# Technical Specifications Task Force
# Improved Standard Technical Specifications Change Traveler

**Revise Response Time Testing Definition**

NUREGs Affected: ☐ 1430 ☑ 1431 ☑ 1432 ☐ 1433 ☐ 1434 ☐ 2194

Classification: 1) Technical Change

Recommended for CLIIP?: Yes

Correction or Improvement: Improvement

NRC Fee Status:

Changes Marked on ISTS Rev: 0.0

See attached.

## Revision History

### OG Revision 0 Revision Status: Active

Revision Proposed by: PWROG

Revision Description:
Original Issue

### Owners Group Review Information

Date Originated by OG: 30-Aug-17

Owners Group Comments
(No Comments)

Owners Group Resolution: Approved Date: 27-Sep-17

### TSTF Review Information

TSTF Received Date: 27-Sep-17 Date Distributed for Review 27-Sep-17

TSTF Comments:
(No Comments)

TSTF Resolution: Approved Date: 31-Oct-17

## Affected Technical Specifications

| | | |
|---|---|---|
| 1.1 | Definitions | NUREG(s)- 1431 Only |
| | Change Description: RTS Response Time | |
| 1.1 | Definitions | NUREG(s)- 1431 Only |
| | Change Description: ESF Response Time | |
| SR 3.3.1.16B Bases | RTS Instrumentation (With Setpoint Control Program) | NUREG(s)- 1431 Only |
| SR 3.3.1.16A Bases | RTS Instrumentation (Without Setpoint Control Program) | NUREG(s)- 1431 Only |
| SR 3.3.2.10B Bases | ESFAS Instrumentation (With Setpoint Control Program) | NUREG(s)- 1431 Only |

| | | |
|---|---|---|
| SR 3.3.2.10A Bases | ESFAS Instrumentation (Without Setpoint Control Program) | NUREG(s)- 1431 Only |
| 1.1 | Definitions<br>Change Description: RPS Response Time | NUREG(s)- 1432 Only |
| 1.1 | Definitions<br>Change Description: ESF Response Time | NUREG(s)- 1432 Only |
| SR 3.3.1.9B Bases | RPS Instrumentation - Operating (Analog) (With Setpoint Control Program) | NUREG(s)- 1432 Only |
| SR 3.3.1.9A Bases | RPS Instrumentation - Operating (Analog) (Without Setpoint Control Program) | NUREG(s)- 1432 Only |
| SR 3.3.1.14B | RPS Instrumentation - Operating (Digital) (With Setpoint Control Program) | NUREG(s)- 1432 Only |
| SR 3.3.1.14A | RPS Instrumentation - Operating (Digital) (Without Setpoint Control Program) | NUREG(s)- 1432 Only |
| SR 3.3.4.5B Bases | ESFAS Instrumenation (Analog) (With Setpoint Control Program) | NUREG(s)- 1432 Only |
| SR 3.3.4.5A Bases | ESFAS Instrumenation (Analog) (Without Setpoint Control Program) | NUREG(s)- 1432 Only |
| SR 3.3.5.4B Bases | ESFAS Instrumenation (Digital) (With Setpoint Control Program) | NUREG(s)- 1432 Only |
| SR 3.3.5.4A Bases | ESFAS Instrumenation (Digital) (Without Setpoint Control Program) | NUREG(s)- 1432 Only |

## 1. SUMMARY DESCRIPTION

NUREG-1431, "Standard Technical Specifications - Westinghouse Plants," and the NUREG-1432, "Standard Technical Specifications - Combustion Engineering Plants," contain definitions for Engineered Safety Feature (ESF) Response Time and Reactor Trip System (RTS) Response Time, and Engineering Safety Feature Actuation System (ESFAS) Response Time and Reactor Protection System (RPS) Response Time, respectively, that are referenced in Surveillance Requirements (SRs), hereafter referred to as Response Time Testing (RTT). These definitions allow the response times for specific NRC-approved components to be verified using an approved methodology in lieu of being measured. The proposed change revises the definitions to eliminate the requirement for prior NRC review and approval of the response time verification of each component, while retaining the requirement for the verification to be performed using an NRC-approved methodology. The proposed change will permit licensees to replace components and verify their response time using an NRC approved methodology, without obtaining prior NRC approval for each component.

## 2. DETAILED DESCRIPTION

### 2.1. System Design and Operation

The RTS and RPS initiate a unit shutdown, based on the values of selected unit parameters, to protect against violating the core fuel design limits and Reactor Coolant System (RCS) pressure boundary during anticipated operational occurrences (AOOs) and to assist the Engineered Safety Features (ESF) Systems in mitigating accidents. The ESF and ESFAS initiate necessary safety systems, based on the values of selected unit parameters, to protect against violating core design limits and the RCS pressure boundary, and to mitigate accidents.

Response Time Testing verifies that the individual channel or train actuation response times are less than or equal to the maximum values assumed in the accident analysis. The RTT acceptance criteria are under licensee control, typically in Technical Requirements Manual or equivalent document. Individual component response times are not modeled in the accident analyses. The analysis models the overall or total elapsed time, from the point at which the parameter exceeds the trip setpoint value at the sensor to the point at which the equipment reaches the required functional state (i.e., control and shutdown rods fully inserted in the reactor core).

The following subsections summarize the current NRC approved methodologies that can be used to evaluate components to determine if the component response time can be verified, in lieu of measured.

#### 2.1.1. Pressure Sensors

**Electric Power Research Institute (EPRI) Topical Report**

EPRI Report NP-7243, "Investigation of Response Time Testing Requirements," (Reference 1) evaluated the response time test data for various pressure sensors to determine whether RTT must be performed to justify those assumptions in Chapter 15 of the Final Safety Analysis Report (FSAR), which contains the safety analyses. The EPRI report reviewed a RTT database of greater than 4200 response time measurements that were provided by 39 nuclear power plants

representing over 2100 different pressure and differential pressure transmitters and switches. The measurement data was entered in a computer database designed to permit analyses of sensor types, RTT results, failure mechanisms, testing techniques, and failure trends. In addition to the evaluation of the measurement data collected, the EPRI report included the results of failure mode effects analysis (FMEA) performed for 17 different sensor types that were considered to represent the majority of pressure sensor instrumentation currently installed or expected to be installed in safety-related systems in U.S. plants.

With respect to the RTT database review, the EPRI report stated that, "No response time failures were found in the over 4200 measurements contained in the database." The EPRI report also found that; "The plant data indicated that several pressure transmitters had been replaced due to failure. However, all of these failures were detected by a channel check, surveillance testing, or other instrument calibration. Although response times may have been degraded by the failure, RTT was not a factor in identifying the failed transmitter."

The EPRI review of the RTT measurement database and results of the FMEAs performed for each pressure sensor demonstrated that the majority of pressure sensor component failure modes which can affect sensor response times will also affect the sensor output and therefore, would be detectable by other required surveillance tests.

The EPRI report also identified certain exceptions (i.e., pressure sensor failure modes that may not be detected by other surveillance tests) and provided specific recommendations to address these exceptions. The EPRI recommendations that addressed the identified failure mode exceptions were incorporated into the subsequent Westinghouse and Combustion Engineering (CE) Owner's Group (WOG and CEOG) Topical Reports (described below), as well as the associated NRC Safety Evaluation for those Topical Reports.

The EPRI report findings and FMEAs formed the bases for the subsequent Westinghouse and CE Owner's Group topical reports that provided the justification to verify, in lieu of measure, the response times for specific pressure sensors (i.e., the use of allocated response times). Note that the EPRI report and subsequent Westinghouse and CE Owner's Group topical reports only address pressure sensors and do not include any other type of sensor (i.e., temperature sensors are not included).

**WCAP-13632-P-A, "Elimination of Pressure Sensor Response Time Testing Requirements"**

The Westinghouse Owners Group (WOG) submitted Topical Report WCAP-13632-P, "Elimination of Pressure Sensor Response Time Testing Requirements" (Reference 2) for NRC review in August 1995, with NRC approval received in September 1995 (Reference 3). In their approval, the NRC stated: "...any sensor failure that significantly degrades sensor response time can be detected during the performance of other surveillance tests, principally calibration." The NRC further stated that, " ... the performance of periodic RTT for the selected pressure and differential pressure sensors identified in the topical report can be eliminated from Technical Specifications (TS) and that allocated sensor response times may be used to verify acceptable RTS and ESFAS channel response times."

By utilizing the FMEA results and the recommendations of the EPRI Report, WCAP-13632-P-A established the justification for eliminating periodic response time measurement for the 17 pressure and differential pressure sensor types that were evaluated in the EPRI report. In addition to the pressure and differential pressure transmitters identified in the EPRI Report, WCAP-13632-P-A identified and evaluated an additional 12 pressure sensor types that were installed in Westinghouse plants. WCAP-13632-P-A documented the justification for eliminating response time testing for these additional sensors (not addressed in the EPRI report) by showing similarity to those sensors included in the EPRI report or by additional FMEA and/or testing data. For the most part, similarity analyses were utilized to compare the design and the functionality of the principal components of each pressure and differential pressure unit, to those evaluated in the EPRI report. Where similarity could not be shown, a FMEA or additional testing data was used to demonstrate that response time would not be significantly affected by degradation of components or that such changes would be detectable by other calibration procedures.

WCAP-13632-P-A establishes the methodology for verifying the total instrument channel response time by using a combination of "allocated response times" for the specified pressure sensors and actual tests (in any series of sequential or overlapping measurements) for the remainder of the instrument channel. The "allocated response times" can be used in lieu of actual measured response times for those pressure sensors when performing the RTT surveillance.

WCAP-13632-P-A specifies that the "allocated response times" be determined as follows:

> The response time to be allocated in place of response times obtained through actual measurement during the period of verification may be obtained from: (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests), (2) inplace, onsite, or offsite (e.g. vendor) test measurements, or (3) utilizing vendor engineering specifications.

**CEOG NPSD-1167-A "Elimination of Pressure Sensor Response Time Testing Requirements"**

The CEOG submitted Topical Report NPSD-1167, "Elimination of Pressure Sensor Response Time Testing Requirements" (Reference 4) for NRC review in May 2000, with NRC approval received in December 2000 (Reference 5). In their approval, the NRC stated: "…response time testing is not required to demonstrate satisfactory sensor performance and that other routine surveillance, such as calibrations and drift monitoring, is sufficient to demonstrate satisfactory sensor performance…."

