Industry/TSTF Standard Technical Specification Change Traveler

P-7 Surveillance

Classification: 1) Technical Change

Priority: 2)Medium

NUREGs Affected: ☐ 1430 ☑ 1431 ☐ 1432 ☐ 1433 ☐ 1434

1.0 DESCRIPTION

This traveler is a request to revised NUREG-1431, Rev. 2, "Standard Technical Specifications Westinghouse Plants." The proposed changes would revise the improved Standard Technical Specifications (iSTS) to require an ACTUATION LOGIC TEST on the P-7 Reactor Trip System (RTS) interlock in lieu of a CHANNEL OPERATIONAL TEST (COT) or CHANNEL CALIBRATION.

2.0 PROPOSED CHANGE

ISTS Table 3.3.1-1, "Reactor Trip System Instrumentation," Function 18.b., "Low Power Reactor Trips Block, P-7," Surveillance Requirements (SR) is revised to require the performance of SR 3.3.1.5 (ACTUATION LOGIC TEST) in lieu of SR 3.3.1.11 (CHANNEL CALIBRATION) and SR 3.3.1.13 (COT). SR 3.4.19.2 is revised to require performance of a COT on P-10 (Power Range Neutron Flux) and P-13 (Turbine Impulse Pressure) in lieu of P-7. New SR 3.4.19.3 is added to require performance of an ACTUATION LOGIC TEST on P-7.

3.0 BACKGROUND

Reactor protection interlocks are provided to ensure reactor trips are in the correct configuration for the current unit status. They back up operator actions to ensure protection system Functions are not bypassed during unit conditions under which the safety analysis assumes the Functions are not bypassed.

The Low Power Reactor Trips Block, P-7 interlock, is actuated by input from either the Power Range Neutron Flux, P-10, or the Turbine Impulse Pressure, P-13 interlock. The LCO requirements for the P-7 interlock ensures that the following Functions are performed: (1) on increasing power, the P-7 interlock automatically enables reactor trips on Pressurizer Pressure-Low, Pressurizer Water Level-High, Reactor Coolant Flow-Low (low flow in two or more RCS loops), Reactor Coolant Pump (RCP) Breaker Open, Undervoltage RCPs, and Underfrequency RCPs; and (2) on decreasing power, the P-7 interlock automatically blocks reactor trips on Pressurizer Pressure-Low, Pressurizer Water Level-High, Reactor Coolant Flow-Low (low flow in two or more RCS loops), Reactor Coolant Pump (RCP) Breaker Open, Undervoltage RCPs, and Underfrequency RCPs. The reactor trips are only required when operating above the P-7 setpoint (approximately 10%). The reactor trips provide protection against violating the DNBR limit. Below the P-7 setpoint, the RCS is capable of providing sufficient natural circulation without any RCP running.

4.0 TECHNICAL ANALYSIS

The P-7 interlock is a logic Function with train and not channel identity. As such, the LCO requires one channel per train to be OPERABLE in MODE 1. The low power signal is derived from three out of four power range neutron flux signals below the setpoint in coincidence with two out of two turbine impulse chamber pressure signals below the setpoint.

Testing of protection system interlocks is provided by the logic testing and semiautomatic testing capabilities of the solid state protection system. In the solid state protection system, the undervoltage coils and auto shunt trip relays (reactor trip) and master relays (engineered safeguards actuation) are pulsed for all combinations of trip and actuation logic with and without the interlock signals. As such, the P-7 interlock lends itself to testing that would meet the requirements of the definition of an ACTUATION LOGIC TEST.

5.0 REGULATORY ANALYSIS

5.1 No Significant Hazards Consideration

ISTS Table 3.3.1-1, "Reactor Trip System Instrumentation," Function 18.b., "Low Power Reactor Trips Block, P-7," Surveillance Requirements (SR) is revised to require the performance of SR 3.3.1.5 (ACTUATION LOGIC TEST) in lieu of SR 3.3.1.11 (CHANNEL CALIBRATION) and SR 3.3.1.13 (COT). SR 3.4.19.2 is revised to require performance of a COT on P-10 (Power Range Neutron Flux) and P-13 (Turbine Impulse Pressure) in lieu of P-7. New SR 3.4.19.3 is added to require performance of an ACTUATION LOGIC TEST on P-7.

