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SOUTHERN COMPANY
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March 30, 2009

Docket Nos.: 50-348
50-364

NL-09-0154

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

Joseph M. Farley Nuclear Plant, Units 1 and 2
Request to Revise Technical Specifications to Delete Reactor Trip System,
Function 11, Reactor Coolant Pump Breaker Position

Ladies and Gentlemen:

In accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," Southern Nuclear Operating Company (SNC) proposes to revise the Technical Specifications (TS), Appendix A to Facility Operating License Nos. NPF-2 and NPF-8 for the Joseph M. Farley Nuclear Plant Units 1 and 2, respectively.

This amendment request eliminates the Reactor Coolant Pump (RCP) Breaker Position reactor trip function and is supported by a modification to the Reactor Trip System that moves the sensing for the RCP Undervoltage reactor trip functions to the motor side of the RCP breakers. The changes will allow the elimination of a trip circuitry that is susceptible to single failure vulnerabilities which can result in unwarranted reactor trips. These design changes are to be implemented for Unit 2 prior to the end of the U2R20 refueling outage (Spring 2010) and for Unit 1 prior to the end of the U1R23 refueling outage (Fall 2010).

Enclosure 1 provides a basis for the proposed changes. Enclosure 2 provides the marked-up TS pages and Bases pages for the proposed changes. Enclosure 3 provides the clean typed pages. The Bases pages will be implemented under the plant Bases Control Program contingent upon NRC approval of this amendment request.

An amendment request similar to this request was submitted on March 8, 2005 and supplemented by request for additional information responses per letter dated August 16, 2005. Due to a change to the proposed design and implementation schedule, that amendment request was withdrawn per letter dated March 17, 2006.

A001
NRR

SNC requests approval of the proposed license amendment by March 31, 2010 with the amendments being implemented prior to the end of refueling outages U1R23 and U2R20 for Unit 1 and Unit 2 respectively.

Mr. M. J. Ajluni states he is the Manager, Nuclear Licensing of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and to the best of his knowledge and belief, the facts set forth in this letter are true.

This letter contains no NRC commitments. If you have any questions, please advise.

Sincerely,

Mark J Ajluni

M. J. Ajluni
Manager, Nuclear Licensing

Sworn to and subscribed before me this 30th *day of* March, *2009.*

Patricia H. Raymond
Notary Public

My commission expires: NOTARY PUBLIC STATE OF ALABAMA AT LARGE
MY COMMISSION EXPIRES: July 21, 2012
BONDED THRU NOTARY PUBLIC UNDERWRITERS

MJA/JLS/phr

Enclosures: 1: Basis for Proposed Changes
2: Marked-up Technical Specification Pages and Bases Pages
3: Clean Typed Technical Specification Pages and Bases Pages

cc: Southern Nuclear Operating Company
Mr. J. T. Gasser, Executive Vice President
Mr. J. R. Johnson, Vice President – Farley
Ms. P. M. Marino, Vice President – Engineering
RTYPE: CFA04.054

U. S. Nuclear Regulatory Commission
Mr. L. A. Reyes, Regional Administrator
Mr. R. E. Martin, NRR Project Manager – Farley
Mr. E. L. Crowe, Senior Resident Inspector – Farley

Alabama Department of Public Health
Dr. D. E. Williamson, State Health Officer

Joseph M. Farley Nuclear Plant
License Amendment Request to Technical Specifications to
Delete Reactor Trip System, Function 11, Reactor Coolant Pump Breaker Position

Enclosure 1

Basis for Proposed Changes

Joseph M. Farley Nuclear Plant
License Amendment Request to Technical Specifications to
Delete Reactor Trip System, Function 11, Reactor Coolant Pump Breaker Position

Enclosure 1

Basis for Proposed Changes

Table of Contents

Enclosure 1

Basis for Proposed Changes

1. 0 Summary Description

This evaluation supports a request to revise Operating License (OL) NPF-2 and NPF-8 for Joseph M. Farley Nuclear Plant (FNP), Units 1 & 2.

Southern Nuclear Operating Company (SNC) proposes to revise the Joseph M. Farley Nuclear Plant (FNP) Unit 1 and Unit 2 Technical Specifications (TS). The proposed changes to the TS involve the deletion of Function 11, Reactor Coolant Pump (RCP) Breaker Position, in TS 3.3.1, "Reactor Trip System (RTS) Instrumentation." The changes proposed to the FNP TS are supported by a modification to the RTS that moves the sensing for the RCP Undervoltage (UV) reactor trip function to the motor side of the RCP breakers. This modification will allow RCP UV sensors to detect the opening of the RCP breakers, in addition to bus undervoltage. In this configuration, above Permissive P-7, two or more RCP breakers opening will actuate corresponding UV relays, which will result in a reactor trip. This modification makes the FNP RTS design similar to the other Westinghouse RTS designs that do not contain an RCP Breaker Position reactor trip function.

The amendments are planned to be implemented prior to the end of refueling outages U1R23 (Fall 2010) and U2R20 (Spring 2010) for Unit 1 and Unit 2.

2.0 Detailed Description

2.1 Background

On November 10, 2003 FNP Unit 2 automatically tripped (Licensee Event Report 2003-001-00), and on November 19, 2008 FNP Unit 1 automatically tripped (Licensee Event Report 2008-004-00). Both trips were the result of loss of power to RCP Breaker Position trip functions. In order to eliminate the potential of a reactor trip from this function in the future, Southern Nuclear Operating Company (SNC) proposes to eliminate the reactor trip on RCP Breaker Position.

For the FNP Units, the RCP Breaker Position reactor trip is currently a backup trip for both the partial loss of flow (Final Safety Analysis Report (FSAR) Section 15.2.5) and the complete loss of flow (FSAR Section 15.3.4) reactor trips. A breaker open signal from any RCP will actuate a reactor trip above Permissive P-8 (approximately 30% RTP), and breaker open signals from any two pumps will actuate a reactor trip between Permissive P-7 (approximately 10% RTP) and Permissive P-8. A reactor trip on RCP breaker position is blocked below Permissive P-7.

2.2 Proposed Change

The proposed changes to the Technical Specifications (TS) for each unit follow. These changes will be implemented sequentially, concurrent with each unit's refueling outage during which the design change is implemented.

1. Condition N, Required Actions N.1 and N.2 and the associated Completion Times in TS 3.3.1, "Reactor Trip System (RTS) Instrumentation" are being deleted.

2. Condition O, Required Actions O.1 and O.2 and the associated Completion Times in TS 3.3.1, "Reactor Trip System (RTS) Instrumentation" are being deleted.

3. Function 11, Reactor Coolant Pump (RCP) Breaker Position, the Applicable Modes or Other Specified Conditions, the Required Channels, Conditions, Surveillance Requirements, Allowable Value, and Trip Setpoint in TS 3.3.1, "Reactor Trip System (RTS) Instrumentation," are being deleted.

4. Footnotes "g" and "h" in TS 3.3.1, "Reactor Trip System (RTS) Instrumentation," are being deleted.

This amendment request eliminates the RCP Breaker Position reactor trip function and is supported by a modification to the Reactor Trip System that moves the sensing for the RCP Undervoltage reactor trip functions to the motor side of the RCP breakers. The changes will allow the elimination of a trip circuitry that is susceptible to single failure vulnerabilities which has resulted in unwarranted reactor trips.

3.0 Technical Evaluation

Justification for Proposed Changes

In general, the proposed changes to the TS involve the deletion of Function 11, RCP Breaker Position, in TS 3.3.1, "Reactor Trip System (RTS) Instrumentation." The changes proposed for the Joseph M. Farley Nuclear Plant (FNP) TS are supported by a modification to the RTS that moves the sensing for the RCP Undervoltage (UV) reactor trip function to the motor side of the RCP breakers. This modification makes the FNP RTS design consistent with the other Westinghouse RTS designs that do not contain an RCP Breaker Position reactor trip function. The basis for the proposed TS changes is discussed below.

Evaluation

To support the elimination of the RCP Breaker Position reactor trip function, the sensing for the RCP UV reactor trip function will be relocated to the motor side of the RCP breakers. This modification will allow RCP UV sensors to detect the opening of the RCP breakers, in addition to bus undervoltage.

The Reactor Coolant System (RCS) Low Flow reactor trip is the primary reactor trip for the complete loss of flow event. This function is generated by 2 out of 3 low RCS flow signals per reactor coolant loop. Above Permissive P-8, low flow in any loop will actuate a reactor trip. Between Permissive P-7 and P-8, low flow in any two loops will actuate a reactor trip. Reactor trip on low RCS flow is blocked below Permissive P-7. This trip ensures that the criterion of maintaining the minimum Departure from Nucleate Boiling Ration (DNBR) above the limit value is met in the event of a complete loss of flow. There is no single failure which could prevent the loss of RCS flow trip. Backup reactor trips for the complete loss of flow event are provided by the RCP UV and RCP Underfrequency (UF) functions. The RCP UV function initiates a reactor trip when voltage is lost to 2 out of 3 RCPs above Permissive P-7. The RCP UF function provides a reactor trip when a degraded frequency condition exists for 2 out of 3 RCP buses above Permissive P-7. The RCP UV and UF functions are blocked below P7. Eliminating the RCP Breaker Position reactor trip will not

adversely impact the conclusions presented in Farley FSAR Section 15.3.4. The current complete loss of flow analysis which credits the Low Flow reactor trip as the primary trip is not impacted and remains applicable. In addition, the RCP UV and /or RCP bus UF reactor trip functions provide backup protection for the complete loss of flow event (including the simultaneous opening of all RCP breakers), such that the diversity and redundancy of the reactor protection system are maintained.

The RCS Low Flow reactor trip is also the primary reactor trip credited in the partial loss of flow event for the Farley units. In the event of a single loop loss of flow, the RCS Low Flow reactor trip meets the criterion of maintaining the minimum DNBR above the limit value. There is no single failure which could prevent the RCS Low Flow reactor trip. If the RCS Low Flow reactor trip is not credited in the partial loss of flow analysis, a reactor trip on either overtemperature delta temperature (OTDT) or overpower delta temperature (OPDT) would terminate the event before DNB occurs in a significant portion of the core. Eliminating the RCP Breaker Position reactor trip will not adversely impact the conclusions presented in the Farley FSAR 15.2.5. The current partial loss of flow analysis, which credits the RCS Low Flow reactor trip, is not impacted and remains applicable. In addition, the OTDT and OPDT functions provide backup protection for the single loop loss of flow event, such that the diversity and redundancy of the reactor protection system are maintained.

