FNP Unit 1

Current Technical Specifications

Reactor Trip System Instrumentation

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TABLE NOTATION

* - With the reactor trip system breakers closed and the control rod drive system capable of rod withdrawal.

(1) - If not performed in previous 7 days.

(2) - Heat balance only, above 15% of RATED THERMAL POWER (RTP). Adjust NIS channel if ~~absolute difference is greater than 2 percent.~~ calorimetric calculated power exceeds NIS indicated power by more than + 2% RTP.

(3) - Compare incore to excore axial flux difference every 31 EFPD. Recalibrate if the absolute difference is greater than or equal to 3 percent.

(4) - Manual ESF functional input check every 18 months.

(5) - Each train or logic channel shall be tested at least every 62 days on a STAGGERED TEST BASIS.

(6) - Neutron detectors may be excluded from CHANNEL CALIBRATION.

(7) - Below the P-6 (Block of Source Range Reactor Trip) setpoint. Upon reaching P-6 from MODE 2 the CHANNEL CHECK must be performed within 1 hour.

(8) - Logic only, if not performed in previous 92 days.

(9) - CHANNEL FUNCTIONAL TEST will consist of verifying that each channel indicates a turbine trip prior to latching the turbine and indicates no turbine trip prior to P-9.

(10) - If not performed in the previous 31 days.

(11) - Independently verify OPERABILITY of the undervoltage and shunt trip circuitry for the Manual Reactor Trip Function.

(12) - Verify reactor trip breaker and reactor trip bypass breaker open upon actuation of each Main Control Board handswitch.

(13) - Local manual shunt trip prior to placing breaker in service. Local manual undervoltage trip prior to placing breaker in service.

(14) - Undervoltage trip via Reactor Protection System.

(15) - Local manual shunt trip.

TABLE 4.3-1 (Continued)

TABLE NOTATION

* - With the reactor trip system breakers closed and the control rod drive system capable of rod withdrawal.

(1) - If not performed in previous 7 days.

(2) - Heat balance only, above 15% of RATED THERMAL POWER (RTP). Adjust NIS channel if calorimetric calculated power exceeds NIS indicated power by more than +2% RTP.

(3) - Compare incore to excore axial flux difference every 31 EFPD. Recalibrate if the absolute difference is greater than or equal to 3 percent.

(4) - Manual ESF functional input check every 18 months.

(5) - Each train or logic channel shall be tested at least every 62 days on a STAGGERED TEST BASIS.

(6) - Neutron detectors may be excluded from CHANNEL CALIBRATION.

(7) - Below the P-6 (Block of Source Range Reactor Trip) setpoint. Upon reaching P-6 from MODE 2 the CHANNEL CHECK must be performed within 1 hour.

(8) - Logic only, if not performed in previous 92 days.

(9) - CHANNEL FUNCTIONAL TEST will consist of verifying that each channel indicates a turbine trip prior to latching the turbine and indicates no turbine trip prior to P-9.

(10) - If not performed in the previous 31 days.

(11) - Independently verify OPERABILITY of the undervoltage and shunt trip circuitry for the Manual Reactor Trip Function.

(12) - Verify reactor trip breaker and reactor trip bypass breaker open upon actuation of each Main Control Board handswitch.

(13) - Local manual shunt trip prior to placing breaker in service. Local manual undervoltage trip prior to placing breaker in service.

(14) - Undervoltage trip via Reactor Protection System.

(15) - Local manual shunt trip.

FNP Unit 2

Current Technical Specifications

Reactor Trip System Instrumentation

Changed Page

Unit 1	Revision
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TABLE 4.3-1 (Continued)

TABLE NOTATION

* - With the reactor trip system breakers closed and the control rod drive system capable of rod withdrawal.

(1) - If not performed in previous 7 days.

(2) - Heat balance only, above 15% of RATED THERMAL POWER (RTP). Adjust NIS channel if ~~absolute difference is greater than 2 percent.~~ calorimetric calculated power exceeds NIS indicated power by more than +2% RTP.

(3) - Compare incore to excore axial flux difference every 31 EFPD. Recalibrate if the absolute difference is greater than or equal to 3 percent.

(4) - Manual ESF functional input check every 18 months.

(5) - Each train or logic channel shall be tested at least every 62 days on a STAGGERED TEST BASIS.

(6) - Neutron detectors may be excluded from CHANNEL CALIBRATION.

(7) - Below the P-6 (Block of Source Range Reactor Trip) setpoint. Upon reaching P-6 from MODE 2 the CHANNEL CHECK must be performed within 1 hour.

(8) - Logic only, if not performed in previous 92 days.

(9) - CHANNEL FUNCTIONAL TEST will consist of verifying that each channel indicates a turbine trip prior to latching the turbine and indicates no turbine trip prior to P-9.

(10) - If not performed in the previous 31 days.

(11) - Independently verify OPERABILITY of the undervoltage and shunt trip circuitry for the Manual Reactor Trip Function.

(12) - Verify reactor trip breaker and reactor trip bypass breaker open upon actuation of each Main Control Board handswitch.

(13) - Local manual shunt trip prior to placing breaker in service. Local manual undervoltage trip prior to placing breaker in service.

(14) - Undervoltage trip via Reactor Protection System.

(15) - Local manual shunt trip.

TABLE 4.3-1 (Continued)

TABLE NOTATION

*	-	With the reactor trip system breakers closed and the control rod drive system capable of rod withdrawal.
(1)	-	If not performed in previous 7 days.
(2)	-	Heat balance only, above 15% of RATED THERMAL POWER (RTP). Adjust NIS channel if calorimetric calculated power exceeds NIS indicated power by more than +2% RTP.
(3)	-	Compare incore to excore axial flux difference every 31 EFPD. Recalibrate if the absolute difference is greater than or equal to 3 percent.
(4)	-	Manual ESF functional input check every 18 months.
(5)	-	Each train or logic channel shall be tested at least every 62 days on a STAGGERED TEST BASIS.
(6)	-	Neutron detectors may be excluded from CHANNEL CALIBRATION.
(7)	-	Below the P-6 (Block of Source Range Reactor Trip) setpoint. Upon reaching P-6 from MODE 2 the CHANNEL CHECK must be performed within 1 hour.
(8)		Logic only, if not performed in previous 92 days.
(9)	-	CHANNEL FUNCTIONAL TEST will consist of verifying that each channel indicates a turbine trip prior to latching the turbine and indicates no turbine trip prior to P-9.
(10)	-	If not performed in the previous 31 days.
(11)	-	Independently verify OPERABILITY of the undervoltage and shunt trip circuitry for the Manual Reactor Trip Function.
(12)	-	Verify reactor trip breaker and reactor trip bypass breaker open upon actuation of each Main Control Board handswitch.
(13)	-	Local manual shunt trip prior to placing breaker in service. Local manual undervoltage trip prior to placing breaker in service.
(14)	-	Undervoltage trip via Reactor Protection System.
(15)	-	Local manual shunt trip.

