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

CNL-17-008

August 7, 2017

10 CFR 50.90

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

Sequoyah Nuclear Plant, Units 1 and 2
Renewed Facility Operating License Nos. DPR-77 and DPR-79
NRC Docket Nos. 50-327 and 50-328

Watts Bar Nuclear Plant, Units 1 and 2
Facility Operating License Nos. NPF-90 and NPF-96
NRC Docket Nos. 50-390 and 50-391

Subject: Sequoyah Nuclear Plant, Units 1 and 2 and Watts Bar Nuclear Plant Units 1 and 2 License Amendment Request to Modify Technical Specification (TS) Surveillance Requirement 3.2.4, "QPTR," and TS 3.3.1, "Reactor Trip System (RTS) Instrumentation," Condition D (SQN-TS-17-02 and WBN-TS-17-014)

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," the Tennessee Valley Authority (TVA) is submitting for Nuclear Regulatory Commission (NRC) approval, a request for an amendment to Renewed Facility Operating License Nos. DPR-77 and DPR-79 for the Sequoyah Nuclear Plant (SQN), Units 1 and 2, respectively, and Facility Operating License Nos. NPF-90 and NPF-96 for the Watts Bar Nuclear Plant (WBN) Unit 1 and Unit 2, respectively.

The proposed license amendment request (LAR) revises the SQN Units 1 and 2 and WBN Units 1 and 2 Technical Specification (TS) 3.2.4, "QPTR," Surveillance Requirement (SR) 3.2.4.2 and TS 3.3.1, "Reactor Trip System (RTS) Instrumentation," and associated Bases. Specifically, the proposed change would revise SR 3.2.4.2 (and the associated Note) and TS 3.3.1, Condition D to provide clarity as to when an incore power distribution measurement for quadrant power tilt ratio (QPTR) is required. The SR 3.2.4 and TS 3.3.1 Bases are also revised to reflect the changes. An administrative change is also being made to WBN Units 1 and 2 SR 3.2.4.1, Note 1, for consistency with the current and proposed changes to TS 3.3.1, Condition D and the existing SQN Units 1 and 2 SR 3.2.4.1, Note 1.

The enclosure provides a description of the proposed changes, technical evaluation of the proposed changes, regulatory evaluation, and a discussion of environmental considerations. Attachments 1, 2, 3, and 4 to the enclosure provide the existing SQN TS and Bases pages marked-up to show the proposed changes. Attachments 5, 6, 7, and 8 to the enclosure provide the existing WBN TS and Bases pages marked-up to show the proposed changes. Attachments 9, 10, 11, and 12 to the enclosure provide the existing SQN TS and Bases pages retyped to show the proposed changes. Attachments 13, 14, 15, and 16 to the enclosure provide the existing WBN TS and Bases pages retyped to show the proposed changes. Changes to the existing TS Bases are provided for information only and will be implemented under the Technical Specification Bases Control Program.

The SQN and WBN Plant Operations Review Committees and the TVA Nuclear Safety Review Board have reviewed this proposed change and determined that operation of SQN Units 1 and 2 and WBN Units 1 and 2 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 consideration 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 enclosures to the Tennessee Department of Environment and Conservation.

TVA requests approval of the proposed TS change within 12 months of the date of this letter with implementation within 30 days following NRC approval.

There are no new regulatory commitments made in this letter. Please address any questions regarding this request to Mr. Edward D. Schrull at (423) 751-3850.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 7th day of August 2017.

Respectfully,

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

cc (see Page 3)

Enclosure:

Evaluation of Proposed Change

cc: See Page 3

cc (Enclosure):

NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Sequoyah Nuclear Plant
NRC Project Manager – Sequoyah Nuclear Plant
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 (w/o enclosure)

Enclosure

Subject: **Sequoyah Nuclear Plant, Units 1 and 2 and Watts Bar Nuclear Plant Units 1 and 2 License Amendment Request to Modify Technical Specification (TS) Surveillance Requirement 3.2.4, "QPTR," and TS 3.3.1, "Reactor Trip System (RTS) Instrumentation," Condition D (SQN-TS-17-02 and WBN-TS-17-014)**

CONTENTS

Enclosure

ATTACHMENTS

1. Proposed TS Changes (Mark-Ups) for SQN Unit 1
2. Proposed TS Changes (Mark-Ups) for SQN Unit 2
3. Proposed TS Bases Page Changes (Mark-Ups) for SQN Unit 1(For Information Only)
4. Proposed TS Bases Page Changes (Mark-Ups) for SQN Unit 2 (For Information Only)
5. Proposed TS Changes (Mark-Ups) for WBN Unit 1
6. Proposed TS Changes (Mark-Ups) for WBN Unit 2
7. Proposed TS Bases Page Changes (Mark-Ups) for WBN Unit 1(For Information Only)
8. Proposed TS Bases Page Changes (Mark-Ups) for WBN Unit 2 (For Information Only)
9. Proposed TS Changes (Final Typed) for SQN Unit 1
10. Proposed TS Changes (Final Typed) for SQN Unit 2
11. Proposed TS Bases Changes (Final Typed) for SQN Unit 1 (For Information Only)
12. Proposed TS Bases Changes (Final Typed) for SQN Unit 2 (For Information Only)
13. Proposed TS Changes (Final Typed) for WBN Unit 1
14. Proposed TS Changes (Final Typed) for WBN Unit 2
15. Proposed TS Bases Changes (Final Typed) for WBN Unit 1 (For Information Only)
16. Proposed TS Bases Changes (Final Typed) for WBN Unit 2 (For Information Only)

1.0 SUMMARY DESCRIPTION

This evaluation supports a request to amend Renewed Facility Operating License (OL) Nos. DPR-77 and DPR-79 for the Tennessee Valley Authority (TVA) Sequoyah Nuclear Plant (SQN), Units 1 and 2, respectively, and Facility OL Nos. NPF-90 and NPF-96 for the TVA Watts Bar Nuclear Plant (WBN) Units 1 and 2, respectively.

The proposed Technical Specification (TS) amendment revises the SQN Units 1 and 2 and WBN Units 1 and 2 TS 3.3.1, "Reactor Trip System (RTS) Instrumentation," Condition D, and TS 3.2.4, "QPTR," Surveillance Requirement (SR) 3.2.4.2, including the associated Note, to avoid confusion as to when an incore power distribution measurement for quadrant power tilt ratio (QPTR) is required.

As currently written, TS 3.3.1, Condition D could result in the option of only performing Required Actions D.1.1 and D.1.2; thereby potentially overlooking the requirement to do an incore power distribution measurement for QPTR within 12 hours per SR 3.2.4.2. This possible confusion has resulted in several nuclear plants revising their TS in order to eliminate any confusion associated with the cross-reference to SR 3.2.4.2 within TS 3.3.1, Condition D (e.g., References 1 through 4). The proposed amendment better aligns the requirement to perform an incore power distribution measurement once per 12 hours with TS 3.2.4.

An administrative change is also being made to WBN Units 1 and 2 SR 3.2.4.1, Note 1, for consistency with the current and proposed changes to TS 3.3.1, Condition D and the existing SQN Units 1 and 2 SR 3.2.4.1, Note 1.

The SR 3.2.4 and TS 3.3.1 Bases are also revised to reflect the changes.

2.0 DETAILED DESCRIPTION

2.1 PROPOSED CHANGES

The following is a detailed description of the proposed SQN Unit 1 and Unit 2 TS changes:

- The Note associated with SR 3.2.4.2 is revised to state "Only required to be performed if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP." The frequency for SR 3.2.4.2 is revised to be consistent with the intent of the current Note by stating "Once within 12 hours AND In accordance with the Surveillance Frequency Control Program."
- A new Note 2 is added to TS 3.3.1, Condition D to refer to SR 3.2.4.2 if input to QPTR from one or more power range neutron flux channels are inoperable with thermal power greater than (>) 75 percent (%) rated thermal power (RTP). As a result, the existing Note becomes Note 1.
- TS 3.3.1 Required Actions D.1.2, D.2.1, and D.2.2 are deleted. The remaining Required Actions are renumbered as D.1 and D.2.

The following is a detailed description of the proposed WBN Unit 1 and Unit 2 TS changes:

- Note 1 to SR 3.2.4.1 is revised to change "< 75% RTP" to "≤ 75% RTP."
- The Note associated with SR 3.2.4.2 is revised to be consistent with the proposed changes to TS 3.3.1, Condition D, by inserting "to QPTR" after "Only required to be performed if input." The "≥ 75% RTP" is revised to "> 75% RTP."
- A new Note 2 is added to TS 3.3.1, Condition D to refer to SR 3.2.4.2 if input to QPTR from one or more power range neutron flux channels are inoperable with thermal power > 75% RTP. As a result, the existing Note becomes Note 1.
- TS 3.3.1 Required Actions D.1.2, D.2.1, and D.2.2 are deleted. The remaining Required Actions are renumbered as D.1 and D.2.

The TS 3.2.4 and TS 3.3.1 Bases are also revised to reflect the proposed changes. The WBN Unit 1 and Unit 2 TS Bases changes include correcting the abbreviation "QTPR" to "QPTR" in the upper right hand corner of for WBN Unit 1 TS Bases 3.2.4 and in the text of TS Bases SR 3.2.4.2.

Attachments 1, 2, 3, and 4 to the enclosure provide the existing SQN TS and Bases pages marked-up to show the proposed changes. Attachments 5, 6, 7, and 8 to the enclosure provide the existing WBN TS and Bases pages marked-up to show the proposed changes. Attachments 9, 10, 11, and 12 to the enclosure provide the existing SQN TS and Bases pages retyped to show the proposed changes. Attachments 13, 14, 15, and 16 to the enclosure provide the existing WBN TS and Bases pages retyped to show the proposed changes. Changes to the existing TS Bases are provided for information only and will be implemented under the Technical Specification Bases Control Program.

2.2 Condition Intended to Resolve

The potential for confusion exists with the current wording of TS 3.3.1, Condition D. Specifically, TS 3.3.1, Condition D could result in the option of only performing Required Actions D.1.1 and D.1.2, potentially overlooking the requirement to do an incore power distribution measurement for QPTR within 12 hours. The proposed revision to TS 3.3.1, Condition D includes the current Note (i.e., the inoperable channel may be bypassed for up to 12 hours for surveillance testing and setpoint adjustment of other channels), while including a new Note to perform SR 3.2.4.2 if input to QPTR from one or more power range neutron flux channels are inoperable with thermal power > 75% RTP. The proposed revision to SR 3.2.4.2 is to achieve consistency with the proposed changes to TS 3.3.1, Condition D.

The proposed revision to WBN Units 1 and 2 SR 3.2.4.1, Note 1, is to achieve consistency with the current and proposed changes to TS 3.3.1, Condition D, the existing Note 1 in SQN Units 1 and 2 SR 3.2.4.1, and the Westinghouse Standard TS in NUREG-1431, Revision 4.

2.3 Background

2.3.1 TS 3.2.4 and SR 3.2.4

<u>SQN</u>

The current SR 3.2.4.2 for both SQN Units 1 and 2 was incorporated as part of the conversion to the Improved TS (ITS) (Reference 5). Attachment 7 through 10 to Reference 5 describe the changes to SR 3.2.4.2 that were made as result of the conversion to ITS.

WBN

The current Note 1 to SR 3.2.4.1 for WBN Units 1 and 2 is the same as that contained in the original WBN Unit 1 OL (Reference 6) and the original WBN Unit 2 OL (Reference 7).

The current SR 3.2.4.2 for WBN Unit 1 is also the same as that contained in the original WBN Unit 1 OL (Reference 6), with the exception that Amendment 82 (Reference 8) inserted the words “either the” and “or the PDMS,” as part of the change to allow use of the Westinghouse proprietary computer code, Best Estimate Analyzer for Core Operations - Nuclear (BEACON). The current SR 3.2.4.2 for WBN Unit 2 is the same as that contained in the original WBN Unit 2 OL (Reference 7).

2.3.2 TS 3.3.1, Condition D

SQN

The current TS 3.3.1, Condition D for both SQN Units 1 and 2 was incorporated as part of the ITS conversion that also incorporated Technical Specification Task Force (TSTF) Travelers TSTF-418, Revision 2, “RPS and ESFAS Test Times and Completion Times (WCAP-14333),” and TSTF-411, Revision 1, “Surveillance Test Interval Extensions for Components of the Reactor Protection System (WCAP-15376-P),” (References 5 and 9, respectively).

WBN

The current TS 3.3.1, Condition D for WBN Unit 1 is based on a license amendment request (LAR) that revised the TS associated with reactor trip and engineered safety feature logic, reactor trip breaker allowable outage time, and surveillance testing interval relaxations (Reference 10). The LAR was based on TSTF-418, Revision 2 and TSTF-411, Revision 1. In addition, the LAR incorporated TSTF-169, Revision 1, “Deletion of Condition 3.3.1.N,” and TSTF-311, Revision 0, “Revision of Surveillance Frequency for TADOT on Turbine Trip Functional Testing,” which were incorporated into NUREG-1431. This LAR was approved by the Nuclear Regulatory Commission (NRC) in Amendment 68 (Reference 11). Subsequently, the WBN Unit 1 Amendment 68 was incorporated into the TS for the original WBN Unit 2 OL (Reference 8).

3.0 TECHNICAL EVALUATION

Section 3.1 contains an evaluation of the proposed TS changes. Section 3.2 contains a description of the affected systems.

