Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

CNL-18-090

July 8, 2018

10 CFR 50.90

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

Watts Bar Nuclear Plant, Unit 1
Facility Operating License No. NPF-90
NRC Docket No. 50-390

Subject: **Application to Modify Watts Bar Nuclear Plant Unit 1 Technical Specifications to Extend Surveillance Requirement 3.3.1.5, 3.3.2.2, and 3.3.6.2 Specified Intervals (390-WBN-TS-2018-14)**

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," Tennessee Valley Authority (TVA) is submitting a request for an amendment to Facility Operating License No. NPF-90 for Watts Bar Nuclear Plant (WBN) Unit 1 for Nuclear Regulatory Commission (NRC) approval.

On June 13, 2018, TVA was performing WBN Unit 1 Surveillance Instruction (SI) 1-SI-99-10-B, “62 Day Functional Test of SSPS Train B and Reactor Trip Breaker B.” 1-SI-99-10-B is performed every 62 days on a staggered test basis and verifies the operability of the solid state protection system (SSPS) Train B and the reactor trip breaker (RTB) B. SI 1-SI-99-10-B also addresses TS SRs that are required to be performed every 92 days on a staggered test basis. Performance of this SI partially satisfies Technical Specification (TS) Surveillance Requirements (SRs) 3.3.1.5, 3.3.2.2, and 3.3.6.2. Performance of this SI requires TVA to enter the appropriate WBN Unit 1 TS Required Actions associated with 1-SI-99-10-B, the most limiting of which are the 24-hour completion times of TS 3.3.1, “RTS Instrumentation,” Required Action P.1, and TS 3.3.2, “Engineered Safety Feature Actuation System,” Required Actions C.1, G.1, and H.1.

During the performance of this SI, the WBN Unit 1 RTB B opened unexpectedly. At the time of the event, WBN Unit 1 was in Mode 1 at 100 percent (%) power. The SSPS Train B was fully functional prior to the test. WBN Unit 2 was not affected because it has its own independent SSPS and RTBs. Train A of the WBN Unit 1 SSPS was also not affected.

Through troubleshooting, post maintenance testing (PMT), independent Westinghouse review, and engineering judgement, TVA has determined that the cause of the unexpected opening of RTB B was an anomaly associated with the SSPS Train B test circuitry when aligned to the intermediate range trip circuits of the universal logic board (see Section 2.3 to the enclosure). Due to the anomaly in the SSPS Train B test circuity, the risk associated with performing the repairs of the test circuitry and completing the SI while at power (See Section 3 of the enclosure), or continuing the troubleshooting and testing, is deemed unacceptable for completion of the SRs listed below. The below SRs are required to be performed before the upcoming WBN Unit 1 Cycle 15 refueling outage (U1R15), scheduled to commence in September 2018.

SR	Description of SR Requirement	SR Frequency	SR due date including the extension allowed by SR 3.0.2
3.3.1.5, Table 3.3.1-1, Function 19	Reactor trip system (RTS) instrumentation actuation logic test	92 days	8/17/2018
3.3.2.2, Table 3.3.2-1, Functions 1.b, 2.b, 3.a(2), 3.b(2), 4.b, 5.a, 6.a, 7.a	Engineered safety feature actuation system (ESFAS) instrumentation actuation logic test	92 days	8/17/2018
3.3.6.2, Table 3.3.6-1, Function 2	Containment vent isolation instrumentation actuation logic test	92 days	8/17/2018

If the above SRs cannot be completed by August 17, 2018, then WBN Unit 1 would be required to enter the 24-hour completion times of TS 3.3.1, Required Action P.1, and TS 3.3.2, Required Actions C.1, G.1 and H.1. Repair of the SSPS Train B test circuitry is estimated to take as much as 132 hours (see Section 3.2.2 to the enclosure). The time to repair the SSPS test circuitry is beyond the total time of 30 hours required to be in Mode 3 in accordance with TS 3.3.1, Required Action P.2, and TS 3.3.2, Required Actions C.2.1, G.2.1 and H.2.1. The time to repair the SSPS test circuitry also exceeds the total time of 60 hours required to be in Mode 5 in accordance with TS 3.3.2, Required Action C.2.2. Therefore, repairing the SSPS Train B test circuitry requires transitioning the unit to Mode 5, the ramifications of which are described in Section 3.2.2 to the enclosure.

Therefore, TVA proposes to amend WBN Unit 1 SR 3.0.2 and Table SR 3.0.2-1 to permit the extension of the above SRs to no later than October 1, 2018, in order that these SRs can be performed during the WBN U1R15 outage. Extending the above SRs provides the lowest incremental increase in risk as discussed further in Sections 3.2 and 3.3 of the enclosure. If WBN Unit 1 enters Mode 5 prior to the WBN U1R15 outage, then the SRs listed in Table 1 of the enclosure will be performed.

TVA requests NRC approval of the TS change on an expedited basis by August 16, 2018. TVA also requests that the implementation of the revised TS be effective immediately to avoid an unnecessary operational transient to initiate a plant shutdown. In addition, while this license amendment request (LAR) is being submitted as a deterministic LAR, TVA concluded that the risk of continued plant operation with the extension of the above SRs is qualitatively assessed to be very low. Furthermore, transitioning the unit to Mode 5 to repair the SSPS Train B test circuitry is not a desirable evolution and poses a significant operational transient to the unit as described in Section 3.2.2 to the enclosure.

The enclosure to this letter provides a description of the proposed changes, technical evaluation of the proposed changes, regulatory evaluation, and a discussion of environmental considerations. Attachments 1 and 2 to the enclosure provide the existing WBN Unit 1 TS and Bases pages marked-up to show the proposed changes. Attachments 3 and 4 to the enclosure provide the existing WBN Unit 1 TS and Bases pages retyped to show the proposed changes. Attachments 5, 6, and 7 to the enclosure provided the justification for the SRs that are being extended.

The WBN Plant Operations Review Committee reviewed this amendment request and concluded that operation of WBN Unit 1 in accordance with the proposed change will not endanger the health and safety of the public.

TVA has determined that there are no significant hazards considerations associated with the proposed change and that the TS 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 enclosure to the Tennessee State Department of Environment and Conservation.

There are no new regulatory commitments associated with this submittal. Please address any questions regarding this request to Ed Schrull at 423-751-3850.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 8th day of July 2018.

Respectfully,

J. W. Shea
Digitally signed by J. W. Shea
Date: 2018.07.08 09:22:37 -04'00'

J. W. Shea
Vice President, Nuclear Regulatory Affairs and Support Services

Enclosure:

Evaluation of the Proposed Change

cc: See Page 4

cc (Enclosure):
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

EVALUATION OF PROPOSED CHANGE

Subject: **Application to Modify the Watts Bar Nuclear Plant Unit 1 Technical Specifications to Extend Surveillance Requirement (SRs) 3.3.1.5, 3.3.2.2, and 3.3.6.2 Specified Intervals (390-WBN-TS-2018-14)**

Contents

ATTACHMENTS

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," Tennessee Valley Authority (TVA) is requesting a license amendment to amend the Watts Bar Nuclear Plant (WBN) Unit 1 Technical Specifications (TS). The proposed amendment revises the TS to allow an extension to the Surveillance Requirements (SRs) outage as identified in Table 1.

On June 13, 2018, TVA was performing WBN Unit 1 Surveillance Instruction (SI) 1-SI-99-10-B, “62 Day Functional Test of SSPS Train B and Reactor Trip Breaker B.” 1-SI-99-10-B is performed every 62 days on a staggered test basis and verifies the operability of the solid state protection system (SSPS) Train B and the reactor trip breaker (RTB) B. SI 1-SI-99-10-B also addresses TS SRs that are required to be performed every 92 days on a staggered test basis. Performance of this SI partially satisfies Technical Specification (TS) Surveillance Requirements (SRs) 3.3.1.5, 3.3.2.2, and 3.3.6.2. Performance of this SI requires TVA to enter the appropriate WBN Unit 1 TS Required Actions associated with 1-SI-99-10-B, the most limiting of which are the 24-hour completion times of TS 3.3.1, “RTS Instrumentation,” Required Action P.1, and TS 3.3.2, “Engineered Safety Feature Actuation System,” Required Actions C.1, G.1, and H.1.

During the performance of this SI, the WBN Unit 1 RTB B opened unexpectedly. At the time of the event, WBN Unit 1 was in Mode 1 at 100 percent (%) power. The SSPS Train B was fully functional prior to the test. WBN Unit 2 was not affected because it has its own independent SSPS and RTBs. Train A of the WBN Unit 1 SSPS was also not affected. Through troubleshooting, post maintenance testing (PMT), independent Westinghouse review, and engineering judgement, TVA has determined that the cause of the unexpected opening of RTB B was an anomaly associated with the SSPS Train B test circuitry when aligned to the intermediate range trip circuits of the universal logic board (see Section 2.3 to this enclosure).

SI 1-SI-99-10-B also addresses TS SRs that are required to be performed every 92 days on a staggered test basis. Due to the anomaly in the SSPS Train B test circuity, the risk associated with performing the repairs of the test circuitry and completing the SI while at power (See Section 3 of this enclosure), or continuing the troubleshooting and testing, is deemed unacceptable. The SRs listed in Table 1 to this enclosure are required to be performed before the upcoming WBN Unit 1 Cycle 15 refueling outage (U1R15), scheduled to commence in September 2018.

If the above SRs cannot be completed by August 17, 2018, then WBN Unit 1 would be required to enter the 24-hour completion times of TS 3.3.1, Required Action P.1, and TS 3.3.2, Required Actions C.1, G.1 and H.1. Repair of the SSPS Train B test circuitry is estimated to take as much as 132 hours (see Section 3.2.2 to this enclosure). The time to repair the SSPS test circuitry is beyond the total time of 30 hours required to be in Mode 3 in accordance with TS 3.3.1, Required Action P.2, and TS 3.3.2, Required Actions C.2.1, G.2.1 and H.2.1. The time to repair the SSPS test circuitry also exceeds the total time of 60 hours required to be in Mode 5 in accordance with TS 3.3.2, Required Action C.2.2. Therefore, repairing the SSPS Train B test circuitry requires transitioning the unit to Mode 5, the ramifications of which are described in Section 3.2.2 of this enclosure.

TVA proposes to amend WBN Unit 1 SR 3.0.2 and Table SR 3.0.2-1 to permit the extension of the SRs, listed in Table 1 to this enclosure, to no later than October 1, 2018, in order that

these SR can be performed during the WBN U1R15 outage. If WBN Unit 1 enters Mode 5 prior to the WBN U1R15 outage, then the SRs listed in Table 1 to this enclosure will be performed***.***

2.0 DETAILED DESCRIPTION

2.1 REASON FOR THE PROPOSED CHANGE

Due to the anomaly in the SSPS Train B test circuity, the risk to performing the repairs of the test circuitry while at power (See Section 3 to this enclosure) has been deemed unacceptable for completion of the SRs listed in Table 1 to this enclosure, which are due to be completed by August 17, 2018. If the SRs listed in Table 1 to this enclosure are not able to be completed by August 17, 2018, WBN Unit 1 would be required to enter the appropriate WBN Unit 1 TS Required Actions associated with SI 1-SI-99-10-B, the most limiting of which are the 24-hour completion times of TS 3.3.1, Required Action P.1, and TS 3.3.2, Required Actions C.1, G.1 and H.1. If these Required Actions cannot be satisfied then TS 3.3.1, Required Action P.2, and TS 3.3.2, Required Actions C.2.1, G.2.1, and H.2.1 require the plant to be in Mode 3 within 30 hours.

