ENCLOSURE 4

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GE Hitachi Nuclear Energy

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Non-Proprietary Information – Class I (Public)

Licensing Topical Report

GEH Methodology for Implementing TSTF-493 Revision 4

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ABSTRACT

This Licensing Topical Report (LTR) describes the methodology developed by GEH for calculating as-found and as-left tolerances for setpoints in the BWR plant Technical Specifications that comply with the guidance in TSTF-493 Revision 4. The methodology preserves the significance of the Technical Specification Allowable Values and provides as found and as-left tolerances for evaluating instrument performance during Technical Specification surveillance tests that are consistent with the guidance in TSTF-493. The methodology presented includes a generic approach for developing as-found and as-left tolerances for loop surveillance tests and also for [[

]] Sample calculations [[ ]] are provided to demonstrate the application of the methodology.

REVISIONS

Rev	Purpose of Revision	Reference
0	Initial Issue	--

1.0 Introduction

1.1 Objective

This LTR documents the GEH TSTF-493 Methodology to be used to implement the guidance of TSTF-493 Revision 4 (Reference 1) (hereafter referred to as "TSTF-493"). TSTF-493 is applicable to currently operating plants that use the U.S. Nuclear Regulatory Commission (NRC) approved GEH Instrument Setpoint Methodology (Reference 2) with respect to setpoint calculations. The methodology discussed in this LTR is consistent with the guidance of TSTF-493. TSTF-493 was issued by the Technical Specification Task Force (TSTF) and endorsed by the Nuclear Regulatory Commission (NRC) as revised Standard Technical Specifications for BWR/4s (Reference 3) and BWR/6s (Reference 4). TSTF-493 addresses NRC concerns that the current operating plant Technical Specification requirements for Limiting Safety System Settings (LSSS) may not be fully in compliance with the intent of 10 CFR 50.36. Specifically, the NRC is concerned that the existing Surveillance Requirements do not provide adequate assurance that instruments will actuate safety functions by the point assumed in the applicable safety analysis.

1.2 TSTF-493 Guidance

The TSTF-493 guidance provides two Notes that should be placed on specific instrument functions contained within the Standard Technical Specifications Surveillance Requirements for instrument channel (loop) and trip unit (if applicable) calibrations. Further, the TSTF-493 guidance provides an acceptable method for identifying the as-left and as-found tolerances that is consistent with NRC Regulatory Issue Summary (RIS) 2006-17, "NRC Staff Position on the Requirements of 10 CFR 50.36, 'Technical Specifications,' Regarding Limiting Safety System Settings During Periodic Testing and Calibration of Instrument Channels" (Reference 5). TSTF-493 also provides the specific actions to be taken if the as-found channel setpoint is outside either the predefined as-left or as-found tolerance.

1.3 GEH TSTF-493 Methodology Considerations

The GEH TSTF-493 Methodology was developed based on the following considerations to implement the guidance of TSTF-493 as it applies to the approved GEH Instrument Setpoint Methodology:

1. The approved GEH Instrument Setpoint Methodology remains applicable for determining the Technical Specification Allowable Values (AVs) and related Nominal Trip Setpoints (NTSPs) for operating plants.
2. A methodology for determining as-found and as-left tolerances, consistent with or more conservative than the TSTF-493 Standard Technical Specification Notes, is required in addition to the GEH Instrument Setpoint Methodology.
3. The GEH TSTF-493 Methodology must consider **current instrument channel (loop) configurations. These configurations include** [[
   ]]

4. The GEH TSTF-493 Methodology must be compatible with the current plant surveillance procedures for device calibration.
5. The plant Technical Specifications, including any changes to implement TSTF-493, are followed. The changes to incorporate TSTF-493 include the addition of the Notes to the Technical Specification surveillance tests for applicable instrument setpoint functions.

2.0 TSTF-493 Guidance

The specific guidance for the implementation of TSTF-493 is to add two Notes to specific instrument "functions" in the improved Standard Technical Specifications. For GEH BWR Standard Technical Specifications, the Notes are typically applied to the Technical Specification Surveillance Requirements for the calibration of the entire instrument loop and the trip units for the loop, if applicable.