3.1 TECHNICAL ANALYSIS OF THE PROPOSED TS CHANGES

Several licensees, in the process of implementing WCAP-14333 (e.g., References 1 through 5, 6, 12, and 13), have restructured TS 3.3.1 Condition D to avoid confusion as to when an incore power distribution measurement for determining QPTR is required. Those deviations from the version of Condition D approved in TSTF-418, Revision 2, were requested because Condition D could incorrectly lead to performing just the option of Required Actions D.1.1 and D.1.2 and potentially overlooking the requirement to do an incore power distribution measurement for QPTR within 12 hours per the Note above SR 3.2.4.2. In addition, per the guidance in TSTF-GG-05-01, "Writer's Guide for Plant Specific Improved Technical Specifications," Required Actions with shorter Completion Times (12 hours) should appear before Required

Actions with longer Completion Times (72 hours), as in the D.2.1 and D.2.2 options. As noted in References 1 and 2, the explicit option to reduce power to less than or equal to (≤) 75% RTP in Required Action D.1.2 is not considered necessary because the requirement to perform an incore power distribution measurement to monitor QPTR is only required when thermal power is > 75% per SR 3.2.4.2.

The proposed changes eliminate the potential confusion as to when to perform SR 3.2.4.2 and simplify TS 3.3.1 Condition D. Further justification for the proposed changes in this LAR is provided below.

3.1.1 TS 3.2.4 and SR 3.2.4 Changes

<u>SQN</u>

The existing Note in SQN Units 1 and 2 SR 3.2.4.2 is revised to clarify when the SR is applicable along with the requirement to initially perform this SR within 12 hours. It should be noted that the current wording for the Note in SQN Units 1 and 2 SR 3.2.4.2 is consistent with NUREG-1431, Revision 4 and TSTF-109-A, "Clarify the QPTR surveillances," (Reference 14). However, as noted in Reference 12, the proposed change to the Note in SQN Units 1 and 2 SR 3.2.4.2 and the corresponding frequency is consistent with the existing Note in the Required Actions for TS 3.3.1, Condition D that is being deleted.

The proposed change achieves consistency between the WBN Units 1 and 2 SR 3.2.4.2 and the SQN Units 1 and 2 SR 3.2.4.2 with the exception that after the initial 12-hour surveillance, WBN would continue to perform this SR every 12 hours while SQN would continue to perform the SR in accordance with the Surveillance Frequency Control Program (SFCP) (currently every 12 hours) because WBN does not have an SFCP. This proposed change eliminates potential confusion regarding the completion time to perform SR 3.2.4.2.

<u>WBN</u>

The change to Note 1 in WBN Units 1 and 2 SR 3.2.4.1 to change "< 75% RTP" to "≤ 75% RTP" is administrative in nature for consistency with the required actions in TS 3.3.1, Condition D (both the current and proposed change), the existing SQN Units 1 and 2 SR 3.2.4.1, Note 1, and NUREG-1431, Revision 4.

The existing Note in WBN Units 1 and 2 SR 3.2.4.2 limits performing this SR to when one power range channel is inoperable with thermal power ≥ 75% RTP. The Note is clarified to require performance only if the input to QPTR from one or more power range neutron flux channels are inoperable with thermal power > 75% RTP. If the inoperable power range channel remains capable of providing a valid input to QPTR, there is no need to perform SR 3.2.4.2. The change from "≥ 75% RTP" to "> 75% RTP" is administrative in nature for consistency with TS 3.3.1, Condition D, the SQN SR 3.2.4.2, and NUREG-1431, Revision 4.

The change from "QTPR" to "QPTR" in WBN Unit 1 TS Bases 3.2.4 is an administrative change to correct an abbreviation error.

3.1.2 TS 3.3.1, Condition D Changes

TS 3.3.1, Condition D applies to one power range neutron flux - high channel inoperable. Condition D currently contains Required Actions D.1.1 and D.1.2 or alternatively, D.2.1 and D.2.2, in lieu of shutting down the reactor by entering Mode 3 (Required Action D.3). Either of the paired Required Actions (D.1.1/D.1.2 or D.2.1/D.2.2) permit continued operation with the inoperable channel as long as both Required Actions in the pair are met.

<u>Required Actions D.1.1 and D.1.2 Changes</u>

Upon discovery of one power range neutron flux - high channel inoperable, Required Action D.1.1 allows 72 hours to place the inoperable channel in trip. In addition to placing the inoperable channel in the tripped condition, thermal power must be reduced to ≤ 75 % RTP within 78 hours (Required Action D.1.2).

In the time period between when the channel is known to be inoperable and before thermal power is reduced to ≤ 75% RTP, current TSs would also require performance of SR 3.2.4.2 within 12 hours and once per 12 hours thereafter. Performing SR 3.2.4.2 confirms that the normalized symmetric power distribution is consistent with QPTR. Upon meeting the requirements of Required Action D.1.2, the requirements of SR 3.2.4.2 are no longer required to be performed. Reducing the power level to ≤ 75% RTP (D.1.2) prevents operation of the core with radial power distributions beyond the design limits even though with one Nuclear Instrumentation System (NIS) power range detector inoperable, 1/4 of the radial power distribution monitoring capability is lost.

The Required Action D.1.1 requirement to place the inoperable NIS channel in trip within 72 hours is retained. This results in a partial trip condition requiring only one-out-of-three logic for actuation of the reactor protection system. As noted in References 1 and 2, deleting Required Action D.1.2 eliminates the requirement to reduce thermal power to ≤ 75% RTP. Reducing thermal power to ≤ 75% RTP is an unnecessary complication based on the proposed revision to SR 3.2.4.2 because the new surveillance note requires performing SR 3.2.4.2 when the NIS channel input to QPTR is inoperable. Performing SR 3.2.4.2 at the specified 12-hour frequency is an accurate alternative means for ensuring that any core power tilt remains within core operating limits, thus adequate protection will be assured. These changes provide for a consistent application of the TS actions and required tests.

Current Required Action D.1.2 requires thermal power to be reduced to ≤ 75% RTP within 78 hours. Proposed Note 2 of LCO 3.3.1, Condition D, states that SR 3.2.4.2 is to be performed for an inoperable power range channel with thermal power > 75% RTP. Therefore, the action to reduce thermal power to ≤ 75% RTP is still an option and current Required Action D.1.2 can be deleted from TS 3.3.1, Condition D.

<u>Required Actions D.2.1 and D.2.2 Changes</u>

Upon discovery of one power range neutron flux- high channel inoperable, Required Action D.2.1 allows 72 hours to place the inoperable channel in trip. In addition to placing the inoperable channel in the tripped condition, Required Action D.2.2 provides the appropriate action for the condition when the NIS channel input to QPTR is also inoperable (at any power level) by requiring performance of SR 3.2.4.2 once per 12 hours. However, because of the connector OR between Required Action D.1.2 and D.2.1, this could result in the option of only performing Required Actions D.1.1 and D.1.2 and not performing the requirement to do an incore power distribution measurement for QPTR within 12 hours.

Required Action D.2.1 is deleted, but the requirement to place the inoperable NIS channel in trip is retained in D.1. Required Action D.2.2 is deleted because retaining this requirement would duplicate incore power distribution measurement requirements that are included with SR 3.2.4.2 when the NIS channel QPTR inputs are inoperable above 75% RTP. Incore power distribution measurement requirements do not apply ≤ 75% RTP when the NIS channel QPTR inputs are inoperable. Deleting Required Actions D.2.1 and D.2.2 provide for a consistent application of the TS actions and required tests.

Addition of Note 2 to Required Action D

Required Action D is revised by inserting a note requiring the performance of SR 3.2.4.2 upon discovery of input to QPTR from one or more power range channels are inoperable with thermal power > 75% RTP. The reference to SR 3.2.4.2 replaces the need to specify performing SR 3.2.4.2 in Required Action D.2.2 when the NIS input to QPTR is inoperable. This change is acceptable because Required Action D.2.2 restates the requirements of SR 3.2.4.2 to calculate QPTR every 12 hours as compensation for lost monitoring capability due to an inoperable NIS channel input to QPTR for thermal power > 75% RTP. This proposed change eliminates potential confusion regarding the completion time to perform SR 3.2.4.2.

3.2 SYSTEM DESCRIPTION

A description of the relevant portions of the SQN and WBN reactor trip and engineered safety features actuation systems are presented below as background for the evaluation of the proposed changes.

3.2.1 Reactor Trip System

The RTS automatically keeps the reactor operating within a safe region by shutting down the reactor whenever the limits of the region are approached. The safe operating region is defined by several considerations such as mechanical/hydraulic limitations on equipment, and heat transfer phenomena. Therefore, the RTS keeps surveillance on process variables that are directly related to equipment mechanical limitations, such as pressure, pressurizer water level (to prevent water discharge through safety valves, and uncovering heaters) and on variables which directly affect the heat transfer capability of the reactor (e.g., reactor coolant flow and temperatures). Still other parameters utilized in the RTS are calculated from various process variables. In any event, whenever a direct process or calculated variable exceeds a setpoint the reactor will be shutdown in order to protect against exceeding the specified fuel design limit, gross damage to fuel cladding or loss of system integrity that could lead to release of radioactive fission products into the containment.

The following systems make up the RTS:

- Process Protection and Control System
- NIS
- Solid State Logic Protection System
- Reactor Trip Switchgear
- Manual Actuation Circuit

The RTS consists of two to four redundant sensors and associated process protection channels, which monitor various plant variables, and two redundant logic trains, which receive input protection actuation signals from the process protection and NIS channels to complete the logical decisions necessary to automatically open the reactor trip breakers.

3.2.2 Engineered Safety Features Actuation System

In addition to the requirements for a reactor trip for anticipated abnormal transients, SQN Units 1 and 2 and WBN Units 1 and 2 are provided with adequate instrumentation and controls to sense accident situations and initiate the operation of necessary engineered safety features (ESF). The occurrence of a limiting fault, such as a loss-of-coolant accident (LOCA) or a main steam line break, requires a reactor trip plus actuation of one or more of the ESF in order to prevent or mitigate damage to the core and reactor coolant system components, and ensure containment integrity.

In order to accomplish these design objectives the ESF system has proper and timely initiating signals, which are supplied by the sensors, transmitters, and logic components making up the various protection system channels and trains of the engineered safety features actuation system (ESFAS).

The ESFAS uses selected plant parameters, determines whether predetermined limits are being exceeded and, if they are, combines the signals into logic matrices sensitive to combinations indicative of primary or secondary system boundary ruptures. After the required logic combination is completed, the system sends actuation signals to the appropriate ESF components.

3.2.3 Power Range Neutron Flux Instrumentation

The NIS power range detectors are located external to the reactor vessel and measure neutrons leaking from the core. The NIS power range detectors provide input to the rod control system and the steam generator (SG) water level control system. Therefore, the actuation logic must be able to withstand 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. This function also provides a signal to prevent automatic and manual rod withdrawal prior to initiating a reactor trip. Limiting further rod withdrawal may terminate the transient and eliminate the need to trip the reactor.

3.2.4 QPTR Limits

The QPTR limit ensures that the gross radial power distribution remains consistent with the design values used in the safety analyses. Precise incore power distribution measurements are made during startup testing, after refueling, and periodically during power operation. With an NIS power range channel inoperable, tilt monitoring for a portion of the reactor core becomes degraded. Large tilts are likely detected with the remaining channels, but the capability for detection of small power tilts in some quadrants is decreased.

3.4 CONCLUSION

The proposed changes to TS 3.3.1, Condition D and SR 3.2.4.2 eliminates confusion as to when to perform SR 3.2.4.2 and simplify the Required Actions of TS 3.3.1, Condition D. Specifically, the proposed amendment revises the SQN Units 1 and 2 and WBN Units 1 and 2 TS 3.3.1, Condition D, and SR 3.2.4.2, including the associated Note, to avoid confusion as to when an incore power distribution measurement for QPTR is required. The proposed change eliminates potential confusion and the possibility of failing to perform SR 3.2.4.2

4.0 REGULATORY EVALUATION

4.1 APPLICABLE REGULATORY REQUIREMENTS/CRITERIA

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50.36, "Technical Specifications," requires that the TS include limiting conditions for operation, which are the lowest functional capability or performance levels of equipment required for safe Operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TS until the condition can be met.

4.1.2 General Design Criteria

SQN and WBN were designed to meet the intent of the "Proposed General Design Criteria for Nuclear Power Plant Construction Permits" published in July 1967. The SQN construction permit was issued in May 1970. The WBN construction permit was issued in January 1973. The SQN Updated Final Safety Analysis Report (UFSAR) and the WBN dual-unit UFSAR address the NRC General Design Criteria (GDC) published as Appendix A to 10 CFR 50 in July 1971. Conformance with the GDC is described in Section 3.1.2 of the SQN UFSAR and WBN dual-unit UFSAR.

The relevant GDC are described below.

<u>Criterion 13 - Instrumentation and control</u>

Instrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety, including those variables and systems that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems.

Conformance with GDC 20 is described in Section 3.1.2 of the SQN UFSAR and Section 3.1.2.3 of the WBN dual-unit UFSAR.

<u>Criterion 20—Protection system functions</u>

The protection system shall be designed (1) to initiate automatically the operation of appropriate systems including the reactivity control systems, to assure that specified acceptable fuel design limits are not exceeded as a result of anticipated operational occurrences and (2) to sense accident conditions and to initiate the operation of systems and components important to safety.

Conformance with GDC 20 is described in Section 3.1.2 of the SQN UFSAR and Section 3.1.2.3 of the WBN dual-unit UFSAR.

<u>Criterion 21 - Protection system reliability and testability</u>

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

Conformance with GDC 21 is described in Section 3.1.2 of the SQN UFSAR and Section 3.1.2.3 of the WBN dual-unit UFSAR.

Criterion 22—Protection system independence

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

Conformance with GDC 22 is described in Section 3.1.2 of the SQN UFSAR and Section 3.1.2.3 of the WBN dual-unit UFSAR.

Criterion 23—Protection system failure modes

The protection system shall be designed to fail into a safe state or into a state demonstrated to be acceptable on some other defined basis if conditions such as disconnection of the system, loss of energy (e.g., electric power, instrument air), or postulated adverse environments (e.g., extreme heat or cold, fire, pressure, steam, water, and radiation) are experienced.

Conformance with GDC 23 is described in Section 3.1.2 of the SQN UFSAR and Section 3.1.2.3 of the WBN dual-unit UFSAR.