Repair of the SSPS Train B test circuitry during power operation is not feasible because Train B SSPS would be out of service for as much as 132 hours (see Section 3.2.2 of this enclosure). The time to repair the SSPS test circuitry is beyond the total time of 30 hours required to be in Mode 3 in accordance with TS 3.3.1, Required Action P.2, and TS 3.3.2, Required Actions C.2.1, G.2.1 and H.2.1. The time to repair the SSPS test circuitry also exceeds the total time of 60 hours required to be in Mode 5 in accordance with TS 3.3.2, Required Action C.2.2. Therefore, repairing the SSPS Train B test circuitry requires transitioning the unit to Mode 5, the ramifications of which are described in Section 3.2.2 to the enclosure.

The proposed change would permit the extension of the SRs, listed in Table 1 to this enclosure, to no later than October 1, 2018, in order that these SR can be performed during the WBN U1R15 outage.

2.2 DESCRIPTION OF THE PROPOSED CHANGES

TVA is proposing to revise WBN Unit 1 TS SR 3.0.2 as follows:

- Delete the current date of November 30, 2017, that has expired and revise SR 3.0.2 as follows:

  "The specified Frequency for each SR is met if the Surveillance is performed within 1.25 times the interval specified in the Frequency, as measured from the previous performance or as measured from the time a specified condition of the Frequency is met. In addition, for each of the SRs listed in Table SR 3.0.2-1 the specified Frequency is met if the Surveillance is performed on or before the date listed on Table SR 3.0.2-1. ~~This extension of the test intervals for these SRs is permitted on a one-time basis to be completed no later than November 30, 2017.~~ ***The Surveillance Frequency extension limits expire on the dates listed in Table SR 3.0.2-1 or when the unit enters MODE 5, whichever occurs first.***"

- Revise SR Table 3.0.2-1 to delete the SRs whose frequency extension limit has expired and add the new SRs as shown in Table 1 to this enclosure.

Attachments 1 and 2 to the enclosure provide the existing WBN Unit 1 TS and Bases pages marked-up to show the proposed changes. Attachments 3 and 4 provide the existing WBN Unit 1 TS and Bases pages retyped to show the proposed changes.

Attachments 5 through 7 provide TVAs evaluation of the acceptability for extending the specified surveillance requirements. Table 1 to this enclosure lists the SRs for which an extension is requested, the dates the SRs were last performed, their current due dates (including the 25% extension allowed by SR 3.0.2), the proposed extended due dates, the number of extended days, the attachments to this enclosure where their evaluation is located, and a description of the SRs.

2.3 CONDITION BACKGROUND

On June 13, 2018, TVA was performing WBN Unit 1 SI 1-SI-99-10-B. During the performance of this SI, the WBN Unit 1 RTB B opened unexpectedly. Through troubleshooting, PMT, independent Westinghouse review, and engineering judgement, TVA has determined that the cause of the unexpected opening of RTB B was an anomaly associated with the SSPS Train B test circuitry (see Figures 1, 2, and 3) when aligned to the intermediate range trip circuits of the universal logic board. Further information to support this determination is provided below:

- During the logic test portion of the SI for SSPS Train B, RTB B spuriously tripped during performance of the logic B blocks inhibited logic testing sequence. This does not trip the reactor due to bypass reactor trip breaker B is closed during testing. During this test, each of the logic inputs is actuated automatically in all combinations of trip and non-trip logic. Trip logic is not maintained sufficiently long enough to permit master relay actuation; master relays are pulsed in order to check continuity. By design, the test circuitry should not result in RTB B opening while testing.
- Performance of the SI was stopped and a troubleshooting plan was developed. During troubleshooting, two universal logic boards were replaced and an undervoltage driver board was reseated.
- After the board replacements and the board reseating, testing was performed that verified all logic functions work as designed, indicating that SSPS Train B is capable of performing its safety function. However, during the testing of memories portion of the circuitry, RTB B opened again when the intermediate range was selected for testing. This does not affect the automatic actuation logic testing.
- Further troubleshooting concluded that the problem was not associated with any of the boards replaced or the reseated board. The condition of RTB B spuriously opening occurs in the following test switch positions (see Figure 3 and Section 3.1) during testing:
    1. Logic B switch (S502) in position 2 during testing with blocks inhibited. The switch is in position 24 when not testing.
    2. Permissive switch (S505) in position 1 during testing. The switch position is in “off” when not testing.
    3. Memories switch (S506) in position 2 during testing. The switch position is in “off” when not testing.

All three switches are used for testing only and the condition of spurious RTB B opening is repeatable in the same test positions. All three test positions are associated with testing the intermediate range requirements.

Due to the anomaly in the SSPS Train B test circuity, the risk associated with performing the repairs of the test circuitry and completing the SI while at power (See Section 3 of this enclosure), or continuing the troubleshooting and testing, is deemed unacceptable. The portions of 1-SI-99-10-B associated with the SRs listed in Table 1 of this enclosure can not be satisfied until the repairs of the test circuitry are complete.

As discussed in Section 3.2.1 and shown in Table 2 of this enclosure, there has been no adverse maintenance history concerning the test circuitry. A description of the SSPS test circuitry is provided in the following section to this enclosure.

3.0 TECHNICAL EVALUATION

3.1 SYSTEMS DESCRIPTION

The SSPS equipment is used for the decision logic processing of outputs from the signal processing equipment. To meet the redundancy requirements, two trains of SSPS, each performing the same functions, are provided. If one SSPS train is taken out of service for maintenance or test purposes, the second SSPS train would provide engineered safety features (ESF) actuation for the unit. If both SSPS trains are taken out of service or placed in test, a reactor trip would result. Each SSPS train is packaged in its own cabinet for physical and electrical separation to satisfy separation and independence requirements.

The outputs from the signal processing equipment are sensed by the SSPS equipment and combined into logic matrices that represent combinations indicative of various transients. If a required logic matrix combination is completed, the system will send actuation signals via master and slave relays to those components whose aggregate function best serves to alleviate the condition and restore the unit to a safe condition.

Each SSPS train has a built-in testing device that can automatically test the decision logic matrix functions and the actuation devices while the unit is at power. When any one SSPS train is taken out of service for testing, the other SSPS train is capable of providing unit monitoring and protection until the testing has been completed. The testing device is semiautomatic to minimize testing time.

The SSPS performs the decision logic for most ESF equipment actuation, generates the electrical output signals that initiate the required actuation, and provides the status, permissive, and annunciator output signals to the main control room of the unit. Figure 1 is a simplified diagram of the SSPS functions. Figure 2 is a block diagram of the SSPS. Figure 3 shows the SSPS panel.

The SSPS is a dual train, redundant protection system housed in two three-bay cabinets, one single bay control board demultiplexer cabinet and a computer-mounted demultiplexer assembly. Each train cabinet has an input relay bay, a logic bay, and an output relay bay. The SSPS uses high threshold integrated circuits for logic, and relays for input and output isolation. A logic tester and an output relay tester permit a test time of approximately ten minutes per train. This allows for more frequent periodic tests and a corresponding increase in confidence level in the operational integrity of the system.

The reactor trip, which is a result of one or more error inputs to the SSPS, is accomplished through the full length rod control system power supply. The RTBs are kept energized through a series of holding contacts. These contacts are on undervoltage (UV) relays. Each SSPS train maintains two UV coils in an energized condition, one for an RTB and one for the bypass breaker of a second series RTB. The coils are energized through a UV board in the train logic. A reactor trip output of the logic will cause the UV board 48 volt (V) output to be removed, deenergizing the UV coils. This will open one or both RTBs and bypass breakers, depending on their status, causing the shutdown and control rods to insert into the core, thus shutting down the reactor.

Each SSPS train has a testing device called a semiautomatic tester located on the logic test panel that contains all the switches, indicators, and manual actuators to perform the functional test of the SSPS Train A or B and reactor trip breaker. It is from this panel that all semiautomatic tests on the system are performed.

The logic test panel contains the test points to monitor the output of the power supplies and to monitor the clock counter signals used by the tester board A132. The meter installed on the panel is connected to the terminal block for the UV current when the system is in normal operation. When the system is in test, the meter is aligned to the output of the circuit being tested, by the logic test switches.

The semiautomatic tests are performed only on the logic circuits that make up logic decisions for protection signals, which are trips, safeguards, memories, or permissive circuits. The logic test panel is the interface between the test personnel and the two tester boards, A103 and A132. The tester clock counter board A103 provides counter signals to the semiautomatic tester board A132 to generate the test signals. The test signals are routed to the circuit being tested by the logic test switches on the logic test panel (S501 thru S504).

All possible combinations of trip signals for the circuit being tested are sent to the test circuit. The output of the test circuit is fed back to the semiautomatic tester board where it is compared to a reference pulse generated by the tester A132. If the comparison is bad, the test pulse train is stopped, the counter is stopped, and the bad light illuminates. Individual circuits and groups of circuits are tested in this manner.

Logic circuits that perform memory functions are tested by the memory function tests and are not connected to the automatic tester. Because the test pulses are too fast and are not the correct configuration for memory testing, a special test arrangement is used for memory test. Memory tests are for those logic circuits that are used to memorize main control room switch closures. These tests are completed by using artificial sets and resets to make the memory circuit operate. The test signals are sent to the test circuit by the memory test switch (S506). The output of the circuit being tested is monitored by a memory test light on the logic test panel.

Below is a further description of the test switches for the SSPS as shown on Figure 3.

<u>Logic A Switch (S501)</u>

The logic A switch is used for logic testing. It is a 10-deck, 24-position switch. Position 1 is off. Positions 2 through 23 are used to test various Universal Logic Board Decision Maker

circuits, the UV driver board, and the safeguards driver boards. Position 24 enables the logic B switch, S502.

Logic B Switch (S502)

The logic B switch is used for logic testing. It is a 10-deck, 24-position switch. Positions 1 through 23 are used to test various universal logic board decision maker circuits, the UV driver board, and the safeguards driver boards. Position 24 enables the logic C switch, S503 (S501 must also be in position 24).

Logic C Switch (S503)

The logic C switch is used for logic testing. It is a 10-deck, 24-position switch. Positions 1 through 23 are used to test various universal logic board decision maker circuits, the UV driver board, and the safeguards driver boards. Position 24 enables the logic D switch, S504 (S501 and S502 must both be in position 24).

Logic D Switch (S504)

The logic D switch is used for logic testing. It is a 10-deck, 24-position switch. Positions 1 through 23 are used to test various universal logic board decision maker circuits, the UV driver board, and the safeguards driver boards. Position 24 enables the permissive test switch, S505 (S501, S502, and S503 must all be in position 24).