ATTACHMENT II

FARLEY NUCLEAR PLANT

IMPROVED TECHNICAL SPECIFICATIONS CHANGE REQUEST

NIS POWER RANGE CHANNEL DAILY SURVEILLANCE REQUIREMENT

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Improved Technical Specifications

Reactor Trip System Instrumentation

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SURVEILLANCE REQUIREMENTS

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

	SURVEILLANCE	FREQUENCY
SR 3.3.1.1	----------NOTE---------- Not required to be performed for source range instrumentation until 1 hour after THERMAL POWER is < P-6. ------------------------ Perform CHANNEL CHECK.	12 hours
SR 3.3.1.2	----------NOTES---------- 1. Adjust NIS channel if ~~absolute difference is > 2%.~~ calorimetric calculated power exceeds NIS indicated power by more than +2% RTP. 2. Not required to be performed until 24 hours after THERMAL POWER is ≥ 15% RTP. ------------------------ Compare results of calorimetric heat balance calculation to Nuclear Instrumentation System (NIS) channel output.	24 hours
SR 3.3.1.3	----------NOTES---------- 1. Recalibrate NIS channel if absolute difference is ≥ 3%. 2. Not required to be performed until 24 hours after THERMAL POWER is ≥ 15% RTP. ------------------------ Compare results of the incore detector measurements to NIS AFD.	31 effective full power days (EFPD)

SURVEILLANCE REQUIREMENTS

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

	SURVEILLANCE	FREQUENCY
SR 3.3.1.1	-----------------NOTE----------------- Not required to be performed for source range instrumentation until 1 hour after THERMAL POWER is < P-6. -- Perform CHANNEL CHECK.	12 hours
SR 3.3.1.2	-----------------NOTES----------------- 1. Adjust NIS channel if calorimetric calculated power exceeds NIS indicated power by more than + 2% RTP. 2. Not required to be performed until 24 hours after THERMAL POWER is ≥ 15% RTP. -- Compare results of calorimetric heat balance calculation to Nuclear Instrumentation System (NIS) channel output.	24 hours
SR 3.3.1.3	-----------------NOTES----------------- 1. Recalibrate NIS channel if absolute difference is ≥ 3%. 2. Not required to be performed until 24 hours after THERMAL POWER is ≥ 15% RTP. -- Compare results of the incore detector measurements to NIS AFD.	31 effective full power days (EFPD)

Farley Nuclear Plant

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Page B 3.3.1-52	Replace
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Page B 3.3.1-55	Replace
Page B 3.3.1-56	Replace
Page B 3.3.1-57	Replace
Page B 3.3.1-58	Add
Page B 3.3.1-59	Add

Improved Technical Specifications Bases Markups

INSERT 1

If the calorimetric is performed at part power (< 50% RTP), adjusting the NIS channel indication in the increasing power direction will assure a reactor trip below the safety analysis limit (≤ 118% RTP). Making no adjustment to the NIS channel indication in the decreasing power direction due to a part power calorimetric assures a reactor trip consistent with the safety analyses.

INSERT 2

This allowance does not preclude making indicated power adjustments, if desired, when the calorimetric calculated power is less than the NIS channel indicated power. To provide close agreement between indicated power and calorimetric power and to preserve operating margin, the NIS channels are normally adjusted when operating at or near full power during steady-state conditions. However, discretion must be exercised if the NIS channel indicated power is adjusted in the decreasing power direction due to a part power calorimetric (< 50% RTP). This action could introduce a non-conservative bias at higher power levels which could result in an NIS reactor trip above the safety analysis limit (> 118% RTP). The cause of the non-conservative bias is the decreased accuracy of the calorimetric at reduced power conditions, as discussed in Westinghouse Technical Bulletin, ESBU-TB-92-14-R1, "Decalibration Effects Of Calorimetric Power Level Measurements On The NIS High Power Reactor Trip At Power Levels Less Than 70% RTP," (Ref. 13). To assure a reactor trip below the safety analysis limit, the Power Range Neutron Flux – High bistables are set ≤ 85% RTP: 1) whenever the NIS channel indicated power is adjusted in the decreasing power direction due to a part power calorimetric below 50% RTP; and 2) for a post refueling startup. Before the Power Range Neutron Flux – High bistables are re-set ≤ 109% RTP, the NIS channel calibration must be confirmed based on a calorimetric performed ≥ 50% RTP.

INSERT 3

A power level of 15% RTP is chosen based on plant stability, i.e., automatic rod control capability and turbine generator synchronized to the grid.

INSERT 4

13. Westinghouse Technical Bulletin, ESBU-TB-92-14-R1, "Decalibration Effects Of Calorimetric Power Level Measurements On The NIS High Power Reactor Trip At Power Levels Less Than 70% RTP."

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.2

SR 3.3.1.2 compares the calorimetric heat balance calculation to the NIS channel output every 24 hours. If the calorimetric exceeds the NIS channel ~~output~~ by ~~>~~ 2% RTP, the NIS is not declared inoperable, but must be adjusted. If the NIS channel output cannot be properly adjusted, the channel is declared inoperable.

Two Notes modify SR 3.3.1.2. The first Note indicates that the NIS channel output shall be adjusted consistent with the calorimetric ~~results~~ if the ~~absolute difference between~~ the NIS channel output ~~and the calorimetric is >~~ 2% RTP. The second Note clarifies that this Surveillance is required only if reactor power is ≥ 15% RTP and that 24 hours is allowed for performing the first Surveillance after reaching 15% RTP. ~~At lower power levels, calorimetric data are inaccurate.~~

The Frequency of every 24 hours is adequate. It is based on unit operating experience, considering instrument reliability and operating history data for instrument drift. Together these factors demonstrate the ~~change in the absolute difference between NIS and~~ heat balance ~~calculated~~ powers ~~rarely exceeds 2%~~ in any 24 hour period.

In addition, control room operators periodically monitor redundant indications and alarms to detect deviations in channel outputs.

SR 3.3.1.3

SR 3.3.1.3 compares the incore system to the NIS channel output every 31 EFPD. If the absolute difference is ≥ 3%, the NIS channel is still OPERABLE, but must be recalibrated.

If the NIS channel cannot be properly recalibrated, the channel is declared inoperable. This Surveillance is performed to verify the f(ΔI) input to the overtemperature ΔT Function.

Two Notes modify SR 3.3.1.3. Note 1 indicates that the excore NIS channel shall be recalibrated if the absolute difference between the incore and excore AFD is ≥ 3%. Note 2 clarifies that the Surveillance is required only if reactor power is ≥ 15% RTP and that 24 hours is allowed for performing the first Surveillance after reaching 15% RTP.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.14 (continued)

As appropriate, each channel's response must be verified every 18 months on a STAGGERED TEST BASIS. Each verification shall include at least one Logic train such that both Logic trains are verified at least once per 36 months. Testing of the final actuation devices is included in the testing. Response times cannot be determined during unit operation because equipment operation is required to measure response times. Experience has shown that these components usually pass this surveillance when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.3.1.14 is modified by a Note stating that neutron detectors are excluded from RTS RESPONSE TIME testing. This Note is necessary because of the difficulty in generating an appropriate detector input signal. Excluding the detectors is acceptable because the principles of detector operation ensure a virtually instantaneous response.

REFERENCES

1. FSAR, Chapter 7.
2. FSAR, Chapter 6.
3. FSAR, Chapter 15.
4. IEEE-279-1971
5. 10 CFR 50.49.
6. WCAP 13751, FNP RTS/ESFAS Setpoint Methodology Study.
7. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.
8. FSAR, Table 7.2.5.
9. RPS Functional System Description (FSD) – A – 181007.
10. WCAP 12925, Median Signal Selector (MSS)
11. WCAP 13807/13808, Elimination of Feedwater Flow trip via Implementation of MSS.
12. Joseph M. Farley Nuclear Power Plant Unit 1 (2) Precautions, Limitations and Setpoints – U – 266647 (U – 280912).

INSERT 4

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.2

SR 3.3.1.2 compares the calorimetric heat balance calculation to the NIS channel output every 24 hours. If the calorimetric calculated power exceeds the NIS channel indicated power by more than + 2% RTP, the NIS channel is not declared inoperable, but must be adjusted. If the NIS channel output cannot be properly adjusted, the channel is declared inoperable.