Criterion 24 - Separation of protection and control systems

The protection system shall be designed to be separated from control systems to the extent that failure of any single control system component or channel, or failure or removal from service of any single protection system component or channel which is common to the control and protection systems leaves intact a system satisfying all reliability, redundancy, and independence requirements of the protection system. Interconnection of the protection and control systems shall be limited so as to assure that safety is not significantly impaired.

Conformance with GDC 24 is described in Section 3.1.2 of the SQN UFSAR and 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 GDC 25 is described in Section 3.1.2 of the SQN UFSAR and Section 3.1.2.3 of the WBN dual-unit UFSAR.

Criterion 27 - Combined reactivity control systems capability

The reactivity control system shall be designed to have a combined capability, in conjunction with poison addition by the emergency core cooling system, of reliably controlling reactivity changes to assure that under postulated accident conditions and with appropriate margin for stuck rods the capability to cool the core is maintained.

Conformance with GDC 27 is described in Section 3.1.2 of the SQN UFSAR and Section 3.1.2.3 of the WBN dual-unit UFSAR.

Criterion 28 - Reactivity limits

The reactivity control system shall be designed with appropriate limits on the potential amount and rate of reactivity increase to assure that the effects of postulated reactivity accidents can neither (1) result in damage to the reactor coolant pressure boundary greater than limited local yielding nor (2) sufficiently disturb the core, its support structures or other reactor pressure vessel internals to impair significantly the capability to cool the core. These postulated reactivity accidents shall include consideration of rod ejection (unless prevented by positive means), rod dropout, steam line rupture, changes in reactor coolant temperature and pressure, and cold water addition.

Conformance with GDC 28 is described in Section 3.1.2 of the SQN UFSAR and Section 3.1.2.3 of the WBN dual-unit UFSAR.

Criterion 29 - Protection against anticipated operational occurrences

The protection and reactivity control systems shall be designed to assure an extremely high probability of accomplishing their safety functions in the event of anticipated operational occurrences.

Conformance with GDC 29 is described in Section 3.1.2 of the SQN UFSAR and Section 3.1.2.3 of the WBN dual-unit UFSAR.

4.1.3 Regulatory Guidance

Regulatory Guide 1.22, "Periodic Testing of Protection System Actuation Functions (Safety Guide 22)"

Regulatory Guide (RG) 1.22 discusses an acceptable method of satisfying GDC 20 and GDC 21 regarding the periodic testing of protection system actuation functions. These periodic tests should duplicate, as closely as practicable, the performance that is required of the actuation devices in the event of an accident.

Conformance with RG 1.22 is described in Section 7.1.2.8 of the SQN UFSAR and Table 7.1-1 of the WBN dual-unit UFSAR.

4.1.4 Conclusion

The proposed change eliminates potential confusion and the possibility of failing to perform SR 3.2.4.2. 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) approval of the traveler will not be inimical to the common defense and security or to the health and safety of the public

4.2 PRECEDENT

The proposed TS change is similar to those approved by NRC in References 1 and 2 for the Vogtle Electric Generating Plant, Units 1 and 2, and the Joseph M. Farley Nuclear Plant, Units 1 and 2, respectively. The differences are:

- In References 1 and 2, Note 2 to TS 3.3.1, Condition D, states “Refer to LCO 3.2.4 for an inoperable power range channel,” whereas the Note 2 to TS 3.3.1, Condition D, in this proposed TS change states, “Perform SR 3.2.4.2 if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP.” The rationale for this difference is that the SQN Units 1 and 2 and WBN Units 1 and 2 TS 3.2.4, Condition A, Required Actions do not have a specific action to perform SR 3.2.4.2. Therefore the proposed Note 2 to TS 3.3.1, Condition D is worded to ensure SR 3.2.4.2 is performed.
- As noted in Section 3.1.1, WBN does not have an SFCP.

The proposed TS change is also similar to those approved by the NRC in References 3 and 4 for the Diablo Canyon Power Plant, Units 1 and 2, and the Callaway Plant, Units 1 and 2, respectively, in that these amendments also revised TS 3.3.1, Condition D to specify the performance of SR 3.2.4.2 when the power range neutron flux input to QPTR is inoperable.

4.3 SIGNIFICANT HAZARDS CONSIDERATION

The Tennessee Valley Authority (TVA) proposes to revise the Sequoyah Nuclear Plant (SQN) Units 1 and 2 and the Watts Bar Nuclear Plant (WBN) Unit 1 and Unit 2 Technical Specification (TS) 3.3.1, "Reactor Trip System (RTS) Instrumentation,” Condition D, and TS 3.2.4, “QPTR,” Surveillance Requirement (SR) 3.2.4.2, including the associated Note, to avoid confusion as to when an incore power distribution measurement for quadrant power tilt ratio (QPTR) is required. As currently written, TS 3.3.1, Condition D could incorrectly result in the option of only performing Required Actions D.1.1 and D.1.2; thereby potentially overlooking the requirement to do an incore power distribution measurement for QPTR within 12 hours per SR 3.2.4.2. The proposed amendment aligns the requirement to perform an incore power distribution measurement once per 12 hours with TS 3.2.4. An administrative change is also being made to WBN Units 1 and 2 SR 3.2.4.1, Note 1, and the Note in WBN Units 1 and 2 SR 3.2.4.2 for consistency with the current and proposed changes to TS 3.3.1, Condition D, the existing SQN Units 1 and 2 SRs 3.2.4.1 and 3.2.4.2, and NUREG-1431, Revision 4.

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 proposed changes do not adversely affect accident initiators or precursors nor alter the design assumptions, conditions, or configuration of the facility or the manner in which the plant is operated and maintained. The proposed changes do not alter or prevent the ability of structures, systems, and components (SSCs) from performing their intended function to mitigate the consequences of an initiating event within the assumed acceptance limits. The proposed changes do not affect the source term, containment isolation, or radiological release assumptions used in evaluating the radiological consequences of an accident previously evaluated. Further, the proposed changes do not increase the types or amounts of radioactive effluent that may be released offsite, nor significantly increase individual or cumulative occupational/public radiation exposures. The proposed changes do not significantly increase the probability of an accident and are consistent with safety analysis assumptions and resultant consequences.

   Therefore, the changes do not increase 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 changes do not result in a change in the manner in which the reactor trip system (RTS) and engineered safety feature actuation system (ESFAS) provide plant protection. The RTS and ESFAS will continue to have the same setpoints after the proposed changes are implemented. There are no design changes associated with the change. The changes do not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed) or a change in the methods governing normal plant operation. In addition, the changes do not impose any new or different requirements. The changes do not alter assumptions made in the safety analysis. The proposed changes are consistent with the safety analysis assumptions and current plant operating practice.

   Therefore, the changes do 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 changes do not alter the manner in which safety limits, limiting safety system settings or limiting conditions for operation are determined. The safety analysis acceptance criteria are not impacted by these changes. Redundant RTS and ESFAS trains are maintained, and diversity with regard to the signals that provide reactor trip and engineered safety features actuation is also maintained. All signals credited as providing primary or secondary protection, and all operator actions credited in the accident analyses will remain the same. The proposed changes will not result in plant operation in a configuration outside the design basis.

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 surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 REFERENCES

1. NRC letter to Southern Nuclear Operating Company, Inc., “Vogtle Electric Generating Plant, Units 1 and 2, Issuance of Amendments Regarding Power Range Neutron Flux Instrumentation Technical Specifications (TAC Nos. MC8510 and MC8511),” dated August 15, 2006 (ML061880216)
2. NRC letter to Southern Nuclear Operating Company, Inc., “Joseph M. Farley Nuclear Plant, Units 1 and 2, Issuance of Amendment to Revise Reactor Trip System Instrumentation Technical Specifications (TAC Nos. MF4214 and MF4215),” dated April 8, 2015 (ML15028A165)
3. NRC letter to Pacific Gas and Electric Company, “Diablo Canyon Power Plant, Unit No. 1 (TAC No. MC2024) and Unit No. 2 (TAC No. MC2025) - Issuance of Amendment Re: Plant Protection Test Times, Completion Times, and Surveillance Test Intervals,” dated January 31, 2005 (ML050330315)
4. NRC letter to Union Electric Company, “Callaway Plant, Unit 1 - Issuance of Amendment Re: Plant Protection Test Times, Completion Times, and Surveillance Test Intervals (TAC No. MC1756),” dated January 31, 2005 (ML050320484)

5. NRC Letter to TVA, "Sequoyah Nuclear Plant, Units 1 and 2 - Issuance of Amendments for the Conversion to the Improved Technical Specifications with Beyond Scope Issues (TAC Nos. MF3128 and MF3129)," dated September 30, 2015. (ML15238B460, ML15236A351, ML15258A511, ML15254A509, and ML15258A516)
6. NRC Letter to TVA, "Issuance of Facility Operating License No. NPF-90, Watts Bar Nuclear Plant, Unit 1 (TAC M94025)," dated February 7, 1996 (ML052930169 and ML080290360)
7. NRC letter to TVA, "Issuance of Facility Operating License No. NPF-96, Watts Bar Nuclear Plant Unit 2," dated October 22, 20015 (ML15251A587)
8. NRC letter to TVA, "Watts Bar Nuclear Plant, Unit 1 - Issuance of Amendment Regarding the Application to Implement Beacon Core Power Distribution and Monitoring System (TAC No. ME1698)," dated October 27, 2009 (ML092710381)
9. TVA presentation to NRC, Sequoyah Nuclear Plant, Units 1 and 2 - NRC Pre-Submittal Meeting, Improved Technical Specification Conversion, dated June 4, 2013 (ML13156A046)
10. TVA letter to NRC, "Watts Bar Nuclear Plant (WBN) Unit 1 - Technical Specification (TS) Change TS -07-04, Reactor Trip System / Engineered Safety Feature Logic, Reactor Trip Breaker Allowance Outage Time, and Surveillance Testing Interval Relaxations," dated June 8, 2007 (ML071660106)
11. NRC letter to TVA, "Watts Bar Nuclear Plant, Unit 1 - Issuance of Amendment Regarding Reactor Trip System and Engineered Safety Features Actuation System Completion Times, Bypass Test Times, and Surveillance Test Intervals (TAC No. MD5880)," dated June 30, 2008 (ML081620043)
12. Southern Nuclear Operating Company, Inc. letter to NRC, "Vogtle Electric Generating Plant Request to Revise Technical Specifications Reactor Trip System Instrumentation," dated September 19, 2005 (ML052620463)
13. Southern Nuclear Operating Company, Inc. letter to NRC, "Joseph M. Farley Nuclear Plant License Amendment Request to Revise Technical Specifications Reactor Trip System Instrumentation," dated June 3, 2014 (ML14154A136)
14. Industry/TSTF Standard Technical Specification Change Traveler, TSTF-109 (WOG-45, Revision 0), "Clarify the QPTR surveillances" (ML040480053)

Enclosure

ATTACHMENT 1

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

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required Action and associated Completion Time not met.	B.1	Reduce THERMAL POWER to ≤ 50% RTP.	4 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.2.4.1	-----------------------------NOTES---------------------------- 1. With input from one Power Range Neutron Flux channel inoperable and THERMAL POWER ≤ 75% RTP, the remaining three power range channels can be used for calculating QPTR. 2. SR 3.2.4.2 may be performed in lieu of this Surveillance. -- Verify QPTR is within limit by calculation.	In accordance with the Surveillance Frequency Control Program
SR 3.2.4.2	------------------------------NOTE----------------------------- Only required to be performed if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP.~~Not required to be performed until 12 hours after input from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP.~~ -- Verify QPTR is within limit using the movable incore detectors.	Once within 12 hours <u>AND</u> In accordance with the Surveillance Frequency Control Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	C.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.	49 hours
D. One Power Range Neutron Flux - High channel inoperable.	------------------NOTES------------------ 1. The inoperable channel may be bypassed for up to 12 hours for surveillance testing and setpoint adjustment of other channels. 2. Perform SR 3.2.4.2 if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP. --	
	D.1.~~1~~ Place channel in trip.	72 hours
	~~AND~~	
	~~D.1.2 Reduce THERMAL POWER to ≤ 75% RTP.~~	~~78 hours~~
	OR	
	~~D.2.1 Place channel in trip.~~	~~72 hours~~
	~~AND~~	
	~~D.2.2 --------------NOTE-------------- Only required to be performed when the Power Range Neutron Flux input to QPTR is inoperable. ------------------------------------~~ ~~Perform SR 3.2.4.2.~~	~~Once per 12 hours~~
	~~OR~~	
	D.~~3~~2 Be in MODE 3.	78 hours

Enclosure

ATTACHMENT 2

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

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time not met.	B.1 Reduce THERMAL POWER to ≤ 50% RTP.	4 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.4.1	-----------------------------NOTES---------------------------- 1. With input from one Power Range Neutron Flux channel inoperable and THERMAL POWER ≤ 75% RTP, the remaining three power range channels can be used for calculating QPTR. 2. SR 3.2.4.2 may be performed in lieu of this Surveillance. --- Verify QPTR is within limit by calculation.	In accordance with the Surveillance Frequency Control Program
SR 3.2.4.2	------------------------------NOTE----------------------------- Only required to be performed if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP.~~Not required to be performed until 12 hours after input from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP.~~ --- Verify QPTR is within limit using the movable incore detectors.	Once within 12 hours AND In accordance with the Surveillance Frequency Control Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	C.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.	49 hours
D. One Power Range Neutron Flux - High channel inoperable.	-------------------NOTES------------------ 1. The inoperable channel may be bypassed for up to 12 hours for surveillance testing and setpoint adjustment of other channels. 2. Perform SR 3.2.4.2 if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP. ---	
	D.1~~.1~~ Place channel in trip.	72 hours
	~~AND~~	
	~~D.1.2 Reduce THERMAL POWER to ≤ 75% RTP.~~	~~78 hours~~
	OR	
	~~D.2.1 Place channel in trip.~~	~~72 hours~~
	~~AND~~	
	~~D.2.2 ---------------NOTE--------------- Only required to be performed when the Power Range Neutron Flux input to QPTR is inoperable. -----------------------------------~~	
	~~Perform SR 3.2.4.2.~~	~~Once per 12 hours~~
	~~OR~~	
	D.~~3~~2 Be in MODE 3.	78 hours

Enclosure

ATTACHMENT 3

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

BASES

SURVEILLANCE REQUIREMENTS (continued)

For those causes of QPTR that occur quickly (e.g., a dropped rod), there typically are other indications of abnormality that prompt a verification of core power tilt.

