In accordance with the Surveillance Frequency Control Program
SR 3.3.1.2 -----NOTES----- 1. Adjust NIS channel if absolute difference is > 2%. 2. Required to be performed within 12 hours after THERMAL POWER is $\geq$ 15% RTP. ----- Compare results of calorimetric heat balance calculation to Nuclear Instrumentation System (NIS) channel output.	In accordance with the Surveillance Frequency Control Program

(continued)

ATTACHMENT 3

Proposed TS Bases Changes (Markup) for WBN Unit 2 (For Information Only)

BASES

ACTIONS

X.1 and X.2 (continued)

The Required Actions have been modified by ~~two~~ Notes. ~~Note 1~~ ~~that~~ allows placing an inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. ~~The~~ Note 1 also allows a channel to be placed in bypass for up to 12 hours for testing of the bypassed channel. However, only one channel may be placed in bypass at any one time. The 12 hour time limit is justified in Reference 14. Note 2 allows level transmitter 2-LT-68-320 to be bypassed until the transmitter is restored to OPERABLE status. Compensatory measures detailed within Tennessee Valley Authority letter CNL-25-083, are listed below and shall be implemented and remain in effect during the extended Completion Time period for Condition X.1.. This extended Completion Time expires no later than July 1, 2025, or until level transmitter 2-LT-68-320 is returned to OPERABLE status, whichever is earliest. The compensatory actions described in CNL-28-083 are:

- Conduct Operation's shift briefs focusing on initiating event response and loss of potentially affected system, structures, and components (SSCs).
- Develop standing order focusing on initiating event response and loss of potentially affected SSCs.
- Prepare operators and maintenance to respond to additional failures.
- Monitor redundant channels at a sufficient frequency and expand monitoring to alternate indications:
 - 2-LT-68-339 and 2-LT-68-335 are operable redundant transmitters that are monitored shiftly under surveillance instruction. 2-LT-68-339 is monitored hourly using station procedures for monitoring plant parameters by the OAC. The frequency of monitoring is sufficient for this condition.
 - A temporary ICS alarm will be established for level deviation at 2%, supporting increased monitoring ahead of the established 5% deviation alarm in Ronan.
 - 2-LT-68-321 cold-calibrated pressurizer level will be used in transient conditions or channel deviation assessment, for qualitative trending purposes.
 - Suspend or minimize activities on systems affecting the out-of-service component and no work or testing will be conducted on redundant pressurizer level channels, 2-LT-68-339 and 2-LT-68-335.
- Ensure that Fire Safe Shutdown Mitigation Strategy is maintained for configuration with component out of service.

(continued)

BASES

ACTIONS

X.1 and X.2 (continued)

- Perform the following for fire zones supporting protected channels:
 - Confirm Functionality of Detection and Suppression in affected Fire Area(s), or compensatory measures in place.
 - Confirm no impaired barriers in affected Fire Area(s) or compensatory measures are in place.
 - Reschedule Surveillances / PMs that could potentially affect FP equipment in the Fire Area(s) or establish appropriate compensatory measures.
 - Minimize work in affected Fire Area(s) / limit personnel access to area.

Y.1 and Y.2

Condition Y applies to the Turbine Trip on Stop Valve Closure. With one, two or three channels inoperable, the inoperable channels must be placed in the trip condition within 72 hours. Since all the valves must be tripped (not fully open) in order for the reactor trip signal to be generated, it is acceptable to place more than one Turbine Stop Valve Closure channel in the trip condition. With one or more channels in the trip condition, a partial reactor trip condition exists. All of the remaining Turbine Stop Valve channels are required to actuate in order to initiate a reactor trip. If a channel cannot be restored to OPERABLE status or placed in the trip condition, then power must be reduced to below the P-9 setpoint within the next 4 hours. The 72 hours allowed to place an inoperable channel in the trip condition and the 4 hours allowed for reducing power are justified in Reference 14.

Enclosure 2

Exemption Request from 10 CFR 50.91(a)(5)

**REQUEST FOR SPECIFIC EXEMPTION FROM THE REQUIREMENTS
OF 10 CFR 50.91 FOR WATTS BAR NUCLEAR PLANT, UNIT 2**

I. Request for Exemption

Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.12, "Specific exemptions," Tennessee Valley Authority (TVA) requests an exemption from certain requirements of 10 CFR 50.91, "Notice for public comment; State consultation," to allow review of a license amendment request (LAR) for Watts Bar Nuclear Plant (WBN), Unit 2 under emergency circumstances. Specifically, 10 CFR 50.91(a)(5) allows the Nuclear Regulatory Commission (NRC) to issue a license amendment involving no significant hazards consideration without prior notice and opportunity for a hearing or for public comment when the NRC determines that an emergency situation exists. While not presently in an emergency situation, the requested exemption would permit emergency review of a license amendment for WBN Unit 2 that is needed to avoid a single point vulnerability condition during a period of high strain on TVA generation capacity.