The CEOG report includes plant-specific information from five utilities and a total of eleven nuclear power plants and addresses seven different types of pressure sensors. The CEOG report 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 two exceptions, the sensors addressed in the CEOG report were all subject to the FMEAs contained in the EPRI report, and, therefore, no further analysis was required. The CEOG report addressed the exceptions by confirming that existing FMEAs

performed by EPRI were applicable to the two other sensor types. As such, the CEOG report utilized similarity evaluations (in the same manner as the Westinghouse Report) to confirm the applicability of the EPRI FMEAs to pressure sensors not specifically included in the EPRI report.

Similar to the Westinghouse report, the CEOG report establishes the use of "allocated response times" for the specified pressure sensors. Since the response time assumed in the safety analyses 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. In accordance with Section 3.1 of the NRC Safety Evaluation for the CEOG report, the allocated response times are obtained from two sources: either from the original equipment manufacturer specification or from a statistical analysis of the results of previous RTTs.

### 2.1.2. Electronic Signal Processing Hardware

**WCAP-14036-P-A "Elimination of Periodic Protection Channel Response Time Tests"**

The WOG submitted Topical Report WCAP-14036-P "Elimination of Periodic Protection Channel Response Time Tests" (Reference 6) for NRC review in January 1998 with NRC approval received in October 1998 (Reference 7). WCAP-14036-P-A provides the technical justification for deletion of periodic RTT of the electronic signal processing hardware between the primary sensor and the final actuated device. This signal processing hardware includes the process analog/digital rack, excore nuclear instrumentation system (NIS), and associated solid state and relay trip logic circuitry up to the slave relay output. Note that WCAP-14036-P-A does not include the individual channel sensors (e.g., pressure or temperature sensors) only the electronics/relays between the sensor and the final actuated device.

The justification for the elimination of periodic RTT for the electronics addressed by WCAP-14036-P-A is based on the FMEAs that either determined that individual component degradation had no response time impact or identified components that may contribute to trip system response time degradation. Where the potential response time impact was identified, testing was conducted to determine the magnitude of the response time degradation, or a bounding response time limit for the system or component was determined. As a result of the FMEA, the only components which were tested were the Westinghouse 7100 and 7300 Process Protection System circuit boards and modules. For the remainder of the hardware types (e.g., NIS, Eagle 21, Solid State Protection System (SSPS), and relay logic), bounding response time allocations were determined. In these cases, the bounding response time allocation is derived from design response time specifications for the component. The bounding response time is justified because of its small magnitude when compared to the total response time limit for the protection channel and because the simulated degradations were grossly exaggerated.

The NRC Safety Evaluation for WCAP-14036-P-A stated:

> Based on this information, the staff concurs that RTT is redundant to other periodic surveillance tests and that appropriate surveillance testing alternatives to RTT are in place per the existing requirements of plant specific TSs. The staff concludes that calibration and other TS surveillance testing requirements will adequately ensure that the response

time is verified for the components identified in WCAP-14036. The staff accepts the use of bounding response times as shown in Table 8-1, page 8-5 of WCAP-14036, when determining total channel response time and concludes that this method of response time verification provides assurance that the total channel response time is within safety analysis limits.

Thus, WCAP-14036-P-A established the method and guidance for the use of bounding response times for RTS and ESFAS channels, in lieu of actual response time measurements.

Note that the CEOG did not pursue a similar effort to eliminate RTS and ESFAS channel response time measurement, and this Topical Report only applies to Westinghouse plants.

## 2.2. Current Technical Specifications Requirements

TSTF-111-A, "Revise Bases for SRs 3.3.1.16 and 3.3.2.10 to Eliminate Pressure Sensor Response Time Testing," was submitted for NRC review in August 1996. This Traveler contained changes to NUREG-1431, "Standard Technical Specifications Westinghouse Plants," to implement the changes approved by the NRC in WCAP-13632-P-A and WCAP-14036-P-A (described above). TSTF-111-A revised the definitions of ESF Response Time and RTS Response Time in Section 1.1 of NUREG-1431. The definitions were revised to allow the use of the NRC approved methodologies in WCAP-13632-P-A and WCAP-14036-P-A. In addition, this Traveler revised the Technical Specifications (TS) Bases to discuss and reference the NRC approved methodologies in WCAP 13632-P-A and WCAP-14036-P-A. TSTF-111-A was incorporated into Revision 2 of NUREG-1432.

NUREG-1431, Section 1.1, "Definitions," states:

> ENGINEERED SAFETY FEATURE (ESF) RESPONSE TIME
>
> The ESF RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety 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. 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.
>
> REACTOR TRIP SYSTEM (RTS) RESPONSE TIME
>
> The RTS RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its RTS trip setpoint at the channel sensor until loss of stationary gripper coil voltage. 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. 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.

The following Surveillance Requirements invoke these definitions:

> SR 3.3.1.16, "RTS Instrumentation," states, "Verify RTS RESPONSE TIME is within limits."
>
> SR 3.3.2.10, "ESFAS Instrumentation," states, "Verify ESFAS RESPONSE TIMES are within limit."

TSTF-368-A, "Incorporate CEOG Topical Report to Eliminate Pressure Sensor Response Time Testing," was submitted to the NRC in October 2000. This Traveler revised NUREG-1432, "Standard Technical Specifications Combustion Engineering Plants," to incorporate the changes approved by the NRC in CEOG NPSD-1167-A (described above). TSTF-368-A revised the definitions of ESFAS Response Time and RPS Response Time in Section 1.1 of NUREG-1432. The definitions were revised to allow the use of the methodology approved in CEOG NPSD-1167-A. In addition, this Traveler revised the Technical Specifications (TS) Bases to discuss and reference the NRC approved methodology in in CEOG NPSD-1167-A. TSTF-368-A was incorporated into Revision 2 of NUREG-1431.

NUREG-1432, Section 1.1, "Definitions," states:

> ENGINEERED SAFETY FEATURE (ESF) RESPONSE TIME
>
> The ESF RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its ESF actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety 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. 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.
>
> REACTOR PROTECTION 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. 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.

The Combustion Engineering Standard Technical Specifications, NUREG-1432, contain separate Section 3.3, "Instrumentation," sections for plants with analog and digital instrumentation. The following Surveillance Requirements invoke these definitions:

> SR 3.3.1.9, "RPS Instrumentation - Operating (Analog)," states, "Verify RPS RESPONSE TIME is within limits."

SR 3.3.4.5, "ESFAS Instrumentation (Analog)," states, "Verify ESF RESPONSE TIME is within limits."

SR 3.3.1.14, "RPS Instrumentation - Operating (Digital)," states, "Verify RPS RESPONSE TIME is within limits."

SR 3.3.2.5, "RPS Instrumentation - Shutdown (Digital)," states, "Verify RPS RESPONSE TIME is within limits."

SR 3.3.5.4, "ESFAS Instrumentation (Digital)," states, "Verify ESF RESPONSE TIME is within limits."

The Standard Technical Specifications for Westinghouse and CE plants contain instrumentation specifications that are applicable to plants with and without a Setpoint Control Program (the "A" and "B" versions, respectively). Currently, no operating plants have a Setpoint Control Program.

## 2.3. Reason for the Proposed Change

Response time testing is resource intensive, which is why the WOG and CEOG pursued its elimination as discussed above. RTT is generally performed in discrete steps, with electronic signal conditioning and logic response time being one of the steps. Other components of the total protection system response time include the sensor and the final actuated device response times. The RTT of instrument channels that includes pressure sensors requires different procedures and techniques to be used for measuring the response time of the pressure sensor devices in those instrument channels. As such, pressure sensor RTT took additional time and effort and often involved the use of specialized contractor services. This prompted the industry efforts to develop alternatives to measuring the response time of certain components.

As components become obsolete, replacements must be installed for continued operation. The replacement components were not available and, therefore, were not included in the NRC-approved topical reports that justified the application of an alternative to measuring response time. The NUREG-1431 and NUREG-1432 RTT definitions require the prior review and approval of RTT elimination for individual components, and there is no topical report that addresses these components. Therefore, RTT of the replacement components is required, with the attendant resources.

## 2.4. Description of Proposed Change

The proposed change revises the following TS definitions in Section 1.1 of NUREG-1431 and NUREG 1432:

- Engineered Safety Feature (ESF) Response Time (NUREG-1431 and NUREG-1432),
- Reactor Trip System (RTS) Response Time (NUREG-1431), and
- Reactor Protection System (RPS) Response Time (NUREG-1432).

The definitions are revised to delete the reference to "components," being previously reviewed and approved by the NRC. The revised definitions (with changes indicated) for both NUREG-1431 and NUREG-1432 are:

NUREG-1431

Engineered Safety Feature (ESF) Response Time

The ESF RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety 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. In lieu of measurement, response time may be verified for selected components provided that the ~~components and~~ methodology for verification ~~have~~ has been previously reviewed and approved by the NRC.

Reactor Trip System (RTS) Response Time

The RTS RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its RTS trip setpoint at the channel sensor until loss of stationary gripper coil voltage. 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. In lieu of measurement, response time may be verified for selected components provided that the ~~components and~~ methodology for verification ~~have~~ has been previously reviewed and approved by the NRC.

NUREG-1432

Engineered Safety Feature (ESF) Response Time

The ESF RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its ESF actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety 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. In lieu of measurement, response time may be verified for selected components provided that the ~~components and~~ methodology for verification ~~have~~ has been previously reviewed and approved by the NRC.

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

The proposed change is supported by changes to the TS Bases. The response time SR Bases reference and discuss the NRC-approved methodologies in WCAP-13632-P-A and WCAP-14036-P-A for Westinghouse plants and NPSD-1167-A for CE plants. Similar to the response time testing definitions, the Bases state that components have been previously reviewed and approved by the NRC. The proposed change revises the Bases to be consistent with the proposed definition change. The regulation in Title 10 of the Code of Federal Regulations (10 CFR), Part 50.36, states: "A summary statement of the bases or reasons for such specifications, other than those covering administrative controls, shall also be included in the application, but shall not become part of the technical specifications." A licensee may make changes to the TS Bases without prior NRC staff review and approval in accordance with the Technical Specifications Bases Control Program. The proposed TS Bases changes are consistent with the proposed TS changes and provide the purpose for each requirement in the specification consistent with the Commission's Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors, dated July 2, 1993 (58 FR 39132).