Permissive Test Switch (S505)

The permissive test switch is used to test permissive circuits. It is a 10-deck, 12-position switch. Position 1 is off. Positions 2 through 12 route test signals from the tester board to various permissive circuits. When the permissive test switch is out of the off position, all P-grounds are lost.

Memory Test Switch (S506)

The memory test switch is used to test various memory circuits. It is an 8-deck, 24-position switch. Position 1 is off. Positions 2 through 24 are used in conjunction with the memory set (S515) and memory reset (S516) pushbuttons to test memory circuits. The associated indicator lamp above the pushbuttons is used to verify that the memory circuit changes state.

Master Relay Selector Switch (S601)

The master relay selector switch establishes the line up for testing master relay operation and continuity through the slave relays.

Mode Selector Switch (S602)

The mode selector switch has two positions (operate and test). In the operate position, 118V AC is available to the slave relays and safeguards actuations can occur if required. A green operate light is energized when the mode selector switch is in the operate position. In the test position, 118V AC is removed from the slave relays and is replaced by 15V DC. This prevents the slave relays from actuating during testing but allows continuity through the

slave relay coils to be verified. The semi-automatic tester is used to check the logic circuitry within the logic cabinet using the multiposition function selector switches.

Further description of the systems applicable to the proposed extended SRs is provided in the individual attachments listed in Table 1.

3.2 TECHNICAL ANALYSIS

3.2.1 Evaluation Method

The proposed surveillance extensions were evaluated, in part, using the guidance provided in Generic Letter (GL) 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. GL 91-04 provided guidance for evaluating the effect of adopting a 24-month surveillance test interval. This guidance was utilized, as appropriate, in the technical evaluations performed to justify the surveillance extensions discussed herein. Specifically, surveillance and failure history reviews were performed for applicable extended SRs. The results of these reviews are discussed in the attachments to this enclosure, which are listed in Table 1.

Table 1 lists the TS SRs for which extensions are being requested and includes the following information for each SR:

- The date the SR was last performed.
- The current due date of the SR (including the 25% extension allowed by SR 3.0.2).
- The proposed extended date of the SR.
- The number of days from the SR current expiration date to the requested extension date (i.e., the number of days that the SR would be extended beyond that allowed by WBN Unit 1 SR 3.0.2, where applicable).

The following is an outline for each evaluation contained in Attachments 5 through 7:

Scope of SR Extension

This section identifies the specific scope (e.g., component, function) associated with the SR that is being requested for extension.

Why these Surveillances Cannot be Performed

This section discusses the bases why the affected SR(s) cannot be performed.

System Description

This section provides descriptions of the system(s) associated with the affected SRs.

Safety Analysis

This section describes the safety analysis from the applicable TS Bases or the WBN dual-unit Updated Final Safety Analysis Report (UFSAR) for the affected SRs.

Surveillance Requirement

Provides a description of the affected SRs and SR testing.

Basis for Extension of the Surveillance Requirements

The attachments to this enclosure provide the basis for the extension of the SR including the following information:

- Review of Operating Experience

  Operating history has demonstrated that the WBN Units 1 and 2 SSPS are highly reliable. Table 2 to this enclosure provides the history for the last ten performances of the SRs listed in Table 1 to this enclosure for both the A and B trains of the WBN Units 1 and 2 SSPS. As shown in Table 2 to this enclosure, a review of the test results has not revealed any automatic logic failures. In addition, the next surveillance of the SSPS Train A in accordance with 1-SI-99-10-A is scheduled for August 9, 2018.

- Additional Testing

  This section describes any additional testing, if applicable, that was done on the affected component(s) other than the SR.

Conclusion

This section summarizes the evaluation and provides the bases for why the SR extension request does not have an adverse impact on the safe and reliable operation of WBN Unit 1.

3.2.2 Repair Considerations and Mode Change Considerations

There are four alternatives for addressing the inability to perform the SSPS Train B automatic logic surveillances due a faulty test circuitry:

1. Repair the SSPS Train B test circuity during power operation. This would involve taking Train B SSPS out of service for at least 132 hours (see below timeline), thus incurring an increase in risk while one train of SSPS is out of service. This alternative was ruled out because of the increase in risk associated with the additional time required beyond the TS 24-hour completion times.
2. Shut the unit down to Mode 5 to repair the test circuitry. This option would involve an increase in risk due to shutting the unit down, plus an additional thermal cycle on the reactor coolant pressure boundary. Transitioning the unit from Mode 1 to Mode 5 to repair the test circuity for the SSPS Train B is not a desirable evolution and poses an operational transient to the unit.
3. Complete the surveillance using jumpers to mimic the function of the memories test switch. While this alternative is feasible, it is not the preferred option because it involves entering the logic cabinet and installing jumpers, which poses a potential trip risk and the potential for error.
4. The most viable, alternative is to delay performance of the SR listed in Table 1 to this enclosure until the refueling outage scheduled for September 2018, unless WBN Unit 1 enters Mode 5 before then. This option provides the lowest increase in risk as discussed in Section 3.3.

The breakdown for performing the repair of the SSPS test circuitry is as follows:

Activity	Hours
Troubleshooting (two shifts)	24
Shutdown SSPS Train B	6
Establish Hold Order	2
Pull Cards	6
Replace Affected Switch(es) and Connector(s)	72
Install Cards	6
Lift Hold Order	2
Restore Power	2
Perform Logic Test	2
Return to Service	2
Perform SI	6
Review Completed SI	2
Total	132

Troubleshooting will require the WBN Unit 1 SSPS Train B energized and/or the bypass breaker racked in and closed. Repairs will require a complete power down of the WBN Unit 1 SSPS Train B to Mode 5, then powered up to complete the PMT (1-SI-99-10-B) plus any specific additional PMTs as a result of repaired or replaced components.

As noted above, the total time to troubleshoot and repair the SSPS Train B circuitry greatly exceeds the required action time to be in Mode 3 within 30 hours as specified in TS 3.3.1, Required Action P.2, and TS 3.3.2, Required Actions C.2.1, G.2.1 and H.2.1. The time to repair the SSPS test circuitry also exceeds the total time of 60 hours required to be in Mode 5 in accordance with TS 3.3.2, Required Action C.2.2.

Therefore, repairing the SSPS Train B test circuitry requires transitioning the unit to Mode 5, which is not desirable because it poses a significant operational transient on the unit along with increased risk to personnel. Furthermore, if a unit trip or other operational issue occurred resulting in the plant entering Mode 3 or Mode 4, transitioning the unit from Mode 3 or Mode 4 to Mode 5 to repair the SSPS Train B test circuitry is not a desirable evolution and poses a significant operational transient to the unit as described below.

While WBN does not have a risk model for the transition from Mode 3 to Mode 5 and back to Mode 3, the precise maneuvering of the nuclear unit involves many operator evolutions and must be carefully performed. A plant mode change from Mode 3 at near 550°F and 2250 psig to Mode 5 at less than 200°F and less than 400 psig and subsequently back to Mode 3 is a significant plant maneuver. This evolution involves plant boration to cold shutdown conditions, a controlled cool down within reactor coolant system (RCS) pressure and temperature limits using auxiliary feedwater and a transition to operation on residual heat removal in Mode 4. With the transition from Mode 4 to Mode 5, the cold overpressure mitigation system is engaged, emergency core cooling system (ECCS) injection capability is inhibited and the cool down is continued until the plant is less than 200°F.

After the unit has entered Mode 5, the repair of the SSPS Train B test circuitry would occur, as required. The return of the plant to normal operating temperature and pressure would require the completion of numerous plant surveillances during plant heatup and subsequent

mode changes. The approach to full temperature and pressure would be slowed to allow the pressurizer safety valves and power operated relief valves (PORVs) to become thermally stable to prevent leakage. The entire evolution to take the plant from Mode 3 to Mode 5 and back to Mode 3 at normal operating pressure and temperature would take approximately four to five days, not including the time required to repair the SSPS Train B test circuitry.

3.3 RISK CONSIDERATIONS

TVA evaluated the overall effect of the proposed SR extensions on WBN Unit 1 from a safety and risk perspective associated with the extension of these surveillances. TVA determined that the risk associated with the proposed SR extensions was small. The risk contributions from each of the separately assessed SR extensions were summed, with acceptable results, which are conservative.

The small risk of extending the SRs as discussed above is outweighed by the successful operating history of the SSPS as discussed in Section 3.2.1 and the compensatory measures discussed in Section 3.4. Therefore, extending the SR listed in Table 1 to this enclosure presents the least amount of risk to the plant, as compared to repairing the test circuitry at power or shutting WBN Unit 1 down to repair the switch prior to the next WBN Unit 1 refueling outage.

3.4 COMPENSATORY MEASURES

The control room operators will be briefed on the circuits in Train B SSPS that have not been tested due to the anomaly in the SSPS test circuitry. This briefing will include a discussion of how the anomaly in these circuits may affect WBN Unit 1 operations. In view of the inability to test Train B SSPS functions per 1-SI-99-10-B, the operators will be directed to take the following compensatory measures:

1. Operators will be made aware of the affected Train B SSPS functions via a Standing Order with direction to maintain increased awareness to automatic SSPS functions, which would fail to actuate following a reactor trip.
2. Operators will take manual actions to complete any automatic SSPS logic actuations that may fail to occur.
3. Twice per shift, while in Modes 1 through 4, operators will verify nominal values for the following plant parameters, and logged in 1-PI-OPS-1-OAC, “Operator at the Controls Mode 1-4 Checklists”:
   - Steam generator level
   - Steam generator pressure
   - Pressurizer pressure
   - Containment pressure
   - SSPS permissive status and associated trip status lights
4. Operator rounds will be increased to twice per shift of the main steam valve rooms and turbine building for steam leaks. This compensatory measure will decrease the likelihood of reactor trip precursors caused by any secondary plant events so that prompt action can be taken.

5. If WBN Unit 1 enters Mode 5 prior to the WBN U1R15 outage, then the SSPS test circuitry will be repaired and the SRs listed in Table 1 to this enclosure will be performed.

4.0 REGULATORY EVALUATION

4.1 APPLICABLE REGULATORY REQUIREMENTS/CRITERIA

4.1.1 Regulations

10 CFR 50.36 sets forth the regulatory requirements for the content of the TSs. This regulation requires, in part, that the TS contain SRs. 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 is maintained, that facility operation will be within safety limits, and that the TS Limiting Condition for Operation (LCO) will be met. The proposed changes to the SRs are for an extension of certain surveillance intervals, which are not specified in the regulations.

4.1.2 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 Unit 1 UFSAR, however, addresses the General Design Criteria (GDC) published as Appendix A to 10 CFR 50 in July 1971, including Criterion 4 as amended October 27, 1987.

The WBN UFSAR contains the GDC followed by a discussion of the design features and procedures that meet the intent of the criteria. The relevant GDC with the discussion of the design features and procedures that meet the intent of the criteria are included below. Any exception to the 1971 GDC is identified in the discussion of the corresponding criterion.

Criterion 20 - Protection 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 this GDC 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 this GDC 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 this GDC is described in Section 3.1.2.3 of the WBN dual-unit UFSAR.