In accordance with the criteria set forth in 10 CFR 50.92, the proposed changes to NUREG-1431 have been evaluated and determined they do not represent a significant hazards consideration by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

Response: No

Overall protection system performance will remain within the bounds of the previously performed accident analyses since there are no hardware changes. The Reactor Trip System (RTS) and Engineered Safety Feature Actuation System (ESFAS) instrumentation will be unaffected. These protection systems will continue to function in a manner consistent with plant design basis. All design, material, and construction standards are maintained. The proposed changes impose surveillance requirements appropriate to the interlock functions to ensure safety related structures, systems, and components (SSCs) are tested in a manner consistent with the safety analysis and licensing basis.

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 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 are consistent with the safety analysis assumptions and resultant consequences.

Therefore, it is concluded that this change does not involve a significant increase in the probability or consequences of an accident previously analyzed.

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

Response: No

The proposed changes to the surveillance requirements do alter the design or performance of the overall protection systems. 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. No performance requirements will be affected, however, the proposed changes do impose different surveillance testing requirements. The changes do not alter the assumptions made in the safety analysis. The proposed changes are consistent with the safety analysis assumptions and current plant operating practice.

Therefore, the possibility of a new or different malfunction of safety related equipment is not created.

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

Response: No

The proposed change does 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 this change. The proposed changes will not result in plant operation in a configuration outside of the design basis. The changes to the surveillance testing requirements maintains or increases the margin of safety by ensuring that the interlock logic functions to trip the reactor as assumed in the safety analysis.

Therefore, it is concluded that this change does not involve a significant reduction in the margin of safety.

Based on the above, the TSTF concludes that the proposed change presents no 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.

5.2 Applicable Regulatory Requirements

General Design Criteria (GDC) 13, requires that instrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety, including those variables and systems that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems.

GDC-20 requires that the protection system(s) 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.

GDC-21 requires that the protection system(s) shall be designed for high functional reliability and testability.

GDC-22 through GDC-25 and GDC-29 require various design attributes for the protection system(s), including independence, safe failure modes, separation from control systems, requirements for reactivity control malfunctions, and protection against anticipated operational occurrences.

10 CFR 50.55a(h) requires that protection systems meet IEEE 279-1971. Sections 4.9 - 4.11 of IEEE 279-1971 discuss testing provisions for protection systems. Regulatory Guide 1.118, Revision 2, discusses acceptable methods for testing protection systems.

The proposed changes do not result in a change to the protection system instrumentation such that the above regulatory requirements or criteria would not be met. 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 approval of the proposed change will not be inimical to the common defense and security or to the health and safety of the public.

6.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed change 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 change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent 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.

7.0 REFERENCES

None

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NRC Contact:	Schulten, Carl	301-314-1192	css1@nrc.gov

Revision History

OG Revision 0 Revision Status: Closed

Revision Proposed by: Callaway

Revision Description:
Original Issue

Owners Group Review Information

Date Originated by OG: 17-Mar-99

Owners Group Comments
(No Comments)

Owners Group Resolution: Approved Date: 17-Mar-99

TSTF Review Information

TSTF Received Date: 17-Jun-99 Date Distributed for Review: 17-Jun-99

OG Review Completed: ☑ BWOG ☑ WOG ☑ CEOG ☑ BWROG

TSTF Comments:

WOG only.