Conclusion

Based on the preceding evaluation, SNC has concluded that the elimination of the RCP Breaker Position reactor trip will not adversely impact any non-LOCA safety analyses.

4.0 Regulatory Evaluation

4.1 Applicable Regulatory Requirements/Criteria

The regulatory bases and guidance documents associated with the systems discussed in this amendment application include the following:

a) General Design Criterion (GDC)-2 requires that structures, systems, and components important to safety be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without the loss of the capability to perform their safety functions.

b) GDC-4 requires that structures, systems, and components important to safety be designed to accommodate the effects of, and to be compatible with, the environmental conditions associated with the normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents. These structures, systems, and components shall be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids, that may result from equipment failures, and from events and conditions outside the nuclear power unit. However, dynamic effects associated with postulated pipe ruptures in nuclear power units may be excluded from the design basis when analyses reviewed and approved by the Commission demonstrate that the probability of fluid system piping rupture is extremely low under conditions consistent with the design basis for the piping.

c) GDC-13 requires that instrumentation 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.

d) GDC-20 requires that the protection system 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.

e) GDC-21 requires that the protection system be designed for high functional reliability and inservice testability.

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

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

h) 10 CFR 50.55a(h) requires that the protection systems meet IEEE 279-1971. Section 4.2 of IEEE 279-1971 discusses the general functional requirement for protection systems to assure they satisfy the single failure criterion.

Additional Regulatory Requirements/Criteria Discussion

The RCP Breaker Position reactor trip change does not require an evaluation relative to the requirements of 10 CFR 50.36(d)(2)(ii)(A)-(D), Criterion 1 through 4, because:

- It is a backup trip and its function is not used for detection and indication in the control room of any degradation of the reactor coolant pressure boundary.

- The trip function is not an initial condition of a design basis accident or transient analysis.

- No credit is taken for the trip in the FNP accident analysis and it is not considered as part of the primary success path related to the integrity of a fission product boundary. It is a backup trip for both the partial loss of flow and the complete loss of flow events.

- It is not relied upon as a signal to initiate a reactor trip for any events modeled in the scope of the Probability Risk Assessment (PRA) model. The PRA model relies upon the Pressurizer Pressure High reactor trip signal for a variety of initiating

events which include partial loss of flow (PLOF) and complete loss of flow (CLOF) events. The RCP Breaker Position reactor trip function is not significant to public health and safety in that it serves as a backup trip for partial or complete loss of flow events and no credit was taken for this trip in any accident analysis.

The proposed change does not affect the overall reliability of the Reactor Protection System (RPS) relative to the design of RPS at FNP because no credit was taken in the accident analysis for the function of the RCP Breaker Position reactor trip. RPS reliability is not dependent upon this trip, thus the removal of this trip has no effect on the overall reliability of the RPS relative to the design of the RPS.

The reliability of the RCS low flow trip function is not affected by this change. Although the RCS Low Flow Trip is the primary trip for the partial and complete loss of reactor coolant flow accident and the RCP Breaker Position reactor trip is currently a backup trip for those same accidents, the two trips do not affect each other. To support the elimination of the RCP Breaker Position trip, the sensors for the RCP UV trip function will be relocated to the motor side of the RCP breakers. Moving the sensors for the RCP UV trip function to the motor side of the RCP breakers will allow the sensors to detect the opening of the RCP breakers, in addition to bus undervoltage. After modifications, for a "complete loss of forced reactor coolant flow accident," the RCP UV Trip or RCP bus UF Trip still remain as backup trips. For a "partial loss of forced reactor coolant flow accident," the OTDT or OPDT reactor trip functions provide the backup protection for the RCS Low Flow reactor trip.

The proposed change satisfies GDC-21 with respect to protection system reliability and testability because the protection system is designed for the high functional reliability and inservice testability commensurate with the safety functions to be performed. RPS reliability is not dependent upon this trip.

- The system consists of a large number of input measurement channels, redundant logic trains, redundant reactor trip breakers, and redundant engineered safety features actuation devices. It performs indication and alarm functions in addition to its reactor trip and engineered safety features actuation functions. The design meets the requirements of IEEE Standard 279-1971, "Criteria for Nuclear Power Generating Station Protection Systems." The redundant logic trains, reactor trip breakers, and engineered safety features actuation relays are electrically isolated and physically separated. Further, physical separation of the channels is maintained within the separated trains to the point of logical processing.

- Either of the two redundant logic trains perform the required protection function. All channels employed in power operation are sufficiently redundant so that individual testing and calibration, without degradation of the protection function or violation of IEEE Standard 279-1971, can be performed with the reactor at power. Such testing discloses failures or reduction in redundancy that may have occurred. Removal from service of any single channel or component employed during power operation does not result in loss of minimum required redundancy. For example, a two of three logic function is placed in the one of two configuration when one channel is removed from service.

- Semiautomatic testers are built into each of the two logic trains. These testers have the capability of testing the major part of the protection system rapidly with the reactor at power. Between tests, the testers continuously monitor a number of internal protection system points, including train power supply voltages and fuses. The outputs of these monitor circuits are logically processed to provide an alarm in the event of a single failure in either train, and automatic reactor trip in the event of one or more for failures in both trains. Self testing provision is designed into each tester.

The proposed change satisfies GDC-22 with respect to functional diversity and diversity in component design and principles of operation and system independence because functional diversity for CLOF events exists through trips associated with OTDT, OPDT, and high pressurizer pressure, and for PLOF events through OTDT and OPDT trips. The OTDT trip, OPDT trip, and the High Pressurizer Pressure trip are diverse; that is, they provide defense against common-mode failures which could affect multiple channels. Thus, FNP can justify elimination of the RCP Breaker Position reactor trip because diversity can still be demonstrated for all postulated events. Functional and locative diversity designed into the system are defenses against loss of the protection function through postulated accident conditions. For the postulated loss of coolant accident, at least five diverse reactor trip demands and at least two diverse engineered safety features actuation demands would be generated. In addition, manual reactor trip and manual engineered safety features actuation means are provided. The protection system has been quantitatively evaluated with respect to functional diversity and qualitatively evaluated with respect to common mode susceptibility. These studies indicate that the system is designed to have a very high probability of performing its function in any postulated occurrence.

There will be no changes to the RTS instrumentation hardware design or design requirements such that compliance with any of the regulatory requirements and guidance documents above would come into question. Therefore, the plant will continue to comply with all applicable regulatory requirements.

4.2 Significant Hazards Consideration

Southern Nuclear Operating Company (SNC) has evaluated whether or not a significant hazards consideration is involved with the proposed changes by focusing on the three standards set forth in 10 CFR 50.92(c) as discussed below:

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

   Response: No.

   The proposed changes do not significantly increase the probability or consequences of an accident previously evaluated in the Final Safety Analysis Report (FSAR). All of the safety analyses have been evaluated for impact. The elimination of Reactor Coolant Pump Breaker Position reactor trip will not initiate any accident; therefore, the probability of an accident has not been increased. An evaluation of dose consequences, with respect to the proposed changes, indicates there is no impact due to the proposed changes and all acceptance criteria

continue to be met. Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

   Response: No.

   The proposed changes do 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 result of the proposed changes. The changes have no adverse effects on any safety-related system. Therefore, all accident analyses criteria continue to be met and these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Do the proposed changes involve a significant reduction in a margin of safety?

   Response: No.

   The proposed changes do not involve a significant reduction in a margin of safety. All analyses that credit the Reactor Coolant System Low Flow reactor trip function have been reviewed and no changes to any inputs are required. The evaluation demonstrated that all applicable acceptance criteria are met. Therefore, the proposed changes do not involve a significant reduction in the margin of safety.

Conclusion

Based on the preceding evaluation, SNC has determined that the proposed changes meet the requirements of 10 CFR 50.92(c) and do not involve a significant hazards consideration.

4.3 Conclusion

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the pubic 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) issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 Environmental Consideration

SNC has determined that the proposed amendment would change a requirement with respect to the 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, SNC has evaluated the proposed amendment and has determined that the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in the 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), an environmental impact statement or environmental assessment of the proposed amendment is not required.

Joseph M. Farley Nuclear Plant
Request to Revise Technical Specifications to
Delete Reactor Trip System, Function 11, Reactor Coolant Pump Breaker Position

Enclosure 2

Marked Up Technical Specification Pages and Bases Pages

List of Affected Pages

3.3.1-6
3.3.1-17
B 3.3.1-21
B 3.3.1-22
B.3.3.1-23
B.3.3.1-24
B 3.3.1-31
B 3.3.1-32
B 3.3.1-44
B 3.3.1-45
B 3.3.1-57

Joseph M. Farley Nuclear Plant
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Delete Reactor Trip System, Function 11, Reactor Coolant Pump Breaker Position

Unit 2 Cycle 20

Changed Pages List

The pages provided in this section will be issued prior to Unit 2 entering Mode 5 from Cycle 20 (Spring 2010)

3.3.1-6
3.3.1-17
B 3.3.1-21
B 3.3.1-22
B.3.3.1-23
B.3.3.1-24
B 3.3.1-31
B 3.3.1-32
B 3.3.1-44
B 3.3.1-45
B 3.3.1-57

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
N. One Reactor Coolant Pump Breaker Position (Single Loop) channel inoperable. [Unit 1 only]	N.1	Restore channel to OPERABLE status.	6 hours
	OR		
	N.2	Reduce THERMAL POWER to < P-8.	10 hours
O. One Reactor Coolant Pump Breaker Position (Two Loops) channel inoperable. [Unit 1 only]	O.1	Place channel in trip.	6 hours
	OR		
	O.2	Reduce THERMAL POWER to < P-7.	12 hours
P. One Low Auto Stop Oil Pressure channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ----------		
	P.1	Place channel in trip.	72 hours
	OR		
	P.2	Reduce THERMAL POWER to < P-9.	76 hours
Q. One, two, or three Turbine Throttle Valve Closure channel(s) inoperable.	Q.1	Place channel(s) in trip.	72 hours
	OR		
	Q.2	Reduce THERMAL POWER to < P-9.	76 hours

Table 3.3.1-1 (page 4 of 8)
Reactor Trip System Instrumentation

[Unit 1 only]

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT
11.	Reactor Coolant Pump (RCP) Breaker Position						
	a. Single Loop	1(g)	1 per RCP	N	SR 3.3.1.12	NA	NA
	b. Two Loops	1(h)	1 per RCP	O	SR 3.3.1.12	NA	NA
12.	Undervoltage RCPs	1(f)	3	M	SR 3.3.1.6 SR 3.3.1.10	≥ 2640 V	≥ 2680 V
13.	Underfrequency RCPs	1(f)	3	M	SR 3.3.1.6 SR 3.3.1.10	≥ 56.9 Hz	≥ 57 Hz
14.	Steam Generator (SG) Water Level — Low Low	1,2	3 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.14	≥ 27.6%	≥ 28%

(f) Above the P-7 (Low Power Reactor Trips Block) interlock.

