*General Directions: This Model safety evaluation (SE) provides the format and content to be used when preparing the plant-specific SE of a license amendment request to adopt TSTF-569, Revision 2. The **bolded** bracketed information shows text that should be filled in for the specific amendment; individual licensees would furnish site-specific nomenclature or values for these bracketed items. The italicized wording provides guidance on what should be included in each section and should not be included in the SE.*

FINAL MODEL SAFETY EVALUATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

TECHNICAL SPECIFICATIONS TASK FORCE TRAVELER

TSTF-569, REVISION 2

"REVISE RESPONSE TIME TESTING DEFINITION"

USING THE CONSOLIDATED LINE ITEM IMPROVEMENT PROCESS

(EPID [insert EPID number])

1.0 INTRODUCTION

By application dated **[enter date]** (Agencywide Documents Access and Management System (ADAMS) Accession No. **[MLXXXXXXXXX]**), **[as supplemented by letters dated [enter date(s) and ADAMS Accession Nos.]], [name of licensee]** (the licensee) submitted a license amendment request (LAR) for **[name of facility (abbreviated name), applicable units]**. The amendment would revise technical specification (TS) definitions for **[***for Westinghouse-designed plants use:* **engineered safety feature (ESF) response time and reactor trip system (RTS) response time** *OR for CE-designed plants use:* **engineered safety feature (ESF) response time and reactor protection system (RPS) response time]** that are referenced in Surveillance Requirements (SRs), hereafter referred to as response time testing (RTT).

The proposed changes are based on Technical Specifications Task Force (TSTF) traveler TSTF-569, Revision 2, "Revise Response Time Testing Definition," dated June 25, 2019 (ADAMS Accession No. ML19176A034). The U.S. Nuclear Regulatory Commission (NRC or the Commission) issued a final safety evaluation (SE) approving TSTF-569, Revision 2, on **[enter date]** (ADAMS Accession No. ML19176A191).

[The licensee has proposed variations from the TS changes described in TSTF-569, Revision 2. The variations are described in Section [2.2.1] of this SE and evaluated in Section [3.3]]. *OR* **[The licensee is not proposing any variations from the TS changes described in TSTF-569, Revision 2, or the applicable parts of the NRC staff's SE of TSTF-569, Revision 2.]]**

[The supplemental letter[s] dated [enter date(s)], provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the NRC staff's original proposed no significant hazards

consideration determination as published in the *Federal Register* on [enter date] (cite FR reference).]

2.0 REGULATORY EVALUATION

2.1 DESCRIPTION OF RESPONSE TIME TESTING

The **[RTS** *OR* **RPS]** initiates a unit shutdown, based on the values of selected unit parameters, to protect against violating the core fuel design limits and the reactor coolant system pressure boundary during anticipated operational occurrences and to assist the engineering safety feature actuation system (ESFAS) in mitigating accidents. The ESFAS initiates necessary safety systems, based on the values of selected unit parameters, to protect against violating core design limits and the reactor coolant system pressure boundary, and to mitigate accidents.

RTT verifies that the individual channel or train actuation response times are less than or equal to the maximum values assumed in the accident analyses. The RTT acceptance criteria are under licensee control. Individual component response times are not modeled in the accident 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 (e.g., control and shutdown rods fully inserted in the reactor core).

2.2 PROPOSED CHANGES TO THE TECHNICAL SPECIFICATIONS

The licensee proposed to revise the RTT TS definitions in Section **[1.1]** of the TS. Specifically, the proposed changes would revise the TS definitions to eliminate the requirement for prior NRC review and approval of the response time verification of new pressure sensor components *{NOTE: this may be used interchangeably with the phrase 'pressure transmitter' within this SE due to the usage of these terms in TSTF-569, Revision 2.}* and protection channel components, while still requiring verification to be performed using the standard methodology contained in NRC-approved TSTF-569, Revision 2, Attachment 1, "Methodology to Eliminate Pressure Sensor and Protection Channel (for Westinghouse Plant only) Response Time Testing." The proposed change would allow the licensee to verify the response time of similar/comparable component types to those components being replaced without prior NRC approval for each set of different components being installed.

