NUCLEAR ENERGY INSTITUTE

Anthony R. Pietrangelo
DIRECTOR
RISK & PERFORMANCE REGULATION
NUCLEAR GENERATION DIVISION

October 24, 2000

Dr. William D. Beckner, Branch Chief
Technical Specifications Branch
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: Forwarding of TSTF 368 Revision 0

PROJECT NUMBER: 689

Dear Dr. Beckner:

Enclosed is Technical Specification NUREGs NEI Technical Specification Task Force (TSTF) Traveler TSTF-368, Rev.0 "Incorporate CEOG Topical Report to Eliminate Pressure Sensor Time Response Testing". This proposed TS and Bases are consistent with those approved for the Westinghouse (TSTF-111) and Boiling Water Reactor (TSTF-332) ISTS NUREGs for elimination of time response testing.

Please contact me at (202) 739-8081 or Vince Gilbert at (202) 739-8138 if you have any questions or need to meet with industry experts on these recommended changes.

Sincerely,

Anthony R. Pietrangelo

Enclosure

c: Patricia Coates
Stewart L. Magruder, NRR/DRPM
Technical Specification Task Force

Industry/TSTF Standard Technical Specification Change Traveler

Incorporate CEOG Topical Report to Eliminate Pressure Sensor Response Time Testing

Classification: 3) Improve Specifications

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

Description:

CEOG Topical Report CE NPSD 1167, "Elimination of Pressure Sensor Response Time Testing Requirements" was submitted as a Final Report to the NRC in May, 2000. This report justifies the elimination of response time testing for RPS and ESFAS pressure sensors. To incorporate this change, the definition of RPS RESPONSE TIME and the definition of ESF RESPONSE TIME need to be revised to state that response time may be verified instead of measured for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC. The TS Bases for SR 3.3.1.14 (RPS Response Time-Digital), SR 3.3.5.4 ESFAS Response Time-Digital), SR 3.3.1.9 (RPS Response Time-Analog) and SR 3.3.4.5 (ESFAS Response Time-Analog) are revised to add a Reviewers Note and clarification regarding the provision to verify response times in lieu of measuring them. A reference of the CEOG Topical Report is also added to the TS Bases sections of the RPS and ESFAS specifications.

The proposed TS and Bases are consistent with those approved for the Westinghouse (TSTF-111) and Boiling Water Reactor (TSTF-332) ISTS NUREGs for elimination of response time testing.

Justification:

See attached justification.

Industry Contact:	Weber, Tom	(602) 393-5764	tweber01@apsc.com
NRC Contact:	Schulten, Carl	301-415-1192	css1@nrc.gov

Revision History

OG Revision 0 **Revision Status: Active** **Next Action: NRC**

Revision Proposed by: CEOG

Revision Description:
Initial Issue

Owners Group Review Information

Date Originated by OG: 31-Jul-00

Owners Group Comments
Distributed and reviewed by e-mail.

Owners Group Resolution: Approved Date: 15-Aug-00

TSTF Review Information

TSTF Received Date: 01-Sep-00 Date Distributed for Review 15-Oct-00

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

TSTF Comments:
(No Comments)

TSTF Resolution: Approved Date: 19-Oct-00

Traveler Rev. 2. Copyright (C) 1998, Excel Services Corporation. Use by Excel Services associates, utility clients, and the U.S. Nuclear Regulatory Commission is granted. All other use without written permission is prohibited.