SR 3.2.4.2

This Surveillance is modified by a Note, which states that the surveillance is only required to be performed if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with ~~it is not required until 12 hours after the input from one or more Power Range Neutron Flux channels are inoperable and the~~THERMAL POWER ~~is~~ > 75% RTP.

With an NIS power range channel inoperable, tilt monitoring for a portion of the reactor core becomes degraded. Large tilts are likely detected with the remaining channels, but the capability for detection of small power tilts in some quadrants is decreased.

With input to QPTR from one or more Power Range Neutron Flux channels inoperable and with THERMAL POWER > 75% RTP, the surveillance is initially performed within 12 hours. Thereafter, t~~T~~he Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

For purposes of monitoring the QPTR when one power range channel is inoperable, the moveable incore detectors are used to confirm that the normalized symmetric power distribution is consistent with the indicated QPTR and any previous data indicating a tilt. The incore detector monitoring is performed with a full incore flux map or two sets of four thimble locations with quarter core symmetry. The two sets of four symmetric thimbles is a set of eight unique detector locations. These locations are C-8, E-5, E-11, H-3, H-13, L-5, L-11, and N-8.

The symmetric thimble flux map can be used to generate symmetric thimble "tilt." This can be compared to a reference symmetric thimble tilt, from the most recent full core flux map, to generate an incore QPTR. Therefore, incore monitoring of QPTR can be used to confirm that QPTR is within limits.

With one NIS channel inoperable, the indicated tilt may be changed from the value indicated with all four channels OPERABLE. To confirm that no change in tilt has actually occurred, which might cause the QPTR limit to be exceeded, the incore result may be compared against previous flux maps either using the symmetric thimbles as described above or a complete flux map. Nominally, quadrant tilt from the Surveillance should be within 2% of the tilt shown by the most recent flux map data.

BASES

ACTIONS (continued)

D.1~~.1, D.1.2, D.2.1, D.2.2,~~ and D.~~3~~2

Condition D applies to the Power Range Neutron Flux - High Function.

The NIS power range detectors provide input to the Rod Control System and therefore, have a two-out-of-four trip logic. A known inoperable channel must be placed in the tripped condition. This results in a partial trip condition requiring only one-out-of-three logic for actuation. The 72 hours allowed by Required Action D.1 to place the inoperable channel in the tripped condition is justified in WCAP-14333-P-A (Ref. 8).

~~In addition to placing the inoperable channel in the tripped condition, THERMAL POWER must be reduced to ≤ 75% RTP within 78 hours~~~~Reducing the power level prevents operation of the core with radial power distributions beyond the design limits. With one of the NIS power range detectors inoperable, 1/4 of the radial power distribution monitoring capability is lost.~~

~~As an alternative to the above Actions, the inoperable channel can be placed in the tripped condition within 72 hours and the QPTR monitored once every 12 hours as per SR 3.2.4.2, QPTR verification. Calculating QPTR every 12 hours compensates for the lost monitoring capability due to the inoperable NIS power range channel and allows continued unit operation at power levels > 75% RTP. The 12 hour Frequency is consistent with LCO 3.2.4, "QUADRANT POWER TILT RATIO (QPTR)."~~ The Required Actions have been modified by two Notes. Note 1 allows the inoperable channel to be placed in the bypassed condition for up to 12 hours while performing routine surveillance testing of other channels. With one channel inoperable, the Note also allows routine surveillance testing of another channel with the inoperable channel in bypass. The Note also allows placing the inoperable channel in the bypass condition to allow setpoint adjustments of other channels when required to reduce the Power Range Neutron Flux-High setpoint in accordance with other Technical Specifications. The 12 hour time limit is justified in Reference 8.

Note 2 states to perform SR 3.2.4.2 if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP.

If Required Action D.1 cannot be met within the specified Completion Time~~As an alternative to the above Actions~~, the plant must be placed in a MODE where this Function is no longer required OPERABLE. Seventy-eight hours are allowed to place the plant in MODE 3. The 78 hour Completion Time includes ~~72 hours for channel corrective maintenance, and an additional~~ 6 hours for the MODE reduction as required by

Required Action D.~~3~~2. This is a reasonable time, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. ~~If Required Actions cannot be completed within their allowed Completion Times, LCO 3.0.3 must be entered.~~

~~The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypass condition for up to 12 hours while performing routine surveillance testing of other channels. The Note also allows placing the inoperable channel in the bypass condition to allow setpoint adjustments of other channels when required to reduce the setpoint in accordance with other Technical Specifications. The 12 hour time limit is justified in Reference 8.~~

BASES

ACTIONS (continued)

~~Required Action D.2.2 has been modified by a Note which only requires SR 3.2.4.2 to be performed if the Power Range Neutron Flux input to QPTR becomes inoperable. Failure of a component in the Power Range Neutron Flux Channel which renders the High Flux Trip Function inoperable may not affect the capability to monitor QPTR. As such, determining QPTR using the movable incore detectors once per 12 hours may not be necessary.~~

<u>E.1 and E.2</u>

Condition E applies to the following reactor trip Functions:

- Power Range Neutron Flux - Low,
- Overtemperature ΔT,
- Overpower ΔT,
- Power Range Neutron Flux - High Positive Rate,
- Power Range Neutron Flux - High Negative Rate, and
- Pressurizer Pressure - High.

A known inoperable channel must be placed in the tripped condition within 72 hours. Placing the channel in the tripped condition results in a partial trip condition requiring only one-out-of-two logic for actuation of the two-out-of-three trips and one-out-of-three logic for actuation of the two-out-of-four trips. The 72 hours allowed to place the inoperable channel in the tripped condition is justified in Reference 8.

If the inoperable channel cannot be placed in the trip condition within the specified Completion Time, the unit must be placed in a MODE where these Functions are not required OPERABLE. An additional 6 hours is allowed to place the unit in MODE 3. Six hours is a reasonable time, based on operating experience, to place the unit in MODE 3 from full power in an orderly manner and without challenging unit systems.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. The 12 hour time limit is justified in Reference 8.

Enclosure

ATTACHMENT 4

Proposed TS Bases Changes (Mark-Ups) for SQN Unit 2 (For Information Only)

BASES

SURVEILLANCE REQUIREMENTS (continued)

For those causes of QPTR that occur quickly (e.g., a dropped rod), there typically are other indications of abnormality that prompt a verification of core power tilt.

SR 3.2.4.2

This Surveillance is modified by a Note, which states that the surveillance is only required to be performed if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with ~~it is not required until 12 hours after the input from one or more Power Range Neutron Flux channels are inoperable and the~~ THERMAL POWER ~~is~~ > 75% RTP.

With an NIS power range channel inoperable, tilt monitoring for a portion of the reactor core becomes degraded. Large tilts are likely detected with the remaining channels, but the capability for detection of small power tilts in some quadrants is decreased.

With input to QPTR from one or more Power Range Neutron Flux channels inoperable and with THERMAL POWER > 75% RTP, the surveillance is initially performed within 12 hours. Thereafter, t~~T~~he Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

For purposes of monitoring the QPTR when one power range channel is inoperable, the moveable incore detectors are used to confirm that the normalized symmetric power distribution is consistent with the indicated QPTR and any previous data indicating a tilt. The incore detector monitoring is performed with a full incore flux map or two sets of four thimble locations with quarter core symmetry. The two sets of four symmetric thimbles is a set of eight unique detector locations. These locations are C-8, E-5, E-11, H-3, H-13, L-5, L-11, and N-8.

The symmetric thimble flux map can be used to generate symmetric thimble "tilt." This can be compared to a reference symmetric thimble tilt, from the most recent full core flux map, to generate an incore QPTR. Therefore, incore monitoring of QPTR can be used to confirm that QPTR is within limits.

With one NIS channel inoperable, the indicated tilt may be changed from the value indicated with all four channels OPERABLE. To confirm that no change in tilt has actually occurred, which might cause the QPTR limit to be exceeded, the incore result may be compared against previous flux maps either using the symmetric thimbles as described above or a complete flux map. Nominally, quadrant tilt from the Surveillance should be within 2% of the tilt shown by the most recent flux map data.

BASES

ACTIONS (continued)

D.1~~.1, D.1.2, D.2.1, D.2.2,~~ and D.~~3~~2

Condition D applies to the Power Range Neutron Flux - High Function.

The NIS power range detectors provide input to the Rod Control System and therefore, have a two-out-of-four trip logic. A known inoperable channel must be placed in the tripped condition. This results in a partial trip condition requiring only one-out-of-three logic for actuation. The 72 hours allowed by Required Action D.1 to place the inoperable channel in the tripped condition is justified in WCAP-14333-P-A (Ref. 8).

~~In addition to placing the inoperable channel in the tripped condition, THERMAL POWER must be reduced to ≤ 75% RTPwithin 78 hours. Reducing the power level prevents operation of the core with radial power distributions beyond the design limits. With one of the NIS power range detectors inoperable, 1/4 of the radial power distribution monitoring capability is lost.~~

~~As an alternative to the above Actions, the inoperable channel can be placed in the tripped condition within 72 hours and the QPTR monitored once every 12 hours as per SR 3.2.4.2, QPTR verification. Calculating QPTR every 12 hours compensates for the lost monitoring capability due to the inoperable NIS power range channel and allows continued unit operation at power levels > 75% RTP. The 12 hour Frequency is consistent with LCO 3.2.4, "QUADRANT POWER TILT RATIO (QPTR)."~~The Required Actions have been modified by two Notes. Note 1 allows the inoperable channel to be placed in the bypassed condition for up to 12 hours while performing routine surveillance testing of other channels. With one channel inoperable, the Note also allows routine surveillance testing of another channel with the inoperable channel in bypass. The Note also allows placing the inoperable channel in the bypass condition to allow setpoint adjustments of other channels when required to reduce the Power Range Neutron Flux-High setpoint in accordance with other Technical Specifications. The 12 hour time limit is justified in Reference 8.

Note 2 states to perform SR 3.2.4.2 if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP

If Required Action D.1 cannot be met within the specified Completion Time~~As an alternative to the above Actions~~, the plant must be placed in a MODE where this Function is no longer required OPERABLE. Seventy-eight hours are allowed to place the plant in MODE 3. The 78 hour Completion Time includes ~~72 hours for channel corrective maintenance, and an additional~~ 6 hours for the MODE reduction as required by

Required Action D.2~~3~~. This is a reasonable time, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. ~~If Required Actions cannot be completed within their allowed Completion Times, LCO 3.0.3 must be entered.~~

~~The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypass condition for up to 12 hours while performing routine surveillance testing of other channels. The Note also allows placing the inoperable channel in the bypass condition to allow setpoint adjustments of other channels when required to reduce the setpoint in accordance with other Technical Specifications. The 12 hour time limit is justified in Reference 8.~~

BASES

ACTIONS (continued)

~~Required Action D.2.2 has been modified by a Note which only requires SR 3.2.4.2 to be performed if the Power Range Neutron Flux input to QPTR becomes inoperable. Failure of a component in the Power Range Neutron Flux Channel which renders the High Flux Trip Function inoperable may not affect the capability to monitor QPTR. As such, determining QPTR using the movable incore detectors once per 12 hours may not be necessary.~~

E.1 and E.2

Condition E applies to the following reactor trip Functions:

- Power Range Neutron Flux - Low,
- Overtemperature ΔT,
- Overpower ΔT,
- Power Range Neutron Flux - High Positive Rate,
- Power Range Neutron Flux - High Negative Rate, and
- Pressurizer Pressure - High.

A known inoperable channel must be placed in the tripped condition within 72 hours. Placing the channel in the tripped condition results in a partial trip condition requiring only one-out-of-two logic for actuation of the two-out-of-three trips and one-out-of-three logic for actuation of the two-out-of-four trips. The 72 hours allowed to place the inoperable channel in the tripped condition is justified in Reference 8.

If the inoperable channel cannot be placed in the trip condition within the specified Completion Time, the unit must be placed in a MODE where these Functions are not required OPERABLE. An additional 6 hours is allowed to place the unit in MODE 3. Six hours is a reasonable time, based on operating experience, to place the unit in MODE 3 from full power in an orderly manner and without challenging unit systems.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. The 12 hour time limit is justified in Reference 8.