If the calorimetric is performed at part power (< 50% RTP), adjusting the NIS channel indication in the increasing power direction will assure a reactor trip below the safety analysis limit (≤ 118% RTP). Making no adjustment to the NIS channel indication in the decreasing power direction due to a part power calorimetric assures a reactor trip consistent with the safety analyses.

This allowance does not preclude making indicated power adjustments, if desired, when the calorimetric calculated power is less than the NIS channel indicated power. To provide close agreement between indicated power and calorimetric power and to preserve operating margin, the NIS channels are normally adjusted when operating at or near full power during steady-state conditions. However, discretion must be exercised if the NIS channel indicated power is adjusted in the decreasing power direction due to a part power calorimetric (< 50% RTP). This action could introduce a non-conservative bias at higher power levels which could result in an NIS reactor trip above the safety analysis limit (> 118% RTP). The cause of the non-conservative bias is the decreased accuracy of the calorimetric at reduced power conditions, as discussed in Westinghouse Technical Bulletin, ESBU-TB-92-14-R1, "Decalibration Effects Of Calorimetric Power Level Measurements On The NIS High Power Reactor Trip At Power Levels Less Than 70% RTP," (Ref. 13). To assure a reactor trip below the safety analysis limit, the Power Range Neutron Flux – High bistables are set ≤ 85% RTP: 1) whenever the NIS channel indicated power is adjusted in the decreasing power direction due to a part power calorimetric below 50% RTP; and 2) for a post refueling startup. Before the Power Range Neutron Flux – High bistables are re-set ≤ 109% RTP, the NIS channel calibration must be confirmed based on a calorimetric performed ≥ 50% RTP.

Two Notes modify SR 3.3.1.2. The first Note indicates that the NIS channel output shall be adjusted consistent with the calorimetric calculated power if the calorimetric calculated power exceeds the

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.3.1.2 (continued)

NIS channel output by more than + 2% RTP. The second Note clarifies that this Surveillance is required only if reactor power is ≥ 15% RTP and that 24 hours is allowed for performing the first Surveillance after reaching 15% RTP. A power level of 15% RTP is chosen based on plant stability, i.e., automatic rod control capability and turbine generator synchronized to the grid.

The Frequency of every 24 hours is adequate. It is based on unit operating experience, considering instrument reliability and operating history data for instrument drift. Together these factors demonstrate that a difference between the heat balance calculated power and the NIS channel indication of more than + 2% RTP is not expected in any 24 hour period.

In addition, control room operators periodically monitor redundant indications and alarms to detect deviations in channel outputs.

SR 3.3.1.3

SR 3.3.1.3 compares the incore system to the NIS channel output every 31 EFPD. If the absolute difference is ≥ 3%, the NIS channel is still OPERABLE, but must be recalibrated.

If the NIS channel cannot be properly recalibrated, the channel is declared inoperable. This Surveillance is performed to verify the f(ΔI) input to the overtemperature ΔT Function.

Two Notes modify SR 3.3.1.3. Note 1 indicates that the excore NIS channel shall be recalibrated if the absolute difference between the incore and excore AFD is ≥ 3%. Note 2 clarifies that the Surveillance is required only if reactor power is ≥ 15% RTP and that 24 hours is allowed for performing the first Surveillance after reaching 15% RTP.

The Frequency of every 31 EFPD is adequate. It is based on unit operating experience, considering instrument reliability and operating history data for instrument drift. Also, the slow changes in neutron flux during the fuel cycle can be detected during this interval.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.4

SR 3.3.1.4 is the performance of a TADOT every 31 days on a STAGGERED TEST BASIS. This test shall verify OPERABILITY by actuation of the end devices.

The RTB test shall include separate verification of the undervoltage trip via the Reactor Protection System and the local manual shunt trip mechanism. The bypass breaker test shall include a local manual shunt trip and local manual undervoltage trip. A Note has been added to indicate that this test must be performed on a bypass breaker prior to placing it in service. The independent test of undervoltage and shunt trip circuitry for the bypass breakers for the manual reactor trip function is included in SR 3.3.1.12. No capability is provided for performing such a test at power.

The Frequency of every 31 days on a STAGGERED TEST BASIS is adequate. It is based on industry operating experience, considering instrument reliability and operating history data.

SR 3.3.1.5

SR 3.3.1.5 is the performance of an ACTUATION LOGIC TEST. The SSPS is tested every 31 days on a STAGGERED TEST BASIS, using the semiautomatic tester. The train being tested is placed in the bypass condition, thus preventing inadvertent actuation. Through the semiautomatic tester, all possible logic combinations, with and without applicable permissives, are tested for each protection function. The Frequency of every 31 days on a STAGGERED TEST BASIS is adequate. It is based on industry operating experience, considering instrument reliability and operating history data.

SR 3.3.1.6

SR 3.3.1.6 is the performance of a TADOT and is performed every 92 days, as justified in Reference 7.

The SR is modified by a Note that excludes verification of setpoints from the TADOT. Since this SR applies to RCP undervoltage and underfrequency relays, setpoint verification requires elaborate bench calibration and is accomplished during the CHANNEL CALIBRATION.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.7

SR 3.3.1.7 is the performance of a COT every 92 days.

A COT is performed on each required channel to ensure the rack components will perform the intended Function.

Setpoints must be within the Allowable Values specified in Table 3.3.1-1.

The "as found" values are evaluated to ensure consistency with (i.e., bounded by) the drift allowance used in the setpoint methodology. The setpoint shall be left set consistent with the assumptions of the current unit specific setpoint methodology.

SR 3.3.1.7 is modified by a Note that provides a 4 hour delay in the requirement to perform this Surveillance for source range instrumentation when entering MODE 3 from MODE 2. This Note allows a normal shutdown to proceed without a delay for testing in MODE 2 and for a short time in MODE 3 until the RTBs are open and SR 3.3.1.7 is no longer required to be performed. If the unit is to be in MODE 3 with the RTBs closed for > 4 hours this Surveillance must be performed prior to 4 hours after entry into MODE 3.

The Frequency of 92 days is justified in Reference 7.

SR 3.3.1.8

SR 3.3.1.8 is the performance of a COT as described in SR 3.3.1.7, except it is modified by a Note that this test shall include verification that the P-6 and P-10 interlocks are in their required state for the existing unit condition. The Frequency is modified by a Note that allows this surveillance to be satisfied if it has been performed within 92 days of the Frequencies prior to reactor startup and four hours after reducing power below P-10 and P-6. The Frequency of "prior to startup" ensures this surveillance is performed prior to critical operations and applies to the source, intermediate and power range low instrument channels. The Frequency of "4 hours after reducing power below P-10" (applicable to the power range low channels) and "4 hours after reducing power below P-6" (applicable to source range channels) allows a normal shutdown to be completed and the unit removed

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.3.1.8 (continued)

from the MODE of Applicability for this surveillance without a delay to perform the testing required by this surveillance. This surveillance is not required for the intermediate range instrumentation during power descension. The Frequency of every 92 days thereafter applies if the plant remains in the MODE of Applicability after the initial performances of prior to reactor startup and four hours after reducing power below P-10 or P-6. The MODE of Applicability for this surveillance is < P-10 for the power range low channels and < P-6 for the source range channels. Once the unit is in MODE 3, this surveillance is no longer required. If power is to be maintained < P-10 or < P-6 for more than 4 hours, then the testing required by this surveillance must be performed prior to the expiration of the 4 hour limit. Four hours is a reasonable time to complete the required testing or place the unit in a MODE where this surveillance is no longer required. This test ensures that the NIS source, intermediate, and power range low channels are OPERABLE prior to taking the reactor critical and after reducing power into the applicable MODE (< P-10 or < P-6) for the power and source range instrumentation for periods > 4 hours.