{NOTE: For Westinghouse-designed plants use:}
[The proposed change would revise the following TS definitions in Section [1.1]:

- **Engineered Safety Feature (ESF) Response Time and**
- **Reactor Trip System (RTS) Response Time.**

The definitions would be revised to state the following (with changes underlined):

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, or the components have been evaluated in accordance with an NRC approved methodology.

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, or the components have been evaluated in accordance with an NRC approved methodology.]

{NOTE: For CE-designed plants use:}
The proposed change would revise the following TS definitions in Section [1.1]:

- **Engineered Safety Feature (ESF) Response Time and**
- **Reactor Protection System (RPS) Response Time.**

The definitions would be revised to state the following (with changes underlined):

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, or the components have been evaluated in accordance with an NRC approved methodology.

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, or the components have been evaluated in accordance with an NRC approved methodology.]

The proposed change would be supported by changes to the TS Bases. Similar to the RTT definitions, the Bases would state that for components that have been evaluated in accordance with a methodology approved by the NRC, the response time can be verified in lieu of being measured. The proposed change would revise the Bases to be consistent with the proposed definition change.

[2.2.1 Variations from TSTF-569, Revision 2

Insert description of any variations here.]

2.3 APPLICABLE REGULATORY REQUIREMENTS AND GUIDANCE

Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36(a)(1) requires each applicant for a license authorizing operation of a utilization facility to include in the application proposed TSs.

The regulation at 10 CFR 50.36(b) states that:

> 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 regulation at 10 CFR 50.40(a) states, in part, that the TSs shall provide reasonable assurance that the health and safety of the public will not be endangered.

Appendix A to 10 CFR Part 50 provides General Design Criteria (GDC) for nuclear power plants. Plant-specific design criteria are described in the plant's Updated Final Safety Analysis Report (UFSAR).

The regulation at 10 CFR Part 50, Appendix A, GDC 13, "Instrumentation and Control," states:

> Instrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety, including those variables and systems that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems. Appropriate controls shall be provided to maintain these variables and systems within prescribed operating ranges.

The regulation at 10 CFR Part 50, Appendix A, GDC 21, "Protection System Reliability and Testability," states:

> The protection system shall be designed for high functional reliability and inservice testability commensurate with the safety functions to be performed. Redundancy and independence designed into the protection system shall be sufficient to assure that (1) no single failure results in loss of the protection function and (2) removal from service of any component or channel does not result in loss of the required minimum redundancy unless the acceptable reliability of operation of the protection system can be otherwise demonstrated. The protection system shall be designed to permit periodic testing of its functioning when the reactor is in operation, including a capability to test channels independently to determine failures and losses of redundancy that may have occurred.

The NRC staff's guidance for the review of TSs is in Chapter 16.0, Revision 3, "Technical Specifications," of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light-Water Reactor] Edition" (SRP), March 2010 (ADAMS Accession No. ML100351425). As described therein, as part of the regulatory standardization effort, the NRC staff has prepared Standard Technical Specifications (STS) for each of the LWR nuclear designs. Accordingly, the NRC staff's review includes consideration of whether the proposed changes are consistent with the applicable reference STS, as modified by NRC-approved travelers. The STS applicable to **[abbreviated name of facility]** is

{NOTE: Choose applicable STS}
[NUREG-1431, Revision 4.0, "Standard Technical Specifications, Westinghouse Plants," April 2012, Volume 1, "Specifications" (ADAMS Accession No. ML12100A222), and Volume 2, "Bases" (ADAMS Accession No. ML12100A228).

NUREG-1432, Revision 4.0, "Standard Technical Specifications, Combustion Engineering Plants," April 2012, Volume 1, "Specifications" (ADAMS Accession No. ML12102A165), and Volume 2, "Bases" (ADAMS Accession No. ML12102A169).]

Regulatory Guide (RG) 1.118, Revision 3, "Periodic Testing of Electric Power and Protection Systems," April 1995 (ADAMS Accession No. ML003739468), endorses the Institute of Electrical and Electronics Engineers, Inc. (IEEE) Std. 338-1987, "IEEE Standard Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems," which was approved on March 3, 1988, by the American National Standards Institute.