(g) Above the P-8 (Power Range Neutron Flux) interlock.

(h) Above the P-7 (Low Power Reactor Trips Block) interlock and below the P-8 (Power Range Neutron Flux) interlock.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

10. Reactor Coolant Flow — Low (continued)

The Reactor Coolant Flow — Low (Two Loops) trip Function ensures that protection is provided against violating the DNBR limit due to low flow in two or more RCS loops while avoiding reactor trips due to normal variations in loop flow.

Above the P-7 setpoint and below the P-8 setpoint, a loss of flow in two or more loops will initiate a reactor trip. Each loop has three flow detectors (shared with the Single Loop trip Function) to monitor flow. The flow signals are not used for any control system input.

The LCO requires three Reactor Coolant Flow — Low channels per loop to be OPERABLE. The trip function is accomplished by 2-out-of-3 channels in two Loops.

In MODE 1 above the P-7 setpoint and below the P-8 setpoint, the Reactor Coolant Flow — Low (Two Loops) trip must be OPERABLE. Below the P-7 setpoint, all reactor trips on low flow are automatically blocked since no conceivable power distributions could occur that would cause a DNB concern at this low power level. Above the P-7 setpoint, the reactor trip on low flow in two or more RCS loops is automatically enabled. Above the P-8 setpoint, a loss of flow in any one loop will actuate a reactor trip because of the higher power level and the reduced margin to the design limit DNBR.

[Unit 1 only]

11. Reactor Coolant Pump (RCP) Breaker Position

Both RCP Breaker Position trip Functions operate together on two sets of auxiliary contacts (sensor), with one set (channel) on each RCP breaker. The breaker position sensing channels and Logic circuits are shared by both breaker position Trip Functions. These Functions anticipate the Reactor Coolant Flow — Low trips to avoid RCS heatup that would occur before the low flow trip actuates. The primary trip for reactor core protection against DNB is provided by the loss of flow trip. No credit was taken in the accident analyses for the function of these trips. Their functional capability enhances the overall reliability of the reactor protection system.

(continued)

[Unit 1 only]

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

11. Reactor Coolant Pump (RCP) Breaker Position (continued)

a. Reactor Coolant Pump Breaker Position (Single Loop)

The RCP Breaker Position (Single Loop) trip Function ensures that protection is provided against violating the DNBR limit due to a loss of flow in one RCS loop. The position of each RCP breaker is monitored. If one RCP breaker is open above the P-8 setpoint, a reactor trip is initiated. For loss of flow transients initiated by opening a given RCP electrical supply breaker, this trip Function will generate a reactor trip before the Reactor Coolant Flow — Low (Single Loop) Trip Setpoint is reached.

The LCO requires one RCP Breaker Position channel per RCP to be OPERABLE. Each channel contains one Train A and one Train B auxiliary contact. The trip function is accomplished by actuation of any single channel by either or both auxiliary contacts. One OPERABLE channel is sufficient for this trip Function because the RCS Flow — Low trip alone provides sufficient protection of unit SLs for loss of flow events. The RCP Breaker Position trip serves to compliment the RCP bus undervoltage trip and to anticipate the low flow trip, minimizing the thermal transient associated with loss of a pump.

This Function measures only the discrete position (open or closed) of the RCP breaker, using two auxiliary contacts per breaker. Therefore, the Function has no adjustable trip setpoint with which to associate an LSSS.

In MODE 1 above the P-8 setpoint, when a loss of flow in any RCS loop could challenge the DNB design basis, the RCP Breaker Position (Single Loop) trip must be OPERABLE. In MODE 1 below the P-8 setpoint, a loss of flow in two or more loops is required to actuate a reactor trip because of the lower power level and the greater margin to the design limit DNBR.

(continued)

[Unit 1 only]

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

11. Reactor Coolant Pump (RCP) Breaker Position (continued)

b. Reactor Coolant Pump Breaker Position (Two Loops)

The RCP Breaker Position (Two Loops) trip Function ensures that protection is provided against violating the DNBR limit due to a loss of flow in two or more RCS loops. The position of each RCP breaker is monitored. Above the P-7 setpoint and below the P-8 setpoint, a loss of flow in two or more loops will initiate a reactor trip. For loss of flow transients initiated by opening two or more RCP electrical supply breakers, this trip Function will generate a reactor trip before the Reactor Coolant Flow — Low (Two Loops) Trip Setpoint is reached.

The LCO requires one RCP Breaker Position channel per RCP to be OPERABLE. Each channel contains one Train A and one Train B auxiliary contact. The channels are combined in a 2-out-of-3 trip Logic. One OPERABLE channel is sufficient for this Function because the RCS Flow — Low trip alone provides sufficient protection of unit SLs for loss of flow events. The RCP Breaker Position trip serves to compliment the RCP bus undervoltage trip and to anticipate the low flow trip, minimizing the thermal transient associated with loss of an RCP.

This Function measures only the discrete position (open or closed) of the RCP breaker, using two auxiliary contacts on each breaker. Therefore, the Function has no adjustable trip setpoint with which to associate an LSSS.

In MODE 1 above the P-7 setpoint and below the P-8 setpoint, the RCP Breaker Position (Two Loops) trip must be OPERABLE. Below the P-7 setpoint, all reactor trips on loss of flow are automatically blocked since no conceivable power distributions could occur that would challenge the DNB design basis at this low power level. Above the P-7 setpoint, the reactor trip on loss of flow in two RCS loops is automatically enabled. Above the P-8 setpoint, a loss of flow in any one loop will actuate a reactor trip because of the higher power level and the reduced margin to the design limit DNBR.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

12. Undervoltage Reactor Coolant Pumps

The Undervoltage RCPs reactor trip Function ensures that protection is provided against violating the DNBR limit due to a loss of flow in two or more RCS loops. The voltage on each RCP bus is monitored by undervoltage relays. Two UV sensors (relays) are associated with each bus (one for each logic train). Each RCP bus is assigned to a protection channel. The actuation logic is two-out-of-three channels (i.e., buses) with loss of voltage. The RCP UV reactor trip logic is interlocked by permissive P-7. Above the P-7 setpoint, a loss of voltage detected on two or more RCP buses will initiate a reactor trip. For undervoltage conditions on multiple RCP buses, this trip Function will generate a reactor trip before the Reactor Coolant Flow — Low (Two Loops) Trip Setpoint is reached. A minimum time delay is incorporated into each Undervoltage RCP channel to prevent reactor trips due to momentary electrical power transients (e.g., fault clearing and fast bus transfer). This time delay is also set so that the time required for a signal to reach the RTBs following the simultaneous loss of power of two or more RCP buses shall not exceed the maximum allotted for protection system equipment (Ref. 18). An additional time delay is allotted for EMF decay.

For Unit 2, the voltage UV sensors are associated with the motor side of the RCP breakers.

This is an anticipatory trip for reactor core protection against violating the DNB design basis. The primary trip is provided by the loss of flow trip. No credit was taken in the accident analyses for the function of this trip. However, the functional capability of this trip enhances the overall reliability of the reactor protection system.

The LCO requires three Undervoltage channels to be OPERABLE.

In MODE 1 above the P-7 setpoint, the Undervoltage RCP trip must be OPERABLE. Below the P-7 setpoint, all reactor trips on loss of flow are automatically blocked since no conceivable power distributions could occur that would challenge the DNB design basis at this low power level. Above the P-7 setpoint, the reactor trip on loss of flow in two or more RCS loops is automatically enabled. This Function uses the same undervoltage channels and Logic circuits as the ESFAS Function 6.f, "Undervoltage Reactor Coolant Pump (RCP)" start of the Turbine-Driven auxiliary feedwater (TDAFW) pump. However, the TDAFW actuation does not employ the P-7 interlock.

(continued)

[Unit 1 only]

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

b. Low Power Reactor Trips Block, P-7 (continued)

- RCPs Breaker Open (Two Loops);
- Undervoltage RCPs; and
- Underfrequency RCPs.

These reactor trips are only required when operating above the P-7 setpoint (approximately 10% power). 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.

(2) on decreasing power, the P-7 interlock automatically blocks reactor trips on the following Functions:

[Unit 1 only]

- Pressurizer Pressure — Low;
- Pressurizer Water Level — High;
- Reactor Coolant Flow — Low (Two Loops);
- RCP Breaker Position (Two Loops);
- Undervoltage RCPs; and
- Underfrequency RCPs.

Trip Setpoint and Allowable Value are not applicable to the P-7 interlock because it is a logic Function and thus has no parameter with which to associate an LSSS.

The P-7 interlock is a logic Function with train and not channel identity. Therefore, the LCO requires one channel per train of Low Power Reactor Trips Block, P-7 interlock to be OPERABLE in MODE 1.

Since the P-7 interlock has no channels, no CHANNEL CALIBRATION or CHANNEL OPERABILITY TEST is needed. The logic is tested by SR 3.3.1.5 under Function 20, Automatic Trip Logic.

The low power trips are blocked below the P-7 setpoint and unblocked above the P-7 setpoint. In MODE 2, 3, 4, 5, or 6, this Function does not have to be OPERABLE because the interlock performs its Function when power level drops below 10% power, which is in MODE 1

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

c. Power Range Neutron Flux, P-8

The Power Range Neutron Flux, P-8 interlock is actuated at approximately 30% power as determined by two-out-of-four NIS power range detectors. The P-8 interlock automatically enables the Reactor Coolant Flow — Low (Single Loop) and RCP Breaker Position (Single Loop) reactor trips on one or more RCS loops on increasing power. The LCO requirement for this trip Function ensures that protection is provided against a loss of flow in any RCS loop that could challenge the DNB design basis when greater than approximately 30% power. On decreasing power, the reactor trips on low flow and breaker position in any loop are automatically blocked.

[Unit 1 only]

The LCO requires four channels of Power Range Neutron Flux, P-8 interlock to be OPERABLE in MODE 1.