SR 3.3.1.9

SR 3.3.1.9 is a calibration of the excore channels to the incore channels. If the measurements do not agree, the excore channels are not declared inoperable but must be calibrated to agree with the incore detector measurements. If the excore channels cannot be adjusted, the channels are declared inoperable. This Surveillance is performed to verify the f(ΔI) input to the overtemperature ΔT Function.

Two Notes modify SR 3.3.1.9. Note 1 states that neutron detectors may be excluded from the calibration. Note 2 specifies that this Surveillance is required only if reactor power is > 50% RTP and that 7 days are allowed for completing the surveillance after reaching 50% RTP.

The Frequency of 18 months is based on plant operating experience and has proven sufficient to maintain the calibration of the excore detectors.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.10

A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the unit specific setpoint methodology. The "as found" values are evaluated to ensure consistency with i.e., bounded by the drift allowance used in the setpoint methodology.

The Frequency of 18 months is based on the assumption of an 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint methodology and the need to perform this surveillance under the conditions that apply during a plant outage. Operating experience has shown these components usually pass the surveillance when performed on the 18 month Frequency.

This SR is modified by two Notes. Note 1 states that neutron detectors are excluded from the CHANNEL CALIBRATION. The CHANNEL CALIBRATION for the power range neutron detectors consists of a normalization of the detectors based on a power calorimetric and flux map performed above 15% RTP. The CHANNEL CALIBRATION for the source range and intermediate range neutron detectors consists of obtaining the detector plateau or preamp discriminator curves and evaluating those curves. This Surveillance is not required for the NIS power range detectors for entry into MODE 2 or 1, and is not required for the NIS intermediate range detectors for entry into MODE 2, because the unit must be in at least MODE 2 to perform the test for the intermediate range detectors and MODE 1 for the power range detectors. Note 2 states that this test shall include verification that the time constants are adjusted to the prescribed values where applicable. The OTΔT, OPΔT, and the power range neutron flux rate functions contain required time constants.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.11

SR 3.3.1.11 is the performance of a COT of RTS interlocks every 18 months. This COT is intended to verify the interlock Logic only.

The Frequency is based on the known reliability of the interlocks and the multichannel redundancy available, and has been shown to be acceptable through operating experience.

SR 3.3.1.12

SR 3.3.1.12 is the performance of a TADOT of the Manual Reactor Trip, RCP Breaker Position, and the SI Input from ESFAS. This TADOT is performed every 18 months. The test shall independently verify the OPERABILITY of the undervoltage and shunt trip mechanisms for the Manual Reactor Trip Function for the Reactor Trip Breakers and Reactor Trip Bypass Breakers. The Reactor Trip Bypass Breaker test shall include testing of the automatic undervoltage trip.

The Frequency is based on the known reliability of the Functions and the multichannel redundancy available, and has been shown to be acceptable through operating experience.

The SR is modified by a Note that excludes verification of setpoints from the TADOT. The Functions affected have no setpoints associated with them.

SR 3.3.1.13

SR 3.3.1.13 is the performance of a TADOT of Turbine Trip Functions. This TADOT will consist of verifying that each channel indicates a Turbine trip prior to Latching the turbine and indicates no turbine trip prior to P-9. A Note states that this Surveillance is not required if it has been performed within the previous 31 days. Verification of the Trip Setpoint does not have to be performed for this Surveillance.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.14

SR 3.3.1.14 verifies that the individual channel/train actuation response times are less than or equal to the maximum values assumed in the accident analysis. Response time testing acceptance criteria are included in FSAR, Table 7.2.5 (Ref. 8). Individual component response times are not modeled in the analyses.

The analyses model the overall or total elapsed time, from the point at which the parameter exceeds the trip setpoint value at the sensor to the point at which the equipment reaches the required functional state (i.e., control and shutdown rods fully inserted in the reactor core).

For channels that include dynamic transfer Functions (e.g., lag, lead/lag, rate/lag, etc.), the response time test may be performed with the transfer Function set to one, with the resulting measured response time compared to the appropriate FSAR response time. Alternately, the response time test can be performed with the time constants set to their nominal value, provided the required response time is analytically calculated assuming the time constants are set at their nominal values.

Response time may be verified by actual tests in any series of sequential, overlapping or total channel measurements, or by summation of allocated sensor response times with actual test on the remainder of the channel in any series of sequential or overlapping measurements. Allocations for specific pressure and differential pressure sensor response times may be obtained from: (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests), (2) in place, onsite, or offsite (e.g. vendor) test measurements, or (3) utilizing vendor engineering specifications.

WCAP – 13632, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for specific sensors identified in the WCAP. The allocations for these sensor response times must be verified prior to placing the sensor in operational service and re-verified following maintenance that may adversely affect response time. In general, electric repair work does not impact

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.3.1.14 (continued)

response time provided the parts used for repair are of the same type and value. One example where time response could be affected is replacing the sensing assembly of a transmitter. Response time verification for other sensor types must be demonstrated by test.

As appropriate, each channel's response must be verified every 18 months on a STAGGERED TEST BASIS. Each verification shall include at least one Logic train such that both Logic trains are verified at least once per 36 months. Testing of the final actuation devices is included in the testing. Response times cannot be determined during unit operation because equipment operation is required to measure response times. Experience has shown that these components usually pass this surveillance when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.3.1.14 is modified by a Note stating that neutron detectors are excluded from RTS RESPONSE TIME testing. This Note is necessary because of the difficulty in generating an appropriate detector input signal. Excluding the detectors is acceptable because the principles of detector operation ensure a virtually instantaneous response.

REFERENCES

1. FSAR, Chapter 7.
2. FSAR, Chapter 6.
3. FSAR, Chapter 15.
4. IEEE-279-1971.
5. 10 CFR 50.49.
6. WCAP 13751, FNP RTS/ESFAS Setpoint Methodology Study.
7. WCAP-10271-P-A, Supplement 2, Rev. 1, June 1990.

(continued)

REFERENCES (continued)

8. FSAR, Table 7.2.5.

9. RPS Functional System Description (FSD) – A – 181007.

10. WCAP 12925, Median Signal Selector (MSS).

11. WCAP 13807/13808, Elimination of Feedwater Flow trip via Implementation of MSS.

12. Joseph M. Farley Nuclear Power Plant Unit 1 (2) Precautions, Limitations and Setpoints – U – 266647 (U – 280912).

13. Westinghouse Technical Bulletin, ESBU-TB-92-14-R1, "Decalibration Effects Of Calorimetric Power Level Measurements On The NIS High Power Reactor Trip At Power Levels Less Than 70% RTP."

ATTACHMENT III

SAFETY ANALYSIS

JOSEPH M. FARLEY NUCLEAR PLANT

NIS POWER RANGE CHANNEL DAILY SURVEILLANCE

REQUIREMENT TECHNICAL SPECIFICATIONS CHANGE

SAFETY ANALYSIS
JOSEPH M. FARLEY NUCLEAR PLANT
NIS POWER RANGE CHANNEL DAILY SURVEILLANCE REQUIREMENT TECHNICAL SPECIFICATIONS CHANGE

INTRODUCTION

When operating above 15% Rated Thermal Power (RTP), the current Farley Technical Specifications Nuclear Instrumentation System (NIS) Power Range daily Surveillance Requirement requires the adjustment of the Power Range channel(s) when the absolute difference between Power Range indicated power and secondary side calorimetric power is greater than 2% RTP. Compliance with this Technical Specifications requirement may result in a non-conservative channel calibration during reduced power operations. The proposed Technical Specifications change will resolve this undesirable condition by requiring adjustment of the NIS Power Range channel(s) only when the calorimetric calculated power is greater than the Power Range indicated power by + 2%.