Criterion 25 - Protection System Requirements for Reactivity Control Malfunctions

The protection system shall be designed to assure that specified acceptable fuel design limits are not exceeded for any single malfunction of the reactivity control systems, such as accidental withdrawal (not ejection or dropout) of control rods.

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

There will be no changes to the WBN design such that compliance with any of the above regulatory requirements would come into question. As such, WBN, Unit 1 will continue to comply with the applicable regulatory requirements.

4.2 PRECEDENT

This LAR is similar in nature to Reference 1 where the Nuclear Regulatory Commission (NRC) approved an extension to the surveillance intervals for SRs 3.3.1.5 and 3.3.2.2 for the SSPS for the Vogtle Electric Generating Plant Unit 2. This extension was needed because the SRs could not be performed due to a broken test switch. The extension allowed continued operation of the unit until the next refueling outage; a time period in which three performances of the SRs were missed. The total duration for the SR extension was approximately five months.

While the circumstances necessitating the need for an extension are different, this LAR is also similar to References 2 and 3, where the NRC approved the one-time extension of various 18-month SRs for WBN Unit 2 until the first refueling outage. The extensions in References 2 and 3 were necessitated due to a delay of the start date for the first refueling outage for WBN Unit 2 because of a delay in the date of commercial operation for WBN Unit 2. The WBN Unit 2 extension was for a maximum of 194 days.

4.3 SIGNIFICANT HAZARDS CONSIDERATION

The Tennessee Valley Authority (TVA) is proposing an amendment to revise the Watts Bar Nuclear Plant (WBN) Unit 1 Technical Specifications (TSs) to allow an extension to certain functions associated with the 92-day TS Surveillance Requirements (SRs) 3.3.1.5, 3.3.2.2, and 3.3.6.2 that currently cannot be performed due to an anomaly with the WBN Unit 1 solid state protection system (SSPS) test circuitry.

TVA proposes to amend WBN Unit 1 SR 3.0.2 and Table SR 3.0.2-1 to permit the extension of the affected SR functions to no later than October 1, 2018, in order that these SRs can be performed during the WBN Unit 1 Cycle 15 refueling outage (U1R15), scheduled to commence in September 2018. If WBN Unit 1 enters Mode 5 prior to the WBN U1R15 outage, then these SRs will be performed.

TVA has evaluated whether or not a significant hazards consideration is involved with the proposed amendment(s) 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 consequences of an accident previously evaluated?

   Response: No.

   The requested action is an extension to the performance interval of a limited number of TS surveillance requirements. The performance of these surveillances, or the extension of these surveillances, is not a precursor to an accident. Performing these surveillances or failing to perform these surveillances does not affect the probability of an accident. Therefore, the proposed delay in performance of the SRs in this amendment request does not increase the probability of an accident previously evaluated.

   A delay in performing these surveillances does not result in a system being unable to perform its required function. In the case of this one-time extension request, the short period of additional time that the systems and components will be in service before the next performance of the surveillance will not affect the ability of those systems to operate as designed. Therefore, the systems required to mitigate accidents will remain capable of performing their required function. No new failure modes have been introduced because of this action and the consequences remain consistent with previously evaluated accidents. On this basis, the proposed delay in performance of the SRs in this amendment request does not involve a significant increase in the consequences of an accident.

   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 amendment does not involve a physical alteration of any system, structure, or component (SSC) or a change in the way any SSC is operated. The

proposed amendment does not involve operation of any SSCs in a manner or configuration different from those previously recognized or evaluated. No new failure mechanisms will be introduced by the one-time SR extensions being requested.

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 amendment is a one-time extension of the performance interval of a limited number of TS SRs. Extending these SRs does not involve a modification of any TS limiting condition for operation. Extending these SRs does not involve a change to any limit on accident consequences specified in the license or regulations. Extending these SRs does not involve a change in how accidents are mitigated or a significant increase in the consequences of an accident. Extending these SRs does not involve a change in a methodology used to evaluate consequences of an accident. Extending these SRs does not involve a change in any operating procedure or process.

   Operating history has demonstrated that the WBN Units 1 and 2 SSPS is highly reliable. A review of the test results has not revealed any automatic logic failures. Based on the limited additional period of time that the systems and components will be in service before the surveillances are next performed, as well as the operating experience that these surveillances are typically successful when performed, it is reasonable to conclude that the margins of safety associated with these SRs will not be affected by the requested extension.

   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 CONCLUSIONS

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 SR. 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.

6.0 REFERENCES

1. NRC letter to Southern Nuclear Company, “Vogtle Electric Generating Plant, Unit 2 Re: Issuance of Amendment (TAC No. MC1256),” dated December 3, 2003 (ML033380002)
2. NRC letter to TVA, 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 (ML17074A501)
3. NRC letter to TVA, Watts Bar Nuclear Plant, Unit 2 - Issuance of Amendment Regarding One-Time Extension of Intervals for Specified Surveillance Requirements (CAC No. MF8895), dated July 11, 2017 (ML17180A024)

Table 1 Technical Specification Extension Summary							
Technical Specification Surveillance Requirement (SR)	SR Frequency	Date last Performed	Due Date plus 25% (Note 1)	Extended Date	Extension Days	Justification Location	Description of SR Requirement
3.3.1.5, Table 3.3.1-1, Function 19	92 days	02/16/18	8/17/2018	10/1/18	45	Attachment 5	Perform reactor trip system (RTS) instrumentation actuation logic test of automatic trip logic
3.3.2.2, Table 3.3.2-1, Function 1.b	92 days	02/16/18	8/17/2018	10/1/18	45	Attachment 6	Perform engineered safety feature actuation system (ESFAS) Instrumentation actuation logic test of safety injection - automatic actuation logic and actuation relays
3.3.2.2, Table 3.3.2-1, Function 2.b	92 days	02/16/18	8/17/2018	10/1/18	45	Attachment 6	Perform ESFAS instrumentation actuation logic test of containment spray - automatic actuation logic and actuation relays
3.3.2.2, Table 3.3.2-1, Function 3.a(2)	92 days	02/16/18	8/17/2018	10/1/18	45	Attachment 6	Perform ESFAS instrumentation actuation logic test of containment isolation - Phase A isolation
3.3.2.2, Table 3.3.2-1, Function 3.b(2)	92 days	02/16/18	8/17/2018	10/1/18	45	Attachment 6	Perform ESFAS instrumentation actuation logic test of containment isolation - Phase B isolation

Table 1 Technical Specification Extension Summary							
Technical Specification Surveillance Requirement (SR)	SR Frequency	Date last Performed	Due Date plus 25% (Note 1)	Extended Date	Extension Days	Justification Location	Description of SR Requirement
3.3.2.2, Table 3.3.2-1, Function 4.b	92 days	02/16/18	8/17/2018	10/1/18	45	Attachment 6	Perform ESFAS instrumentation actuation logic test of steam line isolation - automatic actuation logic and actuation relays
3.3.2.2, Table 3.3.2-1, Function 5.a	92 days	02/16/18	8/17/2018	10/1/18	45	Attachment 6	Perform ESFAS instrumentation actuation logic test of turbine trip and feedwater isolation - automatic actuation logic and actuation relays
3.3.2.2, Table 3.3.2-1, Function 6.a	92 days	02/16/18	8/17/2018	10/1/18	45	Attachment 6	Perform ESFAS instrumentation actuation logic test of auxiliary feedwater - automatic actuation logic and actuation relays
3.3.2.2, Table 3.3.2-1, Function 7.a	92 days	02/16/18	8/17/2018	10/1/18	45	Attachment 6	Perform ESFAS instrumentation actuation logic test of automatic switchover to containment sump - automatic actuation logic and actuation relays

Table 1 Technical Specification Extension Summary							
Technical Specification Surveillance Requirement (SR)	SR Frequency	Date last Performed	Due Date plus 25% (Note 1)	Extended Date	Extension Days	Justification Location	Description of SR Requirement
3.3.6.2, Table 3.3.6-1, Function 2	92 days	02/16/18	8/17/2018	10/1/18	45	Attachment 7	Perform containment vent isolation instrumentation actuation logic test of automatic actuation logic and actuation relays

Note:

1. As discussed in Section 1.0 to this enclosure, the SRs listed in this table are performed every 92 days on a staggered test basis. Therefore, the due date for the Train B portion of the SRs listed in this table is based on the date that these SRs were last performed for Train A. The Train A portion of the SRs listed in this table was last performed on April 24, 2018. Therefore, the due date for the performance of the Train B portion of the SRs listed in this table is August 17, 2018, that is, 115 days (i.e., 92 days plus 25%) from April 24, 2018.

Table 2 Last Ten Performances of the SRs listed in Table 1 to this Enclosure				
Technical Specification Surveillance Requirement (SR)	SIs	Unit	Dates Performed	Automatic Actuation Logic Failures?
3.3.1.5, Table 3.3.1-1, Function 19	1-SI-99-10-A	1	4/12/18	No
			12/7/17	No
3.3.2.2, Table 3.3.2-1, Function 1.b			8/23/17	No
			4/2/17	No
3.3.2.2, Table 3.3.2-1, Function 2.b			12/7/16	No
			8/11/16	No
3.3.2.2, Table 3.3.2-1, Function 3.a(2)			4/14/16	No
			12/11/15	No
3.3.2.2, Table 3.3.2-1, Function 3.b(2)			10/4/15	No
			8/14/15	No
3.3.2.2, Table 3.3.2-1, Function 4.b	2-SI-99-10-A	2	2/22/18	No
			11/9/17	No
3.3.2.2, Table 3.3.2-1, Function 5.a			7/16/17	No
			6/8/17	No
3.3.2.2, Table 3.3.2-1, Function 6.a			3/8/17	No
			11/22/16	No
3.3.2.2, Table 3.3.2-1, Function 7.a			5/18/16	No
			4/7/16	No
3.3.6.2, Table 3.3.6-1, Function 2			2/2/16	No
			1/19/16	No

Table 2 Last Ten Performances of the SRs listed in Table 1 to this Enclosure				
Technical Specification Surveillance Requirement (SR)	SIs	Unit	Dates Performed	Automatic Actuation Logic Failures?
3.3.1.5, Table 3.3.1-1, Function 19 3.3.2.2, Table 3.3.2-1, Function 1.b 3.3.2.2, Table 3.3.2-1, Function 2.b 3.3.2.2, Table 3.3.2-1, Function 3.a(2) 3.3.2.2, Table 3.3.2-1, Function 3.b(2)	1-SI-99-10-B	1	2/16/18	No
			10/19/17	No
			6/15/17	No
			4/15/17	No
			2/17/17	No
			10/21/16	No
			6/16/16	No
			2/7/16	No
			10/4/15	No
			6/4/15	No
3.3.2.2, Table 3.3.2-1, Function 4.b 3.3.2.2, Table 3.3.2-1, Function 5.a 3.3.2.2, Table 3.3.2-1, Function 6.a 3.3.2.2, Table 3.3.2-1, Function 7.a 3.3.6.2, Table 3.3.6-1, Function 2	2-SI-99-10-B	2	1/19/18	No
			11/6/17	No
			8/30/17	No
			7/22/17	No
			7/18/17	No
			7/12/17	No
			9/22/16	No
			6/3/16	No
			2/2/16	No
			1/13/16	No