In MODE 1, a loss of flow in one RCS loop could result in DNB conditions, so the Power Range Neutron Flux, P-8 interlock must be OPERABLE. In MODE 2, 3, 4, 5, or 6, this Function does not have to be OPERABLE because the core is not producing sufficient power to challenge the DNB design basis.

d. Power Range Neutron Flux, P-9

The Power Range Neutron Flux, P-9 interlock is actuated at approximately 50% power as determined by two-out-of-four NIS power range detectors. The LCO requirement for this Function ensures that the Turbine Trip — Low Auto Stop Oil Pressure and Turbine Trip — Turbine Throttle Valve Closure reactor trips are enabled above the P-9 setpoint. Above the P-9 setpoint, a turbine trip will cause a load rejection beyond the capacity of the Steam Dump System in conjunction with the Auto Rod Control System. A reactor trip is automatically initiated on a turbine trip when it is above the P-9 setpoint, to minimize the transient on the reactor and the Reactor Coolant System Pressure Boundary components.

The LCO requires four channels of Power Range Neutron Flux, P-9 interlock to be OPERABLE in MODE 1.

(continued)

BASES

ACTIONS

M.1 and M.2 (continued)

- Undervoltage RCPs; and
- Underfrequency RCPs.

With one channel inoperable, the inoperable channel must be placed in the tripped condition within 72 hours. For RCP UV and RCP UF, both sensors associated with a given channel must be tripped (or, if applicable, bypassed) to satisfy the requirements of action M.1. Placing the channel in the tripped condition results in a partial trip condition requiring only one additional channel to initiate a reactor trip above the P-7 setpoint (above P-8 for Reactor Coolant Flow — Low (Single Loop)). These Functions do not have to be OPERABLE below the P-7 setpoint because the trip protection provided is no longer required. The 72 hours allowed to place the channel in the tripped condition is justified in Reference 11. An additional 6 hours is allowed to reduce THERMAL POWER to below P-7 if the inoperable channel cannot be restored to OPERABLE status or placed in trip within the specified Completion Time. The Reactor Coolant Flow — Low (Single Loop) reactor trip Function does not have to be OPERABLE below the P-8 setpoint; however, the Required Action must take the plant below the P-7 setpoint if an inoperable channel is not tripped within 72 hours due to shared components between this Function and the Reactor Coolant Flow — Low (Two Loops) trip function.

Allowance of this time interval takes into consideration the redundant capability provided by the remaining redundant OPERABLE channel, and the low probability of occurrence of an event during this period that may require the protection afforded by the Functions associated with Condition M.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. The 12 hour time limit is justified in Reference 11.

[Unit 1 only]

N.1 and N.2

Condition N applies to the RCP Breaker Position (Single Loop) reactor trip Function. There is one breaker position channel per RCP breaker. Each channel contains one Train A and one Train B auxiliary contact. With one channel inoperable, the inoperable channel must be restored to OPERABLE status within 6 hours. If the channel cannot be restored to OPERABLE status within the 6 hours, then THERMAL POWER must

(continued)

BASES

ACTIONS

N.1 and N.2 (continued)

be reduced below the P-8 setpoint within the next 4 hours.

[Unit 1 only]

This places the unit in a MODE where the LCO is no longer applicable. This Function does not have to be OPERABLE below the P-8 setpoint because other RTS Functions provide core protection below the P-8 setpoint. The 6 hours allowed to restore the channel to OPERABLE status takes into consideration the redundant capability provided by the remaining redundant OPERABLE channel, and the low probability of occurrence of an event during this period that may require the protection afforded by the RCP Breaker Position (Single Loop) reactor trip Function. The 4 additional hours allowed to reduce THERMAL POWER to below the P-8 setpoint is a reasonable time, based on operating experience, for an orderly power reduction from full power without challenging plant systems.

O.1 and O.2

[Unit 1 only]

Condition O applies to the RCP Breaker Position (Two Loops) reactor trip Function. There is one breaker position channel per RCP breaker. Each channel contains one Train A and one Train B auxiliary contact. With one channel inoperable, the inoperable channel must be restored to OPERABLE status within 6 hours. If the channel cannot be restored to OPERABLE status within 6 hours, then THERMAL POWER must be reduced below the P-7 setpoint within the next 6 hours.

This places the unit in a MODE where the LCO is no longer applicable. This Function does not have to be OPERABLE below the P-7 setpoint because other RTS Functions provide core protection below the P-7 setpoint. Allowance of this time interval takes into consideration the redundant capability provided by the remaining redundant OPERABLE channel, and the low probability of occurrence of an event during this period that may require the protection afforded by the RCP Breaker Position (Two Loops) reactor trip Function.

P.1 and P.2

Condition P applies to Turbine Trip on Low Auto Stop Oil Pressure. With one channel inoperable, the inoperable channel must be placed in

(continued)

BASES

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 also intended to verify the interlock prior to startup, if not performed in the previous 184 days.

The 18 month 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. The 184-day Frequency for RTS Interlock COT performance prior to startup is consistent with the uncertainty allowances for rack drift in the setpoint calculations (Ref. 7) and the COT (SR 3.3.1.7 and SR 3.3.1.8) Surveillance Frequencies for the associated trip functions. Performance of the RTS Interlock COTs in conjunction with periodic actuation logic tests (SR 3.3.1.5) provides assurance that the total interlock function is OPERABLE prior to reactor startup and power ascension.

[Unit 1 only]

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 prior to exceeding P-9. This TADOT consists of verifying that each channel indicates a Turbine trip before Latching the turbine and indicates no turbine trip after the turbine is latched prior to exceeding the P-9 interlock whenever the unit has been in MODE 3. A Note states that this Surveillance is not required if it has been performed within the

(continued)

Joseph M. Farley Nuclear Plant
Request to Revise Technical Specifications to
Delete Reactor Trip System, Function 11, Reactor Coolant Pump Breaker Position

Unit 1 Cycle 23

Changed Pages List

The pages provided in this section will be issued prior to Unit 1 entering Mode 5 from Cycle 23 (Fall 2010)

3.3.1-6
3.3.1-17
B 3.3.1-21
B 3.3.1-22
B.3.3.1-23
B.3.3.1-24
B 3.3.1-31
B 3.3.1-32
B 3.3.1-44
B 3.3.1-45
B 3.3.1-57

Not used.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
N. [Unit 1 only] One Reactor Coolant Pump Breaker Position (Single Loop) channel inoperable.	N.1 Restore channel to OPERABLE status. OR N.2 Reduce THERMAL POWER to < P-8.	6 hours 10 hours
O. [Unit 1 only] One Reactor Coolant Pump Breaker Position (Two Loops) channel inoperable.	O.1 Place channel in trip. OR O.2 Reduce THERMAL POWER to < P-7.	6 hours 12 hours
P. One Low Auto Stop Oil Pressure channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ---------- P.1 Place channel in trip. OR P.2 Reduce THERMAL POWER to < P-9.	Not used. 72 hours 76 hours
Q. One, two, or three Turbine Throttle Valve Closure channel(s) inoperable.	Q.1 Place channel(s) in trip. OR Q.2 Reduce THERMAL POWER to < P-9.	72 hours 76 hours

Not used.

Table 3.3.1-1 (page 4 of 8)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT
11.	[Unit 1 only] Reactor Coolant Pump (RCP) Breaker Position						
	a. Single Loop	1[g]	1 per RCP	N	SR 3.3.1.12	NA	NA
	b. Two Loops	1[h]	1 per RCP	O	SR 3.3.1.12	NA	NA
12.	Undervoltage RCPs	1[f]	3	M	SR 3.3.1.6 SR 3.3.1.10	≥ 2640 V	≥ 2680 V
13.	Underfrequency RCPs	1[f]	3	M	SR 3.3.1.6 SR 3.3.1.10	≥ 56.9 Hz	≥ 57 Hz
14.	Steam Generator (SG) Water Level — Low Low	1,2	3 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.14	≥ 27.6%	≥ 28%

(f) Above the P-7 (Low Power Reactor Trips Block) interlock.

(g) Above the P-8 (Power Range Neutron Flux) interlock.

(h) Above the P-7 (Low Power Reactor Trips Block) interlock and below the P-8 (Power Range Neutron Flux) interlock.

Not used.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

10. Reactor Coolant Flow — Low (continued)

The Reactor Coolant Flow — Low (Two Loops) trip Function ensures that protection is provided against violating the DNBR limit due to low flow in two or more RCS loops while avoiding reactor trips due to normal variations in loop flow.

Above the P-7 setpoint and below the P-8 setpoint, a loss of flow in two or more loops will initiate a reactor trip. Each loop has three flow detectors (shared with the Single Loop trip Function) to monitor flow. The flow signals are not used for any control system input.

The LCO requires three Reactor Coolant Flow — Low channels per loop to be OPERABLE. The trip function is accomplished by 2-out-of-3 channels in two Loops.

In MODE 1 above the P-7 setpoint and below the P-8 setpoint, the Reactor Coolant Flow — Low (Two Loops) trip must be OPERABLE. Below the P-7 setpoint, all reactor trips on low flow are automatically blocked since no conceivable power distributions could occur that would cause a DNB concern at this low power level. Above the P-7 setpoint, the reactor trip on low flow in two or more RCS loops is automatically enabled. Above the P-8 setpoint, a loss of flow in any one loop will actuate a reactor trip because of the higher power level and the reduced margin to the design limit DNBR.

11. [Unit 1 only] Reactor Coolant Pump (RCP) Breaker Position

Both RCP Breaker Position trip Functions operate together on two sets of auxiliary contacts (sensor), with one set (channel) on each RCP breaker. The breaker position sensing channels and Logic circuits are shared by both breaker position Trip Functions. These Functions anticipate the Reactor Coolant Flow — Low trips to avoid RCS heatup that would occur before the low flow trip actuates. The primary trip for reactor core protection against DNB is provided by the loss of flow trip. No credit was taken in the accident analyses for the function of these trips. Their functional capability enhances the overall reliability of the reactor protection system.

Not used.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

11. [Unit 1 only] Reactor Coolant Pump (RCP) Breaker Position (continued)

a. Reactor Coolant Pump Breaker Position (Single Loop)

The RCP Breaker Position (Single Loop) trip Function ensures that protection is provided against violating the DNBR limit due to a loss of flow in one RCS loop. The position of each RCP breaker is monitored. If one RCP breaker is open above the P-8 setpoint, a reactor trip is initiated. For loss of flow transients initiated by opening a given RCP electrical supply breaker, this trip Function will generate a reactor trip before the Reactor Coolant Flow — Low (Single Loop) Trip Setpoint is reached.