In the interim, to ensure compliance with the Technical Specifications and conformance with the safety analyses, Farley has implemented administrative controls. However, these interim controls have resulted in negative operational and equipment impacts. The proposed surveillance change will also reduce the impact of the interim administrative controls.

The non-conservative NIS calibration issue and the proposed Technical Specifications change are applicable to other Westinghouse plants. Farley is the lead plant for the Westinghouse Owner's Group (WOG).

BACKGROUND

Westinghouse Technical Bulletin ESBU-TB-92-14-R1, "Decalibration Effects Of Calorimetric Power Measurements On The NIS High Power Reactor Trip At Power Levels Less Than 70% RTP," dated February 6, 1996, identified potential effects of decalibrating the NIS Power Range channels at part power operation. The decalibration can occur due to the increased uncertainty of the secondary side power calorimetric when performed at part power (less than approximately 70% RTP). When NIS channel indication is reduced to match calculated power, the decalibration results in a non-conservative bias. The proposed change to the Technical Specifications removes the requirement to adjust the NIS Power Range channels when the indicated power is greater than the calorimetric calculated power by an absolute difference of > 2% RTP.

Westinghouse Technical Bulletin 92-14, "Instrumentation Calibration At Reduced Power," dated January 18, 1993, was revised as a result of Westinghouse's review of ABB-CE Infobulletin 94-01, "Potential Nonconservative Treatment Of Power Measurement Uncertainty," dated June 21, 1994. Both bulletins addressed the potential decalibration effects on NIS Power Range indications and reactor trip setpoints due to increased uncertainties associated with secondary side power calorimetric measurements performed at low power levels. After review of the ABB-CE bulletin, Westinghouse determined that further information and clarification would be advisable and issued ESBU-TB-92-14-R1.

The primary error contributor to the instrument uncertainty for a secondary side power calorimetric measurement is the feedwater flow measurement, which is typically a ΔP measurement across a feedwater venturi. While the measurement uncertainty remains constant in ΔP as power decreases, when translated into flow, the uncertainty increases as a square term. Thus a 1% flow error at 100% power can approach a 10% flow error at 30% RTP even though the ΔP error has not changed. ESBU-TB-92-14-R1 depicted how the potential effects of this error increase at lower power levels. In the example presented, for a 10% error in secondary side power calorimetric, the NIS power range could be sufficiently biased in the non-conservative direction to preclude a reactor trip within the assumptions of the safety analyses. For Farley, this event is the Rod Withdrawal From 10% RTP.

There are six recommendations in the revised bulletin. Recommendation Nos. 1 - 5 are in concert with Farley practices and procedures. However, Recommendation No. 6 suggests that if the NIS Power Range indicates a higher power than the secondary side power calorimetric measurement at power levels below approximately 70%, the Power Range channel(s) should not be adjusted. This recommendation is in conflict with the Farley Technical Specifications Power Range daily Surveillance Requirement, which requires channel adjustment whenever the absolute difference is > 2% above 15% RTP.

In response to ESBU-TB-92-14-R1, Farley determined that the ± 2% RTP calorimetric power measurement uncertainty is valid for power levels ≥ 50% RTP based on the Farley-specific calorimetric measurement procedure. Farley also determined that resetting the NIS Power Range (PR) High Neutron Flux High Setpoint reactor trip to ≤ 85% RTP is an acceptable administrative adjunct to continued performance of the calorimetric and adjustment of the NIS PR channels to reflect the calorimetric power below 50% RTP. This second action is an interim solution that replaces Recommendation No. 6 of ESBU-TB-92-14-R1 and, thereby, obviates the conflict with the Technical Specifications. For long-term resolution, the WOG initiated a program (MUHP-3034) to obtain NRC approval to relax the present Technical Specifications requirements to always adjust NIS channels when indicated power differs from calorimetric power by more than 2%. In LER 97-001-00, "Nuclear Instrumentation System Inaccuracies Below 50% Power," dated February 12, 1997, Farley committed to evaluate the need for a Technical Specifications change based on the results of the WOG program. Subsequently, Farley determined the proposed relaxation is a desirable resolution. Farley is the lead plant for this generic WOG program.

At Farley, the interim controls result in the following negative impacts.

1. For calorimetric power determinations < 50% RTP, the NIS PR High Neutron Flux High Setpoint reactor trip bistables must be set at a nominal 85% RTP (or lower) if the NIS indicated power is reduced by adjustment to reflect calorimetric power.

2. Subsequently, when operating power levels are increased above 50% RTP, power ascension delays can result while the NIS PR High Neutron Flux High Setpoint reactor trip bistables are reset to the TS nominal setpoint of ≤ 109% RTP.

3. Failure to reset the PR High Neutron Flux High Setpoint reactor trip bistables prior to increasing power above the administrative setpoint would result in an inadvertent reactor trip.

4. The additional NIS PR bistable adjustments increase wear on the instrumentation.

The interim controls will not be eliminated. However, since the proposed surveillance change will preclude unnecessary adjustments of the NIS Power Range channels, the above operational challenges will be reduced.

PROPOSED TECHNICAL SPECIFICATIONS POWER RANGE SURVEILLANCE CHANGE

Current Technical Specifications

Surveillance Requirement 4.3.1.1 of the Current Technical Specifications (CTS) requires each Reactor Trip System instrumentation channel to be demonstrated operable by performance of the channel checks, calibrations and functional tests specified in Table 4.3-1. The NIS Power Range daily calibration is only applicable to Reactor Trip System Functional Units 2.A, PR High Neutron Flux High, and 2.B, PR High Neutron Flux Low. The current daily surveillance requirement is found in Table Notation (2), which states, "Heat balance only, above 15% of RATED THERMAL POWER. Adjust channel if absolute difference is greater than 2 percent."

To prevent an undesired Power Range decalibration at part power operating conditions, the proposed change will not require a channel adjustment when indicated power is greater than calorimetric power. Nevertheless, to ensure that the NIS PR channels are adjusted when indicated power is less than calorimetric power and to preserve the safety analyses assumptions, the proposed CTS change will state, "Heat balance only, above 15% of RATED THERMAL POWER (RTP). Adjust NIS channel if calorimetric calculated power exceeds NIS indicated power by more than + 2% RTP." This proposed change is identical to the corresponding Improved Technical Specifications revision, which follows.

The CTS Bases are not impacted by this change.

In that Farley desires to implement the proposed changes as soon as practical, marked-up and typed CTS pages for Farley Units 1 and 2 are provided in Attachment I of this amendment request.

Improved Technical Specifications

By letter dated March 12, 1998, Farley submitted a request to convert to the Improved Technical Specifications (ITS). The proposed Power Range surveillance change impacts Surveillance Requirement (SR) 3.3.1.2 of the ITS submittal, which states, "Compare results of calorimetric heat balance calculation to Nuclear Instrumentation System (NIS) channel output." SR 3.3.1.2 Note No. 1 states, "Adjust NIS channel if absolute difference is > 2%." SR 3.3.1.2 Note No. 2 states, "Not required to be performed until 24 hours after THERMAL POWER is ≥ 15% RTP." This ITS surveillance is only applicable to RTS Function No. 2.a, Power Range Neutron Flux High (see Table 3.3.1-1).

The proposed ITS change will revise SR 3.3.1.2 Note No. 1 to state, "Adjust NIS channel if calorimetric calculated power exceeds NIS indicated power by more than + 2% RTP."

An ITS Bases change is also required. The Bases change provides a summary justification for the surveillance change and clarifies when channel adjustments must be made. Specifically, the first paragraph of Bases SR 3.3.1.2 will be revised as follows.