OG Revision 0 **Revision Status: Active** **Next Action: NRC**

NRC Review Information

NRC Received Date: 25-Oct-00

NRC Comments:

(No Comments)

Final Resolution: NRC Action Pending Final Resolution Date:

Incorporation Into the NUREGs

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

NUREG Rev Incorporated:

Affected Technical Specifications

1.0	Definitions Change Description: Reactor Protective System (RPS) Response Time
1.0	Definitions Change Description: Engineered Safety Feature (ESF) Response Time
Ref. 3.3.1 Bases	RPS Instrumentation - Operating (Analog)
Ref. 3.3.1 Bases	RPS Instrumentation - Operating (Digital)
SR 3.3.1.9 Bases	RPS Instrumentation - Operating (Analog)
SR 3.3.1.14 Bases	RPS Instrumentation - Operating (Digital)
Ref. 3.3.4 Bases	ESFAS Instrumentation (Analog)
SR 3.3.4.5 Bases	ESFAS Instrumentation (Analog)
Ref. 3.3.5 Bases	ESFAS Instrumentation (Digital)
SR 3.3.5.4 Bases	ESFAS Instrumentation (Digital)

Traveler Rev. 2. Copyright (C) 1998, Excel Services Corporation. Use by Excel Services associates, utility clients, and the U.S. Nuclear Regulatory Commission is granted. All other use without written permission is prohibited.

Background

The requirement for periodic testing of reactor trip systems is established in Section 50.55a, "Codes and Standards," of 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities." Section 50.55a(h)(2), states that: "For nuclear power plants with construction permits issued after January 1, 1971, but before May 13, 1999, protection systems must meet the requirements stated in either IEEE Std. 279, "Criteria for Protection Systems for Nuclear Power Generating Stations," or in IEEE Std. 603-1991, "Criteria for Safety Systems for Nuclear Power Generating Stations," and the correction sheet dated January 30, 1995. For nuclear power plants with construction permits issued before January 1, 1971, protection systems must be consistent with their licensing basis or may meet the requirements of IEEE Std. 603-1991 and the correction sheet dated January 30, 1995." In addition, 10 CFR 50.36(c)(2)(ii)(A) requires a technical specification limiting condition for operation for "installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary." Section 50.36(c)(3), "Surveillance Requirements," also states that: "Surveillance requirements are requirements related to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within the safety limits, and that the limiting conditions of operation will be met." In 1975, the NRC implemented a program that made response time testing (RTT) a requirement of the TS.

In June 1999, the Combustion Engineering Owners Group (CEOG) under the auspices of ABB Combustion Engineering Nuclear Power Company issued Topical Report CE NPSD-1167, "Elimination of Pressure Sensor Response Time Testing Requirements." In CE NPSD-1167, the CEOG proposed eliminating the requirements for RTT of selected pressure sensors in the reactor protection system (RPS), the emergency core cooling system (ECCS), and the isolation actuation system (IAS). In August 1999, the CEOG submitted Revision 1 to CE NPSD-1167 to modify the pressure transmitter allocated response times from values that were based upon historical data collected at the plants to values that are based upon vendor data of expected response times of properly operating instruments. In May 2000, the CEOG submitted Revision 2 to CE NPSD-1167 to incorporate NRC and utility comments and to correct Appendix C calculated values for allocated response times that were based upon historical data, for those sensors where no vendor response time values are available. Appendix A to CE NPSD-1167, Revision 2 was modified and resubmitted by letter CEOG-00-171, dated June 6, 2000. CE NSPD-1167 was approved by the NRC by letter on July 24, 2000.

The request to eliminate RTT includes plant-specific information on five licensees with a total of 11 nuclear power plants:

- Entergy, Arkansas Nuclear One, Unit 2, and Waterford, Unit 3
- Arizona Public Service Company (APS), Palo Verde Units 1, 2 and 3
- Baltimore Gas & Electric (BGE), Calvert Cliffs Units 1 and 2
- Florida Power & Light (FPL), St. Lucie Units 1 and 2
- Southern California Edison (SCE), San Onofre Units 2 & 3

The following are the pressure sensors for which the CEOG has requested elimination of RTT:

- Rosemount Differential Pressure or Pressure Transmitters Model 1152 DP, HP, AP, and GP, range codes 3, 4, 5, 6, 7, 8, 9, and 0
- Rosemount 1153 Differential Pressure or Pressure Transmitters Models 1153 D, H, A, and G, range codes 3, 4, 5, 6, 7, 8, and 9
- Rosemount 1154 Differential Pressure or Pressure Transmitters Models DP, HP, and GP, range codes 4, 5, 6, 7, 8, 9, and 0
- Rosemount 1154H Differential Pressure or Pressure Transmitters Models D, H, and S, range codes 4, 5, 6, 7, 8, and 9
- Barton 763 and 763A Pressure Transmitter and 764 Differential Pressure Transmitter
- Foxboro Models N-E11DM, N-E13DM, and E13DM
- Weed Model N-E11GM

The systems in which these sensors are used and where the sensor would no longer be tested for response time, differ depending on the licensee concerned. In general, the request is being made for all RPS and engineered safety feature (ESF) systems in which the above listed sensors are used. The allocated response times to be used, in lieu of actual measured response times when determining that the overall system response time is within TS required limits, is either obtained from the sensor manufacturer or derived from plant data obtained from previous response time tests.

Need For Change

Current standard technical specifications (STS) require nuclear power plants to periodically perform RTT for instrument channels in the RPS, the ECCS, and the IAS. The intent of these tests is to ensure that changes in response time of instrumentation beyond the limits assumed in safety analyses are detected and, combined with instrument calibrations, to ensure that the instrumentation is operating correctly.

The basis for elimination of RTT is contained in IEEE 338-1977, Section 6.3.4, paragraph 3 (page 11), which states: "Response time testing of all safety-related equipment, per se, is not required if, in lieu of response time testing, the response time of the safety equipment is verified by functional testing, calibration checks or other tests, or both. This is acceptable if it can be demonstrated that changes in response time beyond acceptable limits are accompanied by changes in performance characteristics which are detectable during routine periodic tests." This IEEE standard was endorsed by Regulatory Guide 1.118, "Periodic Testing of Electric Power and Protection Systems."

In 1991, an Electric Power Research Institute (EPRI) Report, NP-7243, "Investigation of Response Time Testing Requirements," was issued. This report included a failure mode and effects analysis (FMEA) of certain sensors as well as an evaluation of response time test data. The report determined that for these sensors, any failure that will affect the response time characteristics of the sensors will also affect the calibration and other routine surveillances, and, therefore, a separate response time test is not required to demonstrate response time assumptions used in the Final Safety Analysis Report (FSAR).

Proposed Change

In CE NPSD-1167, the CEOG has requested elimination of RTT for sensors evaluated in EPRI Report NP-7243 and used by CE plants. The elimination of RTT will require a change to the TS to remove the requirement to perform RTT of sensors and systems specified in CE Topical Report NPSD-1167, Revision 2. Proposed changes to the CE Standard Technical Specifications (STS) were included in the topical report as Appendix A. This Generic Change presents the proposed changes to the ISTS to implement CE NPSD-1167.

Justification

The CEOG, in NPSD-1167, depended primarily on the analysis performed in EPRI Report NP-7243. In addition, the CEOG reviewed approximately 1400 sensor data points, and determined that no failures of response time had been detected. With one exception, the sensors for which the CEOG requested elimination of RTT were all subject to the FMEAs contained in the EPRI report, and, therefore, no further analysis was required. The one sensor that was not analyzed in EPRI NP-7243 was Barton Model 763A, used by APS in the Palo Verde units.

The EPRI report had concluded that RTT was not useful in the identification of transmitters that failed response time testing and that calibration and other periodic surveillances would detect transmitter response time failures. The FMEA showed that for the transmitters selected for RTT elimination, any component failure that would affect the response time characteristics would also affect the calibration or surveillance results.

The sensor models and the systems in which these sensors were used varied by plant and were discussed in detail in the Topical Report and in the Safety Evaluation.