Enclosure

ATTACHMENT 5

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

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.4.1	-------------------------------NOTES--------------------------- 1. With input from one power range neutron flux channel inoperable and THERMAL POWER <≤ 75% RTP, the remaining three power range channels can be used for calculating QPTR. 2. SR 3.2.4.2 may be performed in lieu of this Surveillance if adequate power range neutron flux channel inputs are not OPERABLE. --- Verify QPTR is within limit by calculation.	7 days <u>AND</u> Once within 12 hours and every 12 hours thereafter with the QPTR alarm inoperable
SR 3.2.4.2	-------------------------------NOTE------------------------------- Only required to be performed if input to QPTR from one or more power range neutron flux channels are inoperable with THERMAL POWER ≥> 75% RTP. --- Verify QPTR is within limit using either the movable incore detectors or the PDMS.	Once within 12 hours <u>AND</u> 12 hours thereafter

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One channel or train inoperable.	C.1 Restore channel or train to OPERABLE status. <u>OR</u> C.2 Open RTBs.	48 hours 49 hours
D. One Power Range Neutron Flux — High channel inoperable.	------------------------NOTES----------------- 1. The inoperable channel may be bypassed for up to 12 hours for surveillance testing and setpoint adjustment of other channels 2. Perform SR 3.2.4.2 if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP. --- D.1~~.1~~ Place channel in trip. ~~AND~~ ~~D.1.2 Reduce THERMAL POWER to ≤ 75% RTP~~. <u>OR</u> ~~D.2.1 Place channel in trip.~~ ~~AND~~ ~~---------------------NOTE--------------------~~ ~~Only required to be performed when the Power Range Neutron Flux input to QPTR is inoperable.~~ ~~---~~ ~~D.2.2 Perform SR 3.2.4.2.~~ ~~OR~~ D.32 Be in MODE 3.	 72 hours ~~78 hours~~ ~~72 hours~~ ~~Once per 12 hours~~ 78 hours

Enclosure

ATTACHMENT 6

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

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.4.1	-------------------------------NOTES---------------------------- a. With input from one power range neutron flux channel inoperable and THERMAL POWER ~~<~~≤ 75% RTP, the remaining three power range channels can be used for calculating QPTR. b. SR 3.2.4.2 may be performed in lieu of this Surveillance if adequate power range neutron flux channel inputs are not OPERABLE. -- Verify QPTR is within limit by calculation.	7 days <u>AND</u> Once within 12 hours and every 12 hours thereafter with the QPTR alarm inoperable
SR 3.2.4.2	-------------------------------NOTE----------------------------- Only required to be performed if input to QPTR from one or more power range neutron flux channels are inoperable with THERMAL POWER ~~≥~~> 75% RTP. -- Verify QPTR is within limit using the PDMS.	Once within 12 hours <u>AND</u> every 12 hours thereafter

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. One channel or train inoperable.	C.1	Restore channel or train to OPERABLE status.	48 hours
	OR		
	C.2	Open RTBs.	49 hours
D. One Power Range Neutron Flux-High channel inoperable.	--------------------NOTES------------------- 1. The inoperable channel may be bypassed for up to 12 hours for surveillance testing and setpoint adjustment of other channels. 2. Perform SR 3.2.4.2 if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP. ---		
	D.1~~.1~~	Place channel in trip.	72 hours
	~~AND~~		
	~~D.1.2~~	~~Reduce THERMAL POWER to ≤ 75% RTP.~~	~~78 hours~~
	~~OR~~		
	~~D.2.1~~	~~Place channel in trip.~~	~~72 hours~~
	~~AND~~		
	~~------------------NOTE------------------~~ ~~Only required to be performed when the Power Range Neutron Flux input to QPTR is inoperable.~~ ~~---~~		
	~~D.2.2~~	~~Perform SR 3.2.4.2.~~	~~Once per 12 hours~~
	OR		
	D.~~3~~2	Be in MODE 3.	78 hours

Enclosure

ATTACHMENT 7

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

B 3.2 POWER DISTRIBUTION LIMITS

B 3.2.4 QUADRANT POWER TILT RATIO (QPTR)

BASES

BACKGROUND

The QPTR limit ensures that the gross radial power distribution remains consistent with the design values used in the safety analyses. Precise radial power distribution measurements are made during startup testing, after refueling, and periodically during power operation.

The power density at any point in the core must be limited so that the fuel design criteria are maintained. Together, LCO 3.2.3, "AXIAL FLUX DIFFERENCE (AFD)," LCO 3.2.4, and LCO 3.1.7, "Control Rod Insertion Limits," provide limits on process variables that characterize and control the three dimensional power distribution of the reactor core. Control of these variables ensures that the core operates within the fuel design criteria and that the power distribution remains within the bounds used in the safety analyses.

APPLICABLE SAFETY ANALYSES

This LCO precludes core power distributions that violate the following fuel design criteria:

a. During a large break loss of coolant accident, the peak cladding temperature must not exceed 2200°F (Ref. 1);

b. During a loss of forced reactor coolant flow accident, there must be at least 95% probability at the 95% confidence level (the 95/95 departure from nucleate boiling (DNB) criterion) that the hot fuel rod in the core does not experience a DNB condition;

c. During an ejected rod accident, the energy deposition to the fuel must not exceed 280 cal/gm (Ref. 2); and

d. The control rods must be capable of shutting down the reactor with a minimum required SDM with the highest worth control rod stuck fully withdrawn (Ref. 3).

The LCO limits on the AFD, the QPTR, the Heat Flux Hot Channel Factor ($F_Q(Z)$), the Nuclear Enthalpy Rise Hot Channel Factor ($F^N_{\Delta H}$), rod group alignment, sequence, overlap, and control bank insertion are established to preclude core power distributions that exceed the safety analyses limits.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The QPTR limits ensure that $F^N_{\Delta H}$ and $F_Q(Z)$ remain below their limiting values by preventing an undetected change in the gross radial power distribution.

In MODE 1, the $F^N_{\Delta H}$ and $F_Q(Z)$ limits must be maintained to preclude core power distributions from exceeding design limits assumed in the safety analyses.

The QPTR satisfies Criterion 2 of the NRC Policy Statement.

LCO

The QPTR limit of 1.02, at which corrective action is required, provides a margin of protection for both the DNB ratio and linear heat generation rate contributing to excessive power peaks resulting from X-Y plane power tilts. A limiting QPTR of 1.02 can be tolerated before the margin for uncertainty in $F_Q(Z)$ and ($F^N_{\Delta H}$) is possibly challenged.

APPLICABILITY

The QPTR limit must be maintained in MODE 1 with THERMAL POWER > 50% RTP to prevent core power distributions from exceeding the design limits.

Applicability in MODE 1 ≤ 50% RTP and in other MODES is not required because there is either insufficient stored energy in the fuel or insufficient energy being transferred to the reactor coolant to require the implementation of a QPTR limit on the distribution of core power. The QPTR limit in these conditions is, therefore, not important. Note that the $F^N_{\Delta H}$ and $F_Q(Z)$ LCOs still apply, but allow progressively higher peaking factors at 50% RTP or lower.

ACTIONS

A.1

With the QPTR exceeding its limit, a power level reduction of 3% RTP for each 1% by which the QPTR exceeds 1.00 is a conservative tradeoff of total core power with peak linear power. The Completion Time of 2 hours allows sufficient time to identify the cause and correct the tilt. Note that the power reduction itself may cause a change in the tilted condition.

(continued)

ACTIONS (continued)

A.2

After completion of Required Action A.1, the QPTR Alarm may still be in its alarmed state. As such, any additional changes in the QPTR are detected by requiring a check of the QPTR once per 12 hours thereafter. If the QPTR continues to increase, THERMAL POWER has to be reduced accordingly. A 12 hour Completion Time is sufficient because any additional change in QPTR would be relatively slow.

A.3

The peaking factors $F^N_{\Delta H}$ and $F_Q(Z)$ are of primary importance in ensuring that the power distribution remains consistent with the initial conditions used in the safety analyses. Performing SRs on $F^N_{\Delta H}$ and $F_Q(Z)$ within the Completion Time of 24 hours ensures that these primary indicators of power distribution are within their respective limits. A Completion Time of 24 hours takes into consideration the rate at which peaking factors are likely to change, and the time required to stabilize the plant and perform an incore power distribution measurement. If these peaking factors are not within their limits, the Required Actions of these Surveillances provide an appropriate response for the abnormal condition. If the QPTR remains above its specified limit, the peaking factor surveillances are required each 7 days thereafter to evaluate $F^N_{\Delta}H$ and $F_Q(Z)$ with changes in power distribution. Relatively small changes are expected due to either burnup and xenon redistribution or correction of the cause for exceeding the QPTR limit.

A.4

Although $F^N_{\Delta H}$ and $F_Q(Z)$ are of primary importance as initial conditions in the safety analyses, other changes in the power distribution may occur as the QPTR limit is exceeded and may have an impact on the validity of the safety analysis. A change in the power distribution can affect such reactor parameters as bank worths and peaking factors for rod malfunction accidents. When the QPTR exceeds its limit, it does not necessarily mean a safety concern exists. It does mean that there is an indication of a change in the gross radial power distribution that requires an investigation and evaluation that is accomplished by examining the incore power distribution. Specifically, the core peaking factors and the quadrant tilt must be evaluated because they are the factors that best characterize the core power distribution. This re-evaluation is required to ensure that, before increasing THERMAL POWER to above the limit of Required Action A.1, the reactor core conditions are consistent with the assumptions in the safety analyses.

(continued)

ACTIONS
(continued)

A.5

If the QPTR has exceeded the 1.02 limit and a re-evaluation of the safety analysis is completed and shows that safety requirements are met, the excore detectors are recalibrated to show a QPTR of 1.0 prior to increasing THERMAL POWER to above the limit of Required Action A.1. This is done to detect any subsequent significant changes in QPTR.

Required Action A.5 is modified by a Note that states that the QPTR is not zeroed out until after the re-evaluation of the safety analysis has determined that core conditions at RTP are within the safety analysis assumptions (i.e., Required Action A.4). This Note is intended to prevent any ambiguity about the required sequence of actions.

A.6

Once the flux tilt is zeroed out (i.e., Required Action A.5 is performed), it is acceptable to return to full power operation. However, as an added check that the core power distribution at RTP is consistent with the safety analysis assumptions, Required Action A.6 requires verification that $F_Q(Z)$ and $F^N_{\Delta H}$ are within their specified limits within 24 hours of reaching RTP. As an added precaution, if the core power does not reach RTP within 24 hours, but is increased slowly, then the peaking factor surveillances must be performed within 48 hours of the time when the ascent to power was begun. These Completion Times are intended to allow adequate time to increase THERMAL POWER to above the limit of Required Action A.1, while not permitting the core to remain with unconfirmed power distributions for extended periods of time.

Required Action A.6 is modified by a Note that states that the peaking factor surveillances may only be done after the excore detectors have been calibrated to show zero tilt (i.e., Required Action A.5). The intent of this Note is to have the peaking factor surveillances performed at operating power levels, which can only be accomplished after the excore detectors are calibrated to show zero tilt and the core returned to power.

(continued)

ACTIONS (continued)

B.1

If Required Actions A.1 through A.6 are not completed within their associated Completion Times, the unit must be brought to a MODE or condition in which the requirements do not apply. To achieve this status, THERMAL POWER must be reduced to < 50% RTP within 4 hours. The allowed Completion Time of 4 hours is reasonable, based on operating experience regarding the amount of time required to reach the reduced power level without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.2.4.1

SR 3.2.4.1 is modified by two Notes. Note 1 allows QPTR to be calculated with three power range channels if THERMAL POWER is ~~<~~≤ 75% RTP and the input from one power range neutron flux channel is inoperable. Note 2 allows performance of SR 3.2.4.2 in lieu of SR 3.2.4.1 if more than one input from power range neutron flux channels are inoperable.

This Surveillance verifies that the QPTR, as indicated by the Nuclear Instrumentation System (NIS) excore channels, is within its limits. The Frequency of 7 days when the QPTR alarm is OPERABLE is acceptable because of the low probability that this alarm can remain inoperable without detection.

When the QPTR alarm is inoperable, the Frequency is increased to 12 hours. This Frequency is adequate to detect any relatively slow changes in QPTR, because for those changes of QPTR that occur quickly (e.g., a dropped rod), there typically are other indications of abnormality that prompt a verification of core power tilt.

SR 3.2.4.2

This Surveillance is modified by a Note, which states the surveillance is only required to be performed if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with~~that it is required only when the input from one or more power range neutron flux channels are inoperable and the~~ THERMAL POWER is ≥~~>~~ 75% RTP.

With an NIS power range channel inoperable, tilt monitoring for a portion of the reactor core becomes degraded. Large tilts are likely detected with the remaining channels, but the capability for detection of small power tilts in some quadrants is decreased. Performing SR 3.2.4.2 at a Frequency of 12 hours provides an accurate alternative means for ensuring that any tilt remains within its limits.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.2.4.2 (continued)

For the purpose of monitoring the Q~~T~~PTR when the input from one or more power range neutron flux channels are inoperable, incore power distribution measurement information is used to confirm that the indicated QPTR is consistent with the reference normalized symmetric power distribution. The incore power distribution information can be used to generate an incore "tilt." This tilt can be compared to the reference incore tilt to generate and incore QPTR. Therefore, incore QPTR can be used to confirm that excore QPTR is within limits.

The incore power distribution measurement information can be obtained from either the movable incore detectors or from an OPERABLE Power Distribution Monitoring System (PDMS) (Ref. 4). If the movable incore detectors are used, then the incore detector monitoring is performed with a full core flux map or two sets of four thimble locations with quarter core symmetry. The two sets of four symmetric thimbles is a set of eight unique detector locations. These locations are C-8, E-5, E-11, H-3, H-13, L-11, and N-8.

The reference normalized symmetric power distribution is available from the last incore power distribution measurement information used to calibrate the excore axial offset. The reference incore power distribution measurement information may have been obtained from either a full core flux map using the Movable Incore Detector System or from an OPERABLE PDMS. The full core flux map information may be reduced to the information from only the two sets of four symmetric thimbles with quarter core symmetry for like comparisons, if practical.

With the input from one or more power range neutron flux channels inoperable, the indicated QPTR may be changed from the value indicated with all four channels OPERABLE. To confirm that no change in tilt has actually occurred, which might causes the QPTR limit to be exceeded, the normalized quadrant tilt is compared against the reference normalized quadrant tilt. Nominally, quadrant tilt from the surveillance should be within 2% of the tilt shown by the reference incore power distribution measurement information.

(continued)

BASES

REFERENCES

1. Title 10, Code of Federal Regulations, Part 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors."

2. Regulatory Guide 1.77, Rev. 0, "Assumptions Used for Evaluating a Control Rod Ejection Accident for Pressurized Water Reactors," May 1974.

3. Title 10, Code of Federal Regulations, Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," GDC 26, "Reactivity Control System Redundancy and Capability."

4. WCAP-12472-P-A, “BEACON Core Monitoring and Operations Support System,” August 1994.

ACTIONS (continued)

D.1~~.1, D.1.2, D.2.1, D.2.2,~~ and D.~~3~~2

Condition D applies to the Power Range Neutron Flux—High Function.