"SR 3.3.1.2 compares the calorimetric heat balance calculation to the NIS channel output every 24 hours. If the calorimetric calculated power exceeds the NIS channel indicated power by more than + 2% RTP, the NIS channel is not declared inoperable, but must be adjusted. If the NIS channel output cannot be properly adjusted, the channel is declared inoperable."

The following two paragraphs will be inserted between the first paragraph and the second paragraph of Bases SR 3.3.1.2.

"If the calorimetric is performed at part power (< 50% RTP), adjusting the NIS channel indication in the increasing power direction will assure a reactor trip below the safety analysis limit (≤ 118% RTP). Making no adjustment to the NIS channel in the decreasing power direction due to a part power calorimetric assures a reactor trip consistent with the safety analyses.

This allowance does not preclude making indicated power adjustments, if desired, when the calorimetric calculated power is less than the NIS channel indicated power. To provide close agreement between indicated power and to preserve operating margin, the NIS channels are normally adjusted when operating at or near full power during steady-state conditions. However, discretion must be exercised if the NIS channel indicated power is adjusted in the decreasing power direction due to a part power calorimetric (< 50% RTP). This action could introduce a non-conservative bias at higher power levels which could result in an NIS reactor trip above the safety analysis limit (> 118% RTP). The cause of the non-conservative bias is the decreased accuracy of the calorimetric at reduced power conditions, as discussed in Westinghouse Technical Bulletin, ESBU-TB-92-14-R1, 'Decalibration Effects Of Calorimetric Power Level Measurements On The NIS High Power Reactor Trip At Power Levels Less Than 70% RTP' (Ref. 13). To assure a reactor trip below the safety analysis limit, the Power Range Neutron Flux – High bistables are set ≤ 85% RTP: 1) whenever the NIS channel indicated power is adjusted in the decreasing power direction due to a part power calorimetric below 50% RTP; and 2) for a post refueling startup. Before the Power Range Neutron Flux – High bistables are re-set ≤ 109% RTP, the NIS channel calibration must be confirmed based on a calorimetric performed ≥ 50% RTP."

The second paragraph of Bases SR 3.3.1.2 will be revised for consistency with the surveillance wording changes proposed in the first paragraph. In addition, the Bases information pertaining to the basis for not requiring performance of a secondary power calorimetric measurement until reaching 15% RTP is being changed to reflect the correct licensing basis for Westinghouse PWR's. That is, 15% RTP was chosen as the minimum power level for the NIS Power Range daily surveillance based on the Westinghouse NSSS design basis capability requirement of being able to achieve stable control system operation in the automatic control mode. The revision is as follows.

"Two Notes modify SR 3.3.1.2. The first Note indicates that the NIS channel output shall be adjusted consistent with the calorimetric calculated power if the calorimetric calculated power exceeds the NIS channel output by more than + 2% RTP. The second Note clarifies that this Surveillance is required only if reactor power is ≥ 15% RTP and that 24 hours is allowed for performing the first Surveillance after reaching 15% RTP. A power level of 15% RTP is chosen based on plant stability, i.e., automatic rod control capability and turbine generator synchronized to the grid."

The third paragraph of Bases SR 3.3.1.2 will also be revised for consistency with the surveillance wording changes proposed in the first paragraph as follows.

"The Frequency of every 24 hours is adequate. It is based on unit operating experience, considering instrument reliability and operating history data for instrument drift. Together these factors demonstrate that a difference between the heat balance calculated power and the NIS channel indication of more than + 2% RTP is not expected in any 24 hour period."

The fourth paragraph of Bases SR 3.3.1.2 will not be revised.

The subject Westinghouse Technical Bulletin will be added to the ITS Bases References as Reference No. 13. The insert is, "13. Westinghouse Technical Bulletin, ESBU-TB-92-14-R1, 'Decalibration Effects Of Calorimetric Power Level Measurements On The NIS High Power Reactor Trip At Power Levels Less Than 70% RTP.'"

The ITS marked-up and typed pages are included in Attachment II of this submittal. These pages are based on the "clean typed copy" page 3.3.1-9 (ITS Volume 11) and "clean typed copy" pages B 3.3.1-50 and B 3.3.1-57 (ITS Volume 12), which were submitted by SNC letter dated April 24, 1998. Due to text additions, pages B 3.3.1-50 through B 3.3.1-57 will be replaced and pages B 3.3.2-58 and B 3.3.1-59 will be added. Review and approval of this licensing amendment change request is applicable to the ITS version as well, which will be incorporated into the ITS submittal when approved. In that Farley is the lead plant for WOG, the proposed ITS Technical Specifications and Bases changes are also applicable to NUREG-1431.

Operational and Safety Analyses Considerations

When gain adjustments are performed on a power escalation, the NIS PR daily surveillance results in the NIS channel reflecting the calorimetric calculated power with increasing accuracy up to approximately 100% RTP. When gain adjustments are performed at steady-state 100% RTP conditions, the NIS PR daily surveillance will adjust the PR channel for variations in indicated power due to changes in core power distributions with increasing burnup.

Normally, adjustment of the NIS channel indicated power in the decreasing power direction will be performed for operational reasons, such as, when operating at 100% RTP to restore operational margin to trip. Another example is when decreasing power and approaching Permissive P-10 reset (which automatically reinstates the PR High Neutron Flux Low Setpoint reactor trip) and there is a mismatch between NIS Power Range and NIS Intermediate Range indicated power levels. Adjustment of indicated power in the decreasing power direction to more closely match the calorimetric calculated power may result in a closer agreement between the NIS Power Range and Intermediate Range channels, thus decreasing the possibility of an adverse interaction.

To ensure that the Power Range High Neutron Flux High Setpoint reactor trip signal will be generated prior to the safety analysis limit of 118% RTP, should operating conditions require that indicated power be decreased to match calculated calorimetric power based on data obtained below 50% RTP, Farley operating procedures will continue to specify that the PR High Neutron Flux High reactor trip setpoint be reduced to ≤ 85% RTP on all channels. The proposed ITS Bases change includes this administrative control requirement.

ANALYSIS

The purpose of this analysis is to assess the impact of the proposed NIS Power Range surveillance change on the licensing basis and demonstrate that the change will not adversely affect the subsequent safe operation of the plant.

NIS Power Range Indication and RTS Functions

When operating above 15% RTP, each Power Range channel is normalized (i.e., calibrated) daily to match the thermal power calculation results based on the secondary heat balance (i.e., calorimetric). The calibration is accomplished by adjusting the gain of each channel summing amplifier, such that the indicated power matches the calorimetric power. The amplifier output (0% to 120% RTP) provides the input signals to the associated channel reactor trip, permissive and control interlock bistables, and the associated power indicators. Therefore, the proposed change to the NIS Power Range daily surveillance potentially impacts the PR indications, RTS functions, control system functions, and miscellaneous alarm functions. These functions include: High Flux High Setpoint, High Flux Low Setpoint, High Positive Rate and High Negative Rate Reactor Trips; Permissives P-8, P-9 and P-10; Control Interlock C-2 (i.e., PR High Flux Rod Stop); automatic Reactor Control System nuclear power input; and PR Channel Deviation, Quadrant Power Tilt Ratio, and N-16 Leakage Detection System alarms.

