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SOUTHERN COMPANY
Energy to Serve Your World℠

August 16, 2005

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

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

Ladies and Gentlemen:

By letter dated March 8, 2005, Southern Nuclear Operating Company (SNC) requested a Technical Specification amendment to eliminate the Reactor Coolant Pump (RCP) Breaker Position Reactor Trip Function.

Per a conference call with SNC on July 7, 2005, the NRC initiated a request for additional information (RAI). The attached enclosure provides the NRC RAI questions and the SNC responses to those RAI questions.

As stated in the March 8, 2005 letter, SNC requests NRC approval of the proposed license amendment by March 11, 2006.

(Affirmation and signature provided on the following page.)

Mr. L. M. Stinson states he is a Vice President 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.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

L. M. Stinson

Sworn to and subscribed before me this 16 *day of* August*, 2005.*

Notary Public

My commission expires: NOTARY PUBLIC STATE OF ALABAMA AT LARGE
MY COMMISSION EXPIRES: June 10, 2008
BONDED THRU NOTARY PUBLIC UNDERWRITERS

LMS/jls/sdl

Enclosure: SNC Response to NRC Request for Additional Information

cc: Southern Nuclear Operating Company
Mr. J. T. Gasser, Executive Vice President
Mr. J. R. Johnson, General Manager – Plant Farley
RTYPE: CFA04.054; LC# 14317

U. S. Nuclear Regulatory Commission
Dr. W. D. Travers, Regional Administrator
Mr. R. E. Martin, NRR Project Manager – Farley
Mr. C. A. Patterson, Senior Resident Inspector – Farley

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Enclosure

SNC Response to NRC Request for Additional Information

NRC Question 1:

Provide a detailed evaluation of the proposed TS change relative to the requirements of 10 CFR 50.36 (2)(ii), Criterion 1 through 4.

SNC Response:

The proposed TS change to eliminate the Reactor Coolant Pump (RCP) Breaker Position Reactor Trip function is not affected by the requirements of 10 CFR 50.36(c)(2)(ii)(A)-(D), Criterion 1 through 4, which require a technical specification to be established for each item meeting one or more of the criteria of Criterion 1 through 4. This function does not meet any of the four criteria as outlined in the response for each criterion given below.

Criterion 1: Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.

SNC response regarding Criterion 1:

The RCP Breaker Position Reactor Trip 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.

Criterion 2: A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

SNC response regarding Criterion 2:

The RCP Breaker Position Reactor Trip is used as backup protection. This trip function is not an initial condition of a design basis accident or transient analysis.

Criterion 3: A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

SNC response regarding Criterion 3:

No credit is taken for the RCP Breaker Position Reactor Trip in the Farley Nuclear Plant (FNP) accident analysis. The RCP Breaker Position Reactor Trip 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.

Criterion 4: A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

SNC response regarding Criterion 4:

The RCP Breaker Position Reactor Trip is not relied upon as a signal to initiate a reactor trip for any events modeled in the scope of the 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.

NRC Question 2:

The current TS Bases B.3.3.1 at FNP indicates that Reactor Coolant Pump (RCP) breaker position trip function provides reactor protection against violation of DNB limit in a loss of Reactor Coolant System (RCS) flow event. This trip function will generate a reactor trip before the actuation of an RCS low flow trip following a loss of RCS flow event. Thus, this anticipatory trip will minimize the thermal transient (i.e.. RCS heatup) associated with a loss of RCS flow event. No credit was taken in the accident analyses for the function of these trips. Their functional capability enhances the overall reliability of the RPS. Please discuss the effect of the overall reliability of the RPS relative to the design of RPS at FNP after removing of the RCP breaker position trip function.

SNC Response:

No credit was taken in the accident analysis for the function of the RCP Breaker Position Reactor Trip. Reactor Protection System (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 backup RCP Breaker Position Reactor Trip will be replaced by the RCP Undervoltage (UV) Trip as backup for a partial loss of flow event.

Review of data for the last four years indicates RPS system reliability continues to improve and in the past five years there have been no reactor trips due to the 7300 Series Process Control System cards in the RCS low flow loop or the Solid State Protection System cards they feed. SNC continues to perform surveillances that demonstrate operability, as required by TS. The RPS is monitored under the Maintenance Rule Program per 10 CFR 50.65; thus, the overall reliability continues to be enhanced via monitoring and corrective actions.