A model application is included. The model may be used by licensees desiring to adopt the traveler following its approval.

**3. Technical Evaluation**

The proposed change will revise the definitions to permit licensees to apply the NRC approved methodologies to determine if response time verification can be implemented for a replacement component without prior NRC review and approval of the application of the methodology to the component. Implementation of the proposed change will eliminate the need to submit license amendment requests for approval of specific replacement components, which results in the most effective use of both licensee and NRC resources.

New or replacement components that are not identified in the NRC-approved topical reports would be evaluated on a case by case basis by applying the methodology in the NRC-approved topical reports. There must be an applicable methodology that is specific for each type of component that is being evaluated. WCAP-13632-P-A (for Westinghouse plants) and NPSD-1167-A (for CE plants) contain the methodology applicable to pressure sensors and establish the guidance for using allocated response times in place of measured RTT. These topical reports are only applicable to pressure sensors (i.e., other sensors such as temperature sensors are not included). WCAP-14036-P-A (only applicable to Westinghouse plants) contains the methodology that is applicable to the electronic signal processing hardware between the primary sensor and the final actuated device and establishes the guidance for using bounding response times in place of measuring response times. The methodology in WCAP-14036-P-A does not include individual channel sensors (e.g., pressure or temperature sensors), only the electronics and relays between the sensor and the final actuated device are included.

NRC prior approval of an RTT for each component is unnecessary as the 10 CFR 50.59 process is applied to any component change and that process evaluates the use of an approved NRC methodology. Prior NRC review and approval is required before a licensee may use a new or unapproved methodology.

### 3.1. Pressure Sensor RTT

EPRI Report NP-7243, "Investigation of Response Time Testing Requirements," (EPRI report) established the basis for evaluating pressure sensors used by WCAP-13632-P-A and NPSD-1167-A (i.e., the Owner's Group Topical Reports). The EPRI report documented the component level detail necessary to evaluate each pressure sensor and the resulting FMEAs performed for each pressure sensor evaluated. The FMEAs performed by EPRI demonstrated that failure modes associated with the analyzed pressure sensors (with a few exceptions) would not affect sensor response time independently of sensor output. Therefore, sensor failure modes that have the potential to affect sensor response time would be detected during the performance of other TS surveillance requirements. The EPRI report included specific recommendations to address the exceptions (i.e., failure modes that may not be detected by other TS surveillance requirements). The EPRI recommendations to address the identified failure mode exceptions were incorporated into the subsequent Owner's Group Topical Reports as well as the associated NRC Safety Evaluations for those Topical Reports.

The EPRI report provided the basis for implementing an alternative to actual RTT of the pressure sensors evaluated subject to the following recommendations:

- Perform hydraulic response time test prior to installation of new transmitter/switch or following refurbishment.

- 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.

- Perform periodic drift monitoring on all Rosemount pressure and differential pressure transmitters in accordance with Rosemount Technical Bulletins and NRC Bulletin 90-01 Supplement 1 (affects certain model numbers only).

- Assure that variable damping (if used) is at the required setting and cannot be changed or perform hydraulic or white noise response time testing of sensor, following each calibration.

The EPRI recommendations discussed above formed the basis for allowing response time verification in lieu of response time measurement for the pressure sensors that were evaluated. The recommendations are necessary to eliminate potential failures that could affect the response time and which may go undetected by other surveillance tests. As such, the EPRI recommendations (if applicable to the specific pressure sensor being evaluated) would continue to be required for implementation of response time verification, in lieu of the measurement of response times.

The Owner's Group Topical Reports utilized the FMEAs documented in the EPRI report to justify the use of an alternative to RTT (i.e., allocated response times) for the evaluated pressure sensors. However, based on the component level of detail and FMEAs documented in the EPRI report, the Owner's Group Topical Reports evaluated additional pressure sensors (i.e., sensors not included in the EPRI report). Specifically, WCAP-13632-P-A identified and evaluated an

additional 12 pressure sensors of various types used by Westinghouse plants. Section 5 of WCAP-13632-P-A documented the details of these additional evaluations. The additional 12 evaluations performed by Westinghouse provide a variety of examples demonstrating how the methodology may be applied in the future to justify the use of response time verification, in lieu of the measurement of response times.

The following discussions provide a broad overview of the methodology utilized by the Owner's Group Topical Reports to justify response time verification, as opposed to the measurement of response times for pressure sensors not previously evaluated by EPRI.

The Owner's Group Topical Reports utilized similarity analyses to compare the design and the functionality of the principal components of each additional pressure sensor to those evaluated in the EPRI report. For those sensors where similarity could not be shown, other techniques (i.e., FMEA or circuit testing) were utilized to justify the implementation of response time verification in lieu of the measurement. Where a new FMEA was required to evaluate a pressure sensor, the EPRI report provides the acceptable component level detail and guidance for performing the FMEA.

The Owner's Group Topical Reports and the EPRI report provide adequate guidance to perform the necessary similarity analysis or a FMEA in sufficient detail to evaluate a pressure sensor to determine whether or not an alternative to RTT (i.e., an allocated response time) is appropriate. The similarity analysis includes mechanical and/or electrical component evaluations, as appropriate, to determine the impact of any design differences on the response time and failure modes of the unit. A successful determination demonstrates that the failure modes associated with the pressure sensor being evaluated would not affect sensor response time independently of sensor output (as concluded in the EPRI report). Thus, in the same manner as the EPRI report, the successful similarity analysis demonstrates that any pressure sensor failures would be detected during the performance of other TS surveillance requirements. An unsuccessful evaluation would reveal failure mode(s) that could adversely affect response time and would not be detectable by other TS required surveillance tests. In this case, response time verification in lieu of measurement would not be appropriate. However, as discussed in the EPRI report and Owner's Group Topical Reports, specific recommendations may be applicable to eliminate the potential for failure modes that adversely affect response time and which may not be detected by other TS surveillance requirements. In that case, the use of response time verification in lieu of measurement would be acceptable.

The Owner's Group Topical Reports introduced the "allocated" response time as the alternative to response time measurement of the pressure sensors. The total RTS/RPS or ESF instrumentation channel response time is verified by summing the allocated sensor response time with the response time of the remainder of the channel. In addition, the Owner's Group Topical Reports also provide sufficient guidance to determine the appropriate allocated response time to use in lieu of the measurement for a pressure sensor. In accordance with the Owner's Group Topical Reports, the allocated response times for pressure sensors are obtained from:

- Historical records based on acceptable RTT (hydraulic, noise, or power interrupt tests),
- Inplace, onsite, or offsite (e.g., vendor) test measurements,

- Utilizing vendor engineering specifications, or
- Statistical analysis of the results of previous RTTs.

Thus, the Owner's Group Topical Reports provide sufficient guidance for evaluating new or different pressure sensors to determine whether response time verification in lieu of measurement is appropriate. If it is determined that response time verification in lieu of measurement is applicable to a pressure sensor, the Owner's Group Topical Reports also provide the guidance necessary to assign the appropriate allocated response time to that sensor.

### 3.2. Electronic Signal Processing Hardware RTT

WCAP-14036-P-A "Elimination of Periodic Protection Channel Response Time Tests," provides the technical justification for elimination of periodic RTT of the electronic signal processing hardware between the primary sensor and the final actuated device. This signal processing hardware includes the process analog/digital rack, excore nuclear instrumentation system (NIS), and associated solid state and relay trip logic circuitry up to the slave relay output. Note that WCAP-14036-P-A does not include the individual channel sensors (e.g., pressure or temperature sensors), only the electronics between the sensor and the final actuated device.

Although the requirement to perform RTT is eliminated for the affected components, the requirement to determine the total response time for an instrument channel remains in accordance with the TS. As such, WCAP-14036-P-A establishes the use of bounding response times when determining the total channel response time. The bounding response time for the affected channel is added to the response time of the remainder of the channel to verify the TS limits for response time continue to be met. This alternative method of response time verification provides assurance that the total channel response time remains within the response times assumed in the safety analysis.

There are currently two examples where the methodology contained in WCAP-14036-P-A was applied to new and different electronic components and approved by the NRC. WCAP-15413-A, "Westinghouse 7300A ASIC-Based Replacement Module Licensing Summary Report," (Reference 8) and WCAP-17867-P-A, "Westinghouse SSPS Board Replacement Licensing Summary Report," (Reference 9) utilize the methodology contained within WCAP-14036-P-A. The implementation of the WCAP-14036-P-A methodology in these subsequent Westinghouse Topical Reports provide examples of how the methodology may be applied to future electronic components intended for replacement parts. The following subsections summarize how the WCAP-14036-P-A methodology was utilized.

#### 3.2.1. WCAP-15413-A, "Westinghouse 7300A ASIC-Based Replacement Module Licensing Summary Report"

The WOG submitted WCAP-15413-A to the NRC for review and approval in June of 2000 in order to implement Application Specific Integrated Circuit (ASIC) Based Replacement Modules (ABRMs) in the 7300 Process Protection and Control System via 10 CFR 50.59 at individual plant sites. The NRC approved WCAP-15413-A in February 2001 (Reference 10). The ABRMs are designed as a card-for-card replacement module intended to be treated as a spare part for

specific 7300 analog cards in operating plants. ASIC technology is a state-of-the art technology that addresses the issues encountered by vintage instrumentation and control equipment life cycle management programs. In a Westinghouse supplied 7300 Process Protection System or Process Control System, the ASIC technology can be implemented as a card-for-card replacement.

WCAP-14036-P-A "Elimination of Periodic Protection Channel Response Time Tests," included the Westinghouse 7300 System of analog process protection equipment and justified the elimination of RTT for this equipment. WCAP-14036-P-A established the use of bounding response times in lieu of measured response time. The bounding response times continue to provide assurance the system actuations are within the response times assumed in the safety analyses. As the ABRM module was designed to be a direct replacement for the 7300 System analog cards included in WCAP-14036-P-A, WCAP-15413-A provided justification to maintain the elimination of response time testing when an analog card is replaced with the equivalent ABRM. Section 9.0 of WCAP-15413-A contains the details of the evaluation performed to justify the replacement of RTT with bounding response times for the ABRMs. The following discussion provides an overview of the evaluation performed in WCAP-15413.