Reactor power is monitored by the plant operators to ensure that the unit is operated within the limits of the Facility Operating License and safety analyses. The revision to the criteria for implementation of the daily surveillance will have a conservative effect on the PR channel indication (i.e., indicated power will be greater than actual power). With regard to the core safety limits, reactor power is one of four operating parameters with uncertainties explicitly used in the Revised Thermal Design Procedure (RTDP). The RTDP and safety analyses assume a reactor power uncertainty of ± 2% RTP. Farley-specific calculations presented in WCAP-12771, Revision 1, "Westinghouse Revised Thermal Design Procedure Instrument Uncertainty Methodology for Alabama Power Farley Nuclear Plant Units 1 and 2 (Uprating to 2785 Mwt NSSS Power)," demonstrate that the secondary side power calorimetric measurement uncertainty at full power conditions is less than the RTDP assumption. Since the Farley-specific uncertainty calculation is not invalidated by the proposed PR surveillance method change, the RTDP and safety analyses reactor power uncertainty assumption of ± 2% RTP continues to be a bounding allowance for the core safety limits and safety analyses. Therefore, the NIS Power Range indications are not adversely impacted by the proposed change.

Farley-specific calculations have been performed for the following Power Range RTS functions: High Neutron Flux High Setpoint and High Neutron Flux Low Setpoint Reactor Trips; and Permissives P-8, P-9 and P-10. The calculation assumptions account for the daily PR calibration specified by the Technical Specifications. The setpoint uncertainty calculations demonstrate conservative margin between the associated Technical Specifications nominal trip setpoints and, when applicable, the corresponding safety analysis limits. Since the daily calibration will continue to be performed and the maximum non-conservative error (i.e., when indicated power is less than calorimetric power) will be ≤ 2% RTP, the PR setpoint calculations, setpoints, and applicable safety analysis limits are not affected by the surveillance change. With respect to the PR High Positive Rate and High Negative Reactor Trips, these trip functions are generated by time-delay relative-comparison circuits. As such, the NIS PR rate trips are not affected by the proposed change. One potential non-conservative impact on the NIS RTS functions is evaluated herein. If the channel indication is greater than the calorimetric power during a unit shutdown, the proposed change could delay the reset of Permissive P-10. Reset of P-10 (≈ 8% RTP) is required to enable the PR High Neutron Flux Low Setpoint and IR High Neutron Flux reactor trips, which afford reactor protection for uncontrolled reactivity excursions from subcritical and low power (i.e., < 10% RTP). It is unlikely that a subcritical condition would be achieved before P-10 would reset. Nevertheless, if indicated power is greater than calorimetric power by a sufficient magnitude (resulting in subcriticality without P-10 reset), the time duration until P-10 reset would be very short. During this brief time interval, the PR High Neutron Flux High Setpoint reactor trip would provide core protection, as demonstrated by event specific analyses. Diverse protection is also afforded by the PR High Positive Rate, OTΔT and OPΔT reactor trips. Therefore, the Power Range RTS functions are not adversely affected by the proposed change.

The Power Range input functions to the Reactor Control System are: Control Interlock C-2 (i.e., PR High Flux Rod Stop), which blocks automatic and manual control rod withdrawal; and the nuclear power input signal (PR-44) to the power mismatch circuits associated with automatic reactor coolant system temperature control. These are control system functions that are not required for safety (FSAR Chapter 7.7). Nevertheless, the proposed PR surveillance change continues to limit the maximum allowed non-conservative calibration error; therefore, the change will not adversely impact the NIS Power Range control system functions.

Miscellaneous alarm functions also use input signals from the NIS Power Range channel(s). The functions are: PR Channel Deviation; Quadrant Power Tilt Ratio (QPTR); and N-16 Leakage Detection System. The Channel Deviation and QPTR alarms are generated by comparison of the PR channel output signals. In that these are relative comparisons between channels, these alarm functions are not adversely affected by the proposed daily calibration change.

The N-16 Leakage Detection System associated with steam line radiation monitors R-70A, B, C may be impacted by the proposed change since the proposed calibration change allows indicated power to be greater than calorimetric power. When greater than 20% power, the N-16 Leakage Detection System provides a continuous trend of the estimated "power-corrected" primary-to-secondary leak rate, and it generates control room alarms if the leak rate increases above three threshold levels (alert, high, high-high). The nuclear power signal is provided from NIS channel PR-43. A potential non-conservative impact on the leakage detection system is acceptable based on the following.

1. The N-16 Leakage Detection System is a non-safety-related indication system that is considered to be an operational aid.

2. Other radiation monitors, such as the air ejector and steam generator blowdown monitors, provide diverse continuous primary-to-secondary leakage indication.

3. Reactor Coolant System leakage is periodically monitored by performance of the surveillance tests required by the Technical Specifications.

4. Actual primary-to-secondary leak rates are determined by radiochemistry analysis in accordance with plant procedures.

5. Normally, when operating at or near full power, PR-43 will be adjusted on a daily basis to match indicated power with calorimetric power. This plant practice results in the optimum channel calibration.

LOCA and LOCA-Related Analyses

The following LOCA and LOCA related analyses are not adversely affected by the proposed modification of NIS Power Range daily surveillance: large and small break LOCA; reactor vessel and loop LOCA blowdown forces; post-LOCA long term core cooling subcriticality; post-LOCA long term core cooling minimum flow; and hot leg switchover to prevent boron precipitation. The proposed modification does not effect the normal plant operating parameters, the safeguards systems actuation or accident mitigation capabilities important to LOCA mitigation, or the assumptions used in the LOCA-related accidents. The surveillance change does not create conditions more limiting than those assumed in these analyses. In addition, the proposed modification does not affect the Steam Generator Tube Rupture (SGTR) analysis methodology or assumptions, and it does not alter the SGTR event analysis results.

Non-LOCA Related Analyses

The non-LOCA safety analyses presented in Chapter 15 of the FSAR are not adversely affected by the proposed NIS Power Range surveillance modification. This modification does not affect normal plant operating parameters, accident mitigation capabilities, the assumptions used in the non-LOCA transients, or create conditions more limiting than those enveloped by the current non-LOCA analyses. Therefore, the conclusions presented in the FSAR remain valid.

Mechanical Components and Systems

The surveillance modification as described does not affect the reactor coolant system component integrity or the ability of the system to perform its intended safety function. The modification as described does not affect the integrity of a plant auxiliary fluid system or the ability of the auxiliary systems to perform their design functions.

I&C Protection and Control Systems

With the specific exception of the NIS Power Range reactor trip and indication functions, the proposed NIS Power Range daily surveillance change does not directly or indirectly involve additional electrical systems, components, or instrumentation considerations. Direct effects as well as indirect effects on equipment important to safety have been considered. Indirect effects include conditions or activities which involve non-safety-related electrical equipment which may affect Class 1E, PAMS, or plant control electrical equipment. Consideration has been given to seismic and environmental qualification, design and performance criteria per IEEE standards, functional requirements, and plant Technical Specifications.

The proposed change does not affect the plant normal operating design transients, margin to trip analysis, or low temperature overpressure protection system.

An evaluation herein determined that the proposed surveillance modification will ensure the performance of the NIS Power High Neutron Flux High Setpoint reactor trip function consistent with the safety analysis assumptions. Deletion of the requirement to adjust the NIS Power Range channel(s) when indicated power is greater than calorimetric calculated power allows the channel(s) to not be adjusted in the non-conservative direction at part power. This allowance prevents the introduction of an error that has not been accounted for in the setpoint uncertainty calculations and the safety analyses associated with the NIS Power Range High Neutron Flux High Setpoint reactor trip function. If indicated power is decreased to match a part power calorimetric performed below 50% RTP, plant administrative controls ensure the PR High Neutron Flux High Setpoint is reduced to ≤ 85% RTP. Thus, the proposed modification does not have a potential for identification of an unreviewed safety question as it would relate to the safety-related function of I&C systems.