Effect on Safety Analysis

The TS require that licensees demonstrate that protective functions will occur within the time required by the plant accident analysis. This protective function time requirement starts when the process variable, such as the pressure or the level exceeds the setpoint for that variable and continues until the protective function is accomplished. For example, this response could be when a required pump is turned on, moves up to speed, and delivers the required flow. Another example of a response could be when a valve is fully open or closed. The CEOG request only justifies the elimination of the sensor RTT but leaves intact the requirement to measure the response time of the rest of the system performing the protective function. Since the time required by the accident analysis is the summation of all response times of components within the protective function, some assumed value for the sensor response time value must be used in lieu of an actual measured value to determine the overall protective system response time, this assumed valued is that time allocated to the response of the sensor. These values are derived from two sources: either from the original equipment manufacturer or from a statistical analysis of the results of previous RTTs. If a statistical analysis is performed, it must be sufficiently conservative to ensure that the allocated response time assigned to the sensor will be valid for 95 percent of the population of sensors, with a 95 percent confidence level. Methodology for this determination is contained in NUREG-1475, "Applying Statistics," April 1994. The sensors for which the manufacturer provided response time values were Rosemount and Barton pressure and

differential pressure transmitters. The allocated response time values, as provided in Table 3.1 of NPSD-1167. The sensors for which no manufacturer response time values were available, the Weed and Foxboro sensors, will have allocated response time values based upon historic plant measured values.

This topical report only covers certain sensors when they are used in specific protective systems. If the licensee should at some time in the future replace the sensor discussed in NPSD-1167 with a new sensor of a different manufacturer or model not mentioned in the topical report or approved by the safety evaluation, the elimination of RTT for the new sensor has not been reviewed or approved, and, therefore, RTT for the new sensor must either be performed and the appropriate changes made to TS and plant procedures, or an additional request for RTT elimination must be submitted and approved. If, however, the replacement sensor is one for which RTT elimination has been approved, the licensee may modify the plant procedures, using an allocated response time based upon a vendor-supplied response time value, or upon historical data for that transmitter type and model. If historical data are used, an appropriate statistical methodology for determining the allocated response time can be found in NUREG- 1475, Table T-1 1 b, "One sided tolerance limit factor for a normal distribution."

The actual values for the assumed response time, while discussed in the SE, will not be contained in TS, but in licensee-controlled documents and procedures. These values can, therefore, be changed based upon physical modifications to the sensors, or additional historic data on actual measured response time values. If the change is due to physical modifications to the sensors, the licensees must also revisit the FMEA upon which the elimination of RTT was based to ensure that assumptions and determinations made in that FMEA are still valid for the modified sensor.

In some instances, the performance of RTT on the RPS and ESFAS functions measures the response time from the input of the sensor to the tripping of the associated relay. In these instances, the licensee must, therefore, revise its test procedures to delete the response time testing of the sensors and measure the remainder of the RPS and the ESFAS loops. The allocated response time will then be added to the measured response time for the remainder of the RPS or the ESFAS protection loop and will be verified to meet the assumptions of the safety analysis. This modification of plant procedures should be discussed in the plant-specific licensing action request submitted to eliminate RTT in accordance with CEOG NPSD-1167 and the SE.

EPRI Topical Report NP-7243, Rev. 01, is the report upon which the CEOG based its Topical Report NPSD-1167 for elimination of RTT. This EPRI topical report includes several recommendations for actions to ensure sensors are operating correctly and that calibration or other surveillance will provide an accurate indication that the dynamic characteristics of the instrument will be accurately reflected in a static calibration. The CEOG has included these recommendations in its topical report and has suggested that utilities wishing to eliminate sensor RTT should incorporate the recommended actions into their revised RTT program. The recommendations of EPRI NP-7243 are as follows:

1. Perform a hydraulic RTT prior to installation of a new transmitter/switch or following refurbishment of the transmitter/switch (e.g., sensor cell or variable damping

components) to determine an initial sensor-specific response time value. The power interrupt test is an alternate method to use on force-balance transmitters; the purpose of this test is to verify sensor response time is within the limits of the allocated value for the transmitter function.