WCAP-15413-A utilized the same methodology as used in WCAP-14036-P-A to analyze the ABRMs. The FMEA circuit analysis determined which components were critical to response time. In lieu of testing, due to the less complex ABRM, the analysis considered catastrophic component failure and degraded component performance to determine a bounding response time for the ABRMs. This response time bounds the limit to which response time can be increased by degraded or failed components without that degradation or failure affecting calibration and therefore, being detected by other TS surveillance requirements. The FMEAs performed for the ABRMs accomplished the following:

- Identified response time sensitive components on the Main Board and Personality Modules via circuit analysis;
- Evaluated the impact on response time if a component fails or degrades;
- Identified detectability of degraded components via calibration; and
- Identified components that impact calibration but not response time.

Based on the results of the FMEAs with degraded components, WCAP-15413-A established the justification for eliminating the periodic RTT of process protection channels using ABRM modules as direct replacements for the Westinghouse 7300 Process Protection System analog cards. Similar to the results of WCAP-14036-P-A, the FMEAs demonstrated that component degradation will not increase the response time beyond the bounding response time without that degradation being detectable by other periodic surveillance tests, such as channel checks, functional tests and/or calibrations. In place of periodic tests, generic bounding response times were developed for ABRM modules for use in the determination of total response time for the RTS and ESF instrument functions (consistent with the methodology of WCAP-14036-P-A) and as required by TS. Bounding response time allocations for the different ABRMs were provided in Table 9-1 of WCAP-15413-A to be used to verify plant specific response times remain within the required limits for protection system functions when ABRM(s) are installed.

The NRC Safety Evaluation for the elimination of RTT for the ABRMs in WCAP-15413-A stated, in part, that:

> Based on its review of the information presented in the Section 9 of WCAP-15413, the staff agrees that significant degradation of instrumentation response times can be detected during the performance of calibrations and other currently required surveillance tests. The staff also finds that the bounding response times determined by the FMEA and listed in Table 9-1 of WCAP-15413 are acceptable. Therefore, the staff concludes that, for a plant that has already eliminated RTT in accordance with WCAP-14036-P-A, Revision 1, the existing TS surveillance requirements would provide reasonable assurance that the safety functions of the plant's instrumentation will be satisfied without the need for periodic RTT.

As such, WCAP-15413-A provides an example of how new or different electronic components would be evaluated. In addition, WCAP-15413-A provides an example for how the bounding response times would be determined consistent with WCAP-14036-P-A.

### 3.2.2. WCAP-17867-P-A, "Westinghouse SSPS Board Replacement Licensing Summary Report"

The WOG submitted WCAP-17867-P-A, Revision 0, to the NRC for review and approval in February of 2014. The NRC approved of WCAP-17867-P-A, Revision 1 in September 2014 (Reference 11). WCAP-17687-P-A provided the documentation associated with the new designed SSPS boards which use configured logic devices (Complex Programmable Logic Device (CPLD)). The new design SSPS boards are replacement components for the original design SSPS boards in operating plants that can be installed by documenting a 10 CFR 50.59 review.

WCAP-17687-P-A documents the design process, design details, analyses, manufacturing controls, and verification process with results to provide a comprehensive summary of evidence concluding that the installation of the new design SSPS circuit boards maintain or improve upon the existing reliability and functional requirements for the SSPS, and does not introduce any unanalyzed failures and that it eliminates the concern for introduction of software common cause failures that would compromise SSPS equipment operations. As part of the comprehensive documentation of the redesigned SSPS boards, WCAP-17687-P-A evaluated the new design SSPS boards to ensure the response time of the SSPS remains acceptable and is within the system time response analysis for that justified the elimination of RTT in WCAP-14036-P-A.

Section 10 of WCAP-17687-P-A contains a description of the evaluation performed to confirm the CPLD replacement boards have time responses that are within the bounding times allowed for RTT elimination as discussed and approved in WCAP-14036-P-A. The following discussion provides an overview of the evaluations described in Section 10 of WCAP-17687-P-A.

The operation of the SSPS for both the RTS and ESF instrumentation was evaluated including the credible failures for the new designed boards. Using the same analysis as the original WCAP-14036-P-A, it was determined the new designed boards were within the original bounding times for an actuation function. Further evaluations were performed where multiple

new designed boards were connected in series for the worst-case time response (longest possible series of boards). Even if all the boards in series failed to the worst-case response time, the total response time would still only be a small fraction of the bounding response time assumed in WCAP-14036-P-A. As such, WCAP-17687-P-A concluded that the response time of the system following installation of the new design boards is acceptable and falls within the system time response analysis for RTT elimination in WCAP-14036-P-A.

In the Safety Evaluation for WCAP-17687-P-A, the NRC stated:

> The NRC staff finds that there is sufficient information in the TR to adequately demonstrate that the performance of the new design boards have time responses that are within the bounding times allowed for in the time response testing elimination analysis in a manner that is consistent with the NRC staff's evaluation in its approval for use of WCAP-14036-P-A, Revision 1, assuming that only new design boards are being used to accomplish reactor trip or ESFAS actuation functions. The NRC staff also notes that some licensees may elect to use an appropriate combination of new design ULB, UVD, and SGD boards in conjunction with original design SSPS boards. The new design boards have been found to require a few microseconds greater response time than their original design SSPS counterparts, and still be capable of functioning within the bounding response times described within WCAP-14036-P-A, Revision 1. The NRC staff finds the performance of the new design boards in conjunction with original design SSPS boards accomplishing the same reactor trip or ESFAS actuation function would also have time responses that are within the bounding times allowed for in the time response testing elimination analysis in a manner that is consistent with the NRC staff's evaluation in its approval for use of WCAP-14036-P-A, Revision 1.

Thus, WCAP-17687-P-A provides another example of how new or different electronic components may be evaluated and bounding response times determined consistent with WCAP-14036-P-A.

### 3.3. Surveillance Frequency Control Program

Although not directly related to the elimination of RTT, a question was raised regarding how the extension of Surveillance Frequencies in accordance with the Surveillance Frequency Control Program (SFCP) may affect the elimination of RTT. When RTT is eliminated, other TS surveillance testing is relied on to detect component failures.

TSTF-425, Revision 3, "Relocate Surveillance Frequencies to Licensee Control - RITSTF Initiative 5b," added the SFCP as an Administrative Control program in Section 5 of the Standard Technical Specifications. TSTF-425, Revision 3, was approved by the NRC on July 6, 2009.

The SFCP states:

> Surveillance Frequency Control Program
>
> This program provides controls for Surveillance Frequencies. The program shall ensure that Surveillance Requirements specified in the Technical Specifications are performed at intervals sufficient to assure the associated Limiting Conditions for Operation are met.
>
> a. The Surveillance Frequency Control Program shall contain a list of Frequencies of those Surveillance Requirements for which the Frequency is controlled by the program.
>
> b. Changes to the Frequencies listed in the Surveillance Frequency Control Program shall be made in accordance with NEI 04-10, "Risk-Informed Method for Control of Surveillance Frequencies," Revision 1.
>
> c. The provisions of Surveillance Requirements 3.0.2 and 3.0.3 are applicable to the Frequencies established in the Surveillance Frequency Control Program.

Item b. of the program requires that changes to Frequencies be made in accordance with NEI 04-10, "Risk-Informed Method for Control of Surveillance Frequencies," Revision 1 (Reference 12). NEI 04-10 was submitted to the NRC for approval in April 2007 and approved in September 2007 (Reference 13). The method contained in NEI 04-10 is consistent with Regulatory Guide (RG) 1.174, "An Approach for Using Probabilistic Risk Assessments in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," (Reference 14) and RG 1.177, "An Approach for Plant-Specific Risk-Informed Decisionmaking: Technical Specifications," (Reference 15).

With respect to the control of Surveillance Frequency changes, NEI 04-10 States:

> The SFCP shall ensure that Surveillance Requirements specified in the Technical Specifications are performed at intervals sufficient to assure the associated Limiting Conditions for Operation (LCOs) are met. Existing regulatory programs, such as 10 CFR 50.65 (Ref. 2; the Maintenance Rule) and the corrective action program required by 10 CFR 50, Appendix B (Ref. 3), require monitoring of Surveillance test failures and require action be taken to address such failures. One of these actions may be to consider changing the Frequency at which a Surveillance is performed. These regulatory requirements are sufficient to ensure that Surveillance Frequencies which are insufficient to assure the LCO is met are identified and action taken. In addition, the SFCP requires monitoring of Surveillance Frequencies that are changed using the process described in this document.

In addition, the NRC Safety Evaluation for NEI 04-10 stated:

> NEI 04-10, Revision 1, requires performance monitoring of SSCs whose surveillance frequency has been revised as part of a feedback process to assure that the change in test frequency has not resulted in degradation of equipment performance and operational safety. The monitoring and feedback includes consideration of Maintenance Rule

monitoring of equipment performance. In the event of degradation of SSC performance, the surveillance frequency is reassessed in accordance with the methodology, in addition to any corrective actions which may apply as part of the Maintenance Rule requirements. The performance monitoring and feedback specified in NEI 04-10, Revision 1, is sufficient to reasonably assure acceptable SSC performance and is consistent with Regulatory Position 3.2 of RG 1.177. Thus, the fifth key safety principle of RG 1.177 is satisfied.

Therefore, the SFCP, as implemented by NEI 04-10, and the regulations (discussed above) provide adequate assurance that any changes to Surveillance Frequencies are monitored and controlled such that the affected plant components are maintained operable in accordance with the TS.

## 4. Regulatory Evaluation

### 4.1. Applicable Regulatory Requirements/Criteria

Regulatory Guide 1.118, "Periodic Testing of Electric Power and Protection Systems," describes a method acceptable to the NRC staff for complying with the NRC's regulations with respect to the periodic testing of the electric power and protection systems. This RG endorses the use of IEEE Std. 338-1987, "Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems." The standard provides design and operational criteria for the performance of periodic testing as part of the surveillance program of nuclear power plant safety systems. The periodic testing consists of functional tests and checks, calibration verification, and time response measurements, as required, to verify that the safety system performs to meet its defined safety functions. Clause 6.3.4 of IEEE 338-1987 states response time testing shall be required only on safely systems or subsystems to verify that the response times are within the limits given in the Safety Analysis Report including Technical Specifications. Response time testing of all safety-related equipment is not required if, in lieu of response time testing, the response time of safety system 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 that are detectable during routine periodic tests.