Branch Technical Position (BTP) 7-17, "Guidance on Self-Test and Surveillance Test Provisions," August 23, 2016 (ADAMS Accession No. ML16019A316), states, in part:

> Failures detected by hardware, software, and surveillance testing should be consistent with the failure detectability assumptions of the single-failure analysis and the failure modes and effects analysis.

3.0 TECHNICAL EVALUATION

3.1 PROPOSED CHANGES TO THE RESPONSE TIME TESTING DEFINITION

The proposed change to TS Section **[1.1]** would eliminate required direct measurement RTT for selected **[***For CE plants:* **pressure transmitter/sensor** *OR for Westinghouse plants:* **pressure transmitter/sensor and protection channel]** components but does not eliminate required surveillance testing for the entirety of an instrument channel or the system as a whole (e.g., RTS). Therefore, the NRC staff finds that the proposed change is consistent with the surveillance testing requirements of 10 CFR 50.36.

The NRC staff confirmed that the proposed change has no effect on the design, fabrication, use, or methods of testing of the instrumentation and will not affect the ability of the instrumentation to perform the functions assumed in the safety analysis. Therefore, compliance with the design criteria GDC 13 and GDC 21 or the equivalent plant-specific criteria is not affected.

RG 1.118, Revision 3, describes acceptable methods for complying with NRC regulations pertaining to periodic testing of protection systems and power systems.

TSTF-569, Revision 2, states the following regarding applicable design criteria:

> Section 6.3.4 of IEEE Standard 338-1977, "Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems," states response time testing of all safety-related equipment, per se, is not required if, in lieu of response time testing, the response time of safety system equipment is verified by functional testing, calibration check, or other tests, or both. This is acceptable if it can be demonstrated that changes in response time beyond acceptable limits are accompanied by changes in performance characteristics which are detectable during routine periodic tests.
>
> Clause 6.3.4 of IEEE 338-1987, "Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems," 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.
>
> Section 5.3.4, "Response time verification tests," of IEEE Standard 338-2012, "IEEE Standard for Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems," Item c) states 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. 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 traveler states that system operation, design basis, and capability for testing will remain unchanged as the replacement components comply with these design criteria. The NRC staff found that the traveler provided an adequate technical basis and that replacement components can continue to perform the same design functions as the original components. The NRC staff found that the methodologies contained in Attachment 1 to the traveler provide adequate criteria for ensuring that replacement components degraded response time issues or failures would be captured. Therefore, conformance with IEEE 338-2012 and 338-1987 design criteria is not affected, since the licensee is adopting TSTF-569, Revision 2.

3.2 SUMMARY

The NRC staff reviewed the proposed changes against the regulations and determined that, with the proposed changes, the TS will continue to meet the requirements of 10 CFR 50.36(b) and, consistent with 10 CFR 50.40, will continue to provide reasonable assurance that the health and safety of the public will not be endangered. Additionally, the NRC staff determined that the proposed changes are technically clear and consistent with customary terminology and format in accordance with SRP Chapter 16.0. Therefore, the NRC staff concludes that the proposed changes are acceptable.

[3.3 VARIATIONS FROM TSTF-569, REVISION 2

The licensee described variations from TSTF-569, Revision 2, in Section [2.2] of the LAR. The licensee provided justification for the proposed variations. The NRC staff reviewed the justifications and determined that the variations are [not] acceptable because….

The [Name of facility's] TSs utilize different [numbering][and][titles] than the STS on which TSTF-569, Revision 2, was based. The NRC staff determined that these differences are editorial and do not affect the applicability of TSTF-569, Revision 2, to the proposed LAR.]

4.0 STATE CONSULTATION

{This section is to be prepared by the plant project manager.}

In accordance with the Commission's regulations, the **[Name of State]** State official was notified of the proposed issuance of the amendment(s) on **[date]**. The State official had **[no]** comments. **[If comments were provided, they should be addressed here.]**

5.0 ENVIRONMENTAL CONSIDERATION

{This section is to be prepared by the plant project manager in accordance with current procedures.}

6.0 CONCLUSION

{This section is to be prepared by the plant project manager.}

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the

amendment(s) will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: **[PM Name, NRR/DORL**
C. Tilton, NRR/DSS]

Date: August 14, 2019