The LCO requires one RCP Breaker Position channel per RCP to be OPERABLE. Each channel contains one Train A and one Train B auxiliary contact. The trip function is accomplished by actuation of any single channel by either or both auxiliary contacts. One OPERABLE channel is sufficient for this trip Function because the RCS Flow — Low trip alone provides sufficient protection of unit SLs for loss of flow events. The RCP Breaker Position trip serves to compliment the RCP bus undervoltage trip and to anticipate the low flow trip, minimizing the thermal transient associated with loss of a pump.

This Function measures only the discrete position (open or closed) of the RCP breaker, using two auxiliary contacts per breaker. Therefore, the Function has no adjustable trip setpoint with which to associate an LSSS.

In MODE 1 above the P-8 setpoint, when a loss of flow in any RCS loop could challenge the DNB design basis, the RCP Breaker Position (Single Loop) trip must be OPERABLE. In MODE 1 below the P-8 setpoint, a loss of flow in two or more loops is required to actuate a reactor trip because of the lower power level and the greater margin to the design limit DNBR.

Not used.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

11. [Unit 1 only] Reactor Coolant Pump (RCP) Breaker Position (continued)

b. Reactor Coolant Pump Breaker Position (Two Loops)

The RCP Breaker Position (Two Loops) trip Function ensures that protection is provided against violating the DNBR limit due to a loss of flow in two or more RCS loops. The position of each RCP breaker is monitored. Above the P-7 setpoint and below the P-8 setpoint, a loss of flow in two or more loops will initiate a reactor trip. For loss of flow transients initiated by opening two or more RCP electrical supply breakers, this trip Function will generate a reactor trip before the Reactor Coolant Flow — Low (Two Loops) Trip Setpoint is reached.

The LCO requires one RCP Breaker Position channel per RCP to be OPERABLE. Each channel contains one Train A and one Train B auxiliary contact. The channels are combined in a 2-out-of-3 trip Logic. One OPERABLE channel is sufficient for this Function because the RCS Flow — Low trip alone provides sufficient protection of unit SLs for loss of flow events. The RCP Breaker Position trip serves to compliment the RCP bus undervoltage trip and to anticipate the low flow trip, minimizing the thermal transient associated with loss of an RCP.

This Function measures only the discrete position (open or closed) of the RCP breaker, using two auxiliary contacts on each breaker. Therefore, the Function has no adjustable trip setpoint with which to associate an LSSS.

In MODE 1 above the P-7 setpoint and below the P-8 setpoint, the RCP Breaker Position (Two Loops) trip must be OPERABLE. Below the P-7 setpoint, all reactor trips on loss of flow are automatically blocked since no conceivable power distributions could occur that would challenge the DNB design basis at this low power level. Above the P-7 setpoint, the reactor trip on loss of flow in two RCS loops is automatically enabled. Above the P-8 setpoint, a loss of flow in any one loop will actuate a reactor trip because of the higher power level and the reduced margin to the design limit DNBR.

Not used.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

12. Undervoltage Reactor Coolant Pumps

The Undervoltage RCPs reactor trip Function ensures that protection is provided against violating the DNBR limit due to a loss of flow in two or more RCS loops. The voltage on each RCP bus is monitored by undervoltage relays. Two UV sensors (relays) are associated with each bus (one for each logic train). For Unit 2, the voltage UV sensors are associated with the motor side of the RCP breakers. Each RCP bus is assigned to a protection channel. The actuation logic is two-out-of-three channels (i.e., buses) with loss of voltage. The RCP UV reactor trip logic is interlocked by permissive P-7. Above the P-7 setpoint, a loss of voltage detected on two or more RCP buses will initiate a reactor trip. For undervoltage conditions on multiple RCP buses, this trip Function will generate a reactor trip before the Reactor Coolant Flow — Low (Two Loops) Trip Setpoint is reached. A minimum time delay is incorporated into each Undervoltage RCP channel to prevent reactor trips due to momentary electrical power transients (e.g., fault clearing and fast bus transfer). This time delay is also set so that the time required for a signal to reach the RTBs following the simultaneous loss of power of two or more RCP buses shall not exceed the maximum allotted for protection system equipment (Ref. 18). An additional time delay is allotted for EMF decay.

This is an anticipatory trip for reactor core protection against violating the DNB design basis. The primary trip is provided by the loss of flow trip. No credit was taken in the accident analyses for the function of this trip. However, the functional capability of this trip enhances the overall reliability of the reactor protection system.

The LCO requires three Undervoltage channels to be OPERABLE.

In MODE 1 above the P-7 setpoint, the Undervoltage RCP trip must be OPERABLE. Below the P-7 setpoint, all reactor trips on loss of flow are automatically blocked since no conceivable power distributions could occur that would challenge the DNB design basis at this low power level. Above the P-7 setpoint, the reactor trip on loss of flow in two or more RCS loops is automatically enabled. This Function uses the same undervoltage channels and Logic circuits as the ESFAS Function 6.f, "Undervoltage Reactor Coolant Pump (RCP)" start of the Turbine-Driven auxiliary feedwater (TDAFW) pump. However, the TDAFW actuation does not employ the P-7 interlock.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

b. Low Power Reactor Trips Block, P-7 (continued)

- ~~[Unit 1 only] RCPs Breaker Open (Two Loops);~~
- Undervoltage RCPs; and
- Underfrequency RCPs.

These reactor trips are only required when operating above the P-7 setpoint (approximately 10% power). 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.

(2) on decreasing power, the P-7 interlock automatically blocks reactor trips on the following Functions:

- Pressurizer Pressure — Low;
- Pressurizer Water Level — High;
- Reactor Coolant Flow — Low (Two Loops);
- ~~[Unit 1 only] RCP Breaker Position (Two Loops);~~
- Undervoltage RCPs; and
- Underfrequency RCPs.

Trip Setpoint and Allowable Value are not applicable to the P-7 interlock because it is a logic Function and thus has no parameter with which to associate an LSSS.

The P-7 interlock is a logic Function with train and not channel identity. Therefore, the LCO requires one channel per train of Low Power Reactor Trips Block, P-7 interlock to be OPERABLE in MODE 1.

Since the P-7 interlock has no channels, no CHANNEL CALIBRATION or CHANNEL OPERABILITY TEST is needed. The logic is tested by SR 3.3.1.5 under Function 20, Automatic Trip Logic.

The low power trips are blocked below the P-7 setpoint and unblocked above the P-7 setpoint. In MODE 2, 3, 4, 5, or 6, this Function does not have to be OPERABLE because the interlock performs its Function when power level drops below 10% power, which is in MODE 1

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

c. Power Range Neutron Flux, P-8

The Power Range Neutron Flux, P-8 interlock is actuated at approximately 30% power as determined by two-out-of-four NIS power range detectors. The P-8 interlock automatically enables the Reactor Coolant Flow — Low (Single Loop) and [Unit 1 only] RCP Breaker Position (Single Loop) reactor trips on one or more RCS loops on increasing power. The LCO requirement for this trip Function ensures that protection is provided against a loss of flow in any RCS loop that could challenge the DNB design basis when greater than approximately 30% power. On decreasing power, the reactor trips on low flow and [Unit 1 only] breaker position in any loop are automatically blocked.

is

The LCO requires four channels of Power Range Neutron Flux, P-8 interlock to be OPERABLE in MODE 1.

In MODE 1, a loss of flow in one RCS loop could result in DNB conditions, so the Power Range Neutron Flux, P-8 interlock must be OPERABLE. In MODE 2, 3, 4, 5, or 6, this Function does not have to be OPERABLE because the core is not producing sufficient power to challenge the DNB design basis.

d. Power Range Neutron Flux, P-9

The Power Range Neutron Flux, P-9 interlock is actuated at approximately 50% power as determined by two-out-of-four NIS power range detectors. The LCO requirement for this Function ensures that the Turbine Trip — Low Auto Stop Oil Pressure and Turbine Trip — Turbine Throttle Valve Closure reactor trips are enabled above the P-9 setpoint. Above the P-9 setpoint, a turbine trip will cause a load rejection beyond the capacity of the Steam Dump System in conjunction with the Auto Rod Control System. A reactor trip is automatically initiated on a turbine trip when it is above the P-9 setpoint, to minimize the transient on the reactor and the Reactor Coolant System Pressure Boundary components.

The LCO requires four channels of Power Range Neutron Flux, P-9 interlock to be OPERABLE in MODE 1.

(continued)

BASES

ACTIONS

M.1 and M.2 (continued)

- Undervoltage RCPs; and
- Underfrequency RCPs.

With one channel inoperable, the inoperable channel must be placed in the tripped condition within 72 hours. For RCP UV and RCP UF, both sensors associated with a given channel must be tripped (or, if applicable, bypassed) to satisfy the requirements of action M.1. Placing the channel in the tripped condition results in a partial trip condition requiring only one additional channel to initiate a reactor trip above the P-7 setpoint (above P-8 for Reactor Coolant Flow — Low (Single Loop)). These Functions do not have to be OPERABLE below the P-7 setpoint because the trip protection provided is no longer required. The 72 hours allowed to place the channel in the tripped condition is justified in Reference 11. An additional 6 hours is allowed to reduce THERMAL POWER to below P-7 if the inoperable channel cannot be restored to OPERABLE status or placed in trip within the specified Completion Time. The Reactor Coolant Flow — Low (Single Loop) reactor trip Function does not have to be OPERABLE below the P-8 setpoint; however, the Required Action must take the plant below the P-7 setpoint if an inoperable channel is not tripped within 72 hours due to shared components between this Function and the Reactor Coolant Flow — Low (Two Loops) trip function.

Allowance of this time interval takes into consideration the redundant capability provided by the remaining redundant OPERABLE channel, and the low probability of occurrence of an event during this period that may require the protection afforded by the Functions associated with Condition M.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. The 12 hour time limit is justified in Reference 11.

~~[Unit 1 only]~~ N.1 and N.2

Not used.

~~Condition N applies to the RCP Breaker Position (Single Loop) reactor trip Function. There is one breaker position channel per RCP breaker. Each channel contains one Train A and one Train B auxiliary contact. With one channel inoperable, the inoperable channel must be restored to OPERABLE status within 6 hours. If the channel cannot be restored to OPERABLE status within the 6 hours, then THERMAL POWER must~~

(continued)

BASES

ACTIONS

[Unit 1 only] N.1 and N.2 (continued)

be reduced below the P-8 setpoint within the next 4 hours.