2. For transmitters and switches that use capillary tubes, RTT should be performed after initial installation and after any maintenance or modification activity that could damage the capillary tubes.

3. Perform periodic drift monitoring on all Rosemount pressure and differential pressure transmitters, models 1151, 1152, 1153 and 1154. Guidance on drift monitoring can be found in EPRI NP-7121 and Rosemount Technical Bulletins. Drift monitoring intervals should be based on utility response to NRC Bulletin 90-01.

4. If variable damping is used, implement a method to ensure that the potentiometer is at the required setting and cannot be inadvertently changed. This approach should eliminate the need for RTT to detect a variable damping failure mode. Otherwise, RTT each transmitter by hydraulic or electronic white noise analysis methods, at a minimum, following each transmitter calibration.

Determination of No Significant Hazards Considerations

A change is proposed to the Improved Technical Specifications NUREG 1432 for Combustion Engineering plants, to allow the elimination of pressure sensor response time testing requirements as described in approved Topical Report CE NPSD-1167, "Elimination of Pressure Sensor Response Time Testing."

In accordance with the criteria set forth in 10 CFR 50.92, the Industry has evaluated these proposed Improved Technical Specification changes and determined they do not represent a significant hazards consideration. The following is provided in support of this conclusion.

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

The proposed change allows the elimination of pressure sensor response time testing. Response time testing is not an initiator of any accident previously evaluated. Consequently, the probability of an accident previously evaluated is not significantly increased. The allocated pressure sensor response times allowed in lieu of measurement have been determined to adequately represent the response time of the components such that the safety systems utilizing those components will continue to perform their accident mitigation function as assumed in the safety analysis. Therefore, the consequences of an accident previously evaluated are not significantly increased by this change. Therefore, this change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

The proposed change allows the elimination of pressure sensor response time testing. The proposed change does not involve a physical alteration of the plant (no new or different type of equipment will be installed) or a change in the methods governing normal plant operation. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

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

The proposed change allows the elimination of pressure sensor response time testing. The proposed change allows the use of allocated response times for certain pressure sensors in lieu of measurement of those response times. Evaluations have determined that allocated response times may be used with no reduction in the margin of safety provided by the safety systems supported by those pressure sensors. Therefore, this change does not involve a significant reduction in a margin of safety.

Insert Definition

In lieu of measurement, response time may be verified for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC.

Insert 1

---------- Reviewer's Note ----------
Applicable portions of the following TS Bases are applicable to plants adopting CEOG Topical Report CE NPSD-1167-A, "Elimination of Pressure Sensor Response Time Testing Requirements."

Response time may be verified by any series of sequential, overlapping or total channel measurements, including allocated sensor response time, such that the response time is verified. Allocations for sensor response times may be obtained from records of test results, vendor test data, or vendor engineering specifications. Topical Report CE NPSD-1167-A, "Elimination of Pressure Sensor Response time Testing Requirements," Ref. {10 - analog and digital 3.3.1, analog 3.3.4 / 11 - digital 3.3.5} provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for specific sensors identified in the Topical Report. Response time verification for other sensor types must be demonstrated by test. The allocation of sensor response times must be verified prior to placing a new component in operation and reverified after maintenance that may adversely affect the sensor response time.

Insert 2

CEOG Topical Report CE NPSD-1167-A, "Elimination of Pressure Sensor Response Time Testing Requirements."

1.1 Definitions

ENGINEERED SAFETY FEATURE (ESF) RESPONSE TIME (continued)	function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays, where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured.
Insert definition	
L_a	The maximum allowable containment leakage rate, L_a, shall be [0.25]% of containment air weight per day at the calculated peak containment pressure (P_a).
LEAKAGE	LEAKAGE shall be:

a. Identified LEAKAGE

1. LEAKAGE, such as that from pump seals or valve packing (except reactor coolant pump (RCP) seal water injection or leakoff), that is captured and conducted to collection systems or a sump or collecting tank;

2. LEAKAGE into the containment atmosphere from sources that are both specifically located and known either not to interfere with the operation of leakage detection systems or not to be pressure boundary LEAKAGE; or

3. Reactor Coolant System (RCS) LEAKAGE through a steam generator (SG) to the Secondary System.

b. Unidentified LEAKAGE

All LEAKAGE that is not identified LEAKAGE;

c. Pressure Boundary LEAKAGE

LEAKAGE (except SG LEAKAGE) through a nonisolable fault in an RCS component body, pipe wall, or vessel wall.