Figure 1 - Simplified SSPS Functions

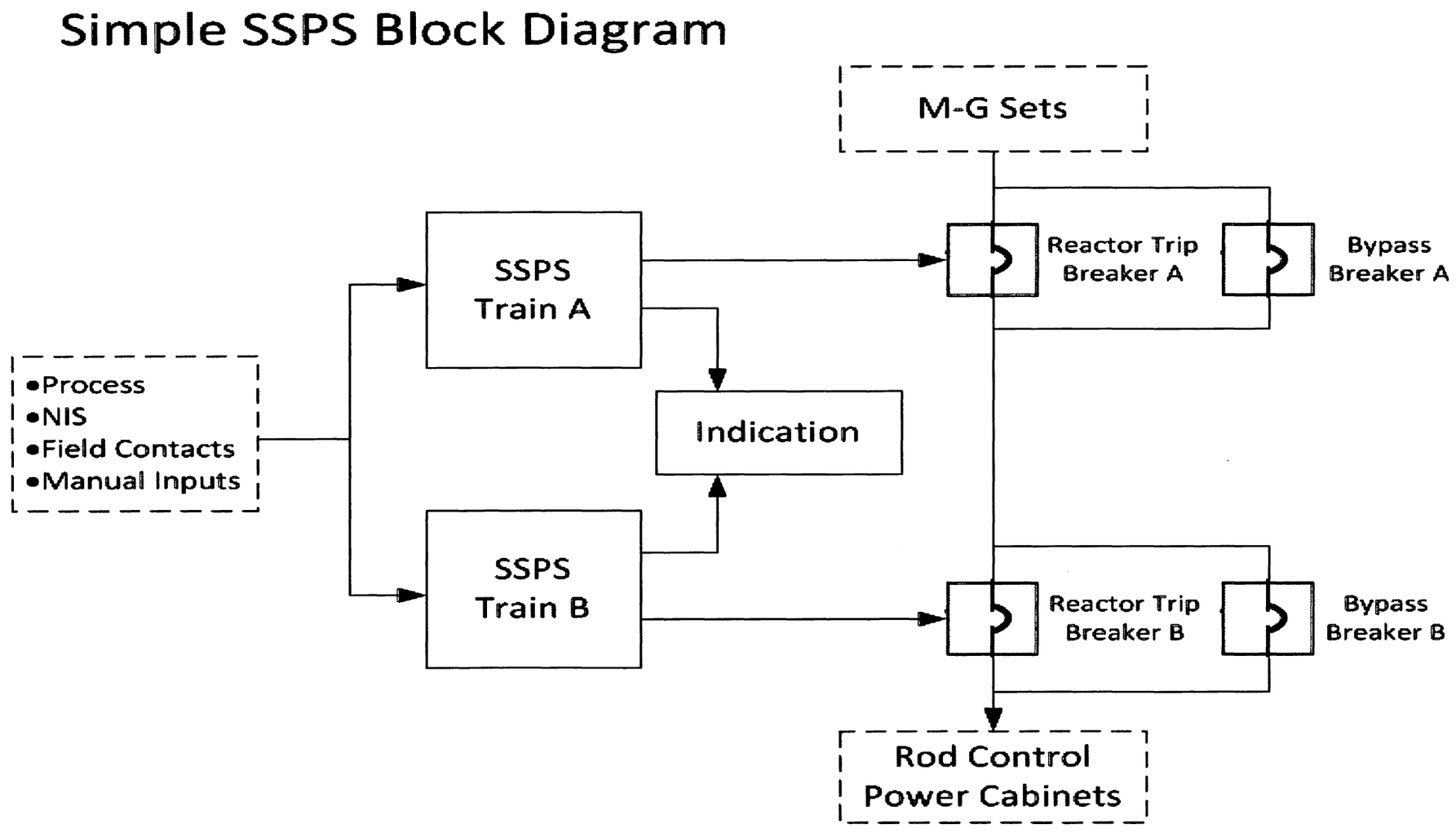
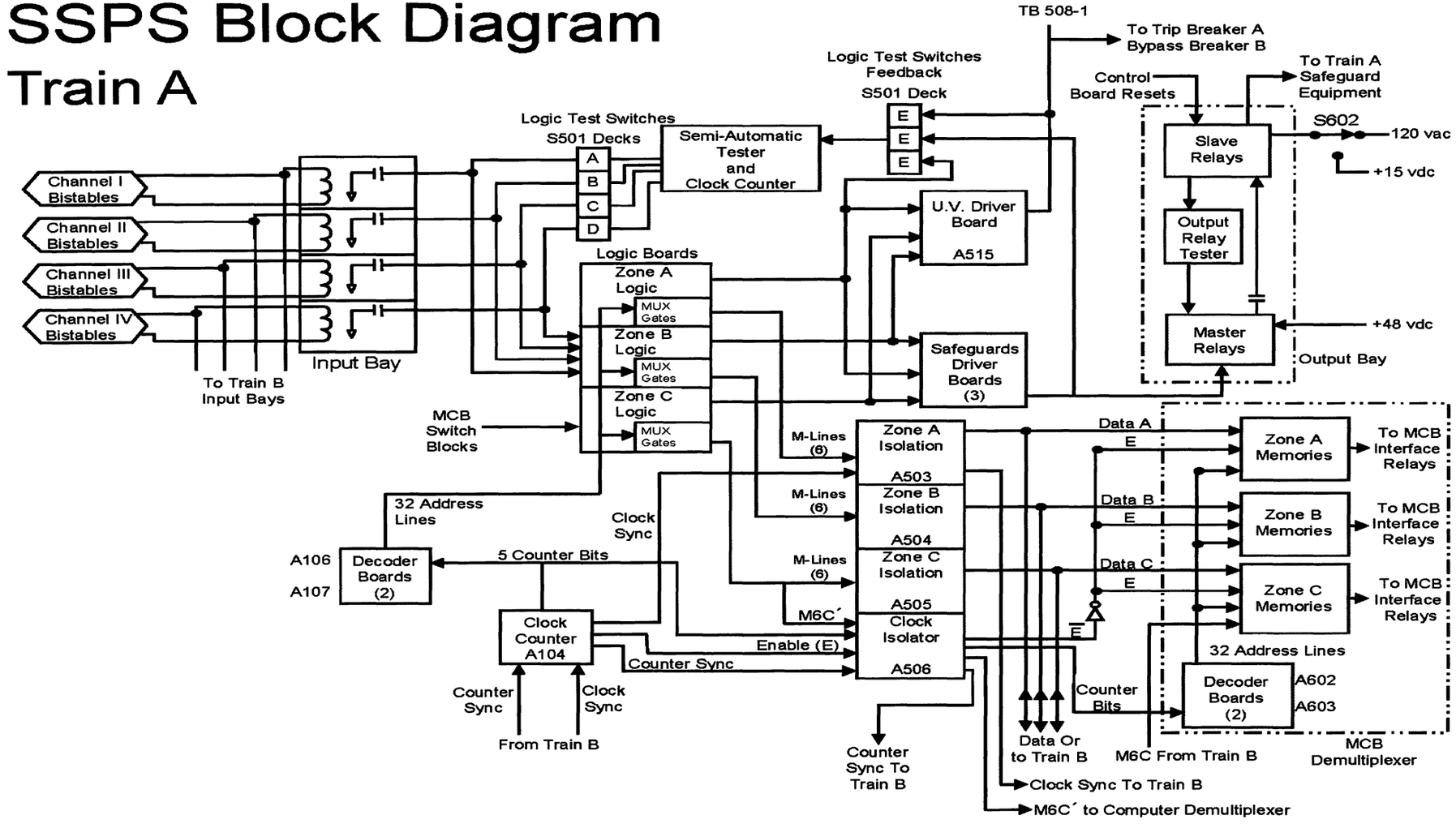


Figure 2 - SSPS Block Diagram



Enclosure

Figure 3 - SSPS Panel

Enclosure

Attachment 1

Proposed TS Changes (Mark-Ups) for WBN Unit 1

3.0 SURVEILLANCE REQUIREMENT (SR) APPLICABILITY

SR 3.0.1

SRs shall be met during the MODES or other specified conditions in the Applicability for individual LCOs, unless otherwise stated in the SR. Failure to meet a Surveillance, whether such failure is experienced during the performance of the Surveillance or between performances of the Surveillance, shall be failure to meet the LCO. Failure to perform a Surveillance within the specified Frequency shall be failure to meet the LCO except as provided in SR 3.0.3. Surveillances do not have to be performed on inoperable equipment or variables outside specified limits.

SR 3.0.2

The specified Frequency for each SR is met if the Surveillance is performed within 1.25 times the interval specified in the Frequency, as measured from the previous performance or as measured from the time a specified condition of the Frequency is met. In addition, for each of the SRs listed in Table SR 3.0.2-1 the specified Frequency is met if the Surveillance is performed on or before the date listed on Table SR 3.0.2-1. ~~This extension of the test intervals for these SRs is permitted on a one-time basis to be completed no later than November 30, 2017.~~ The Surveillance Frequency extension limits expire on the dates listed in Table SR 3.0.2-1 or when the unit enters MODE 5, whichever occurs first.

For Frequencies specified as "once," the above interval extension does not apply.

If a Completion Time requires periodic performance on a "once per . . ." basis, the above Frequency extension applies to each performance after the initial performance.

Exceptions to this Specification are stated in the individual Specifications.

SR 3.0.3

If it is discovered that a Surveillance was not performed within its specified Frequency, then compliance with the requirement to declare the LCO not met may be delayed, from the time of discovery, up to 24 hours or up to the limit of the specified Frequency, whichever is greater. This delay period is permitted to allow performance of the Surveillance. A risk evaluation shall be performed for any Surveillance delayed greater than 24 hours and the risk impact shall be managed.

If the Surveillance is not performed within the delay period, the LCO must immediately be declared not met, and the applicable Condition(s) must be entered.