This places the unit in a MODE where the LCO is no longer applicable. This Function does not have to be OPERABLE below the P-8 setpoint because other RTS Functions provide core protection below the P-8 setpoint. The 6 hours allowed to restore the channel to OPERABLE status takes into consideration the redundant capability provided by the remaining redundant OPERABLE channel, and the low probability of occurrence of an event during this period that may require the protection afforded by the RCP Breaker Position (Single Loop) reactor trip Function. The 4 additional hours allowed to reduce THERMAL POWER to below the P-8 setpoint is a reasonable time, based on operating experience, for an orderly power reduction from full power without challenging plant systems.

Not used.

[Unit 1 only] O.1 and O.2

Condition O applies to the RCP Breaker Position (Two Loops) reactor trip Function. There is one breaker position channel per RCP breaker. Each channel contains one Train A and one Train B auxiliary contact. With one channel inoperable, the inoperable channel must be restored to OPERABLE status within 6 hours. If the channel cannot be restored to OPERABLE status within 6 hours, then THERMAL POWER must be reduced below the P-7 setpoint within the next 6 hours.

This places the unit in a MODE where the LCO is no longer applicable. This Function does not have to be OPERABLE below the P-7 setpoint because other RTS Functions provide core protection below the P-7 setpoint. Allowance of this time interval takes into consideration the redundant capability provided by the remaining redundant OPERABLE channel, and the low probability of occurrence of an event during this period that may require the protection afforded by the RCP Breaker Position (Two Loops) reactor trip Function.

Not used.

P.1 and P.2

Condition P applies to Turbine Trip on Low Auto Stop Oil Pressure. With one channel inoperable, the inoperable channel must be placed in

(continued)

BASES

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 also intended to verify the interlock prior to startup, if not performed in the previous 184 days.

The 18 month 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. The 184-day Frequency for RTS Interlock COT performance prior to startup is consistent with the uncertainty allowances for rack drift in the setpoint calculations (Ref. 7) and the COT (SR 3.3.1.7 and SR 3.3.1.8) Surveillance Frequencies for the associated trip functions. Performance of the RTS Interlock COTs in conjunction with periodic actuation logic tests (SR 3.3.1.5) provides assurance that the total interlock function is OPERABLE prior to reactor startup and power ascension.

SR 3.3.1.12

SR 3.3.1.12 is the performance of a TADOT of the Manual Reactor Trip, ~~[Unit 1 only] 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 prior to exceeding P-9. This TADOT consists of verifying that each channel indicates a Turbine trip before Latching the turbine and indicates no turbine trip after the turbine is latched prior to exceeding the P-9 interlock whenever the unit has been in MODE 3. A Note states that this Surveillance is not required if it has been performed within the

(continued)

Enclosure 3

Joseph M. Farley Nuclear Plant, Units 1 and 2
Request to Revise Technical Specifications to
Delete Reactor Trip System, Function 11, Reactor Coolant Pump Breaker Position

Enclosure 3

Clean Typed Technical Specification Pages and Bases Pages

List of Affected Pages

3.3.1-6
3.3.1-17
B 3.3.1-21
B 3.3.1-22
B.3.3.1-23
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B 3.3.1-31
B 3.3.1-32
B 3.3.1-44
B 3.3.1-45
B 3.3.1-57

Joseph M. Farley Nuclear Plant
Request to Revise Technical Specifications to
Delete Reactor Trip System, Function 11, Reactor Coolant Pump Breaker Position

Unit 2 Cycle 20

Changed Pages List

The pages provided in this section will be issued prior to Unit 2 entering Mode 5 from Cycle 20 (Spring 2010)

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B 3.3.1-21
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B 3.3.1-32
B 3.3.1-44
B 3.3.1-45
B 3.3.1-57

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
N. (Unit 1 only) One Reactor Coolant Pump Breaker Position (Single Loop) channel inoperable.	N.1 Restore channel to OPERABLE status. OR N.2 Reduce THERMAL POWER to < P-8.	6 hours 10 hours
O. (Unit 1 only) One Reactor Coolant Pump Breaker Position (Two Loops) channel inoperable.	O.1 Place channel in trip. OR O.2 Reduce THERMAL POWER to < P-7.	6 hours 12 hours
P. One Low Auto Stop Oil Pressure channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ---------- P.1 Place channel in trip. OR P.2 Reduce THERMAL POWER to < P-9.	 72 hours 76 hours
Q. One, two, or three Turbine Throttle Valve Closure channel(s) inoperable.	Q.1 Place channel(s) in trip. OR Q.2 Reduce THERMAL POWER to < P-9.	72 hours 76 hours

Table 3.3.1-1 (page 4 of 8)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT
11.	(Unit 1 only) Reactor Coolant Pump (RCP) Breaker Position						
	a. Single Loop	1[(g)]	1 per RCP	N	SR 3.3.1.12	NA	NA
	b. Two Loops	1[(h)]	1 per RCP	O	SR 3.3.1.12	NA	NA
12.	Undervoltage RCPs	1[(f)]	3	M	SR 3.3.1.6 SR 3.3.1.10	≥ 2640 V	≥ 2680 V
13.	Underfrequency RCPs	1[(f)]	3	M	SR 3.3.1.6 SR 3.3.1.10	≥ 56.9 Hz	≥ 57 Hz
14.	Steam Generator (SG) Water Level — Low Low	1,2	3 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.14	≥ 27.6%	≥ 28%

(f) Above the P-7 (Low Power Reactor Trips Block) interlock.

(g) Above the P-8 (Power Range Neutron Flux) interlock.

(h) Above the P-7 (Low Power Reactor Trips Block) interlock and below the P-8 (Power Range Neutron Flux) interlock.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

10. Reactor Coolant Flow — Low (continued)

The Reactor Coolant Flow — Low (Two Loops) trip Function ensures that protection is provided against violating the DNBR limit due to low flow in two or more RCS loops while avoiding reactor trips due to normal variations in loop flow.

Above the P-7 setpoint and below the P-8 setpoint, a loss of flow in two or more loops will initiate a reactor trip. Each loop has three flow detectors (shared with the Single Loop trip Function) to monitor flow. The flow signals are not used for any control system input.

The LCO requires three Reactor Coolant Flow — Low channels per loop to be OPERABLE. The trip function is accomplished by 2-out-of-3 channels in two Loops.

In MODE 1 above the P-7 setpoint and below the P-8 setpoint, the Reactor Coolant Flow — Low (Two Loops) trip must be OPERABLE. Below the P-7 setpoint, all reactor trips on low flow are automatically blocked since no conceivable power distributions could occur that would cause a DNB concern at this low power level. Above the P-7 setpoint, the reactor trip on low flow in two or more RCS loops is automatically enabled. Above the P-8 setpoint, a loss of flow in any one loop will actuate a reactor trip because of the higher power level and the reduced margin to the design limit DNBR.

11. [Unit 1 only] Reactor Coolant Pump (RCP) Breaker Position

Both RCP Breaker Position trip Functions operate together on two sets of auxiliary contacts (sensor), with one set (channel) on each RCP breaker. The breaker position sensing channels and Logic circuits are shared by both breaker position Trip Functions. These Functions anticipate the Reactor Coolant Flow — Low trips to avoid RCS heatup that would occur before the low flow trip actuates. The primary trip for reactor core protection against DNB is provided by the loss of flow trip. No credit was taken in the accident analyses for the function of these trips. Their functional capability enhances the overall reliability of the reactor protection system.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

11. [Unit 1 only] Reactor Coolant Pump (RCP) Breaker Position (continued)

a. Reactor Coolant Pump Breaker Position (Single Loop)

The RCP Breaker Position (Single Loop) trip Function ensures that protection is provided against violating the DNBR limit due to a loss of flow in one RCS loop. The position of each RCP breaker is monitored. If one RCP breaker is open above the P-8 setpoint, a reactor trip is initiated. For loss of flow transients initiated by opening a given RCP electrical supply breaker, this trip Function will generate a reactor trip before the Reactor Coolant Flow — Low (Single Loop) Trip Setpoint is reached.

The LCO requires one RCP Breaker Position channel per RCP to be OPERABLE. Each channel contains one Train A and one Train B auxiliary contact. The trip function is accomplished by actuation of any single channel by either or both auxiliary contacts. One OPERABLE channel is sufficient for this trip Function because the RCS Flow — Low trip alone provides sufficient protection of unit SLs for loss of flow events. The RCP Breaker Position trip serves to compliment the RCP bus undervoltage trip and to anticipate the low flow trip, minimizing the thermal transient associated with loss of a pump.

This Function measures only the discrete position (open or closed) of the RCP breaker, using two auxiliary contacts per breaker. Therefore, the Function has no adjustable trip setpoint with which to associate an LSSS.

In MODE 1 above the P-8 setpoint, when a loss of flow in any RCS loop could challenge the DNB design basis, the RCP Breaker Position (Single Loop) trip must be OPERABLE. In MODE 1 below the P-8 setpoint, a loss of flow in two or more loops is required to actuate a reactor trip because of the lower power level and the greater margin to the design limit DNBR.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

11. [Unit 1 only] Reactor Coolant Pump (RCP) Breaker Position (continued)

b. Reactor Coolant Pump Breaker Position (Two Loops)

The RCP Breaker Position (Two Loops) trip Function ensures that protection is provided against violating the DNBR limit due to a loss of flow in two or more RCS loops. The position of each RCP breaker is monitored. Above the P-7 setpoint and below the P-8 setpoint, a loss of flow in two or more loops will initiate a reactor trip. For loss of flow transients initiated by opening two or more RCP electrical supply breakers, this trip Function will generate a reactor trip before the Reactor Coolant Flow — Low (Two Loops) Trip Setpoint is reached.

The LCO requires one RCP Breaker Position channel per RCP to be OPERABLE. Each channel contains one Train A and one Train B auxiliary contact. The channels are combined in a 2-out-of-3 trip Logic. One OPERABLE channel is sufficient for this Function because the RCS Flow — Low trip alone provides sufficient protection of unit SLs for loss of flow events. The RCP Breaker Position trip serves to compliment the RCP bus undervoltage trip and to anticipate the low flow trip, minimizing the thermal transient associated with loss of an RCP.

This Function measures only the discrete position (open or closed) of the RCP breaker, using two auxiliary contacts on each breaker. Therefore, the Function has no adjustable trip setpoint with which to associate an LSSS.