The proposed change will allow certain replacement components to be evaluated to determine whether response time verification can be implemented, in lieu of the measurement of response times. This is consistent with Clause 6.3.4 of IEEE 338-1987 (discussed above), in that the evaluation would confirm whether or not it can be demonstrated that changes in response time beyond acceptable limits are accompanied by changes in performance characteristics that are detectable during other routine periodic tests. The replacement components will continue to perform the same function as the original equipment. As such, the system operation, design basis, and capability for testing will remain unchanged.

Section IV, "The Commission Policy," of the "Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors" (58 Federal Register 39132), dated July 22, 1993, states in part:

> The purpose of Technical Specifications is to impose those conditions or limitations upon reactor operation necessary to obviate the possibility of an abnormal situation or event giving rise to an immediate threat to the public health and safety by identifying those features that are of controlling importance to safety and establishing on them certain conditions of operation which cannot be changed without prior Commission approval.
>
> …[T]he Commission will also entertain requests to adopt portions of the improved STS [(e.g., TSTF-569)], even if the licensee does not adopt all STS improvements.
>
> …The Commission encourages all licensees who submit Technical Specification related submittals based on this Policy Statement to emphasize human factors principles.
>
> …In accordance with this Policy Statement, improved STS have been developed and will be maintained for each NSSS Owners Group. The Commission encourages licensees to use the improved STS as the basis for plant-specific Technical Specifications.
>
> …[I]t is the Commission intent that the wording and Bases of the improved STS be used … to the extent practicable.

As described in the Commission's "Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors," recommendations were made by NRC and industry task groups for new STS that include greater emphasis on human factors principles in order to add clarity and understanding to the text of the STS, and provide improvements to the Bases of STS, which provides the purpose for each requirement in the specification. Improved vendor-specific STS were developed and issued by the NRC in September 1992.

Additionally, 10 CFR 50.36(b) requires:

> Each license authorizing operation of a … utilization facility … will include technical specifications. The technical specifications will be derived from the analyses and evaluation included in the safety analysis report, and amendments thereto, submitted pursuant to [10 CFR] 50.34 ["Contents of applications; technical information"]. The Commission may include such additional technical specifications as the Commission finds appropriate.

The categories of items required to be in the TSs are provided in 10 CFR 50.36(c). As required by 10 CFR 50.36(c)(2)(i), the TSs will include LCOs, which are the lowest functional capability or performance levels of equipment required for safe operation of the facility. Per 10 CFR 50.36(c)(2)(i), when an LCO of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TSs until the condition can be met.

Per 10 CFR 50.90, whenever a holder of a license desires to amend the license, application for an amendment must be filed with the Commission, fully describing the changes desired, and following as far as applicable, the form prescribed for original applications.

Per 10 CFR 50.92(a), in determining whether an amendment to a license will be issued to the applicant, the Commission will be guided by the considerations which govern the issuance of initial licenses to the extent applicable and appropriate.

The NRC staff's guidance for the review of TSs is in Chapter 16, "Technical Specifications," of NUREG-0800, Revision 3, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" (SRP), dated March 2010 (ADAMS Accession No. ML100351425). As described therein, as part of the regulatory standardization effort, the NRC staff has prepared STS for each of the light-water reactor nuclear designs.

### 4.2. Conclusions

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

## 5. REFERENCES

1. EPRI Report NP-7243, Revision 1, "Investigation of Response Time Testing Requirements," May 1991.
2. WCAP-13632-P-A, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," January 1996.
3. NRC Letter (Bruce A. Boger - NRC to Roger A. Newton - WOG) "Review of Westinghouse Electric Corporation Topical Report WCAP-13632, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements, Dated August 1995- Westinghouse Owners Group Program MUHP-3040, Revision 1," September 5, 1995.
4. CEOG NPSD-1167-A, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," January 2001.
5. NRC Letter (Stuart A. Richards – NRC to Richard Bernier – CEOG), "Correction of Safety Evaluation for Combustion Engineering Owners Group Topical Report CE NPSD-1167, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," May 2000 (TAC NO. MA6010)," December 5, 2000.
6. WCAP-14036-P-A, Revision 1, "Elimination of Periodic Protection Channel Response Time Tests," October 1998.
7. NRC Letter (Thomas H. Essig – NRC to Lou Liberatori – WOG), "Safety Evaluation Related to Topical Report WCAP-14036, Revision 1, "Elimination of Periodic Protection Channel Response Time Tests" (TAC No. MA0863)," October 6, 1998.
8. WCAP-15413-A, Revision 0, "Westinghouse 7300A ASIC-Based Replacement Module Licensing Summary Report," March 2001.
9. WCAP-17867-P-A, Revision 1, "Westinghouse SSPS Board Replacement Licensing Summary Report," October 2014.
10. NRC Letter (Stuart A. Richards – NRC to Michael G. Edison – WOG) "Review of Westinghouse Topical Report WCAP-15413, "Westinghouse 7300A ASIC-Based

Replacement Module Licensing Summary Report (TAC No. M96513)," February 8, 2001.

11. NRC Letter (Aby S. Mohseni – NRC to W. Anthony Nowinowski – PWROG) "Final Safety Evaluation for Pressurized Water Reactor Owners Group Topical Report WCAP-17867-P, Revision 1, "Westinghouse SSPS Board Replacement Licensing Summary Report" (TAC No. MF4655)," September 19, 2014.
12. NEI 04-10, Revision 1 "Risk-Informed Method for Control of Surveillance Frequencies," April 2007.
13. NRC Letter (Ho K. Nieh – NRC to Biff Bradley – NEI) "Final Safety Evaluation for Nuclear Energy Institute (NEI) Topical Report (TR) 04-10, Revision 1, "Risk-Informed Technical Specification Initiative 5b, "Risk-Informed Method for Control of Surveillance Frequencies" (TAC No. MD6111)," September 19, 2007.
14. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," August 1998.
15. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," August 1998.

**MODEL APPLICATION**

[DATE] 10 CFR 50.90

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

SUBJECT: PLANT NAME
DOCKET NO. 50-[xxx]
APPLICATION TO REVISE TECHNICAL SPECIFICATIONS TO ADOPT TSTF-569, "REVISION OF RESPONSE TIME TESTING DEFINITIONS"

Pursuant to 10 CFR 50.90, [LICENSEE] is submitting a request for an amendment to the Technical Specifications (TS) for [PLANT NAME, UNIT NOS.].

[LICENSEE] requests adoption of TSTF-569, "Revise Response Time Testing Definition," which is an approved change to the Improved Standard Technical Specifications (ISTS), into the [PLANT NAME, UNIT NOS] Technical Specifications (TS). The proposed amendment revises the TS Definitions for Engineered Safety Feature (ESF) Response Time and [Reactor Trip System (RTS) Response Time (for Westinghouse plants) or Reactor Protection System (RPS) Response Time (for CE plants)].

The enclosure provides a description and assessment of the proposed changes. Attachment 1 provides the existing TS pages marked to show the proposed changes. Attachment 2 provides revised (clean) TS pages. Attachment 3 provides existing TS Bases pages marked to show the proposed changes for information only.

Approval of the proposed amendment is requested by [date]. Once approved, the amendment shall be implemented within [ ] days.

This letter contains no regulatory commitments

In accordance with 10 CFR 50.91, a copy of this application, with attachments, is being provided to the designated [STATE] Official.

[In accordance with 10 CFR 50.30(b), a license amendment request must be executed in a signed original under oath or affirmation. This can be accomplished by attaching a notarized affidavit confirming the signature authority of the signatory, or by including the following statement in the cover letter: "I declare under penalty of perjury that the foregoing is true and correct. Executed on (date)." The alternative statement is pursuant to 28 USC 1746. It does not require notarization.]

If you should have any questions regarding this submittal, please contact [NAME, TELEPHONE NUMBER].

Sincerely,

[Name, Title]

Enclosure Description and Assessment

Attachments:
1. Proposed Technical Specification Changes (Mark-Up)
2. Revised Technical Specification Pages
3. Proposed Technical Specification Bases Changes (Mark-Up)

{Attachments 1, 2, and 3 are not included in the model application and are to be provided by the licensee.}

cc: NRC Project Manager
NRC Regional Office
NRC Resident Inspector
State Contact

ENCLOSURE

DESCRIPTION AND ASSESSMENT

## 1.0 DESCRIPTION

[LICENSEE] requests adoption of TSTF-569, "Revise Response Time Testing Definition," which is an approved change to the Improved Standard Technical Specifications (ISTS), into the [PLANT NAME, UNIT NOS] Technical Specifications (TS). The proposed amendment revises the TS Definitions for Engineered Safety Feature (ESF) Response Time and [Reactor Trip System (RTS) Response Time (for Westinghouse plants) or Reactor Protection System (RPS) Response Time (for CE plants)].

## 2.0 ASSESSEMENT

### 2.1 Applicability of Safety Evaluation

[LICENSEE] has reviewed the safety evaluation for TSTF-569 provided to the Technical Specifications Task Force in a letter dated [DATE]. This review included a review of the NRC staff's evaluation, as well as the information provided in TSTF-569. [As described herein,] [LICENSEE] has concluded that the justifications presented in TSTF-569 and the safety evaluation prepared by the NRC staff are applicable to [PLANT, UNIT NOS.] and justify this amendment for the incorporation of the changes to the [PLANT] TS.

### 2.2 Variations

[[LICENSEE] is not proposing any variations from the TS changes described in the TSTF-569 or the applicable parts of the NRC staff's safety evaluation dated [DATE].] [[LICENSEE] is proposing the following variations from the TS changes described in the TSTF-569 or the applicable parts of the NRC staff's safety evaluation: describe the variations]

[The [PLANT] TS utilize different [numbering][and][titles] than the Standard Technical Specifications on which TSTF-569 was based. Specifically, [describe differences between the plant-specific TS numbering and/or titles and the TSTF-569 numbering and titles.] These differences are administrative and do not affect the applicability of TSTF-569 to the [PLANT] TS.]