An exemption is required from 10 CFR 50.91(a)(5) to support an emergency review of a proposed one-time change to WBN Unit 2 Technical Specification (TS) 3.3.1, "Reactor Trip System (RTS) Instrumentation," Condition X, to allow WBN to bypass a pressurizer water level transmitter for up to 30 days while repairs are in progress to restore operability. If repairs are unsuccessful during the extended period, the level transmitter will be returned to a tripped condition, and WBN Unit 2 will be subject to reactor shutdown in the event of another failed pressurizer level transmitter.

II. Background

On June 1, 2025, at approximately 0720 hours Eastern Daylight Time, WBN Unit 2 experienced a failure of pressurizer water level indicator 2-LI-68-320. This placed the unit in TS 3.3.1, Condition X, which states that with one RTS channel inoperable, the channel must either be placed in a trip condition within 72 hours or reduce thermal power to below the P-7 interlock. Interlock P-7 blocks a reactor trip when the plant is below approximately 10 percent power on a low reactor coolant flow in more than one loop, reactor coolant pump undervoltage, reactor coolant pump underfrequency, pressurizer low pressure, or pressurizer high water level. The channel was placed in the trip condition, and the issue was entered into the TVA Corrective Action Program. On June 3, 2025, troubleshooting efforts determined that the cause of the failure of 2-LI-68-320 was due to problems with level transmitter 2-LT-68-320. Specifically, Eagle-21 rack 2-R-9 was providing power to the transmitter and the Eagle-21 rack was not receiving expected transmitter output, which indicated that 2-LT-68-320 had failed. This was confirmed through inspection of the level transmitter in the WBN Unit 2 lower containment.

Currently, TVA has two of seven units offline which is limiting the generation capacity needed to supply electricity to the people of the Tennessee Valley. This condition is exacerbated by increased load demand due to higher summer temperatures. The weather forecast for the next 10 days predicts highs in the upper eighties.

The Pressurizer High Level Trip function is a two-out-of-three channel trip logic. With 2-LT-68-320 placed in the trip condition for compliance with TS 3.3.1 Condition X.1, this trip function is a one-out-of-two trip logic and constitutes a single point vulnerability. This means that any failure of the remaining two level transmitters to a trip state will cause the Unit 2 reactor

to trip, thus reducing TVA's generation further, and challenge the ability of TVA to meet the electric power grid demand.

III. Basis for Approval of Exemption Request

In accordance with 10 CFR 50.12(a)(1), the NRC may, upon application by an interested person or upon its own initiative, grant exemptions from the requirements of the regulations of this part as it determines are authorized by law, will not present an undue risk to the public health and safety, and are consistent with the common defense and security.

- *Authorized by Law*

This exemption would allow TVA to submit a LAR for emergency review by the NRC to prevent a situation in which WBN Unit 2 is forced to derate or shutdown due to an additional pressurizer level transmitter failure. The NRC has the authority under 10 CFR 50.12 to grant exemptions from the requirements of Part 50 upon showing proper justification. TVA is not seeking an exemption from the requirements of 10 CFR 50.90 for amendment of license. The intent of this request is solely to allow the use of the emergency circumstances in 10 CFR 50.91(a)(5) to issue a license amendment without the time constraints of prior notice and public comment.

- *Will Not Present an Undue Risk to the Public Health and Safety*

This exemption from the noticing and public comment requirements of 10 CFR 50.91 will not present an undue risk to the health and safety of the public. Granting this exemption will allow for a one-time TS change needed to avoid a single point vulnerability to WBN Unit 2 for a limited time duration and, thereby, the power generation capacity for the Tennessee Valley. All plant processes for ensuring the health and safety of site personnel and the public will continue to be met.

- *Consistent with the Common Defense and Security*

As noted above, this exemption request is only to support the expedited NRC review of license amendments as allowed for emergency situations under 10 CFR 50.91(a)(5). The requirements of 10 CFR 50.90 will continue to be met, including the technical and regulatory justifications for the proposed one-time TS change, and the exemption is consistent with the common defense and security.