The NIS power range detectors provide input to the CRD System and the SG Water Level Control System and, therefore, have a two-out-of-four trip logic. A known inoperable channel must be placed in the tripped condition. This results in a partial trip condition requiring only one-out-of-three logic for actuation. The 72 hours allowed by Required Action D.1 to place the inoperable channel in the tripped condition is justified in Reference 14.

~~In addition to placing the inoperable channel in the tripped condition, THERMAL POWER must be reduced to ≤ 75% RTP within 78 hours. Reducing the power level prevents operation of the core with radial power distributions beyond the design limits. With one of the NIS power range detectors inoperable, 1/4 of the radial power distribution monitoring capability is lost.~~

~~As an alternative to the above actions, the inoperable channel can be placed in the tripped condition within 72 hours and the QPTR monitored once every 12 hours as per SR 3.2.4.2, QPTR verification. Calculating QPTR every 12 hours compensates for the lost monitoring capability due to the inoperable NIS power range channel and allows continued unit operation at power levels ≥ 75% RTP. The 12 hour Frequency is consistent with LCO 3.2.4, "QUADRANT POWER TILT RATIO (QPTR)."~~The Required Actions have been modified by two Notes. Note 1 allows the inoperable channel to be placed in the bypassed condition for up to 12 hours while performing routine surveillance testing of other channels. With one channel inoperable, the Note also allows routine surveillance testing of another channel with the inoperable channel in bypass. The Note also allows placing the inoperable channel in the bypass condition to allow setpoint adjustments of other channels when required to reduce the Power Range Neutron Flux-High setpoint in accordance with other Technical Specifications. The 12 hour time limit is justified in Reference 14.

Note 2 states to perform SR 3.2.4.2 if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP.

If Required Action D.1 cannot be met within the specified Completion Time~~As an alternative to the above actions~~, the plant must be placed in a MODE where this Function is no longer required OPERABLE. Seventy-eight hours are allowed to place the plant in MODE 3. The 78-hour Completion Time includes ~~72 hours for channel corrective maintenance and an additional~~ 6 hours for the MODE reduction as required by Required Action D.~~3~~2. This is a reasonable time, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. ~~If Required Actions cannot be completed within their allowed Completion Times, LCO 3.0.3 must be entered.~~

~~The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypass condition for up to 12 hours while performing routine surveillance testing of other channels. The Note also allows placing the~~

(continued)

~~inoperable channel in the bypass condition to allow setpoint adjustments of other channels when required to reduce the setpoint in accordance with other Technical Specifications. The 12 hour time limit is justified in Reference 14.~~

(continued)

ACTIONS
(continued)

~~Required Action D.2.2 has been modified by a Note which only requires SR 3.2.4.2 to be performed if the Power Range Neutron Flux input to QPTR becomes inoperable. Failure of a component in the Power Range Neutron Flux channel which renders the High Flux trip Function inoperable may not affect the capability to monitor QPTR. As such, determining QPTR using the movable incore detectors or the PDMS once per 12 hours may not be necessary.~~

E.1 and E.2

Condition E applies to the following reactor trip Functions:

- Power Range Neutron Flux—Low; and
- Power Range Neutron Flux—High Positive Rate

A known inoperable channel must be placed in the tripped condition within 72 hours. Placing the channel in the tripped condition results in a partial trip condition requiring only one-out-of-two logic for actuation of the two-out-of-three trips and one-out-of-three logic for actuation of the two-out-of-four trips. The 72 hours allowed to place the inoperable channel in the tripped condition is justified in Reference 14.

If the inoperable channel cannot be placed in the trip condition within the specified Completion Time, the plant must be placed in a MODE where these Functions are not required OPERABLE. An additional 6 hours is allowed to place the plant in MODE 3. Six hours is a reasonable time, based on operating experience, to place the plant in MODE 3 from full power in an orderly manner and without challenging plant systems.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. The 12 hour time limit is justified in Reference 14.

(continued)

Enclosure

ATTACHMENT 8

Proposed TS Bases Page Changes (Mark-Ups) for WBN Unit 2 (For Information Only)

ACTIONS (continued)

B.1

If Required Actions A.1 through A.6 are not completed within their associated Completion Times, the unit must be brought to a MODE or condition in which the requirements do not apply. To achieve this status, THERMAL POWER must be reduced to < 50% RTP within 4 hours. The allowed Completion Time of 4 hours is reasonable, based on operating experience regarding the amount of time required to reach the reduced power level without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.2.4.1

SR 3.2.4.1 is modified by two Notes. Note 1 allows QPTR to be calculated with three power range channels if THERMAL POWER is ~~<~~≤ 75% RTP and the input from one power range neutron flux channel is inoperable. Note 2 allows performance of SR 3.2.4.2 in lieu of SR 3.2.4.1 if more than one input from power range neutron flux channels are inoperable.

This Surveillance verifies that the QPTR, as indicated by the Nuclear Instrumentation System (NIS) excore channels, is within its limits. The Frequency of 7 days when the QPTR alarm is OPERABLE is acceptable because of the low probability that this alarm can remain inoperable without detection.

When the QPTR alarm is inoperable, the Frequency is increased to 12 hours. This Frequency is adequate to detect any relatively slow changes in QPTR, because for those changes of QPTR that occur quickly (e.g., a dropped rod), there typically are other indications of abnormality that prompt a verification of core power tilt.

SR 3.2.4.2

This Surveillance is modified by a Note, which states the surveillance is only required to be performed if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with~~that it is required only when the input from one or more power range neutron flux channels are inoperable and the~~ THERMAL POWER ~~is ≥~~> 75% RTP.

With an NIS power range channel inoperable, tilt monitoring for a portion of the reactor core becomes degraded. Large tilts are likely detected with the remaining channels, but the capability for detection of small power tilts in some quadrants is decreased. Performing SR 3.2.4.2 at a Frequency of 12 hours provides an accurate alternative means for ensuring that any tilt remains within its limits.

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

must be opened within the next hour. The additional hour provides sufficient time to accomplish the action in an orderly manner. With the RTBs open, these Functions are no longer required. The Completion Time is reasonable considering that in this Condition, the remaining OPERABLE channel or train is adequate to perform the safety function, and given the low probability of an event occurring during this interval.

D.1~~.1, D.1.2, D.2.1, D.2.2,~~ and D.~~3~~2

Condition D applies to the Power Range Neutron Flux - High Function.

The NIS power range detectors provide input to the CRD System and the SG Water Level Control System and, therefore, have a two-out-of-four trip logic. A known inoperable channel must be placed in the tripped condition. This results in a partial trip condition requiring only one-out-of-three logic for actuation. The 72 hours allowed by Required Action D.1 to place the inoperable channel in the tripped condition is justified in Reference 14.

~~In addition to placing the inoperable channel in the tripped condition, THERMAL POWER must be reduced to ≤ 75% RTP within 78 hours. Reducing the power level prevents operation of the core with radial power distributions beyond the design limits. With one of the NIS power range detectors inoperable, 1/4 of the radial power distribution monitoring capability is lost.~~

~~As an alternative to the above actions, the inoperable channel can be placed in the tripped condition within 72 hours and the QPTR monitored once every 12 hours as per SR 3.2.4.2, QPTR verification. Calculating QPTR every 12 hours compensates for the lost monitoring capability due to the inoperable NIS power range channel and allows continued unit operation at power levels ≥ 75% RTP. The 12 hour Frequency is consistent with LCO 3.2.4, "QUADRANT POWER TILT RATIO (QPTR)."~~The Required Actions have been modified by two Notes. Note 1 allows the inoperable channel to be placed in the bypassed condition for up to 12 hours while performing routine surveillance testing of other channels. With one channel inoperable, the Note also allows routine surveillance testing of another channel with the inoperable channel in bypass. The Note also allows placing the inoperable channel in the bypass condition to allow setpoint adjustments of other channels when required to reduce the Power Range Neutron Flux-High setpoint in accordance with other Technical Specifications. The 12 hour time limit is justified in Reference 14.

(continued)

BASES

Note 2 states to perform SR 3.2.4.2 if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP

If Required Action D.1 cannot be met within the specified Completion Time~~As an alternative to the above actions~~, the plant must be placed in a MODE where this Function is no longer required OPERABLE. Seventy-eight hours are allowed to place the plant in MODE 3. The 78 hour Completion Time includes ~~72 hours for channel corrective maintenance and an additional~~ 6 hours for the MODE reduction as required by Required Action D.~~3~~2. This is a reasonable time, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems. ~~If Required Actions cannot be completed within their allowed Completion Times, LCO 3.0.3 must be entered.~~

ACTIONS

~~D.1.1, D.1.2, D.2.1, D.2.2, and D.3 (continued)~~

~~The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypass condition for up to 12 hours while performing routine surveillance testing of other channels. The Note also allows placing the inoperable channel in the bypass condition to allow setpoint adjustments of other channels when required to reduce the setpoint in accordance with other Technical Specifications. The 12 hour time limit is justified in Reference 14.~~

~~Required Action D.2.2 has been modified by a Note which only requires SR 3.2.4.2 to be performed if the Power Range Neutron Flux input to QPTR becomes inoperable. Failure of a component in the Power Range Neutron Flux channel which renders the High Flux trip Function inoperable may not affect the capability to monitor QPTR. As such, determining QPTR using the PDMS once per 12 hours may not be necessary.~~E.1 and E.2

Condition E applies to the following reactor trip Functions:

- Power Range Neutron Flux - Low; and
- Power Range Neutron Flux - High Positive Rate.

A known inoperable channel must be placed in the tripped condition within 72 hours. Placing the channel in the tripped condition results in a partial trip condition requiring only one-out-of-two logic for actuation of the two-out-of-three trips and one-out-of-three logic for actuation of the two-out-of-four trips. The 72 hours allowed to place the inoperable channel in the tripped condition is justified in Reference 14.

(continued)

BASES

If the inoperable channel cannot be placed in the trip condition within the specified Completion Time, the plant must be placed in a MODE where these Functions are not required OPERABLE. An additional 6 hours is allowed to place the plant in MODE 3. Six hours is a reasonable time, based on operating experience, to place the plant in MODE 3 from full power in an orderly manner and without challenging plant systems.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. The 12 hour time limit is justified in Reference 14.

(continued)

ATTACHMENT 9

Proposed TS Changes (Final Typed) for SQN Unit 1

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required Action and associated Completion Time not met.	B.1	Reduce THERMAL POWER to ≤ 50% RTP.	4 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.4.1	------------------------------NOTES---------------------------- 1. With input from one Power Range Neutron Flux channel inoperable and THERMAL POWER ≤ 75% RTP, the remaining three power range channels can be used for calculating QPTR. 2. SR 3.2.4.2 may be performed in lieu of this Surveillance. --- Verify QPTR is within limit by calculation.	In accordance with the Surveillance Frequency Control Program
SR 3.2.4.2	-------------------------------NOTE------------------------------ Only required to be performed if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP. --- Verify QPTR is within limit using the movable incore detectors.	Once within 12 hours <u>AND</u> In accordance with the Surveillance Frequency Control Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	C.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.	49 hours
D. One Power Range Neutron Flux - High channel inoperable.	-------------------NOTES------------------ 1. The inoperable channel may be bypassed for up to 12 hours for surveillance testing and setpoint adjustment of other channels. 2. Perform SR 3.2.4.2 if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP. ---	
	D.1 Place channel in trip.	72 hours
	<u>OR</u>	
	D.2 Be in MODE 3.	78 hours

Enclosure

ATTACHMENT 10

Proposed TS Changes (Final Typed) for SQN Unit 2

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required Action and associated Completion Time not met.	B.1	Reduce THERMAL POWER to ≤ 50% RTP.	4 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.4.1	-----------------------------NOTES---------------------------- 1. With input from one Power Range Neutron Flux channel inoperable and THERMAL POWER ≤ 75% RTP, the remaining three power range channels can be used for calculating QPTR. 2. SR 3.2.4.2 may be performed in lieu of this Surveillance. --- Verify QPTR is within limit by calculation.	In accordance with the Surveillance Frequency Control Program
SR 3.2.4.2	------------------------------NOTE----------------------------- Only required to be performed if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP. --- Verify QPTR is within limit using the movable incore detectors.	Once within 12 hours <u>AND</u> In accordance with the Surveillance Frequency Control Program

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	C.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.	49 hours
D. One Power Range Neutron Flux - High channel inoperable.	-------------------NOTES------------------ 1. The inoperable channel may be bypassed for up to 12 hours for surveillance testing and setpoint adjustment of other channels. 2. Perform SR 3.2.4.2 if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP. ---	
	D.1 Place channel in trip.	72 hours
	<u>OR</u>	
	D.2 Be in MODE 3.	78 hours

ATTACHMENT 11

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

BASES

SURVEILLANCE REQUIREMENTS (continued)

For those causes of QPTR that occur quickly (e.g., a dropped rod), there typically are other indications of abnormality that prompt a verification of core power tilt.

SR 3.2.4.2

This Surveillance is modified by a Note, which states that the surveillance is only required to be performed if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP.

With an NIS power range channel inoperable, tilt monitoring for a portion of the reactor core becomes degraded. Large tilts are likely detected with the remaining channels, but the capability for detection of small power tilts in some quadrants is decreased.

With input to QPTR from one or more Power Range Neutron Flux channels inoperable and with THERMAL POWER > 75% RTP, the surveillance is initially performed within 12 hours. Thereafter, the Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

For purposes of monitoring the QPTR when one power range channel is inoperable, the moveable incore detectors are used to confirm that the normalized symmetric power distribution is consistent with the indicated QPTR and any previous data indicating a tilt. The incore detector monitoring is performed with a full incore flux map or two sets of four thimble locations with quarter core symmetry. The two sets of four symmetric thimbles is a set of eight unique detector locations. These locations are C-8, E-5, E-11, H-3, H-13, L-5, L-11, and N-8.