[The [PLANT] TS contain requirements that differ from the Standard Technical Specifications on which TSTF-569 was based, such as definition titles and wording, but these differences do not affect the applicability of the TSTF-569 justification. [Differences and why TSTF-569 is still applicable.]

## 3.0 REGULATORY ANALYSIS

### 3.1 No Significant Hazards Consideration Determination

[LICENSEE] requests adoption of TSTF-569, "Revise Response Time Testing Definition," which is an approved change to the Improved Standard Technical Specifications (ISTS), into the

[PLANT NAME, UNIT NOS] Technical Specifications (TS). The proposed amendment revises the TS Definitions for Engineered Safety Feature (ESF) Response Time and [Reactor Trip System (RTS) Response Time (for Westinghouse plants) or Reactor Protection System (RPS) Response Time (for CE plants)].

[LICENSEE] has evaluated whether or not a significant hazards consideration is involved with the proposed amendment(s) by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

   **Response: No**

   The proposed change revises the TS Definition of [RTS or RPS] and ESF instrumentation response time to permit the licensee to evaluate using an NRC-approved methodology and apply a bounding response time for some components in lieu of measurement. The requirement for the instrumentation to actuate within the response time assumed in the accident analysis is unaffected.

   The response time associated with the [RTS or RPS] and ESF instrumentation is not an initiator of any accident. Therefore, the proposed change has no significant effect on the probability of any accident previously evaluated.

   The affected [RTS or RPS] and ESF instrumentation are assumed to actuate their respective components within the required response time to mitigate accidents previously evaluated. Revising the TS definition for [RTS or RPS] and ESF instrumentation response times to allow an alternate method for verifying response time for some components does not alter the surveillance requirements to verify the [RTS or RPS] and ESF instrumentation response times are within the required limits. As such, the TS will continue to assure that the [RTS or RPS] and ESF instrumentation actuate their associated components within the specified response time to accomplish the required safety functions assumed in the accident analyses. Therefore, the assumptions used in any accidents previously evaluated are unchanged and there is no significant increase in the consequences.

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

   **Response: No**

   The proposed change revises the TS Definition of [RTS or RPS] and ESF instrumentation response time to permit the licensee to evaluate using an NRC-approved methodology and apply a bounding response time for some components in lieu of measurement. The proposed change does not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed). The proposed change does not alter any

assumptions made in the safety analyses. The proposed change does not alter the limiting conditions for operation for the [RTS or RPS] or ESF instrumentation, nor does it change the Surveillance Requirement to verify the [RTS or RPS] and ESF instrumentation response times are within the required limits. As such, the proposed change does not alter the operability requirements for the [RTS or RPS] and ESF instrumentation, and therefore, does not introduce any new failure modes.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

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

**Response: No**

The proposed change revises the TS Definition of [RTS or RPS] and ESF instrumentation response time to permit the licensee to evaluate using an NRC-approved methodology and apply a bounding response time for some components in lieu of measurement. The proposed change has no effect on the required [RTS or RPS] and ESF instrumentation response times or setpoints assumed in the safety analyses and the TS requirements to verify those response times and setpoints. The proposed change does not alter any Safety Limits or analytical limits in the safety analysis. The proposed change does not alter the TS operability requirements for the [RTS or RPS] and ESF instrumentation. The [RTS or RPS] and ESF instrumentation actuation of the required systems and components at the required setpoints and within the specified response times will continue to accomplish the design basis safety functions of the associated systems and components in the same manner as before. As such, the [RTS or RPS] and ESF instrumentation will continue to perform the required safety functions as assumed in the safety analyses for all previously evaluated accidents.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, the [LICENSEE] concludes that the proposed change presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

3.2 Conclusions

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission’s regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

## 4.0 EVIRONMENTAL EVALUATION

The proposed change would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed change meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed change.

**Technical Specifications and Bases Proposed Changes**

1.1 Definitions

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| ENGINEERED SAFETY FEATURE (ESF) RESPONSE TIME | The ESF RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety 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. In lieu of measurement, response time may be verified for selected components provided that the ~~components and~~ methodology for verification ~~have~~ *has* been previously reviewed and approved by the NRC. |
| LEAKAGE | LEAKAGE shall be:<br><br>a. <u>Identified LEAKAGE</u><br><br>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,<br><br>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<br><br>3. Reactor Coolant System (RCS) LEAKAGE through a steam generator to the Secondary System (primary to secondary LEAKAGE);<br><br>b. <u>Unidentified LEAKAGE</u><br><br>All LEAKAGE (except RCP seal water injection or leakoff) that is not identified LEAKAGE, and<br><br>c. <u>Pressure Boundary LEAKAGE</u><br><br>LEAKAGE (except primary to secondary LEAKAGE) through a nonisolable fault in an RCS component body, pipe wall, or vessel wall. |

1.1 Definitions

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| QUADRANT POWER TILT RATIO (QPTR) | QPTR shall be the ratio of the maximum upper excore detector calibrated output to the average of the upper excore detector calibrated outputs, or the ratio of the maximum lower excore detector calibrated output to the average of the lower excore detector calibrated outputs, whichever is greater. |
| RATED THERMAL POWER (RTP) | RTP shall be a total reactor core heat transfer rate to the reactor coolant of [2893] MWt. |
| REACTOR TRIP SYSTEM (RTS) RESPONSE TIME | The RTS RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its RTS trip setpoint at the channel sensor until loss of stationary gripper coil voltage. 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. In lieu of measurement, response time may be verified for selected components provided that the ~~components and~~ methodology for verification ~~have~~ *has* been previously reviewed and approved by the NRC. |
| 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:<br><br>a. All rod cluster control assemblies (RCCAs) are fully inserted except for the single RCCA of highest reactivity worth, which is assumed to be fully withdrawn. However, with all RCCAs verified fully inserted by two independent means, it is not necessary to account for a stuck RCCA in the SDM calculation. With any RCCA not capable of being fully inserted, the reactivity worth of the RCCA must be accounted for in the determination of SDM, and<br><br>b. In MODES 1 and 2, the fuel and moderator temperatures are changed to the [nominal zero power design level]. |
| SLAVE RELAY TEST | A SLAVE RELAY TEST shall consist of energizing all slave relays in the channel required for channel OPERABILITY and verifying the OPERABILITY of each required slave relay. The SLAVE RELAY TEST shall include a continuity check of associated required testable actuation devices. The SLAVE RELAY TEST may be performed by means of any series of sequential, overlapping, or total steps. |

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.16

SR 3.3.1.16 verifies that the individual channel/train actuation response times are less than or equal to the maximum values assumed in the accident analysis. Response time testing acceptance criteria are included in Technical Requirements Manual, Section 15 (Ref. 14). Individual component response times are not modeled in the analyses.

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

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

----------REVIEWER'S NOTE----------
Applicable portions of the following Bases are applicable for plants adopting *the methodology contained in* WCAP-13632-P-A and/or WCAP-14036-P.
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Response time may be verified by actual response time tests in any series of sequential, overlapping or total channel measurements, or by the summation of allocated sensor, signal processing and actuation logic response times with actual response time tests on the remainder of the channel. Allocations for sensor response times may be obtained from: (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests), (2) in place, onsite, or offsite (e.g., vendor) test measurements, or (3) utilizing vendor engineering specifications. WCAP-13632-P-A, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," (Ref. 10) provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for ~~specific~~ *the* sensors ~~identified~~ *inevaluated in accordance with* the *methodology contained in the* WCAP. Response time verification for other sensor types must be demonstrated by test.

BASES

SURVEILLANCE REQUIREMENTS (continued)

[ WCAP-14036-P, Revision 1, "Elimination of Periodic Protection Channel Response Time Tests," (Ref. 15) provides the basis and methodology for using allocated signal processing and actuation logic response times in the overall verification of the protection system channel response time. ] The allocations for sensor, signal conditioning, and actuation logic response times must be verified prior to placing the component in operational service and re-verified following maintenance that may adversely affect response time. In general, electrical repair work does not impact response time provided the parts used for repair are of the same type and value. *The* ~~Specific~~ components ~~identified in~~ *evaluated in accordance with* the *methodology contained in the* WCAP may be replaced without verification testing. One example where response time could be affected is replacing the sensing assembly of a transmitter.

[ As appropriate, each channel's response must be verified every [18] months on a STAGGERED TEST BASIS. Testing of the final actuation devices is included in the testing. Response times cannot be determined during unit operation because equipment operation is required to measure response times. Experience has shown that these components usually pass this surveillance when performed at the 18 months Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

----------REVIEWER'S NOTE----------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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SR 3.3.1.16 is modified by a Note stating that neutron detectors are excluded from RTS RESPONSE TIME testing. This Note is necessary because of the difficulty in generating an appropriate detector input signal. Excluding the detectors is acceptable because the principles of detector operation ensure a virtually instantaneous response.

REFERENCES

1. Regulatory Guide 1.105, Revision 3, "Setpoints for Safety Related Instrumentation."
2. FSAR, Chapter [7].
3. FSAR, Chapter [6].

BASES

SURVEILLANCE REQUIREMENTS (continued)

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 3.3.1.15

SR 3.3.1.15 is the performance of a TADOT of Turbine Trip Functions. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable TADOT of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. This TADOT is as described in SR 3.3.1.4, except that this test is performed prior to exceeding the [P-9] interlock whenever the unit has been in MODE 3. This Surveillance is not required if it has been performed within the previous 31 days. Verification of the Trip Setpoint does not have to be performed for this Surveillance. Performance of this test will ensure that the turbine trip Function is OPERABLE prior to exceeding the [P-9] interlock.

SR 3.3.1.16

SR 3.3.1.16 verifies that the individual channel/train actuation response times are less than or equal to the maximum values assumed in the accident analysis. Response time testing acceptance criteria are included in Technical Requirements Manual, Section 15 (Ref. 14). Individual component response times are not modeled in the analyses.

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

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

BASES

SURVEILLANCE REQUIREMENTS (continued)

----------REVIEWER'S NOTE----------
Applicable portions of the following Bases are applicable for plants adopting *the methodology contained in* WCAP-13632-P-A and/or WCAP-14036-P.
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Response time may be verified by actual response time tests in any series of sequential, overlapping or total channel measurements, or by the summation of allocated sensor, signal processing and actuation logic response times with actual response time tests on the remainder of the channel. Allocations for sensor response times may be obtained from: (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests), (2) in place, onsite, or offsite (e.g., vendor) test measurements, or (3) utilizing vendor engineering specifications. WCAP-13632-P-A, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," (Ref. 10) provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for ~~specific~~ *the* sensors ~~identified in~~ *evaluated in accordance with* the *methodology contained in the* WCAP. Response time verification for other sensor types must be demonstrated by test.