TSTF Resolution: Approved Date: 07-Jul-99

NRC Review Information

NRC Received Date: 20-Jul-99

NRC Comments:

On 12/13/2001, on a teleconference with Dominion regarding the North Anna ITS, Carl Schulten stated that Dominion had incorporated TSTF-347, "P-7 Surveillance" (a WOG only change), which is not approved. Carl stated that the NRC had provided comments on TSTF-347, but the TSTF had never acted on them. The TSTF has no record of receiving any comments on TSTF-347. Carl looked at the NRC's database and it states that on 4/26/00 the NRC reviewer made the comment "Include conforming changes to LCO 3.4.19, SR 3.4.19.2 by replacing the P-7 COT with a COT of P-10 and P-13." The comment was forwarded to the Branch Chief on 5/17/00, but it does not appear the information was forwarded to the TSTF. The reviewer stated that he would approve TSTF-347 if we incorporated that change.

Final Resolution: Superceded by Revision Final Resolution Date: 14-Dec-02

TSTF Revision 1 Revision Status: Active Next Action: TSTF

Revision Proposed by: WOG

Revision Description:
On December 13, 2001, in a conference call between Dominion and the NRC regarding the North Anna conversion application, a question/comment was raised concerning TSTF-347. As of December 13, 2001, the NRC had not approved TSTF-347. It was mentioned that in April 2000, comments had been provided that conforming changes to LCO 3.4.19, "RCS Loops - Test Exceptions," should be made. The Technical Specification Task Force has no documentation to indicate that these comments were provided which is probably why no additional action has been taken to revise the TSTF. On December 17, 2001, proposed changes to LCO 3.4.19 where provided by electronic mail to Carl Schulten of the Technical Specification Branch for review.

TSTF Revision 1 **Revision Status: Active** **Next Action: TSTF**

Owners Group Review Information

Date Originated by OG: 11-Jan-02

Owners Group Comments
(No Comments)

Owners Group Resolution: Approved Date: 11-Jan-02

TSTF Review Information

TSTF Received Date: 14-Jan-02 Date Distributed for Review: 14-Jan-02

OG Review Completed: ☐ BWOG ☑ WOG ☐ CEOG ☐ BWROG

TSTF Comments:
(No Comments)

TSTF Resolution: Date:

Incorporation Into the NUREGs

File to BBS/LAN Date: TSTF Informed Date: TSTF Approved Date:

NUREG Rev Incorporated:

Affected Technical Specifications

LCO 3.3.1	RTS Instrumentation
	Change Description: Table 3.3.1-1, Function 18.b SRs
SR 3.3.1.5 Bases	RTS Instrumentation
SR 3.4.19.2	RCS Loops - Test Exceptions
SR 3.4.19.2 Bases	RCS Loops - Test Exceptions
SR 3.4.19.3	RCS Loops - Test Exceptions
	Change Description: New
SR 3.4.19.3 Bases	RCS Loops - Test Exceptions
	Change Description: New

Table 3.3.1-1 (page 4 of 6)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL[a] TRIP SETPOINT
18. Reactor Trip System Interlocks						
a. Intermediate Range Neutron Flux, P-6	2[d]	2	P	SR 3.3.1.11 SR 3.3.1.13	≥ [6E-11] amp	[1E-10] amp
b. Low Power Reactor Trips Block, P-7	1	1 per train	Q	~~SR 3.3.1.11~~ ~~SR 3.3.1.13~~ SR 3.3.1.5	NA	NA
c. Power Range Neutron Flux, P-8	1	4	Q	SR 3.3.1.11 SR 3.3.1.13	≤ [50.2]% RTP	[48]% RTP
d. Power Range Neutron Flux, P-9	1	4	Q	SR 3.3.1.11 SR 3.3.1.13	≤ [52.2]% RTP	[50]% RTP
e. Power Range Neutron Flux, P-10	1,2	4	P	SR 3.3.1.11 SR 3.3.1.13	≥ [7.8]% RTP and ≤ [12.2]% RTP	[10]% RTP
f. Turbine Impulse Pressure, P-13	1	2	Q	[SR 3.3.1.1] SR 3.3.1.10 SR 3.3.1.13	≤ [12.2]% turbine power	[10]% turbine power
19. Reactor Trip Breakers[i] (RTBs)	1,2	2 trains	O	SR 3.3.1.4	NA	NA
	3[b], 4[b], 5[b]	2 trains	C	SR 3.3.1.4	NA	NA
20. Reactor Trip Breaker Undervoltage and Shunt Trip Mechanisms	1,2	1 each per RTB	R	SR 3.3.1.4	NA	NA
	3[b], 4[b], 5[b]	1 each per RTB	C	SR 3.3.1.4	NA	NA
21. Automatic Trip Logic	1,2	2 trains	N	SR 3.3.1.5	NA	NA
	3[b], 4[b], 5[b]	2 trains	C	SR 3.3.1.5	NA	NA

(b) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(i) Including any reactor trip bypass breakers that are racked in and closed for bypassing an RTB.