(continued)

Table SR 3.0.2-1		
Surveillance Requirement (SR)	Description of SR Requirement	Frequency Extension Limit
~~3.8.1.9~~	~~Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and:~~ ~~a. Following load rejection, the frequency is ≤ 66.75 Hz;~~ ~~b. Within 3 seconds following load rejection, the voltage is ≥ 6555 V and ≤ 7260 V; and~~ ~~c. Within 4 seconds following load rejection, the frequency is ≥ 59.8 Hz and ≤ 60.1 Hz.~~	~~11/30/17~~
~~3.8.1.10~~	~~Verify each DG operating at a power factor ≥ 0.8 and ≤ 0.9 does not trip and voltage is maintained ≤ 8880 V during and following a load rejection of ≥ 3960 kW and ≤ 4400 kW and ≥ 2970 kVAR and ≤ 3300 kVAR~~	~~11/30/17~~
~~3.8.1.11~~	~~Verify on an actual or simulated loss of offsite power signal:~~ ~~a. De-energization of emergency buses;~~ ~~b. Load shedding from emergency buses;~~ ~~c. DG auto-starts from standby condition and:~~ ~~1. energizes permanently connected loads in ≤ 10 seconds,~~ ~~2. energizes auto-connected shutdown loads through automatic load sequencer,~~ ~~3. maintains steady state voltage ≥ 6800 V and ≤ 7260 V,~~ ~~4. maintains steady state frequency ≥ 59.8 Hz and ≤ 60.1 Hz, and~~ ~~5. supplies permanently connected and auto-connected shutdown loads for ≥ 5 minutes~~	~~11/30/17~~
~~3.8.1.13~~	~~Verify each DG's automatic trips are bypassed on automatic or emergency start signal except:~~ ~~a. Engine overspeed; and~~ ~~b. Generator differential current~~	~~11/30/17~~
~~3.8.1.16~~	~~Verify each DG:~~ ~~a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power;~~ ~~b. Transfers loads to offsite power source; and~~ ~~c. Returns to ready-to-load operation~~	~~11/30/17~~
~~3.8.1.18~~	~~Verify the time delay setting for each sequenced load block is within limits for each accident condition and non-accident condition load sequence.~~	~~11/30/17~~

Table SR 3.0.2-1 (continued)		
Surveillance Requirement (SR)	Description of SR Requirement	Frequency Extension Limit
~~3.8.1.19~~	~~Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ESF actuation signal:~~ ~~a. De-energization of emergency buses;~~ ~~b. Load shedding from emergency buses; and~~ ~~c. DG auto-starts from standby condition and:~~ ~~1. energizes permanently connected loads in ≤ 10 seconds,~~ ~~2. energizes auto-connected emergency loads through load sequencer,~~ ~~3. achieves steady state voltage: ≥ 6800 V and ≤ 7260 V,~~ ~~4. achieves steady state frequency ≥ 59.8 Hz and ≤ 60.1 Hz, and~~ ~~5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.~~	~~11/30/17~~
3.3.1.5, Table 3.3.1-1, Function 19	Perform RTS Instrumentation Actuation Logic Test of Automatic Trip logic	10/1/18
3.3.2.2, Table 3.3.2-1, Function 1.b	Perform Engineered Safety Feature Actuation System (ESFAS) Instrumentation Actuation Logic Test of Safety Injection - Automatic Actuation Logic and Actuation Relays	10/1/18
3.3.2.2, Table 3.3.2-1, Function 2.b	Perform ESFAS Instrumentation Actuation Logic Test of Containment Spray - Automatic Actuation Logic and Actuation Relays	10/1/18
3.3.2.2, Table 3.3.2-1, Function 3.a(2)	Perform ESFAS Instrumentation Actuation Logic Test of Containment Isolation - Phase A Isolation	10/1/18
3.3.2.2, Table 3.3.2-1, Function 3.b(2)	Perform ESFAS Instrumentation Actuation Logic Test of Containment Isolation - Phase B Isolation	10/1/18
3.3.2.2, Table 3.3.2-1, Function 4.b	Perform ESFAS Instrumentation Actuation Logic Test of Steam Line Isolation - Automatic Actuation Logic and Actuation Relays	10/1/18
3.3.2.2, Table 3.3.2-1, Function 5.a	Perform ESFAS Instrumentation Actuation Logic Test of Turbine Trip and Feedwater Isolation - Automatic Actuation Logic and Actuation Relays	10/1/18
3.3.2.2, Table 3.3.2-1, Function 6.a	Perform ESFAS Instrumentation Actuation Logic Test of Auxiliary Feedwater - Automatic Actuation Logic and Actuation Relays	10/1/18
3.3.2.2, Table 3.3.2-1, Function 7.a	Perform ESFAS Instrumentation Actuation Logic Test of Automatic Switchover to Containment Sump - Automatic Actuation Logic and Actuation Relays	10/1/18
3.3.6.2, Table 3.3.6-1, Function 2	Perform Containment Vent Isolation Instrumentation Actuation Logic Test of Automatic Actuation Logic and Actuation Relays	10/1/18

Enclosure

Attachment 2

Proposed TS Bases Page Changes (Mark-Ups) for WBN Unit 1 (For Information Only)

BASES (continued)

SR 3.0.2

SR 3.0.2 establishes the requirements for meeting the specified Frequency for Surveillances and any Required Action with a Completion Time that requires the periodic performance of the Required Action on a "once per . . ." interval.

SR 3.0.2 permits a 25% extension of the interval specified in the Frequency. This extension facilitates Surveillance scheduling and considers plant operating conditions that may not be suitable for conducting the Surveillance (e.g., transient conditions or other ongoing Surveillance or maintenance activities). ~~On a one-time basis the surveillance interval for those surveillances listed in TS Table 3.0.2-1 are allowed to be extended as identified on Table SR 3.0.2-1. The one-time surveillance interval extensions expires on November 30, 2017.~~For each of the SRs listed in Table SR 3.0.2-1 the specified Frequency is met if the Surveillance is performed on or before the date listed on Table SR 3.0.2-1. The Surveillance Frequency extension limits expire on the dates listed in Table SR 3.0.2-1 or when the unit enters MODE 5, whichever occurs first.

The 25% extension does not significantly degrade the reliability that results from performing the Surveillance at its specified Frequency. This is based on the recognition that the most probable result of any particular Surveillance being performed is the verification of conformance with the SRs. The exceptions to SR 3.0.2 are those Surveillances for which the 25% extension of the interval specified in the Frequency does not apply. These exceptions are stated in the individual Specifications. The requirements of regulations take precedence over the TS. Therefore, when a test interval is specified in the regulations, the test interval cannot be extended by the TS, and the surveillance requirement will include a note in the frequency stating, "SR 3.0.2 does not apply." An example of an exception when the test interval is not specified in the regulations, is the discussion in the Containment Leakage Rate Testing Program, that SR 3.0.2 does not apply. This exception is provided because the program already includes extension of test intervals.

As stated in SR 3.0.2, the 25% extension also does not apply to the initial portion of a periodic Completion Time that requires performance on a "once per . . ." basis. The 25% extension applies to each performance after the initial performance. The initial performance of the Required Action, whether it is a particular Surveillance or some other remedial action, is considered a single action with a single Completion Time. One reason for not allowing the 25% extension to this Completion Time is that such an action usually verifies that no loss of function has occurred by checking the status of redundant or diverse components or accomplishes the function of the inoperable equipment in an alternative manner.

The provisions of SR 3.0.2 are not intended to be used repeatedly merely as an operational convenience to extend Surveillance intervals (other than those consistent with refueling intervals) or periodic Completion Time intervals beyond those specified, with the exception of surveillances required to be performed on a 31-day frequency. For surveillances performed on a 31-day frequency, the normal surveillance interval may be extended in accordance with Specification 3.0.2 cyclically as required to remain synchronized to the 13-week maintenance work schedules. This practice is acceptable based on the results of an evaluation of 31-day frequency surveillance test histories that demonstrate that

(continued)

Enclosure

Attachment 3

Proposed TS Changes (Final Typed) for WBN Unit 1

3.0 SURVEILLANCE REQUIREMENT (SR) APPLICABILITY

SR 3.0.1

SRs shall be met during the MODES or other specified conditions in the Applicability for individual LCOs, unless otherwise stated in the SR. Failure to meet a Surveillance, whether such failure is experienced during the performance of the Surveillance or between performances of the Surveillance, shall be failure to meet the LCO. Failure to perform a Surveillance within the specified Frequency shall be failure to meet the LCO except as provided in SR 3.0.3. Surveillances do not have to be performed on inoperable equipment or variables outside specified limits.

SR 3.0.2

The specified Frequency for each SR is met if the Surveillance is performed within 1.25 times the interval specified in the Frequency, as measured from the previous performance or as measured from the time a specified condition of the Frequency is met. In addition, for each of the SRs listed in Table SR 3.0.2-1 the specified Frequency is met if the Surveillance is performed on or before the date listed on Table SR 3.0.2-1. The Surveillance Frequency extension limits expire on the dates listed in Table SR 3.0.2-1 or when the unit enters MODE 5, whichever occurs first.

For Frequencies specified as "once," the above interval extension does not apply.

If a Completion Time requires periodic performance on a "once per . . ." basis, the above Frequency extension applies to each performance after the initial performance.

Exceptions to this Specification are stated in the individual Specifications.

SR 3.0.3

If it is discovered that a Surveillance was not performed within its specified Frequency, then compliance with the requirement to declare the LCO not met may be delayed, from the time of discovery, up to 24 hours or up to the limit of the specified Frequency, whichever is greater. This delay period is permitted to allow performance of the Surveillance. A risk evaluation shall be performed for any Surveillance delayed greater than 24 hours and the risk impact shall be managed.

If the Surveillance is not performed within the delay period, the LCO must immediately be declared not met, and the applicable Condition(s) must be entered.

(continued)

Table SR 3.0.2-1 (continued)		
Surveillance Requirement (SR)	Description of SR Requirement	Frequency Extension Limit
3.3.1.5, Table 3.3.1-1, Function 19	Perform RTS Instrumentation Actuation Logic Test of Automatic Trip Logic	10/1/18
3.3.2.2, Table 3.3.2-1, Function 1.b	Perform Engineered Safety Feature Actuation System (ESFAS) Instrumentation Actuation Logic Test of Safety Injection - Automatic Actuation Logic and Actuation Relays	10/1/18
3.3.2.2, Table 3.3.2-1, Function 2.b	Perform ESFAS Instrumentation Actuation Logic Test of Containment Spray - Automatic Actuation Logic and Actuation Relays	10/1/18
3.3.2.2, Table 3.3.2-1, Function 3.a(2)	Perform ESFAS Instrumentation Actuation Logic Test of Containment Isolation - Phase A Isolation	10/1/18
3.3.2.2, Table 3.3.2-1, Function 3.b(2)	Perform ESFAS Instrumentation Actuation Logic Test of Containment Isolation - Phase B Isolation	10/1/18
3.3.2.2, Table 3.3.2-1, Function 4.b	Perform ESFAS Instrumentation Actuation Logic Test of Steam Line Isolation - Automatic Actuation Logic and Actuation Relays	10/1/18
3.3.2.2, Table 3.3.2-1, Function 5.a	Perform ESFAS Instrumentation Actuation Logic Test of Turbine Trip and Feedwater Isolation - Automatic Actuation Logic and Actuation Relays	10/1/18
3.3.2.2, Table 3.3.2-1, Function 6.a	Perform ESFAS Instrumentation Actuation Logic Test of Auxiliary Feedwater - Automatic Actuation Logic and Actuation Relays	10/1/18
3.3.2.2, Table 3.3.2-1, Function 7.a	Perform ESFAS Instrumentation Actuation Logic Test of Automatic Switchover to Containment Sump - Automatic Actuation Logic and Actuation Relays	10/1/18
3.3.6.2, Table 3.3.6-1, Function 2	Perform Containment Vent Isolation Instrumentation Actuation Logic Test of Automatic Actuation Logic and Actuation Relays	10/1/18

Enclosure

Attachment 4

Proposed TS Bases Changes (Final Typed) for WBN Unit 1 (For Information Only)

BASES (continued)

SR 3.0.2

SR 3.0.2 establishes the requirements for meeting the specified Frequency for Surveillances and any Required Action with a Completion Time that requires the periodic performance of the Required Action on a "once per . . ." interval.