[ WCAP-14036-P, Revision 1, "Elimination of Periodic Protection Channel Response Time Tests," (Ref. 15) provides the basis and methodology for using allocated signal processing and actuation logic response times in the overall verification of the protection system channel response time.] The allocations for sensor, signal conditioning, and actuation logic response times must be verified prior to placing the component in operational service and re-verified following maintenance that may adversely affect response time. In general, electrical repair work does not impact response time provided the parts used for repair are of the same type and value. *The* ~~Specific~~ components ~~identified~~ *evaluated* in *accordance with* the *methodology contained in the* WCAP may be replaced without verification testing. One example where response time could be affected is replacing the sensing assembly of a transmitter.

[ As appropriate, each channel's response must be verified every [18] months on a STAGGERED TEST BASIS. Testing of the final actuation devices is included in the testing. Response times cannot be determined during unit operation because equipment operation is required to measure response times. Experience has shown that these components usually pass this surveillance when performed at the 18 months Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.10

This SR ensures the individual channel ESF RESPONSE TIMES are less than or equal to the maximum values assumed in the accident analysis. Response Time testing acceptance criteria are included in the Technical Requirements Manual, Section 15 (Ref. 13). Individual component response times are not modeled in the analyses. The analyses model the overall or total elapsed time, from the point at which the parameter exceeds the Trip Setpoint value at the sensor, to the point at which the equipment in both trains reaches the required functional state (e.g., pumps at rated discharge pressure, valves in full open or closed position).

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

----------REVIEWER'S NOTE----------
Applicable portions of the following Bases are applicable for plants adopting *the methodology contained in* WCAP-13632-P-A (Ref. 14). and/or WCAP-14036-P (Ref. 15).
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Response time may be verified by actual response time tests in any series of sequential, overlapping or total channel measurements, or by the summation of allocated sensor, signal processing and actuation logic response times with actual response time tests on the remainder of the channel. Allocations for sensor response times may be obtained from: (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests), (2) in place, onsite, or offsite (e.g., vendor) test measurements, or (3) utilizing vendor engineering specifications. WCAP-13632-P-A, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," (Ref. 14) dated January 1996, provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for ~~specific~~ *the* sensors ~~identified in~~ *evaluated in accordance with* the *methodology contained in the* WCAP. Response time verification for other sensor types must be demonstrated by test.

BASES

SURVEILLANCE REQUIREMENTS (continued)

WCAP-14036-P, Revision 1, "Elimination of Periodic Protection Channel Response Time Tests," (Ref. 15) provides the basis and methodology for using allocated signal processing and actuation logic response times in the overall verification of the protection system channel response time. The allocations for sensor, signal conditioning, and actuation logic response times must be verified prior to placing the component in operational service and re-verified following maintenance that may adversely affect response time. In general, electrical repair work does not impact response time provided the parts used for repair are of the same type and value. *The* ~~Specific~~ components ~~identified~~ *evaluated* in *accordance with* the *methodology contained in the* WCAP may be replaced without verification testing. One example where response time could be affected is replacing the sensing assembly of a transmitter.

[ ESF RESPONSE TIME tests are conducted on an [18] month STAGGERED TEST BASIS. Testing of the final actuation devices, which make up the bulk of the response time, is included in the testing of each channel. The final actuation device in one train is tested with each channel. Therefore, staggered testing results in response time verification of these devices every [18] months. The [18] month Frequency is consistent with the typical refueling cycle and is based on unit operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

----------REVIEWER'S NOTE----------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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This SR is modified by a Note that clarifies that the turbine driven AFW pump is tested within 24 hours after reaching [1000] psig in the SGs.

SR 3.3.2.11

SR 3.3.2.11 is the performance of a TADOT as described in SR 3.3.2.8, except that it is performed for the P-4 Reactor Trip Interlock, and the

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.10

This SR ensures the individual channel ESF RESPONSE TIMES are less than or equal to the maximum values assumed in the accident analysis. Response Time testing acceptance criteria are included in the Technical Requirements Manual, Section 15 (Ref. 13). Individual component response times are not modeled in the analyses. The analyses model the overall or total elapsed time, from the point at which the parameter exceeds the Trip Setpoint value at the sensor, to the point at which the equipment in both trains reaches the required functional state (e.g., pumps at rated discharge pressure, valves in full open or closed position).

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

----------REVIEWER'S NOTE----------
Applicable portions of the following Bases are applicable for plants adopting *the methodology contained in* WCAP-13632-P-A (Ref. 14). and/or WCAP-14036-P (Ref. 15).
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Response time may be verified by actual response time tests in any series of sequential, overlapping or total channel measurements, or by the summation of allocated sensor, signal processing and actuation logic response times with actual response time tests on the remainder of the channel. Allocations for sensor response times may be obtained from: (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests), (2) in place, onsite, or offsite (e.g., vendor) test measurements, or (3) utilizing vendor engineering specifications. WCAP-13632-P-A, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," (Ref. 14) dated January 1996, provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for ~~specific~~ *the* sensors ~~identified in~~ *evaluated in accordance with* the *methodology contained in the* WCAP. Response time verification for other sensor types must be demonstrated by test.

BASES

SURVEILLANCE REQUIREMENTS (continued)

WCAP-14036-P, Revision 1, "Elimination of Periodic Protection Channel Response Time Tests," (Ref. 15) provides the basis and methodology for using allocated signal processing and actuation logic response times in the overall verification of the protection system channel response time. The allocations for sensor, signal conditioning, and actuation logic response times must be verified prior to placing the component in operational service and re-verified following maintenance that may adversely affect response time. In general, electrical repair work does not impact response time provided the parts used for repair are of the same type and value. *The* ~~Specific~~ components ~~identified in~~ *evaluated in accordance with* the *methodology contained in the* WCAP may be replaced without verification testing. One example where response time could be affected is replacing the sensing assembly of a transmitter.

[ ESF RESPONSE TIME tests are conducted on an [18] month STAGGERED TEST BASIS. Testing of the final actuation devices, which make up the bulk of the response time, is included in the testing of each channel. The final actuation device in one train is tested with each channel. Therefore, staggered testing results in response time verification of these devices every [18] months. The [18] month Frequency is consistent with the typical refueling cycle and is based on unit operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

----------REVIEWER'S NOTE----------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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This SR is modified by a Note that clarifies that the turbine driven AFW pump is tested within 24 hours after reaching [1000] psig in the SGs.

## 1.1 Definitions

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| Ē - AVERAGE DISINTEGRATION ENERGY | Ē shall be the average (weighted in proportion to the concentration of each radionuclide in the reactor coolant at the time of sampling) of the sum of the average beta and gamma energies per disintegration (in MeV) for isotopes, other than iodines, with half lives > [15] minutes, making up at least 95% of the total noniodine activity in the coolant. |
| ENGINEERED SAFETY FEATURE (ESF) RESPONSE TIME | The ESF RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its ESF actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety 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. In lieu of measurement, response time may be verified for selected components provided that the ~~components and~~ methodology for verification ~~have~~ *has* been previously reviewed and approved by the NRC. |
| LEAKAGE | LEAKAGE shall be:<br><br>a. <u>Identified LEAKAGE</u><br><br>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,<br><br>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<br><br>3. Reactor Coolant System (RCS) LEAKAGE through a steam generator to the Secondary System (primary to secondary LEAKAGE),<br><br>b. <u>Unidentified LEAKAGE</u><br><br>All LEAKAGE (except RCP seal water injection or leakoff) that is not identified LEAKAGE, and |

1.1 Definitions

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| LEAKAGE (continued) | |
| | c. <u>Pressure Boundary LEAKAGE</u><br><br>LEAKAGE (except primary to secondary LEAKAGE) through a nonisolable fault in an RCS component body, pipe wall, or vessel wall. |
| MODE | A MODE shall correspond to any one inclusive combination of core reactivity condition, power level, average reactor coolant temperature, and reactor vessel head closure bolt tensioning specified in Table 1.1-1 with fuel in the reactor vessel. |
| OPERABLE – OPERABILITY | A system, subsystem, train, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s). |
| PHYSICS TESTS | PHYSICS TESTS shall be those tests performed to measure the fundamental nuclear characteristics of the reactor core and related instrumentation.<br><br>These tests are:<br><br>a. Described in Chapter [14, Initial Test Program] of the FSAR,<br><br>b. Authorized under the provisions of 10 CFR 50.59, or<br><br>c. Otherwise approved by the Nuclear Regulatory Commission. |
| PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR) | The PTLR is the unit specific document that provides the reactor vessel pressure and temperature limits, including heatup and cooldown rates, for the current reactor vessel fluence period. These pressure and temperature limits shall be determined for each fluence period in accordance with Specification 5.6.4. |
| RATED THERMAL POWER (RTP) | RTP shall be a total reactor core heat transfer rate to the reactor coolant of [3410] MWt. |

1.1 Definitions

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| REACTOR PROTECTION 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. In lieu of measurement, response time may be verified for selected components provided that the ~~components and~~ methodology for verification ~~have~~ *has* been previously reviewed and approved by the NRC. |
| 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:<br><br>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, and<br><br>[ b. 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. ] |
| THERMAL POWER | THERMAL POWER shall be the total reactor core heat transfer rate to the reactor coolant. |

BASES

SURVEILLANCE REQUIREMENTS (continued)

----------REVIEWER'S NOTE----------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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The Surveillance is modified by a Note to indicate that the neutron detectors are excluded from CHANNEL CALIBRATION 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 calorimetric calibration (SR 3.3.1.2) and the linear subchannel gain check (SR 3.3.1.3).

SR 3.3.1.9

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.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

----------REVIEWER'S NOTE----------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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BASES

SURVEILLANCE REQUIREMENTS (continued)

Testing may be performed in one measurement or in overlapping segments, with verification that all components are tested.