- REVIEWER'S NOTE -

(a) Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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.

, including operation of the P-7 permissive which is a logic function only.

SR 3.3.1.6

SR 3.3.1.6 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.

A Note modifies SR 3.3.1.6. The Note states that this Surveillance is required only if reactor power is > 50% RTP and that [24] hours is allowed for performing the first surveillance after reaching 50% RTP.

The Frequency of 92 EFPD is adequate. It is based on industry operating experience, considering instrument reliability and operating history data for instrument drift.

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 entire channel will perform the intended Function. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL OPERATIONAL TEST of a relay. This is acceptable because all of the other required contacts of the

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.19 RCS Loops - Test Exceptions

LCO 3.4.19 The requirements of LCO 3.4.4, "RCS Loops - MODES 1 and 2," may be suspended with THERMAL POWER < P-7.

APPLICABILITY: MODES 1 and 2 during startup and PHYSICS TESTS.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. THERMAL POWER ≥ P-7.	A.1 Open reactor trip breakers.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.19.1	Verify THERMAL POWER is < P-7.	1 hour
SR 3.4.19.2	Perform a COT for each power range neutron flux - low and intermediate range neutron flux channel and P-7 P-10, and P-13	Prior to initiation of startup and PHYSICS TESTS
SR 3.4.19.3	Perform an ACTUATION LOGIC TEST on P-7.	Prior to initiation of startup and PHYSICS TESTS

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.19.1

Verification that the power level is < the P-7 interlock setpoint (10%) will ensure that the fuel design criteria are not violated during the performance of the PHYSICS TESTS. The Frequency of once per hour is adequate to ensure that the power level does not exceed the limit. Plant operations are conducted slowly during the performance of PHYSICS TESTS and monitoring the power level once per hour is sufficient to ensure that the power level does not exceed the limit.

SR 3.4.19.2

, P-10, and P-13

The power range and intermediate range neutron detectors ~~and the P-7~~ interlock setpoint must be verified to be OPERABLE and adjusted to the proper value. A COT is performed prior to initiation of the PHYSICS TESTS. This will ensure that the RTS is properly aligned to provide the required degree of core protection during the performance of the PHYSICS TESTS. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL OPERATIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions.

INSERT A

REFERENCES

1. 10 CFR 50, Appendix B, Section XI.
2. 10 CFR 50, Appendix A, GDC 1, 1988.

The Low Power Reactor Trips Block, P-7 interlock, is actuated from either the Power Range Neutron Flux, P-10, or the Turbine Impulse Chamber Pressure, P-13 interlock. The P-7 interlock is a logic Function with train, not channel identity.

The SR 3.3.1.8 Frequency is sufficient for the power range and intermediate range neutron detectors to ensure that the instrumentation is OPERABLE before initiating PHYSICS TESTS.

Rev 1

INSERT A

SR 3.4.19.3

The Low Power Reactor Trips Block, P-7 interlock, must be verified to be OPERABLE in MODE 1 by LCO 3.3.1, "Reactor Trip System Instrumentation." The P-7 interlock is actuated from either the Power Range Neutron Flux, P-10, or the Turbine Impulse Chamber Pressure, P-13 interlock. The P-7 interlock is a logic Function. An ACTUATION LOGIC TEST is performed to verify OPERABILITY of the P-7 interlock prior to initiation of startup and PHYSICS TESTS. This will ensure that the RTS is properly functioning to provide the required degree of core protection during the performance of the PHYSICS TESTS.