SR 3.0.2 permits a 25% extension of the interval specified in the Frequency. This extension facilitates Surveillance scheduling and considers plant operating conditions that may not be suitable for conducting the Surveillance (e.g., transient conditions or other ongoing Surveillance or maintenance activities). For each of the SRs listed in Table SR 3.0.2-1 the specified Frequency is met if the Surveillance is performed on or before the date listed on Table SR 3.0.2-1. The Surveillance Frequency extension limits expire on the dates listed in Table SR 3.0.2-1 or when the unit enters MODE 5, whichever occurs first.

The 25% extension does not significantly degrade the reliability that results from performing the Surveillance at its specified Frequency. This is based on the recognition that the most probable result of any particular Surveillance being performed is the verification of conformance with the SRs. The exceptions to SR 3.0.2 are those Surveillances for which the 25% extension of the interval specified in the Frequency does not apply. These exceptions are stated in the individual Specifications. The requirements of regulations take precedence over the TS. Therefore, when a test interval is specified in the regulations, the test interval cannot be extended by the TS, and the surveillance requirement will include a note in the frequency stating, "SR 3.0.2 does not apply." An example of an exception when the test interval is not specified in the regulations, is the discussion in the Containment Leakage Rate Testing Program, that SR 3.0.2 does not apply. This exception is provided because the program already includes extension of test intervals.

As stated in SR 3.0.2, the 25% extension also does not apply to the initial portion of a periodic Completion Time that requires performance on a "once per . . ." basis. The 25% extension applies to each performance after the initial performance. The initial performance of the Required Action, whether it is a particular Surveillance or some other remedial action, is considered a single action with a single Completion Time. One reason for not allowing the 25% extension to this Completion Time is that such an action usually verifies that no loss of function has occurred by checking the status of redundant or diverse components or accomplishes the function of the inoperable equipment in an alternative manner.

The provisions of SR 3.0.2 are not intended to be used repeatedly merely as an operational convenience to extend Surveillance intervals (other than those consistent with refueling intervals) or periodic Completion Time intervals beyond those specified, with the exception of surveillances required to be performed on a 31-day frequency. For surveillances performed on a 31-day frequency, the normal surveillance interval may be extended in accordance with Specification 3.0.2 cyclically as required to remain synchronized to the 13-week maintenance work schedules. This practice is acceptable based on the results of an evaluation of 31-day frequency surveillance test histories that demonstrate that no adverse failure rate changes have occurred nor would be expected to develop as a result of cyclical use of surveillance interval extensions and the fact that the total number of 31-day frequency surveillances performed in any one-year period remains unchanged.

(continued)

Enclosure

Attachment 5

SR 3.3.1.5, Function 19 - Perform RTS Instrumentation Actuation Logic Test of Automatic Trip Logic

Date the SR was Last Performed - see Table 1 to this enclosure.

Requested Date for Extended Surveillance - see Table 1 to this enclosure.

Surveillance Interval Extension in Days – see Table 1 to this enclosure.

Scope of SR Extension

The automatic trip logic (TS Table 3.3.1-1, Function 19) for the RTS provides a means to interrupt the power to the control rod drive mechanisms, which will allow the rods to fall into the reactor core. The reactor trip signals generated by the RTS automatic trip logic cause the associated train of RTB and bypass breaker to open and shut down the reactor. The scope of this extension will delay the required performance of RTS automatic trip logic testing 45 days, from the current required performance date of August 17, 2018, to October 1, 2018.

Why this Surveillance Cannot be Performed at this Time

During performance of 1-SI-99-10-B, an anomaly was found in the SSPS Train B test circuitry (see Section 2.3 to this enclosure) associated with the automatic logic testing causing the associated Train B RTB to open prematurely. As discussed in Sections 2 and 3 to this enclosure, the degraded SSPS test circuitry presents an unacceptable risk to completing SR 3.3.1.5 for Table 3.3.1-1, Function 19.

WBN Unit 1 is currently operating in Mode 1 at full power. In this mode, attempts to repair the SSPS testing circuitry involve several risks. The maintenance would require removing Train B SSPS from service. With one train inoperable, TS 3.3.1, Condition P requires the train to be restored to an operable status in 24 hours or be in Mode 3 within six hours. As discussed in Section 3.2 to this enclosure, the estimate for repair significantly exceeds the completion time for restoring the SSPS train to an operable status. Therefore, having a train of SSPS actuation logic out of service at power would be undesirable as compared to the proposed alternative of extending the surveillance interval of SR 3.3.1.5 for Table 3.3.1-1, Function 19.

System Description

The RTS initiates a unit shutdown, based on the values of selected unit parameters, to protect against violating the core fuel design limits and RCS pressure boundary during anticipated operational occurrences (AOOs) and to assist the ESF systems in mitigating accidents. The RTS system utilizes four channels in each instrumentation function, two channels of manual reactor trip in each logic function, and two trains in each automatic trip logic function. The RTS automatic trip logic generates reactor trip signals, which cause the associated train RTB and bypass breaker to open and shut down the reactor. The RTS automatic trip logic function uses the SSPS to perform decision logic processing from the signal processing equipment. The SSPS equipment senses the setpoint comparator trip outputs, contact outputs and bistable outputs from the signal processing equipment. Outputs are then combined into logic matrices that represent combinations indicative of

various unit transients. When a required logic matrix combination is completed, the system will generates the electrical output signal that will initiate the required trip or actuation, and provides the status, permissive, and annunciator output signals to the main control room. Two trains of SSPS are provided with each train capable of performing the same functions. If one train of SSPS is taken out of service for maintenance or test purposes, the second train of SSPS provides protection for the unit. If both trains of SSPS are taken out of service, placed in test or experience a loss of power, a reactor trip will result.

TS 3.3.1, Table 3.3.1-1, Function 19, requires two trains of RTS automatic trip logic to be operable. Two operable channels ensure that random failure of a single logic channel will not prevent reactor trip. Each train of automatic trip logic must be operable in Mode 1 or 2 when the reactor is critical. In Modes 3, 4, or 5, each automatic trip logic train must be operable when the associated RTB closed and the control rod drive system is capable of rod withdrawal.

Safety Analysis

The RTS functions to preserve the safety limits during all AOOs and mitigates the consequences of design basis accidents in all operational modes in which the rod control system is capable of rod withdrawal or one or more rods are not fully inserted.

Each of the analyzed accidents and transients can be detected by one or more RTS functions. The accident analysis takes credit for most RTS trip functions. RTS trip functions that are retained yet not specifically credited in the accident analysis are credited in the safety analysis. These RTS trip functions provide protection for conditions that do not require dynamic transient analysis to demonstrate function performance. They also serve as backups to RTS trip functions that were credited in the accident analysis.

Surveillance Requirement

SR 3.3.1.5 for Table 3.3.1-1, Function 19 is the performance of an actuation logic test for the RTS. The logic processing function is tested every 92 days on a staggered test basis, using the SSPS semiautomatic tester. The RTS actuation logic train being tested is placed in the bypass condition, thus preventing inadvertent actuation. SR 3.3.1.5 tests all possible logic combinations, with and without applicable permissives, for each RTS protection function.

Basis for Extension of the Surveillance Requirements

Review of Operating Experience

The RTS SSPS actuation logic test surveillance performance histories for both WBN Units 1 and 2 have been reviewed for failures associated with RTS periodic logic system testing. As shown in Table 2 to this enclosure, a review of the last ten performances of the RTS logic tests for both WBN Units 1 and 2 did not reveal any RTS SSPS automatic logic instrumentation failures.

SR 3.3.1.5, Function 19 - Perform RTS Instrumentation Actuation Logic Test of Automatic Trip Logic

Additional Testing

None

Conclusion

TVA has reviewed the last successful performance of RTS Train B for SR 3.3.1.5 for TS Table 3.3.1-1, Function 19 and performed a review of operating experience to determine the reliability of the SSPS trip matrix. Based on this review, TVA has determined that extending this SR by the number of days shown in Table 1 to this enclosure, is acceptable and will have no adverse effect on the functionality of the RTS trip function as stated in the WBN Unit 1 accident analysis.

Enclosure

Attachment 6

SR 3.3.2.2, Functions 1.b, 2.b, 3.a(2), 3.b(2), 4.b, 5.a, 6.a, and 7.a - Perform ESFAS Instrumentation Actuation Logic Test

Date the SR was Last Performed - see Table 1 to this enclosure.

Requested Date for Extended Surveillance - see Table 1 to this enclosure.

Surveillance Interval Extension In Days – see Table 1 to this enclosure.

Scope of SR Extension

The scope of this SR extension applies to the following automatic trip logic functions for the ESFAS in TS Table 3.3.2-1:

Function	Description	Description of SR
1.b	ESFAS instrumentation actuation logic test of safety injection - automatic actuation logic and actuation relays	Automatic actuation logic and actuation relays consist of the same features and operate in the same manner as described for ESFAS Function 1.b (safety injection-automatic actuation logic and actuation relays). The Actuation logic consists of all circuitry housed within the actuation subsystems, including the initiating relay contacts responsible for actuating the ESF equipment,
2.b	ESFAS instrumentation actuation logic test of containment spray - automatic actuation logic and actuation relays	
3.a(2)	ESFAS instrumentation actuation logic test of Phase A isolation - automatic actuation logic and actuation relays	
3.b(2)	ESFAS instrumentation actuation logic test of Phase B isolation - automatic actuation logic and actuation relays	
4.b	ESFAS instrumentation actuation logic test of steam line isolation - automatic actuation logic and actuation relays	
5.a	ESFAS instrumentation actuation logic test of turbine trip and feedwater isolation - actuation logic and actuation relays	
6.a	ESFAS instrumentation actuation logic test of auxiliary feedwater - automatic actuation logic and actuation relays	
7.a	ESFAS instrumentation actuation logic test of automatic switchover to containment sump - automatic actuation logic and actuation relays	

SR 3.3.2.2, Functions 1.b, 2.b, 3.a(2), 3.b(2), 4.b, 5.a, 6.a, and 7.a - Perform ESFAS Instrumentation Actuation Logic Test

The scope of this extension will delay the required performance of the ESFAS automatic trip logic testing 45 days, from the current required performance date of August 17, 2018, to October 1, 2018.

Why these Surveillances Cannot be Performed at this Time

During performance of 1-SI-99-10-B, an anomaly was found in the SSPS Train B test circuitry (see Section 2.3 to this enclosure) associated with the automatic logic testing causing the associated Train B RTB to open prematurely. As discussed in Sections 2 and 3 to this enclosure, the degraded SSPS test circuitry presents an unacceptable risk to completing SR 3.3.2.2, Functions 1.b, 2.b, 3.a(2), 3.b(2), 4.b, 5.a, 6.a, and 7.a of TS Table 3.3.2-1.

WBN Unit 1 is currently operating in Mode 1 at full power. In this mode, attempts to repair the SSPS testing circuitry involve several risks. The maintenance would require removing Train B SSPS from service. With one train inoperable, TS 3.3.2, Conditions G and H, require the train to be restored to an operable status in 24 hours or be in Mode 3 within six hours. As discussed in Section 3.2 to this enclosure, the estimate for repairing the SSPS test circuitry significantly exceeds the TS-required completion time for restoring the SSPS train to an operable status. Therefore, having a train of SSPS actuation logic out of service at power would be undesirable as compared to the proposed alternative of extending the surveillance interval of SR 3.3.3.2 for Table 3.3.2-1, Functions 1.b, 2.b, 3.a(2), 3.b(2), 4.b, 5.a, 6.a, and 7.a.