----------REVIEWER'S NOTE----------
Applicable portions of the following TS Bases are applicable to plants adopting *the methodology contained in* CEOG Topical Report CE NPSD-1167-1, "Elimination of Pressure Sensor Response Time Testing Requirements."
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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. 11) provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for ~~specific~~ *the* sensors ~~identified in~~ *evaluated in accordance with* the *methodology contained 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.

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 3.3.1.2).

REFERENCES

1. Regulatory Guide 1.105, Revision 3, "Setpoints for Safety-Related Instrumentation."
2. 10 CFR 50, Appendix A, GDC 21.
3. 10 CFR 100.
4. IEEE Standard 279-1971, April 5, 1972.
5. FSAR, Chapter [14].
6. 10 CFR 50.49.

BASES

SURVEILLANCE REQUIREMENTS (continued)

functioning as required and is expected to pass the next surveillance, then the channel is OPERABLE and can be restored to service at the completion of the surveillance. After the surveillance is completed, the channel as-found condition will be entered into the Corrective Action Program for further evaluation.

[ The Frequency is based upon the assumption of an 18 month calibration interval for the determination of the magnitude of equipment drift.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

----------REVIEWER'S NOTE----------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---------- ]

The Surveillance is modified by a Note to indicate that the neutron detectors are excluded from CHANNEL CALIBRATION 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 calorimetric calibration (SR 3.3.1.2) and the linear subchannel gain check (SR 3.3.1.3).

SR 3.3.1.9

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

BASES

SURVEILLANCE REQUIREMENTS (continued)

time degradation, but not channel failure, are infrequent occurrences. Also, response times cannot be determined at power, since equipment operation is required.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

----------REVIEWER'S NOTE----------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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Testing may be performed in one measurement or in overlapping segments, with verification that all components are tested.

----------REVIEWER'S NOTE----------
Applicable portions of the following TS Bases are applicable to plants adopting *the methodology contained in* CEOG Topical Report CE NPSD-1167-1, "Elimination of Pressure Sensor Response Time Testing Requirements."
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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) provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for ~~specific~~ *the* sensors ~~identified in~~ *evaluated in accordance with* the *methodology contained 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.

BASES

SURVEILLANCE REQUIREMENTS (continued)

----------REVIEWER'S NOTE----------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---------- ]

SR 3.3.4.4 is modified by two Notes as identified in Table 3.3.4-1. The first Note requires evaluation of channel performance for the condition where the as-found setting for the channel setpoint is outside its as-found tolerance but conservative with respect to the Allowable Value. Evaluation of channel performance will verify that the channel will continue to behave in accordance with safety analysis assumptions and the channel performance assumptions in the setpoint methodology. The purpose of the assessment is to ensure confidence in the channel performance prior to returning the channel to service. For channels determined to be OPERABLE but degraded, after returning the channel to service the performance of these channels will be evaluated under the plant Corrective Action Program. Entry into the Corrective Action Program will ensure required review and documentation of the condition. The second Note requires that the as-left setting for the channel be returned to within the as-left tolerance of the [LTSP]. Where a setpoint more conservative than the [LTSP] is used in the plant surveillance procedures [NTSP], the as-left and as-found tolerances, as applicable, will be applied to the surveillance procedure setpoint. This will ensure that sufficient margin to the Safety Limit and/or Analytical Limit is maintained. If the as-left channel setting cannot be returned to a setting within the as-left tolerance of the [LTSP], then the channel shall be declared inoperable.

The second Note also requires that [LTSP] and the methodologies for calculating the as-left and the as-found tolerances be in [insert the facility FSAR reference or the name of any document incorporated into the facility FSAR by reference].

SR 3.3.4.5

This Surveillance ensures that the train actuation response times are the maximum values assumed in the safety analyses. Individual component response times are not modeled in the analyses. The analysis models the overall or total elapsed time, from the point at which the parameter exceeds the trip setpoint value at the sensor to the point at which the equipment in both trains reaches the required functional state (e.g.,

BASES

SURVEILLANCE REQUIREMENTS (continued)

pumps at rated discharge pressure, valves in full open or closed position). Response time testing acceptance criteria are included in Reference 5. The test may be performed in one measurement or in overlapping segments, with verification that all components are measured.

----------REVIEWER'S NOTE----------
Applicable portions of the following TS Bases are applicable to plants adopting *the methodology contained in* CEOG Topical Report CE NPSD-1167-1, "Elimination of Pressure Sensor Response Time Testing Requirements."
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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. 12) provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for ~~specific~~ *the* sensors ~~identified in~~ *evaluated in accordance with* the *methodology contained 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.

[ 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.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

[ The Frequency is based upon the assumption of an [18] month calibration interval for the determination of the magnitude of equipment drift in the setpoint analysis.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

----------REVIEWER'S NOTE----------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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SR 3.3.4.5

This Surveillance ensures that the train actuation response times are the maximum values assumed in the safety analyses. Individual component response times are not modeled in the analyses. The analysis models the overall or total elapsed time, from the point at which the parameter exceeds the trip setpoint value at the sensor to the point at which the equipment in both trains reaches the required functional state (e.g., pumps at rated discharge pressure, valves in full open or closed position). Response time testing acceptance criteria are included in Reference 5. The test may be performed in one measurement or in overlapping segments, with verification that all components are measured.

----------REVIEWER'S NOTE----------
Applicable portions of the following TS Bases are applicable to plants adopting *the methodology contained in* CEOG Topical Report CE NPSD-1167-1, "Elimination of Pressure Sensor Response Time Testing Requirements."
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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

BASES

SURVEILLANCE REQUIREMENTS (continued)

vendor engineering specifications. Topical Report CE NPSD-1167-A, "Elimination of Pressure Sensor Response Time Testing Requirements," (Ref. 12) provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for ~~specific~~ *the* sensors ~~identified in~~ *evaluated in accordance with* the *methodology contained 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.

[ 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.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

----------REVIEWER'S NOTE----------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
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REFERENCES

1. Regulatory Guide 1,105, "Setpoints for Safety-Related Instrumentation," Revision 3.
2. 10 CFR 50, Appendix A.
3. 10 CFR 100.
4. FSAR, Section [7.3].
5. NRC Safety Evaluation Report, [Date].

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SURVEILLANCE REQUIREMENTS (continued)

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.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

----------REVIEWER'S NOTE----------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---------- ]

----------REVIEWER'S NOTE----------
Applicable portions of the following TS Bases are applicable to plants adopting *the methodology contained in* CEOG Topical Report CE NPSD-1167-1, "Elimination of Pressure Sensor Response Time Testing Requirements."
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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

BASES

SURVEILLANCE REQUIREMENTS (continued)

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. 11) provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for ~~specific~~ *the* sensors ~~identified~~ *evaluated in accordance with* the *methodology contained 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.

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).

REFERENCES

1. Regulatory Guide 1.105, Revision 3, "Setpoints for Safety-Related Instrumentation."
2. 10 CFR 50, Appendix A, GDC 21.
3. 10 CFR 100.
4. NRC Safety Evaluation Report.
5. IEEE Standard 279-1971, April 5, 1972.
6. FSAR, Chapter [14].
7. 10 CFR 50.49.
8. "Plant Protection System Selection of Trip Setpoint Values."
9. FSAR, Section [7.2].
10. CEN-327, June 2, 1986, including Supplement 1, March 3, 1989.
11. CEOG Topical Report CE NPSD-1167-A, "Elimination of Pressure Sensor Response Time Testing Requirements."

BASES

SURVEILLANCE REQUIREMENTS (continued)

This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. Proper operation of bypass permissives is critical during plant startup because the bypasses must be in place to allow startup operation and must be removed at the appropriate points during power ascent to enable certain reactor trips. Consequently, the appropriate time to verify bypass removal function OPERABILITY is just prior to 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.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

----------REVIEWER'S NOTE----------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---------- ]

----------REVIEWER'S NOTE----------
Applicable portions of the following TS Bases are applicable to plants adopting *the methodology contained in* CEOG Topical Report CE NPSD-1167-1, "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) provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for ~~specific~~ *the* sensors ~~identified in~~ *evaluated in accordance with* the *methodology contained 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.

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).

REFERENCES

1. Regulatory Guide 1.105, Revision 3, "Setpoints for Safety-Related Instrumentation."
2. 10 CFR 50, Appendix A, GDC 21.
3. 10 CFR 100.
4. NRC Safety Evaluation Report.

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SURVEILLANCE REQUIREMENTS (continued)

The second Note also requires that [LTSP] and the methodologies for calculating the as-left and the as-found tolerances be in [insert the facility FSAR reference or the name of any document incorporated into the facility FSAR by reference].

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 12.

----------REVIEWER'S NOTE----------
Applicable portions of the following TS Bases are applicable to plants adopting *the methodology contained in* CEOG Topical Report CE NPSD-1167-1, "Elimination of Pressure Sensor Response Time Testing Requirements."
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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. 13) provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for ~~specific~~ *the* sensors ~~identified in~~ *evaluated in accordance with* the *methodology contained 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.

[ 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.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SCP. If the actual setting of the channel is found to be conservative with respect to the Allowable Value but is beyond the as-found tolerance band, the channel is OPERABLE but degraded. The degraded condition of the channel will be further evaluated during performance of the SR. This evaluation will consist of resetting the channel setpoint to the [NTSP] (within the allowed tolerance), and evaluating the channel response. If the channel is functioning as required and is expected to pass the next surveillance, then the channel is OPERABLE and can be restored to service at the completion of the surveillance. After the surveillance is completed, the channel as-found condition will be entered into the Corrective Action Program for further evaluation.

[ 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.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

----------REVIEWER'S NOTE----------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---------- ]

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 12.

----------REVIEWER'S NOTE----------
Applicable portions of the following TS Bases are applicable to plants adopting *the methodology contained in* CEOG Topical Report CE NPSD-1167-1, "Elimination of Pressure Sensor Response Time Testing Requirements."
----------

BASES

SURVEILLANCE REQUIREMENTS (continued)

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. 13) provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for ~~specific~~ *the* sensors ~~identified in~~ *evaluated in accordance with* the *methodology contained 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.

[ 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.

OR

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

----------REVIEWER'S NOTE----------
Plants controlling Surveillance Frequencies under a Surveillance Frequency Control Program should utilize the appropriate Frequency description, given above, and the appropriate choice of Frequency in the Surveillance Requirement.
---------- ]

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