In MODE 1 above the P-7 setpoint and below the P-8 setpoint, the RCP Breaker Position (Two Loops) trip must be OPERABLE. Below the P-7 setpoint, all reactor trips on loss of flow are automatically blocked since no conceivable power distributions could occur that would challenge the DNB design basis at this low power level. Above the P-7 setpoint, the reactor trip on loss of flow in two RCS loops is automatically enabled. Above the P-8 setpoint, a loss of flow in any one loop will actuate a reactor trip because of the higher power level and the reduced margin to the design limit DNBR.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

12. Undervoltage Reactor Coolant Pumps

The Undervoltage RCPs reactor trip Function ensures that protection is provided against violating the DNBR limit due to a loss of flow in two or more RCS loops. The voltage on each RCP bus is monitored by undervoltage relays. Two UV sensors (relays) are associated with each bus (one for each logic train). For Unit 2, the voltage UV sensors are associated with the motor side of the RCP breakers. Each RCP bus is assigned to a protection channel. The actuation logic is two-out-of-three channels (i.e., buses) with loss of voltage. The RCP UV reactor trip logic is interlocked by permissive P-7. Above the P-7 setpoint, a loss of voltage detected on two or more RCP buses will initiate a reactor trip. For undervoltage conditions on multiple RCP buses, this trip Function will generate a reactor trip before the Reactor Coolant Flow — Low (Two Loops) Trip Setpoint is reached. A minimum time delay is incorporated into each Undervoltage RCP channel to prevent reactor trips due to momentary electrical power transients (e.g., fault clearing and fast bus transfer). This time delay is also set so that the time required for a signal to reach the RTBs following the simultaneous loss of power of two or more RCP buses shall not exceed the maximum allotted for protection system equipment (Ref. 18). An additional time delay is allotted for EMF decay.

This is an anticipatory trip for reactor core protection against violating the DNB design basis. The primary trip is provided by the loss of flow trip. No credit was taken in the accident analyses for the function of this trip. However, the functional capability of this trip enhances the overall reliability of the reactor protection system.

The LCO requires three Undervoltage channels to be OPERABLE.

In MODE 1 above the P-7 setpoint, the Undervoltage RCP trip must be OPERABLE. Below the P-7 setpoint, all reactor trips on loss of flow are automatically blocked since no conceivable power distributions could occur that would challenge the DNB design basis at this low power level. Above the P-7 setpoint, the reactor trip on loss of flow in two or more RCS loops is automatically enabled. This Function uses the same undervoltage channels and Logic circuits as the ESFAS Function 6.f, "Undervoltage Reactor Coolant Pump (RCP)" start of the Turbine-Driven auxiliary feedwater (TDAFW) pump. However, the TDAFW actuation does not employ the P-7 interlock.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

b. Low Power Reactor Trips Block, P-7 (continued)

- [Unit 1 only] RCPs Breaker Open (Two Loops);
- Undervoltage RCPs; and
- Underfrequency RCPs.

These reactor trips are only required when operating above the P-7 setpoint (approximately 10% power). 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.

(2) on decreasing power, the P-7 interlock automatically blocks reactor trips on the following Functions:

- Pressurizer Pressure — Low;
- Pressurizer Water Level — High;
- Reactor Coolant Flow — Low (Two Loops);
- [Unit 1 only] RCP Breaker Position (Two Loops);
- Undervoltage RCPs; and
- Underfrequency RCPs.

Trip Setpoint and Allowable Value are not applicable to the P-7 interlock because it is a logic Function and thus has no parameter with which to associate an LSSS.

The P-7 interlock is a logic Function with train and not channel identity. Therefore, the LCO requires one channel per train of Low Power Reactor Trips Block, P-7 interlock to be OPERABLE in MODE 1.

Since the P-7 interlock has no channels, no CHANNEL CALIBRATION or CHANNEL OPERABILITY TEST is needed. The logic is tested by SR 3.3.1.5 under Function 20, Automatic Trip Logic.

The low power trips are blocked below the P-7 setpoint and unblocked above the P-7 setpoint. In MODE 2, 3, 4, 5, or 6, this Function does not have to be OPERABLE because the interlock performs its Function when power level drops below 10% power, which is in MODE 1

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

c. Power Range Neutron Flux, P-8

The Power Range Neutron Flux, P-8 interlock is actuated at approximately 30% power as determined by two-out-of-four NIS power range detectors. The P-8 interlock automatically enables the Reactor Coolant Flow — Low (Single Loop) and [Unit 1 only] RCP Breaker Position (Single Loop) reactor trips on one or more RCS loops on increasing power. The LCO requirement for this trip Function ensures that protection is provided against a loss of flow in any RCS loop that could challenge the DNB design basis when greater than approximately 30% power. On decreasing power, the reactor trips on low flow and [Unit 1 only] breaker position in any loop are automatically blocked.

The LCO requires four channels of Power Range Neutron Flux, P-8 interlock to be OPERABLE in MODE 1.

In MODE 1, a loss of flow in one RCS loop could result in DNB conditions, so the Power Range Neutron Flux, P-8 interlock must be OPERABLE. In MODE 2, 3, 4, 5, or 6, this Function does not have to be OPERABLE because the core is not producing sufficient power to challenge the DNB design basis.

d. Power Range Neutron Flux, P-9

The Power Range Neutron Flux, P-9 interlock is actuated at approximately 50% power as determined by two-out-of-four NIS power range detectors. The LCO requirement for this Function ensures that the Turbine Trip — Low Auto Stop Oil Pressure and Turbine Trip — Turbine Throttle Valve Closure reactor trips are enabled above the P-9 setpoint. Above the P-9 setpoint, a turbine trip will cause a load rejection beyond the capacity of the Steam Dump System in conjunction with the Auto Rod Control System. A reactor trip is automatically initiated on a turbine trip when it is above the P-9 setpoint, to minimize the transient on the reactor and the Reactor Coolant System Pressure Boundary components.

The LCO requires four channels of Power Range Neutron Flux, P-9 interlock to be OPERABLE in MODE 1.

(continued)

BASES

ACTIONS

M.1 and M.2 (continued)

- Undervoltage RCPs; and
- Underfrequency RCPs.

With one channel inoperable, the inoperable channel must be placed in the tripped condition within 72 hours. For RCP UV and RCP UF, both sensors associated with a given channel must be tripped (or, if applicable, bypassed) to satisfy the requirements of action M.1. Placing the channel in the tripped condition results in a partial trip condition requiring only one additional channel to initiate a reactor trip above the P-7 setpoint (above P-8 for Reactor Coolant Flow — Low (Single Loop)). These Functions do not have to be OPERABLE below the P-7 setpoint because the trip protection provided is no longer required. The 72 hours allowed to place the channel in the tripped condition is justified in Reference 11. An additional 6 hours is allowed to reduce THERMAL POWER to below P-7 if the inoperable channel cannot be restored to OPERABLE status or placed in trip within the specified Completion Time. The Reactor Coolant Flow — Low (Single Loop) reactor trip Function does not have to be OPERABLE below the P-8 setpoint; however, the Required Action must take the plant below the P-7 setpoint if an inoperable channel is not tripped within 72 hours due to shared components between this Function and the Reactor Coolant Flow — Low (Two Loops) trip function.

Allowance of this time interval takes into consideration the redundant capability provided by the remaining redundant OPERABLE channel, and the low probability of occurrence of an event during this period that may require the protection afforded by the Functions associated with Condition M.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. The 12 hour time limit is justified in Reference 11.

[Unit 1 only] N.1 and N.2

Condition N applies to the RCP Breaker Position (Single Loop) reactor trip Function. There is one breaker position channel per RCP breaker. Each channel contains one Train A and one Train B auxiliary contact. With one channel inoperable, the inoperable channel must be restored to OPERABLE status within 6 hours. If the channel cannot be restored to OPERABLE status within the 6 hours, then THERMAL POWER must

(continued)

BASES

ACTIONS

[Unit 1 only] N.1 and N.2 (continued)

be reduced below the P-8 setpoint within the next 4 hours.

This places the unit in a MODE where the LCO is no longer applicable. This Function does not have to be OPERABLE below the P-8 setpoint because other RTS Functions provide core protection below the P-8 setpoint. The 6 hours allowed to restore the channel to OPERABLE status takes into consideration the redundant capability provided by the remaining redundant OPERABLE channel, and the low probability of occurrence of an event during this period that may require the protection afforded by the RCP Breaker Position (Single Loop) reactor trip Function. The 4 additional hours allowed to reduce THERMAL POWER to below the P-8 setpoint is a reasonable time, based on operating experience, for an orderly power reduction from full power without challenging plant systems.

[Unit 1 only] O.1 and O.2

Condition O applies to the RCP Breaker Position (Two Loops) reactor trip Function. There is one breaker position channel per RCP breaker. Each channel contains one Train A and one Train B auxiliary contact. With one channel inoperable, the inoperable channel must be restored to OPERABLE status within 6 hours. If the channel cannot be restored to OPERABLE status within 6 hours, then THERMAL POWER must be reduced below the P-7 setpoint within the next 6 hours.

This places the unit in a MODE where the LCO is no longer applicable. This Function does not have to be OPERABLE below the P-7 setpoint because other RTS Functions provide core protection below the P-7 setpoint. Allowance of this time interval takes into consideration the redundant capability provided by the remaining redundant OPERABLE channel, and the low probability of occurrence of an event during this period that may require the protection afforded by the RCP Breaker Position (Two Loops) reactor trip Function.

P.1 and P.2

Condition P applies to Turbine Trip on Low Auto Stop Oil Pressure. With one channel inoperable, the inoperable channel must be placed in

(continued)

BASES

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 also intended to verify the interlock prior to startup, if not performed in the previous 184 days.

The 18 month 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. The 184-day Frequency for RTS Interlock COT performance prior to startup is consistent with the uncertainty allowances for rack drift in the setpoint calculations (Ref. 7) and the COT (SR 3.3.1.7 and SR 3.3.1.8) Surveillance Frequencies for the associated trip functions. Performance of the RTS Interlock COTs in conjunction with periodic actuation logic tests (SR 3.3.1.5) provides assurance that the total interlock function is OPERABLE prior to reactor startup and power ascension.