(continued)

1.1 Definitions (continued)

RATED THERMAL POWER (RTP)	RTP shall be a total reactor core heat transfer rate to the reactor coolant of [3410] MWt.
REACTOR PROTECTIVE SYSTEM (RPS) RESPONSE TIME	The RPS RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its RPS trip setpoint at the channel sensor until electrical power to the CEAs drive mechanism is interrupted. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured.

Insert definition

SHUTDOWN MARGIN (SDM)	SDM shall be the instantaneous amount of reactivity by which the reactor is subcritical or would be subcritical from its present condition assuming: a. All full length CEAs (shutdown and regulating) are fully inserted except for the single CEA of highest reactivity worth, which is assumed to be fully withdrawn. However, with all CEAs verified fully inserted by two independent means, it is not necessary to account for a stuck CEA in the SDM calculation. With any CEAs not capable of being fully inserted, the reactivity worth of these CEAs must be accounted for in the determination of SDM; b. In MODES 1 and 2, the fuel and moderator temperatures are changed to the [nominal zero power design level][; and] [c. There is no change in part length CEA position.]
STAGGERED TEST BASIS	A STAGGERED TEST BASIS shall consist of the testing of one of the systems, subsystems, channels, or other designated components during the interval specified by the Surveillance Frequency, so that all systems, subsystems, channels, or other designated components are tested during *n* Surveillance Frequency intervals, where *n* is the total number of systems, subsystems, channels, or other designated components in the associated function.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.9 (continued)

occurrences. Also, response times cannot be determined at power, since equipment operation is required. Testing may be performed in one measurement or in overlapping segments, with verification that all components are tested.

Insert 1

REFERENCES

1. 10 CFR 50, Appendix A, GDC 21.
2. 10 CFR 100.
3. IEEE Standard 279-1971, April 5, 1972.
4. FSAR, Chapter [14].
5. 10 CFR 50.49.
6. "Plant Protection System Selection of Trip Setpoint Values."
7. FSAR, Section [7.2].
8. NRC Safety Evaluation Report, [Date].
9. CEN-327, June 2, 1986, including Supplement 1, March 3, 1989.
10.

Insert 2

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.4.5 (continued)

state (e.g., pumps at rated discharge pressure, valves in full open or closed position). Response time testing acceptance criteria are included in Reference 3. The test may be performed in one measurement or in overlapping segments, with verification that all components are measured.

Insert 1

ESF RESPONSE TIME tests are conducted on a STAGGERED TEST BASIS of once every [18] months. This results in the interval between successive tests of a given channel of n x 18 months, where n is the number of channels in the Function. Surveillance of the final actuation devices, which make up the bulk of the response time, is included in the testing of each channel. Therefore, staggered testing results in response time verification of these devices every [18] months. The [18] month STAGGERED TEST BASIS Frequency is based upon plant operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

REFERENCES

1. FSAR, Section [7.3].
2. 10 CFR 50, Appendix A.
3. NRC Safety Evaluation Report, [Date].
4. IEEE Standard 279-1971.
5. FSAR, Chapter [14].
6. 10 CFR 50.49.
7. "Plant Protection System Selection of Trip Setpoint Values."
8. FSAR, Section [7.2].
9. CEN-327, June 2, 1986, including Supplement 1, March 3, 1989.
10.