RTS and ESFAS Setpoints

With the specific exception of the NIS Power Range indication and reactor trip functions, the proposed modification to the Power Range daily surveillance, does not affect the Reactor Trip System (RTS) or the Engineered Safety Feature Actuation System (ESFAS) setpoints. This proposed modification does not change the current trip setpoints or instrument operability requirements identified in the Technical

Specifications. The modification should ensure the operability of the NIS Power Range reactor trip at part power conditions after normalization at 100% RTP conditions consistent with the safety analysis assumptions. Therefore, the proposed modification has no effect on the RTS and ESFAS safety functions.

Other Safety-Related Areas and Analyses

The following safety-related areas and analyses are not affected by the proposed surveillance modification: Containment Integrity Analyses (Short Term/Long Term LOCA Release); Main Steamline Break (MSLB) Mass and Energy Release; Radiological Analyses; Probabilistic Risk Assessment; and Emergency Response Procedures.

SUMMARY / CONCLUSION

The proposed Technical Specifications change modifies the Power Range daily Surveillance Requirement by only requiring a calibration adjustment when PR indicated power is less than the calculated secondary calorimetric power by > 2% RTP. The detailed analysis presented herein assessed the potential impact of the proposed daily surveillance change on applicable Farley safety analyses and NIS Power Range indications, RTS functions, and control system functions. The assessments demonstrated that the change will not adversely affect the Farley design basis safety analyses, Power Range functions, or the subsequent safe operation of the plant.

ATTACHMENT IV

10 CFR 50.92 SIGNIFICANT HAZARDS EVALUATION

JOSEPH M. FARLEY NUCLEAR PLANT

NIS POWER RANGE CHANNEL DAILY SURVEILLANCE

REQUIREMENT TECHNICAL SPECIFICATIONS CHANGE

10 CFR 50.92 SIGNIFICANT HAZARDS EVALUATION
JOSEPH M. FARLEY NUCLEAR PLANT
NIS POWER RANGE CHANNEL DAILY SURVEILLANCE
REQUIREMENT TECHNICAL SPECIFICATIONS CHANGE

INTRODUCTION

When operating above 15% Rated Thermal Power (RTP), the current Farley Technical Specifications Nuclear Instrumentation System (NIS) Power Range daily Surveillance Requirement requires the adjustment of the Power Range channel(s) when the absolute difference between Power Range indicated power and secondary side calorimetric power is greater than 2% RTP. Compliance with this Technical Specifications requirement may result in a non-conservative channel calibration during reduced power operations. The proposed Technical Specifications change will address the potential non-conservatism by requiring adjustment of the NIS Power Range channel(s) only when the calorimetric calculated power is greater than the Power Range indicated power by + 2%. In the interim, to ensure compliance with the Technical Specifications and conformance with the safety analyses, Farley has implemented administrative controls.

The potential non-conservative NIS calibration issue and the proposed Technical Specifications change are applicable to other Westinghouse plants. Farley is the lead plant for the Westinghouse Owners Group (WOG).

PROPOSED CHANGE

Surveillance Requirement 4.3.1.1 of the Current Technical Specifications (CTS) requires each Reactor Trip System (RTS) instrumentation channel to be demonstrated operable by performance of the channel checks, calibrations and functional tests specified in Table 4.3-1. The NIS Power Range (PR) daily calibration (i.e., surveillance requirement) is found in Table Notation (2). To prevent an undesired Power Range decalibration at part power operating conditions, the proposed change will not require a channel adjustment when indicated power is greater than calorimetric power. Nevertheless, to ensure that the NIS PR channels are adjusted when indicated power is less than calorimetric power by greater than 2% RTP and to preserve the safety analyses assumptions, the proposed CTS Table 4.3-1 Note (2) revision will state, "Heat balance only, above 15% of RATED THERMAL POWER (RTP). Adjust NIS channel if calorimetric calculated power exceeds NIS indicated power by more than + 2% RTP."

The proposed change to the criterion for implementation of the Power Range daily surveillance is also applicable to Surveillance Requirement (SR) 3.3.1.2 Note No. 1 and the associated ITS Bases of the Farley Improved Technical Specifications (ITS) submittal (reference SNC letters dated March 12, 1998 and April 24, 1998). Review and approval of this licensing amendment change request is applicable to the ITS version as well, which will be incorporated into the ITS submittal when approved.

10 CFR 50.92 EVALUATION

When operating above 15% RTP, each Power Range channel is normalized (i.e., calibrated) daily to match the thermal power calculation results based on the secondary heat balance (i.e., calorimetric). The calibration is accomplished by adjusting the gain of each channel summing amplifier, such that the indicated power matches the calorimetric power. The amplifier output (0% to 120% RTP) provides the input signals to the associated channel reactor trip, permissive and control interlock bistables and the associated power level indications. Therefore, the proposed change to the NIS Power Range daily surveillance potentially impacts the PR indications, RTS functions, control system functions, and miscellaneous alarm functions. These functions include: High Flux High Setpoint, High Flux Low Setpoint, High Positive Rate, and High Negative Rate Reactor Trips; Permissives P-8, P-9 and P-10; Control Interlock C-2 (i.e., PR High Flux Rod Stop); automatic Reactor Control System nuclear power input; and PR Channel Deviation, Quadrant Power Tilt Ratio, and N-16 Leakage Detection System alarms.

The detailed analysis presented in Attachment III assessed the potential impact of the proposed daily surveillance change on applicable Farley safety analyses and NIS Power Range indications, RTS functions, and control system functions. The analysis also assessed the potential impact on the PR High Neutron Flux High Setpoint reactor trip function and the associated safety analysis limit when channel adjustments are made during specific operating conditions. The assessments demonstrated that the proposed CTS and ITS changes will not adversely affect the Farley design basis safety analyses, NIS Power Range safety functions, or the subsequent safe operation of the plant.

As required by 10 CFR 50.91 (a)(1), an analysis has been provided to demonstrate that the proposed license amendment revising Technical Specifications NIS Power Range daily Surveillance Requirement does not involve a significant hazards consideration. The analysis supports the following conclusions with respect to 10 CFR 50.92.

1. Does the proposed surveillance change involve a significant increase in the probability or consequences of an accident previously evaluated?

   The proposed surveillance change does not significantly increase the probability or consequences of an accident previously evaluated in the FSAR. This modification does not directly initiate an accident. The consequences of accidents previously evaluated in the FSAR are not adversely affected by this proposed change because the change to the NIS Power Range channel adjustment requirement ensures the conservative response of the channel even at part power levels.

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

   The proposed surveillance change does not create the possibility of a new or different kind of accident than any accident already evaluated in the FSAR. No new accident scenarios, failure mechanisms, or limiting single failures are introduced as a result of the proposed change. The proposed Technical Specifications change does not challenge the performance or integrity of any safety-related systems. Therefore, the possibility of a new or different kind of accident is not created.

3. Does the proposed surveillance change involve a significant reduction in a margin of safety?

The proposed surveillance change does not involve a significant reduction in a margin of safety. The proposed change does require a revision to the criterion for implementation of Power Range channel adjustment based on secondary power calorimetric calculation; however, the change does not eliminate any RTS surveillances or alter the frequency of surveillances required by the Technical Specifications. The revision to the criterion for implementation of the daily surveillance will have a conservative effect on the performance of the NIS Power Range channel, particularly at part power after normalization at 100% RTP conditions. The nominal trip setpoints specified by the Technical Specifications and the safety analysis limits assumed in the transient and accident analysis are unchanged. The margin of safety associated with the acceptance criteria for any accident is unchanged. Therefore, the proposed change will not significantly reduce the margin of safety as defined in the Technical Specifications.

CONCLUSION

Based on the preceding information, it has been determined that the proposed change to the NIS Power Range daily surveillance does not involve a significant hazards consideration as defined in 10 CFR 50.92 (c).