The symmetric thimble flux map can be used to generate symmetric thimble "tilt." This can be compared to a reference symmetric thimble tilt, from the most recent full core flux map, to generate an incore QPTR. Therefore, incore monitoring of QPTR can be used to confirm that QPTR is within limits.

With one NIS channel inoperable, the indicated tilt may be changed from the value indicated with all four channels OPERABLE. To confirm that no change in tilt has actually occurred, which might cause the QPTR limit to be exceeded, the incore result may be compared against previous flux maps either using the symmetric thimbles as described above or a complete flux map. Nominally, quadrant tilt from the Surveillance should be within 2% of the tilt shown by the most recent flux map data.

BASES

ACTIONS (continued)

D.1 and D.2

Condition D applies to the Power Range Neutron Flux - High Function.

The NIS power range detectors provide input to the Rod Control System and therefore, have a two-out-of-four trip logic. A known inoperable channel must be placed in the tripped condition. This results in a partial trip condition requiring only one-out-of-three logic for actuation. The 72 hours allowed by Required Action D.1 to place the inoperable channel in the tripped condition is justified in WCAP-14333-P-A (Ref. 8).

The Required Actions have been modified by two Notes. Note 1 allows the inoperable channel to be placed in the bypassed condition for up to 12 hours while performing routine surveillance testing of other channels. With one channel inoperable, the Note also allows routine surveillance testing of another channel with the inoperable channel in bypass. The Note also allows placing the inoperable channel in the bypass condition to allow setpoint adjustments of other channels when required to reduce the Power Range Neutron Flux-High setpoint in accordance with other Technical Specifications. The 12 hour time limit is justified in Reference 8.

Note 2 states to perform SR 3.2.4.2 if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP.

If Required Action D.1 cannot be met within the specified Completion Time, the plant must be placed in a MODE where this Function is no longer required OPERABLE. Seventy-eight hours are allowed to place the plant in MODE 3. The 78 hour Completion Time includes 6 hours for the MODE reduction as required by Required Action D.2. This is a reasonable time, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems.

BASES

ACTIONS (continued)

E.1 and E.2

Condition E applies to the following reactor trip Functions:

- Power Range Neutron Flux - Low,
- Overtemperature ΔT,
- Overpower ΔT,
- Power Range Neutron Flux - High Positive Rate,
- Power Range Neutron Flux - High Negative Rate, and
- Pressurizer Pressure - High.

A known inoperable channel must be placed in the tripped condition within 72 hours. Placing the channel in the tripped condition results in a partial trip condition requiring only one-out-of-two logic for actuation of the two-out-of-three trips and one-out-of-three logic for actuation of the two-out-of-four trips. The 72 hours allowed to place the inoperable channel in the tripped condition is justified in Reference 8.

If the inoperable channel cannot be placed in the trip condition within the specified Completion Time, the unit must be placed in a MODE where these Functions are not required OPERABLE. An additional 6 hours is allowed to place the unit in MODE 3. Six hours is a reasonable time, based on operating experience, to place the unit in MODE 3 from full power in an orderly manner and without challenging unit systems.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. The 12 hour time limit is justified in Reference 8.

ATTACHMENT 12

Proposed TS Bases Changes (Final Typed) for SQN Unit 2 (For Information Only)

BASES

SURVEILLANCE REQUIREMENTS (continued)

For those causes of QPTR that occur quickly (e.g., a dropped rod), there typically are other indications of abnormality that prompt a verification of core power tilt.

SR 3.2.4.2

This Surveillance is modified by a Note, which states that the surveillance is only required to be performed if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP.

With an NIS power range channel inoperable, tilt monitoring for a portion of the reactor core becomes degraded. Large tilts are likely detected with the remaining channels, but the capability for detection of small power tilts in some quadrants is decreased.

With input to QPTR from one or more Power Range Neutron Flux channels inoperable and with THERMAL POWER > 75% RTP, the surveillance is initially performed within 12 hours. Thereafter, the Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

For purposes of monitoring the QPTR when one power range channel is inoperable, the moveable incore detectors are used to confirm that the normalized symmetric power distribution is consistent with the indicated QPTR and any previous data indicating a tilt. The incore detector monitoring is performed with a full incore flux map or two sets of four thimble locations with quarter core symmetry. The two sets of four symmetric thimbles is a set of eight unique detector locations. These locations are C-8, E-5, E-11, H-3, H-13, L-5, L-11, and N-8.

The symmetric thimble flux map can be used to generate symmetric thimble "tilt." This can be compared to a reference symmetric thimble tilt, from the most recent full core flux map, to generate an incore QPTR. Therefore, incore monitoring of QPTR can be used to confirm that QPTR is within limits.

With one NIS channel inoperable, the indicated tilt may be changed from the value indicated with all four channels OPERABLE. To confirm that no change in tilt has actually occurred, which might cause the QPTR limit to be exceeded, the incore result may be compared against previous flux maps either using the symmetric thimbles as described above or a complete flux map. Nominally, quadrant tilt from the Surveillance should be within 2% of the tilt shown by the most recent flux map data.

BASES

ACTIONS (continued)

D.1 and D.2

Condition D applies to the Power Range Neutron Flux - High Function.

The NIS power range detectors provide input to the Rod Control System and therefore, have a two-out-of-four trip logic. A known inoperable channel must be placed in the tripped condition. This results in a partial trip condition requiring only one-out-of-three logic for actuation. The 72 hours allowed by Required Action D.1 to place the inoperable channel in the tripped condition is justified in WCAP-14333-P-A (Ref. 8).

The Required Actions have been modified by two Notes. Note 1 allows the inoperable channel to be placed in the bypassed condition for up to 12 hours while performing routine surveillance testing of other channels. With one channel inoperable, the Note also allows routine surveillance testing of another channel with the inoperable channel in bypass. The Note also allows placing the inoperable channel in the bypass condition to allow setpoint adjustments of other channels when required to reduce the Power Range Neutron Flux-High setpoint in accordance with other Technical Specifications. The 12 hour time limit is justified in Reference 8.

Note 2 states to perform SR 3.2.4.2 if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP

If Required Action D.1 cannot be met within the specified Completion Time, the plant must be placed in a MODE where this Function is no longer required OPERABLE. Seventy-eight hours are allowed to place the plant in MODE 3. The 78 hour Completion Time includes 6 hours for the MODE reduction as required by Required Action D.2. This is a reasonable time, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems.

BASES

ACTIONS (continued)

E.1 and E.2

Condition E applies to the following reactor trip Functions:

- Power Range Neutron Flux - Low,
- Overtemperature ΔT,
- Overpower ΔT,
- Power Range Neutron Flux - High Positive Rate,
- Power Range Neutron Flux - High Negative Rate, and
- Pressurizer Pressure - High.

A known inoperable channel must be placed in the tripped condition within 72 hours. Placing the channel in the tripped condition results in a partial trip condition requiring only one-out-of-two logic for actuation of the two-out-of-three trips and one-out-of-three logic for actuation of the two-out-of-four trips. The 72 hours allowed to place the inoperable channel in the tripped condition is justified in Reference 8.

If the inoperable channel cannot be placed in the trip condition within the specified Completion Time, the unit must be placed in a MODE where these Functions are not required OPERABLE. An additional 6 hours is allowed to place the unit in MODE 3. Six hours is a reasonable time, based on operating experience, to place the unit in MODE 3 from full power in an orderly manner and without challenging unit systems.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. The 12 hour time limit is justified in Reference 8.

Enclosure

ATTACHMENT 13

Proposed TS Changes (Final Typed) for WBN Unit 1

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.4.1	-------------------------------NOTES--------------------------- 1. With input from one power range neutron flux channel inoperable and THERMAL POWER ≤ 75% RTP, the remaining three power range channels can be used for calculating QPTR. 2. SR 3.2.4.2 may be performed in lieu of this Surveillance if adequate power range neutron flux channel inputs are not OPERABLE. --- Verify QPTR is within limit by calculation.	7 days <u>AND</u> Once within 12 hours and every 12 hours thereafter with the QPTR alarm inoperable
SR 3.2.4.2	-------------------------------NOTE------------------------------- Only required to be performed if input to QPTR from one or more power range neutron flux channels are inoperable with THERMAL POWER > 75% RTP. --- Verify QPTR is within limit using either the movable incore detectors or the PDMS.	Once within 12 hours <u>AND</u> 12 hours thereafter

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One channel or train inoperable.	C.1 Restore channel or train to OPERABLE status. <u>OR</u> C.2 Open RTBs.	48 hours 49 hours
D. One Power Range Neutron Flux — High channel inoperable.	------------------------NOTES----------------- 1. The inoperable channel may be bypassed for up to 12 hours for surveillance testing and setpoint adjustment of other channels 2. Perform SR 3.2.4.2 if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP. --- D.1 Place channel in trip. <u>OR</u> D.2 Be in MODE 3.	 72 hours 78 hours

(continued)

Enclosure

ATTACHMENT 14

Proposed TS Changes (Final Typed) for WBN Unit 2

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.4.1	-------------------------------NOTES--------------------------- a. With input from one power range neutron flux channel inoperable and THERMAL POWER ≤ 75% RTP, the remaining three power range channels can be used for calculating QPTR. b. SR 3.2.4.2 may be performed in lieu of this Surveillance if adequate power range neutron flux channel inputs are not OPERABLE. --- Verify QPTR is within limit by calculation.	7 days <u>AND</u> Once within 12 hours and every 12 hours thereafter with the QPTR alarm inoperable
SR 3.2.4.2	-------------------------------NOTE----------------------------- Only required to be performed if input to QPTR from one or more power range neutron flux channels are inoperable with THERMAL POWER > 75% RTP. --- Verify QPTR is within limit using the PDMS.	Once within 12 hours <u>AND</u> every 12 hours thereafter

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. One channel or train inoperable.	C.1	Restore channel or train to OPERABLE status.	48 hours
	<u>OR</u>		
	C.2	Open RTBs.	49 hours
D. One Power Range Neutron Flux-High channel inoperable.	--------------------NOTES----------------- 1. The inoperable channel may be bypassed for up to 12 hours for surveillance testing and setpoint adjustment of other channels. 2. Perform SR 3.2.4.2 if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP. ---		
	D.1	Place channel in trip.	72 hours
	<u>OR</u>		
	D.2	Be in MODE 3.	78 hours

continued)

Enclosure

ATTACHMENT 15

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

B 3.2 POWER DISTRIBUTION LIMITS

B 3.2.4 QUADRANT POWER TILT RATIO (QPTR)

BASES

BACKGROUND

The QPTR limit ensures that the gross radial power distribution remains consistent with the design values used in the safety analyses. Precise radial power distribution measurements are made during startup testing, after refueling, and periodically during power operation.

The power density at any point in the core must be limited so that the fuel design criteria are maintained. Together, LCO 3.2.3, "AXIAL FLUX DIFFERENCE (AFD)," LCO 3.2.4, and LCO 3.1.7, "Control Rod Insertion Limits," provide limits on process variables that characterize and control the three dimensional power distribution of the reactor core. Control of these variables ensures that the core operates within the fuel design criteria and that the power distribution remains within the bounds used in the safety analyses.

APPLICABLE SAFETY ANALYSES

This LCO precludes core power distributions that violate the following fuel design criteria:

a. During a large break loss of coolant accident, the peak cladding temperature must not exceed 2200°F (Ref. 1);

b. During a loss of forced reactor coolant flow accident, there must be at least 95% probability at the 95% confidence level (the 95/95 departure from nucleate boiling (DNB) criterion) that the hot fuel rod in the core does not experience a DNB condition;

c. During an ejected rod accident, the energy deposition to the fuel must not exceed 280 cal/gm (Ref. 2); and

d. The control rods must be capable of shutting down the reactor with a minimum required SDM with the highest worth control rod stuck fully withdrawn (Ref. 3).

The LCO limits on the AFD, the QPTR, the Heat Flux Hot Channel Factor ($F_Q(Z)$), the Nuclear Enthalpy Rise Hot Channel Factor ($F^N_{\Delta H}$), rod group alignment, sequence, overlap, and control bank insertion are established to preclude core power distributions that exceed the safety analyses limits.

(continued)

APPLICABLE SAFETY ANALYSES (continued)

The QPTR limits ensure that $F^N_{\Delta H}$ and $F_Q(Z)$ remain below their limiting values by preventing an undetected change in the gross radial power distribution.

In MODE 1, the $F^N_{\Delta H}$ and $F_Q(Z)$ limits must be maintained to preclude core power distributions from exceeding design limits assumed in the safety analyses.

The QPTR satisfies Criterion 2 of the NRC Policy Statement.

LCO

The QPTR limit of 1.02, at which corrective action is required, provides a margin of protection for both the DNB ratio and linear heat generation rate contributing to excessive power peaks resulting from X-Y plane power tilts. A limiting QPTR of 1.02 can be tolerated before the margin for uncertainty in $F_Q(Z)$ and ($F^N_{\Delta H}$) is possibly challenged.

APPLICABILITY

The QPTR limit must be maintained in MODE 1 with THERMAL POWER > 50% RTP to prevent core power distributions from exceeding the design limits.

Applicability in MODE 1 ≤ 50% RTP and in other MODES is not required because there is either insufficient stored energy in the fuel or insufficient energy being transferred to the reactor coolant to require the implementation of a QPTR limit on the distribution of core power. The QPTR limit in these conditions is, therefore, not important. Note that the $F^N_{\Delta H}$ and $F_Q(Z)$ LCOs still apply, but allow progressively higher peaking factors at 50% RTP or lower.

ACTIONS

A.1

With the QPTR exceeding its limit, a power level reduction of 3% RTP for each 1% by which the QPTR exceeds 1.00 is a conservative tradeoff of total core power with peak linear power. The Completion Time of 2 hours allows sufficient time to identify the cause and correct the tilt. Note that the power reduction itself may cause a change in the tilted condition.