Insert 2

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.13 (continued)

startup. The allowance to conduct this Surveillance within 92 days of startup is based on the reliability analysis presented in topical report CEN-327, "RPS/ESFAS Extended Test Interval Evaluation" (Ref. 9). Once the operating bypasses are removed, the bypasses must not fail in such a way that the associated trip Function gets inadvertently bypassed. This feature is verified by the trip Function CHANNEL FUNCTIONAL TEST, SR 3.3.1.7 or SR 3.3.1.9. Therefore, further testing of the bypass function after startup is unnecessary.

SR 3.3.1.14

This SR ensures that the RPS RESPONSE TIMES are verified to be less than or equal to the maximum values assumed in the safety analysis. Individual component response times are not modeled in the analyses. The analyses model the overall or total elapsed time, from the point at which the parameter exceeds the trip setpoint value at the sensor to the point at which the RTCBs open. Response times are conducted on an [18] month STAGGERED TEST BASIS. This results in the interval between successive surveillances of a given channel of n x 18 months, where n is the number of channels in the function. The Frequency of [18] months is based upon operating experience, which has shown that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences. Also, response times cannot be determined at power, since equipment operation is required. Testing may be performed in one measurement or in overlapping segments, with verification that all components are tested.

Insert 1

A Note is added to indicate that the neutron detectors are excluded from RPS RESPONSE TIME testing because they are passive devices with minimal drift and because of the difficulty of simulating a meaningful signal. Slow changes in detector sensitivity are compensated for by performing the daily calorimetric calibration (SR 3.3.1.4).

(continued)

BASES (continued)

REFERENCES

1. 10 CFR 50, Appendix A, GDC 21.
2. 10 CFR 100.
3. NRC Safety Evaluation Report.
4. IEEE Standard 279-1971, April 5, 1972.
5. FSAR, Chapter [14].
6. 10 CFR 50.49.
7. "Plant Protection System Selection of Trip Setpoint Values."
8. FSAR, Section [7.2].
9. CEN-327, June 2, 1986, including Supplement 1, March 3, 1989.
10. Insert 2

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.5.3 (continued)

The [18] month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power.

SR 3.3.5.4

This Surveillance ensures that the train actuation response times are within the maximum values assumed in the safety analyses.

Response time testing acceptance criteria are included in Reference 10.

Insert 1

ESF RESPONSE TIME tests are conducted on a STAGGERED TEST BASIS of once every [18] months. The [18] month Frequency is consistent with the typical industry refueling cycle and is based upon plant operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

SR 3.3.5.5

SR 3.3.5.5 is a CHANNEL FUNCTIONAL TEST similar to SR 3.3.5.2, except SR 3.3.5.5 is performed within 92 days prior to startup and is only applicable to bypass functions. Since the Pressurizer Pressure—Low bypass is identical for both the RPS and ESFAS, this is the same Surveillance performed for the RPS in SR 3.3.1.13.

The CHANNEL FUNCTIONAL TEST for proper operation of the bypass permissives is critical during plant heatups because the bypasses may be in place prior to entering MODE 3 but must be removed at the appropriate points during plant startup to enable the ESFAS Function. Consequently, just prior to startup is the appropriate time to verify bypass function OPERABILITY. Once the bypasses are removed, the bypasses must not fail in such a way that the associated ESFAS Function is inappropriately bypassed. This feature is verified by SR 3.3.5.2.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.5.5 (continued)

The allowance to conduct this test with 92 days of startup is based on the reliability analysis presented in topical report CEN-327, "RPS/ESFAS Extended Test Interval Evaluation" (Ref. 9).

REFERENCES

1. FSAR, Section [7.3].
2. 10 CFR 50, Appendix A.
3. NRC Safety Evaluation Report.
4. IEEE Standard 279-1971.
5. FSAR, Chapter [15].
6. 10 CFR 50.49.
7. "Plant Protection System Selection of Trip Setpoint Values."
8. FSAR, Section [7.2].
9. CEN-327, May 1986, including Supplement 1, March 1989.
10. Response Time Testing Acceptance Criteria.
11.

Insert 2