As stated in 10 CFR 50.12(a)(2), the NRC will not consider granting an exemption to the regulations unless special circumstances are present. This exemption meets the special circumstances criteria of 10 CFR 50.12(a)(2)(iv).

- *The exemption would result in benefit to the public health and safety that compensates for any decrease in safety that may result from the grant of the exemption*

Granting this exemption will allow for a one-time TS change needed to avoid a single point vulnerability to the power generation needs of the people of the Tennessee Valley. Without the exemption, there is risk to TVA generation reliability that could result in power load curtailments during high summer temperatures and/or activation of fossil units with increased environmental emissions.

IV. Technical Justification

As provided for in 10 CFR 50.91(a)(5), TVA is required to explain why this emergency situation occurred and why it could not avoid this situation. TVA could not have reasonably avoided this situation as discussed below.

1. Failure of 2-LT-68-320 pressurizer level transmitter was not a foreseeable occurrence. This transmitter had no indications of failing. This transmitter was recently calibrated successfully on May 5, 2025, so failure of the transmitter would not have been expected.
2. Previous outage calibrations were reviewed and no deficiencies were identified. Furthermore, there are no open corrective maintenance work orders on this transmitter. This transmitter is replaced on a 15-year frequency with the next replacement due in 2029. Redundant level transmitters 2-LT-68-335 and 2-LT-68-339 are also within calibration frequency with no open deficiencies documented against them.
3. The loss of two other generating units in the TVA fleet was also not a foreseeable occurrence, as issues developed quickly.
4. Events in items 1, 2, and 3 occurring in a period where hot weather has moved into the Tennessee Valley was also not a foreseeable occurrence, placing a significant strain on generating resources.

Three pressurizer water level channels are used to generate a reactor trip condition based on two-out-of-three logic and serve to prevent water discharge through the pressurizer safety relief valves. The pressurizer level channels also provide isolated output signals to the distributed control system (DCS) for pressurizer water level control. A median signal selector in the DCS selects the median of the three pressurizer level signals so that a spurious signal from any one channel will not cause a control action. If a failed channel is detected by the DCS, it will not be used in the control algorithm and the average of the two remaining signals will be used for control.

During reactor operation, dissolved hydrogen can accumulate in the system (reference leg) creating an error in the level measurement system. In a rapid reactor coolant system depressurization event, dissolution of the hydrogen gas could force condensate out of the system. A bellows seal assembly is used to minimize the measurement error for this event. Leaks of the reference leg to atmosphere will be immediately detectable by off scale indication and alarms on the control board. A closed pressurizer level instrument shutoff valve would be detected by comparing the level indications from the redundant level channels (three channels). There is no single instrument valve which could affect more than one of the three level channels.

The high water level trip setpoint provides sufficient margin such that the undesirable condition of discharging liquid coolant through the safety valves is avoided. Even at full power conditions, which would produce the worst thermal expansion rates, a failure of water level control would not lead to any liquid discharge through the safety valves. This is due to the automatic high pressurizer pressure reactor trip actuating at a pressure sufficiently below the safety valve setpoint.

This amendment is urgently needed because the failed pressurizer level transmitter has reduced redundancy in a key safety parameter, and with time-limited action statements. The situation does not meet immediate emergency criteria but special circumstances justify treatment as an emergency due to the safety significance and the time-sensitive need for NRC

action to avoid unnecessary plant shutdown while maintaining safety. For license amendment approval in the necessary time frame, an exemption from 10 CFR 50.91(a)(5) is needed.

V. Environmental Consideration

A review has determined that the proposed exemption would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20. However, the proposed exemption does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed exemption meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed exemption.

VI. Conclusion

The emergency circumstances of 10 CFR 50.91(a)(5) are reserved for situations where failure to act in a timely manner would result in derating or shutdown of a nuclear power plant, or in prevention of either resumption of operation or of increase in power output up to the plant's licensed power level. These allowances do not presently apply to WBN Unit 2, but approval of this exemption request would support a proposed one-time TS change needed to avoid an emergency situation.

Pursuant to 10 CFR 50.12, the requested exemption is authorized by law, does not present undue risk to public health and safety, and is consistent with the common defense and security. In addition, special circumstances exist to justify the approval of an exemption from the requirements of 10 CFR 50.91(a)(5).

VII. References

None.