(continued)

ACTIONS (continued)

A.2

After completion of Required Action A.1, the QPTR Alarm may still be in its alarmed state. As such, any additional changes in the QPTR are detected by requiring a check of the QPTR once per 12 hours thereafter. If the QPTR continues to increase, THERMAL POWER has to be reduced accordingly. A 12 hour Completion Time is sufficient because any additional change in QPTR would be relatively slow.

A.3

The peaking factors $F^N_{\Delta H}$ and $F_Q(Z)$ are of primary importance in ensuring that the power distribution remains consistent with the initial conditions used in the safety analyses. Performing SRs on $F^N_{\Delta H}$ and $F_Q(Z)$ within the Completion Time of 24 hours ensures that these primary indicators of power distribution are within their respective limits. A Completion Time of 24 hours takes into consideration the rate at which peaking factors are likely to change, and the time required to stabilize the plant and perform an incore power distribution measurement. If these peaking factors are not within their limits, the Required Actions of these Surveillances provide an appropriate response for the abnormal condition. If the QPTR remains above its specified limit, the peaking factor surveillances are required each 7 days thereafter to evaluate $F^N_{\Delta}H$ and $F_Q(Z)$ with changes in power distribution. Relatively small changes are expected due to either burnup and xenon redistribution or correction of the cause for exceeding the QPTR limit.

A.4

Although $F^N_{\Delta H}$ and $F_Q(Z)$ are of primary importance as initial conditions in the safety analyses, other changes in the power distribution may occur as the QPTR limit is exceeded and may have an impact on the validity of the safety analysis. A change in the power distribution can affect such reactor parameters as bank worths and peaking factors for rod malfunction accidents. When the QPTR exceeds its limit, it does not necessarily mean a safety concern exists. It does mean that there is an indication of a change in the gross radial power distribution that requires an investigation and evaluation that is accomplished by examining the incore power distribution. Specifically, the core peaking factors and the quadrant tilt must be evaluated because they are the factors that best characterize the core power distribution. This re-evaluation is required to ensure that, before increasing THERMAL POWER to above the limit of Required Action A.1, the reactor core conditions are consistent with the assumptions in the safety analyses.

(continued)

BASES

ACTIONS (continued)

A.5

If the QPTR has exceeded the 1.02 limit and a re-evaluation of the safety analysis is completed and shows that safety requirements are met, the excore detectors are recalibrated to show a QPTR of 1.0 prior to increasing THERMAL POWER to above the limit of Required Action A.1. This is done to detect any subsequent significant changes in QPTR.

Required Action A.5 is modified by a Note that states that the QPTR is not zeroed out until after the re-evaluation of the safety analysis has determined that core conditions at RTP are within the safety analysis assumptions (i.e., Required Action A.4). This Note is intended to prevent any ambiguity about the required sequence of actions.

A.6

Once the flux tilt is zeroed out (i.e., Required Action A.5 is performed), it is acceptable to return to full power operation. However, as an added check that the core power distribution at RTP is consistent with the safety analysis assumptions, Required Action A.6 requires verification that $F_Q(Z)$ and $F^N_{\Delta H}$ are within their specified limits within 24 hours of reaching RTP. As an added precaution, if the core power does not reach RTP within 24 hours, but is increased slowly, then the peaking factor surveillances must be performed within 48 hours of the time when the ascent to power was begun. These Completion Times are intended to allow adequate time to increase THERMAL POWER to above the limit of Required Action A.1, while not permitting the core to remain with unconfirmed power distributions for extended periods of time.

Required Action A.6 is modified by a Note that states that the peaking factor surveillances may only be done after the excore detectors have been calibrated to show zero tilt (i.e., Required Action A.5). The intent of this Note is to have the peaking factor surveillances performed at operating power levels, which can only be accomplished after the excore detectors are calibrated to show zero tilt and the core returned to power.

(continued)

BASES

ACTIONS (continued)

B.1

If Required Actions A.1 through A.6 are not completed within their associated Completion Times, the unit must be brought to a MODE or condition in which the requirements do not apply. To achieve this status, THERMAL POWER must be reduced to < 50% RTP within 4 hours. The allowed Completion Time of 4 hours is reasonable, based on operating experience regarding the amount of time required to reach the reduced power level without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.2.4.1

SR 3.2.4.1 is modified by two Notes. Note 1 allows QPTR to be calculated with three power range channels if THERMAL POWER is ≤ 75% RTP and the input from one power range neutron flux channel is inoperable. Note 2 allows performance of SR 3.2.4.2 in lieu of SR 3.2.4.1 if more than one input from power range neutron flux channels are inoperable.

This Surveillance verifies that the QPTR, as indicated by the Nuclear Instrumentation System (NIS) excore channels, is within its limits. The Frequency of 7 days when the QPTR alarm is OPERABLE is acceptable because of the low probability that this alarm can remain inoperable without detection.

When the QPTR alarm is inoperable, the Frequency is increased to 12 hours. This Frequency is adequate to detect any relatively slow changes in QPTR, because for those changes of QPTR that occur quickly (e.g., a dropped rod), there typically are other indications of abnormality that prompt a verification of core power tilt.

SR 3.2.4.2

This Surveillance is modified by a Note, which states the surveillance is only required to be performed if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER is > 75% RTP.

With an NIS power range channel inoperable, tilt monitoring for a portion of the reactor core becomes degraded. Large tilts are likely detected with the remaining channels, but the capability for detection of small power tilts in some quadrants is decreased. Performing SR 3.2.4.2 at a Frequency of 12 hours provides an accurate alternative means for ensuring that any tilt remains within its limits.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.2.4.2 (continued)

For the purpose of monitoring the QPTR when the input from one or more power range neutron flux channels are inoperable, incore power distribution measurement information is used to confirm that the indicated QPTR is consistent with the reference normalized symmetric power distribution. The incore power distribution information can be used to generate an incore “tilt.” This tilt can be compared to the reference incore tilt to generate and incore QPTR. Therefore, incore QPTR can be used to confirm that excore QPTR is within limits.

The incore power distribution measurement information can be obtained from either the movable incore detectors or from an OPERABLE Power Distribution Monitoring System (PDMS) (Ref. 4). If the movable incore detectors are used, then the incore detector monitoring is performed with a full core flux map or two sets of four thimble locations with quarter core symmetry. The two sets of four symmetric thimbles is a set of eight unique detector locations. These locations are C-8, E-5, E-11, H-3, H-13, L-11, and N-8.

The reference normalized symmetric power distribution is available from the last incore power distribution measurement information used to calibrate the excore axial offset. The reference incore power distribution measurement information may have been obtained from either a full core flux map using the Movable Incore Detector System or from an OPERABLE PDMS. The full core flux map information may be reduced to the information from only the two sets of four symmetric thimbles with quarter core symmetry for like comparisons, if practical.

With the input from one or more power range neutron flux channels inoperable, the indicated QPTR may be changed from the value indicated with all four channels OPERABLE. To confirm that no change in tilt has actually occurred, which might causes the QPTR limit to be exceeded, the normalized quadrant tilt is compared against the reference normalized quadrant tilt. Nominally, quadrant tilt from the surveillance should be within 2% of the tilt shown by the reference incore power distribution measurement information.

(continued)

REFERENCES

1. Title 10, Code of Federal Regulations, Part 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors."

2. Regulatory Guide 1.77, Rev. 0, "Assumptions Used for Evaluating a Control Rod Ejection Accident for Pressurized Water Reactors," May 1974.

3. Title 10, Code of Federal Regulations, Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," GDC 26, "Reactivity Control System Redundancy and Capability."

4. WCAP-12472-P-A, “BEACON Core Monitoring and Operations Support System,” August 1994.

ACTIONS (continued)

D.1 and D.2

Condition D applies to the Power Range Neutron Flux—High Function.

The NIS power range detectors provide input to the CRD System and the SG Water Level Control System and, therefore, have a two-out-of-four trip logic. A known inoperable channel must be placed in the tripped condition. This results in a partial trip condition requiring only one-out-of-three logic for actuation. The 72 hours allowed by Required Action D.1 to place the inoperable channel in the tripped condition is justified in Reference 14.

The Required Actions have been modified by two Notes. Note 1 allows the inoperable channel to be placed in the bypassed condition for up to 12 hours while performing routine surveillance testing of other channels. With one channel inoperable, the Note also allows routine surveillance testing of another channel with the inoperable channel in bypass. The Note also allows placing the inoperable channel in the bypass condition to allow setpoint adjustments of other channels when required to reduce the Power Range Neutron Flux-High setpoint in accordance with other Technical Specifications. The 12 hour time limit is justified in Reference 14.

Note 2 states to perform SR 3.2.4.2 if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP.

If Required Action D.1 cannot be met within the specified Completion Time, the plant must be placed in a MODE where this Function is no longer required OPERABLE. Seventy-eight hours are allowed to place the plant in MODE 3. The 78-hour Completion Time includes 6 hours for the MODE reduction as required by Required Action D.2. This is a reasonable time, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems.

ACTIONS
(continued)

E.1 and E.2

Condition E applies to the following reactor trip Functions:

- Power Range Neutron Flux—Low; and
- Power Range Neutron Flux—High Positive Rate

A known inoperable channel must be placed in the tripped condition within 72 hours. Placing the channel in the tripped condition results in a partial trip condition requiring only one-out-of-two logic for actuation of the two-out-of-three trips and one-out-of-three logic for actuation of the two-out-of-four trips. The 72 hours allowed to place the inoperable channel in the tripped condition is justified in Reference 14.

If the inoperable channel cannot be placed in the trip condition within the specified Completion Time, the plant must be placed in a MODE where these Functions are not required OPERABLE. An additional 6 hours is allowed to place the plant in MODE 3. Six hours is a reasonable time, based on operating experience, to place the plant in MODE 3 from full power in an orderly manner and without challenging plant systems.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. The 12 hour time limit is justified in Reference 14.

(continued)

Enclosure

ATTACHMENT 16

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

ACTIONS (continued)

B.1

If Required Actions A.1 through A.6 are not completed within their associated Completion Times, the unit must be brought to a MODE or condition in which the requirements do not apply. To achieve this status, THERMAL POWER must be reduced to < 50% RTP within 4 hours. The allowed Completion Time of 4 hours is reasonable, based on operating experience regarding the amount of time required to reach the reduced power level without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.2.4.1

SR 3.2.4.1 is modified by two Notes. Note 1 allows QPTR to be calculated with three power range channels if THERMAL POWER is ≤ 75% RTP and the input from one power range neutron flux channel is inoperable. Note 2 allows performance of SR 3.2.4.2 in lieu of SR 3.2.4.1 if more than one input from power range neutron flux channels are inoperable.

This Surveillance verifies that the QPTR, as indicated by the Nuclear Instrumentation System (NIS) excore channels, is within its limits. The Frequency of 7 days when the QPTR alarm is OPERABLE is acceptable because of the low probability that this alarm can remain inoperable without detection.

When the QPTR alarm is inoperable, the Frequency is increased to 12 hours. This Frequency is adequate to detect any relatively slow changes in QPTR, because for those changes of QPTR that occur quickly (e.g., a dropped rod), there typically are other indications of abnormality that prompt a verification of core power tilt.

SR 3.2.4.2

This Surveillance is modified by a Note, which states the surveillance is only required to be performed if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP.

With an NIS power range channel inoperable, tilt monitoring for a portion of the reactor core becomes degraded. Large tilts are likely detected with the remaining channels, but the capability for detection of small power tilts in some quadrants is decreased. Performing SR 3.2.4.2 at a Frequency of 12 hours provides an accurate alternative means for ensuring that any tilt remains within its limits.

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

must be opened within the next hour. The additional hour provides sufficient time to accomplish the action in an orderly manner. With the RTBs open, these Functions are no longer required. The Completion Time is reasonable considering that in this Condition, the remaining OPERABLE channel or train is adequate to perform the safety function, and given the low probability of an event occurring during this interval.

D.1 and D.2

Condition D applies to the Power Range Neutron Flux - High Function.

The NIS power range detectors provide input to the CRD System and the SG Water Level Control System and, therefore, have a two-out-of-four trip logic. A known inoperable channel must be placed in the tripped condition. This results in a partial trip condition requiring only one-out-of-three logic for actuation. The 72 hours allowed by Required Action D.1 to place the inoperable channel in the tripped condition is justified in Reference 14.

The Required Actions have been modified by two Notes. Note 1 allows the inoperable channel to be placed in the bypassed condition for up to 12 hours while performing routine surveillance testing of other channels. With one channel inoperable, the Note also allows routine surveillance testing of another channel with the inoperable channel in bypass. The Note also allows placing the inoperable channel in the bypass condition to allow setpoint adjustments of other channels when required to reduce the Power Range Neutron Flux-High setpoint in accordance with other Technical Specifications. The 12 hour time limit is justified in Reference 14.

Note 2 states to perform SR 3.2.4.2 if input to QPTR from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER > 75% RTP

If Required Action D.1 cannot be met within the specified Completion Time, the plant must be placed in a MODE where this Function is no longer required OPERABLE. Seventy-eight hours are allowed to place the plant in MODE 3. The 78 hour Completion Time includes 6 hours for the MODE reduction as required by Required Action D.2. This is a reasonable time, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems.

(continued)

ACTIONS

E.1 and E.2

Condition E applies to the following reactor trip Functions:

- Power Range Neutron Flux - Low; and
- Power Range Neutron Flux - High Positive Rate.

A known inoperable channel must be placed in the tripped condition within 72 hours. Placing the channel in the tripped condition results in a partial trip condition requiring only one-out-of-two logic for actuation of the two-out-of-three trips and one-out-of-three logic for actuation of the two-out-of-four trips. The 72 hours allowed to place the inoperable channel in the tripped condition is justified in Reference 14.

If the inoperable channel cannot be placed in the trip condition within the specified Completion Time, the plant must be placed in a MODE where these Functions are not required OPERABLE. An additional 6 hours is allowed to place the plant in MODE 3. Six hours is a reasonable time, based on operating experience, to place the plant in MODE 3 from full power in an orderly manner and without challenging plant systems.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. The 12 hour time limit is justified in Reference 14.

(continued)