SR 3.3.1.12

SR 3.3.1.12 is the performance of a TADOT of the Manual Reactor Trip, [Unit 1 only] 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 prior to exceeding P-9. This TADOT consists of verifying that each channel indicates a Turbine trip before Latching the turbine and indicates no turbine trip after the turbine is latched prior to exceeding the P-9 interlock whenever the unit has been in MODE 3. A Note states that this Surveillance is not required if it has been performed within the

(continued)

Joseph M. Farley Nuclear Plant
Request to Revise Technical Specifications to
Delete Reactor Trip System, Function 11, Reactor Coolant Pump Breaker Position

Unit 1 Cycle 23

Changed Pages List

The pages provided in this section will be issued prior to Unit 1 entering Mode 5 from Cycle 23 (Fall 2010)

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B 3.3.1-45
B 3.3.1-57

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
N. Not used		
O. Not used		
P. One Low Auto Stop Oil Pressure channel inoperable.	----------NOTE---------- The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. ---------- P.1 Place channel in trip. OR P.2 Reduce THERMAL POWER to < P-9.	 72 hours 76 hours
Q. One, two, or three Turbine Throttle Valve Closure channel(s) inoperable.	Q.1 Place channel(s) in trip. OR Q.2 Reduce THERMAL POWER to < P-9.	72 hours 76 hours

Table 3.3.1-1 (page 4 of 8)
Reactor Trip System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	TRIP SETPOINT
11.	Not used						
12.	Undervoltage RCPs	1[(f)]	3	M	SR 3.3.1.6 SR 3.3.1.10	≥ 2640 V	≥ 2680 V
13.	Underfrequency RCPs	1[(f)]	3	M	SR 3.3.1.6 SR 3.3.1.10	≥ 56.9 Hz	≥ 57 Hz
14.	Steam Generator (SG) Water Level — Low Low	1,2	3 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.14	≥ 27.6%	≥ 28%

(f) Above the P-7 (Low Power Reactor Trips Block) interlock.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

10. Reactor Coolant Flow — Low (continued)

The Reactor Coolant Flow — Low (Two Loops) trip Function ensures that protection is provided against violating the DNBR limit due to low flow in two or more RCS loops while avoiding reactor trips due to normal variations in loop flow.

Above the P-7 setpoint and below the P-8 setpoint, a loss of flow in two or more loops will initiate a reactor trip. Each loop has three flow detectors (shared with the Single Loop trip Function) to monitor flow. The flow signals are not used for any control system input.

The LCO requires three Reactor Coolant Flow — Low channels per loop to be OPERABLE. The trip function is accomplished by 2-out-of-3 channels in two Loops.

In MODE 1 above the P-7 setpoint and below the P-8 setpoint, the Reactor Coolant Flow — Low (Two Loops) trip must be OPERABLE. Below the P-7 setpoint, all reactor trips on low flow are automatically blocked since no conceivable power distributions could occur that would cause a DNB concern at this low power level. Above the P-7 setpoint, the reactor trip on low flow in two or more RCS loops is automatically enabled. Above the P-8 setpoint, a loss of flow in any one loop will actuate a reactor trip because of the higher power level and the reduced margin to the design limit DNBR.

11. Not used.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

11. Not used. (continued)

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

11. Not used. (continued)

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

12. Undervoltage Reactor Coolant Pumps

The Undervoltage RCPs reactor trip Function ensures that protection is provided against violating the DNBR limit due to a loss of flow in two or more RCS loops. The voltage for each RCP is monitored by undervoltage relays. Two UV sensors (relays) are associated with each RCP (one for each logic train). The voltage UV sensors are associated with the motor side of the RCP breakers. Each RCP is assigned to a protection channel. The actuation logic is two-out-of-three channels with loss of voltage. The RCP UV reactor trip logic is interlocked by permissive P-7. Above the P-7 setpoint, a loss of voltage detected on two or more RCPs will initiate a reactor trip. For undervoltage conditions on multiple RCPs, this trip Function will generate a reactor trip before the Reactor Coolant Flow — Low (Two Loops) Trip Setpoint is reached. A minimum time delay is incorporated into each Undervoltage RCP channel to prevent reactor trips due to momentary electrical power transients (e.g., fault clearing and fast bus transfer). This time delay is also set so that the time required for a signal to reach the RTBs following the simultaneous loss of power of two or more RCPs shall not exceed the maximum allotted for protection system equipment (Ref. 18). An additional time delay is allotted for EMF decay.

This is an anticipatory trip for reactor core protection against violating the DNB design basis. The primary trip is provided by the loss of flow trip. No credit was taken in the accident analyses for the function of this trip. However, the functional capability of this trip enhances the overall reliability of the reactor protection system.

The LCO requires three Undervoltage channels to be OPERABLE.

In MODE 1 above the P-7 setpoint, the Undervoltage RCP trip must be OPERABLE. Below the P-7 setpoint, all reactor trips on loss of flow are automatically blocked since no conceivable power distributions could occur that would challenge the DNB design basis at this low power level. Above the P-7 setpoint, the reactor trip on loss of flow in two or more RCS loops is automatically enabled. This Function uses the same undervoltage channels and Logic circuits as the ESFAS Function 6.f, "Undervoltage Reactor Coolant Pump (RCP)" start of the Turbine-Driven auxiliary feedwater (TDAFW) pump. However, the TDAFW actuation does not employ the P-7 interlock.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

b. Low Power Reactor Trips Block, P-7 (continued)

- Undervoltage RCPs; and
- Underfrequency RCPs.

These reactor trips are only required when operating above the P-7 setpoint (approximately 10% power). 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.

(2) on decreasing power, the P-7 interlock automatically blocks reactor trips on the following Functions:

- Pressurizer Pressure — Low;
- Pressurizer Water Level — High;
- Reactor Coolant Flow — Low (Two Loops);
- Undervoltage RCPs; and
- Underfrequency RCPs.

Trip Setpoint and Allowable Value are not applicable to the P-7 interlock because it is a logic Function and thus has no parameter with which to associate an LSSS.

The P-7 interlock is a logic Function with train and not channel identity. Therefore, the LCO requires one channel per train of Low Power Reactor Trips Block, P-7 interlock to be OPERABLE in MODE 1.

Since the P-7 interlock has no channels, no CHANNEL CALIBRATION or CHANNEL OPERABILITY TEST is needed. The logic is tested by SR 3.3.1.5 under Function 20, Automatic Trip Logic.

The low power trips are blocked below the P-7 setpoint and unblocked above the P-7 setpoint. In MODE 2, 3, 4, 5, or 6, this Function does not have to be OPERABLE because the interlock performs its Function when power level drops below 10% power, which is in MODE 1

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

c. Power Range Neutron Flux, P-8

The Power Range Neutron Flux, P-8 interlock is actuated at approximately 30% power as determined by two-out-of-four NIS power range detectors. The P-8 interlock automatically enables the Reactor Coolant Flow — Low (Single Loop) reactor trip on one or more RCS loops on increasing power. The LCO requirement for this trip Function ensures that protection is provided against a loss of flow in any RCS loop that could challenge the DNB design basis when greater than approximately 30% power. On decreasing power, the reactor trip on low flow in any loop is automatically blocked.

The LCO requires four channels of Power Range Neutron Flux, P-8 interlock to be OPERABLE in MODE 1.

In MODE 1, a loss of flow in one RCS loop could result in DNB conditions, so the Power Range Neutron Flux, P-8 interlock must be OPERABLE. In MODE 2, 3, 4, 5, or 6, this Function does not have to be OPERABLE because the core is not producing sufficient power to challenge the DNB design basis.

d. Power Range Neutron Flux, P-9

The Power Range Neutron Flux, P-9 interlock is actuated at approximately 50% power as determined by two-out-of-four NIS power range detectors. The LCO requirement for this Function ensures that the Turbine Trip — Low Auto Stop Oil Pressure and Turbine Trip — Turbine Throttle Valve Closure reactor trips are enabled above the P-9 setpoint. Above the P-9 setpoint, a turbine trip will cause a load rejection beyond the capacity of the Steam Dump System in conjunction with the Auto Rod Control System. A reactor trip is automatically initiated on a turbine trip when it is above the P-9 setpoint, to minimize the transient on the reactor and the Reactor Coolant System Pressure Boundary components.

The LCO requires four channels of Power Range Neutron Flux, P-9 interlock to be OPERABLE in MODE 1.

(continued)

BASES

ACTIONS

M.1 and M.2 (continued)

- Undervoltage RCPs; and
- Underfrequency RCPs.

With one channel inoperable, the inoperable channel must be placed in the tripped condition within 72 hours. For RCP UV and RCP UF, both sensors associated with a given channel must be tripped (or, if applicable, bypassed) to satisfy the requirements of action M.1. Placing the channel in the tripped condition results in a partial trip condition requiring only one additional channel to initiate a reactor trip above the P-7 setpoint (above P-8 for Reactor Coolant Flow — Low (Single Loop)). These Functions do not have to be OPERABLE below the P-7 setpoint because the trip protection provided is no longer required. The 72 hours allowed to place the channel in the tripped condition is justified in Reference 11. An additional 6 hours is allowed to reduce THERMAL POWER to below P-7 if the inoperable channel cannot be restored to OPERABLE status or placed in trip within the specified Completion Time. The Reactor Coolant Flow — Low (Single Loop) reactor trip Function does not have to be OPERABLE below the P-8 setpoint; however, the Required Action must take the plant below the P-7 setpoint if an inoperable channel is not tripped within 72 hours due to shared components between this Function and the Reactor Coolant Flow — Low (Two Loops) trip function.

Allowance of this time interval takes into consideration the redundant capability provided by the remaining redundant OPERABLE channel, and the low probability of occurrence of an event during this period that may require the protection afforded by the Functions associated with Condition M.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 12 hours while performing routine surveillance testing of the other channels. The 12 hour time limit is justified in Reference 11.

N.1 and N.2

Not used.

(continued)

BASES

ACTIONS

N.1 and N.2 (continued)

Not used.

O.1 and O.2

Not used.

P.1 and P.2

Condition P applies to Turbine Trip on Low Auto Stop Oil Pressure. With one channel inoperable, the inoperable channel must be placed in

(continued)

BASES

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 also intended to verify the interlock prior to startup, if not performed in the previous 184 days.

The 18 month 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. The 184-day Frequency for RTS Interlock COT performance prior to startup is consistent with the uncertainty allowances for rack drift in the setpoint calculations (Ref. 7) and the COT (SR 3.3.1.7 and SR 3.3.1.8) Surveillance Frequencies for the associated trip functions. Performance of the RTS Interlock COTs in conjunction with periodic actuation logic tests (SR 3.3.1.5) provides assurance that the total interlock function is OPERABLE prior to reactor startup and power ascension.

SR 3.3.1.12

SR 3.3.1.12 is the performance of a TADOT of the Manual Reactor Trip 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 prior to exceeding P-9. This TADOT consists of verifying that each channel indicates a Turbine trip before Latching the turbine and indicates no turbine trip after the turbine is latched prior to exceeding the P-9 interlock whenever the unit has been in MODE 3. A Note states that this Surveillance is not required if it has been performed within the

(continued)