NRC Question 3:

Describe the reliability of the RCS low flow trip function based on the data from operating history at FNP. Also, explain on how the modified design of the reactor protection system (RPS) at FNP satisfy the requirements of 10 CFR 50, Appendix A, GDC 21 with respect to protection system reliability and testability. Since the RCP breaker position trip function is designed to protect against a loss of RCS flow event from different electrical failure mode in comparison with that for the under-frequency and undervoltage trips, please discuss how the proposed change satisfy GDC 22 with respect to functional diversity or diversity in component design and principles of operation.

SNC Response:

1. 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 the backup trip for those same accidents, the two trips do not affect each other. The RCP Breaker Position Reactor Trip will be replaced by the RCP UV Trip. After modifications, for a "complete loss of forced reactor coolant flow accident," the RCP UV Trip or RCP Underfrequency (UF) Trip still remain as backup trips. For a "partial loss of forced reactor coolant flow accident," the RCP UV Trip will replace the RCP Breaker Position Reactor Trip as backup.

   Review of data for the last four years indicates RPS system reliability continues to improve and in the past five years there have been no reactor trips due to the 7300 Series Process Control System cards in the RCS low flow loop or the Solid State Protection System cards they feed. SNC continues to perform surveillances that demonstrate operability, as required by TS. The RPS is monitored under the Maintenance Rule Program per 10 CFR 50.65; thus, the overall reliability continues to be enhanced via monitoring and corrective actions.

2. The GDC 21 discusses the following:

   Reliability:

   1) Show that "no single failure results in loss of the protection function."
   2) Show that "removal from service of any component or channel does not result in loss of the required minimum redundancy unless the acceptable reliability of operation of the protection system can be otherwise demonstrated."

   Testability:

   1) Show that the protection system is "designed to permit periodic testing of its functioning when the reactor is in operation, including a capability to test channels independently to determine failures and losses of redundancy that may have occurred."

   The following discussion regarding the protection system high functional reliability and inservice testability conformance is provided in FSAR Section 3.1.17.

   "CRITERION 21 - PROTECTION SYSTEM RELIABILITY AND TESTABILITY

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

CONFORMANCE

The protection system is designed for the high functional reliability and inservice testability commensurate with the safety functions to be performed.

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 mode 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."

3. GDC 22 discusses the following:

   Diversity:

   1) Show that "Design techniques, such as functional diversity or diversity in component design and principles of operation, shall be used to the extent practical to prevent loss of the protective function."

Initially, the primary reactor trips for complete loss of flow (CLOF) events were RCP UV and RCP UF. Later, reactor coolant system low flow reactor trip became the primary reactor trip for complete loss of flow and the RCP UV and RCP UF were retained as anticipatory and not primary reactor trips.

The SNC submittal dated February 14, 1997 and the NRC SER dated April 29, 1998 (TAC NOS. M98120 and M98121) stated that the reactor trip on low primary coolant flow provided protection for partial and complete loss of forced reactor coolant flow events.

Functional diversity for CLOF events exists through trips associated with OTΔT, OPΔT, and high pressurizer pressure and for PLOF events through OTΔT and OPΔT trips. The OTΔT Trip, OPΔT Trip, and the High Pressurizer Pressure Trip are diverse; that is, they provide defense against common-mode failures which could affect multiple channels. Thus, Farley can justify elimination of the RCP Breaker Position Reactor Trip because diversity can still be demonstrated for all postulated events.

The following discussion regarding protection system diversity and common mode susceptibility is provided in FSAR Section 3.1.18.

"CRITERION 22 - PROTECTION SYSTEM INDEPENDENCE

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

CONFORMANCE

The protection system has been designed to perform its intended protective functions under the effects of accident conditions or postulated events.

The design features that limit the effects of natural phenomena such as tornado, flood, earthquake, and fire, are physical separation and electrical isolation of redundant channels and subsystems, functional diversity of subsystems, and safe component and subsystem failure modes. The redundant logic trains, reactor trip breakers, and safety features actuation devices are physically separated and electrically isolated. Physically separate channel cable trays, conduit, and penetrations are provided to ensure independence of redundant elements of each train. Functional diversity and location diversity are designed into the system. For example, the loss of one feedwater pump would actuate one pressure trip, one high-level trip, one low-level trip, two temperature trips, and one flow trip. The system logic is designed so that, with exception of the safety features actuation devices, a zero input represents a trip demand. Hence, severed or shorted channel wiring, loss of power, and the majority of channel component failures are seen by the system as trip demands.

The protection system is tested and qualified under extreme environmental conditions. These tests ensure that the equipment will perform the required functions under accident conditions.

Loss of the protection function through improper testing or failure of the test equipment is guarded against by interlocks that enable the test of only one of the two trains at the same time, bypass trip breakers to maintain the protection function during test, annunciation of the test mode, unambiguous tester readout, and the indication, alarm, and status systems.

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."