System Description

The ESFAS initiates the necessary safety systems, based on the values of selected unit parameters, to protect against violating core design limits and the RCS pressure boundary, and to mitigate accidents. The ESFAS instrumentation includes the following interconnected modules

- Signal processing equipment including process protection system, and field contacts: provide analog to digital conversion [digital protection system (DPS)], signal conditioning, setpoint comparison, process algorithm actuation, compatible electrical signal output to protection system devices, and control board/control room/miscellaneous indications.
- SSPS including input, logic, and output bays: initiates the proper unit shutdown or ESF actuation in accordance with the defined logic and based on the bistable, setpoint comparators, or contact outputs from the signal process control and protection system.

The signal processing equipment is described in further detail below. The SSPS is described in Section 3.1 to this enclosure.

<u>Signal Processing Equipment</u>

Three or four channels of process control equipment are used for the signal processing of unit parameters measured by the field instruments. The process control equipment provides

analog to digital conversion, signal conditioning, comparable output signals for instruments located on the main control board, and comparison of measured input signals with setpoints established by safety analyses. If the measured value of a unit parameter exceeds the predetermined setpoint, an output from a setpoint comparator or contact is forwarded to the SSPS for decision evaluation. Channel separation is maintained up to and through the input bays. However, not all unit parameters require four channels of sensor measurement and signal processing. Some unit parameters provide input only to the SSPS, while others provide input to the SSPS, the main control board, the unit computer, and one or more control systems.

If a parameter is used only for input to the protection circuits, three channels with a two-out-of-three logic are sufficient to provide the required reliability and redundancy. If one channel fails in a direction that would not result in a partial function trip, the function is still operable with a two-out-of-two logic. If one channel fails such that a partial function trip occurs, a trip will not occur and the function is still operable with a one-out-of- two logic.

If a parameter is used for input to the SSPS and a control function, four channels with a two out-of-four logic are sufficient to provide the required reliability and redundancy. The circuit must be able to withstand both an input failure to the control system, which may then require the protection function actuation, and a single failure in the other channels providing the protection function actuation. A single failure will neither cause nor prevent the protection function actuation.

Safety Analysis

Each of the analyzed accidents can be detected by one or more ESFAS functions. One of the ESFAS functions is the primary actuation signal for that accident or for more than one type of accident. An ESFAS function may also be a secondary, or backup, actuation signal for one or more accidents. For example, Pressurizer Pressure—Low is a primary actuation signal for small loss of coolant accidents (LOCAs) and a backup actuation signal for steam line breaks (SLBs) outside containment. Functions such as manual initiation, not specifically credited in the accident safety analysis, are qualitatively credited in the safety analysis. These functions may provide protection for conditions that do not require dynamic transient analysis to demonstrate function performance. These functions may also serve as backups to functions that were credited in the accident analysis.

The required channels of ESFAS instrumentation provide unit protection in the event of any of the analyzed accidents. ESFAS instrumentation functions provide unit protection by initiating the following protection system actuations:

- Safety injection
- Containment spray
- Containment isolation
- Steam line isolation
- Turbine trip and feedwater isolation
- Auxiliary feedwater
- Automatic switchover to containment sump

SR 3.3.2.2, Functions 1.b, 2.b, 3.a(2), 3.b(2), 4.b, 5.a, 6.a, and 7.a - Perform ESFAS Instrumentation Actuation Logic Test

Surveillance Requirement

SR 3.3.2.2 for Table 3.3.2-1, Functions 1.b, 2.b, 3.a(2), 3.b(2), 4.b, 5.a, 6.a, and 7.a is the performance of an actuation logic test for the ESFAS instrumentation. The logic processing function is tested every 92 days on a staggered test basis, using the SSPS semiautomatic tester. The ESFAS actuation logic train being tested is placed in the bypass condition, thus preventing inadvertent actuation. SR 3.3.2.2 tests all possible logic combinations, with and without applicable permissives, for each ESFAS protection function.

Basis for Extension of the Surveillance Requirements

Review of Operating Experience

The ESFAS actuation logic test surveillance performance histories for both WBN Unit 1 and Unit 2 have been reviewed for failures associated with ESFAS automatic logic system testing. As shown in Table 2 to this enclosure, a review of the last ten performances of the ESFAS automatic logic tests for both WBN Units 1 and 2 did not reveal ESFAS SSPS automatic logic instrumentation failures.

Additional Testing

None

Conclusion

TVA has reviewed the last successful performance of ESFAS actuation logic test for SR 3.3.2.2 for Table 3.3.2-1, Functions 1.b, 2.b, 3.a(2), 3.b(2), 4.b, 5.a, 6.a, and 7.a, and performed a review of operating experience to determine the reliability of the SSPS trip matrix. Based on this review, TVA has determined that extending this SR by the number of days shown in Table 1 to this enclosure, is acceptable and will have no adverse effect on the functionality of the ESFAS trip function as stated in the WBN Unit 1 accident analysis.

Enclosure

Attachment 7

SR 3.3.6.2, Function 2 - Perform Containment Vent Isolation Instrumentation Actuation Logic Test of Automatic Actuation Logic and Actuation Relays

Date the SR was Last Performed - see Table 1 to this enclosure.

Requested Date for Extended Surveillance - see Table 1 to this enclosure.

Surveillance Interval Extension In Days – see Table 1 to this enclosure.

Scope of SR Extension

Containment vent isolation (CVI) instrumentation closes the containment isolation valves in the containment purge system on a safety injection signal, thereby isolating the containment atmosphere from the environment to minimize releases of radioactivity in the event of an accident. SR 3.3.6.2 is the 92-day actuation logic test that is normally performed with the unit at power. The test involves verification that all possible CVI automatic logic combinations perform their function correctly. In addition, the master relay coil is pulsed for continuity. This test verifies that the logic modules are operable and that there is an intact voltage signal path to the master relay coils.

The scope of this extension will delay the required performance of CVI automatic logic testing for 45 days, from the current required performance date of August 17, 2018, to October 1, 2018.

Why this Surveillance Cannot be Performed at this Time

During performance of 1-SI-99-10-B, an anomaly was found in the SSPS Train B test circuitry (see Section 2.3 to this enclosure) associated with the automatic logic testing causing the associated Train B RTB to open prematurely. As discussed in Sections 2 and 3 to this enclosure, the degraded SSPS test circuitry presents an unacceptable risk to completing SR 3.3.6.2 for Table 3.3.6-1, Function 2.

WBN Unit 1 is currently operating in Mode 1 at full power. In this mode, attempts to repair the SSPS testing circuitry involve several risks. The maintenance would require removing Train B SSPS from service. With one train inoperable, TS 3.3.6, Condition B, requires entry into TS 3.6.3, Condition E. TS 3.6.3, Condition E requires isolation of the containment purge system by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange in 24 hours. Isolating the containment purge system with the unit in operation poses a challenge to plant operations. The containment purge system is used to control containment pressure during plant operations. Therefore, isolating the containment purge system impacts the ability to control containment pressure necessitating restoring the containment pressure relief isolations under administrative controls. The administrative controls consist of having a dedicated operator at the valve controls to close the isolation valve in the event of an accident. Such an activity poses a challenge to plant operations in stationing the dedicated operator in comparison to the relatively low risk to the proposed 45-day extension of this SR. Therefore, having a the containment purge system isolated at power would be undesirable as compared to the proposed alternative of extending the surveillance interval of SR 3.3.6.2 for Table 3.3.6-1, Function 2.

SR 3.3.6.2, Function 2 - Perform Containment Vent Isolation Instrumentation Actuation Logic Test of Automatic Actuation Logic and Actuation Relays

System Description

The CVI instrumentation closes the containment isolation valves in the containment purge system. This action isolates the containment atmosphere from the environment to minimize releases of radioactivity in the event of an accident. CVI is initiated by a safety injection signal or by manual actuation. Safety Injection is an ESF that actuates with the occurrence of a limiting fault, such as loss of coolant accident of a steamline break to prevent or mitigate damage to the core, RCS components, to ensure containment integrity.

The ESFAS uses selected plant parameters to determine whether predetermined safety limits are being exceeded and, if they are, combines the signals into logic matrices within the SSPS. The SSPS equipment senses the setpoint comparator trip outputs, contact outputs and bistable outputs from the signal processing equipment. Outputs are then combined into logic matrices that represent combinations indicative of various unit transients. When a required logic matrix combination is completed, the system will generate the electrical output signal that will initiate the ESF.

ESFAS consists of two discrete portions of circuitry:

1) A process instrumentation portion consisting of three to four redundant channels per parameter or variable to monitor various plant parameters
2) A logic portion consisting of two redundant trains, which receive inputs from the process protection channels and perform the logic needed to actuate the ESF equipment. Each train is capable of actuating the ESF equipment required. The intent is that any single failure within ESFAS shall not prevent system action when required.

TS 3.3.6 requires two trains of the containment vent isolation instrumentation automatic actuation logic and actuation relays to be operable in Modes 1, 2, 3, and 4. Two trains of logic are provided with each train capable of performing the same functions. If one train of logic is taken out of service for maintenance or test purposes, the second train provides protection for the unit.

Safety Analysis

CVI instrumentation functions to close the containment isolation valves in the containment purge system to minimize the release of radioactivity in the event of a design basis accident in Modes 1, 2, 3, and 4.

Each of the analyzed accidents and transients can be detected by one or more ESFAS functions. The accident analysis takes credit for the ESFAS functions.

Surveillance Requirement

SR 3.3.6.2 for TS Table 3.3.6-1, Function 2, is a performance of an automatic actuation logic and actuation relay test for the CVI, as it applies to actuation on an SI signal. The automatic actuation logic is tested every 92 days on a staggered test basis, using the SSPS semiautomatic tester. The actuation logic train being tested is placed in the bypass

condition, thus preventing inadvertent actuation. SR 3.3.6.2 tests all possible logic combinations associated with an SI signal, with and without applicable permissives, for the CVI function.

Basis for Extension of the Surveillance Requirements

Review of Operating Experience

The CVI SSPS actuation logic test surveillance performance histories for both WBN Unit 1 and Unit 2 have been reviewed for failures associated with periodic logic system testing. As shown in Table 2 to this enclosure, a review of the last ten performances of the CVI SSPS actuation logic tests for both WBN Units 1 and 2 did not reveal any CVI SSPS automatic logic instrumentation failures.

Additional Testing

None

Conclusion

TVA has reviewed the last successful performance of SR 3.3.6.2 for TS Table 3.3.6, Function 2, and performed a review of operating experience to determine the reliability of the SSPS trip matrix. Based on this review, TVA has determined that extending this SR by the number of days shown in Table 1 to this enclosure, is acceptable and will have no adverse effect on the functionality of the CVI function as stated in the WBN Unit 1 accident analysis.