The two TSTF–493 Notes are shown below. Note 1 is taken directly from the TSTF guidance, and Note 2 has been modified only to reflect the terminology used for the implemented setpoint (or Final Nominal Trip Setpoint ($NTSP_F$)) in the GEH TSTF-493 Methodology:

1. If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.
2. The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the $NTSP_F$ at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the $NTSP_F$ are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance Procedures to confirm channel performance. The methodology to determine the $NTSP_F$ and the methodologies used to determine the as-found and the as-left tolerances are specified in [facility FSAR or the other document incorporated into the facility FSAR by reference].

It is anticipated that a Licensee's plant-specific License Amendment Request will incorporate similar wording, consistent with their plant-specific Technical Specification requirements.

TSTF-493 guidance states that during the process of checking the setpoint, consistent with the two Notes, there are four possible results in best case to worst case order:

1. "The setpoint is found within the as-left tolerance; the results are recorded in the procedure, and the Technical Specifications require no further action.
2. "The setpoint is outside the as-left tolerance but within the as-found tolerance; the setpoint is reset to within the as-left tolerance, and the Technical Specifications require no further action.
3. "The setpoint is found conservative with respect to the Allowable Value but outside the as-found tolerance. In this case the channel is OPERABLE, but degraded. The degraded condition will be further evaluated during performance of the SR. This evaluation will consist of resetting the channel setpoint to the [NTSP or LTSP] (within the allowed tolerance), and evaluating the channel response. If the channel is functioning as required and expected to pass the next surveillance, then the channel is Operable and can be restored to service at the completion of the surveillance.

4. "The setpoint is found non-conservative to the Allowable Value; the channel is inoperable until the setpoint is reset to the [NTSP or LTSP] (within the as-left tolerance), and any evaluations necessary to return the channel to service are completed."

With respect to the guidance for determining the specific as-left and as-found tolerances, TSTF-493 states:

> "Implementation of Note 1 requires the licensee to calculate an as-found tolerance. One acceptable method of calculating the as-found tolerance is the Square Root Sum of the Squares (SRSS) combination of either a) Reference Accuracy (RA), Measurement and Test Equipment (M&TE) error, M&TE readability (M&TEr) and projected drift, or b) as-left tolerance and the projected drift (assuming that as-left tolerance is ≤ SRSS combination of RA, M&TE error, M&TEr). Different methods of calculating the as-found tolerance (including the inclusion of additional uncertainties (e.g., normal radiation effect, temperature effect between calibrations, capillary tubing error) may be acceptable. Alternate methods must result in an as-found tolerance that is small enough to detect abnormal channel performance. Any additional uncertainties included in the as-found tolerance calculation must be justified."
>
> and
>
> "Implementation of Note 2 may require some licensees to recalculate the as-left tolerance for some channels to ensure that realistic values are used that do not mask instrument performance."

Based on the implementation guidance for Notes 1 and 2 in TSTF-493, an as-left tolerance of ≤ SRSS combination of RA, M&TE error, and M&TEr is acceptable. Also, based on Notes 1 and 2, an as-found tolerance of ≤ SRSS combination of RA, M&TE error, M&TEr and drift is acceptable. Use of a more conservative methodology is also considered acceptable.

3.0 GEH TSTF-493 Methodology

This section provides the specific GEH TSTF-493 Methodology that is to be used in the determination of the As-Found Tolerance (AFT) and As-Left Tolerance (ALT) for setpoint calculations performed by GEH. To implement the GEH TSTF-493 Methodology for new setpoint calculations, the approved GEH Instrument Setpoint Methodology is used to calculate the instrument setpoints for the instrument loop. These setpoints include:

1. Allowable Value (AV)
2. First Nominal Trip Setpoint ($NTSP_1$), which is equivalent to the Limiting Trip Setpoint (LTSP) described in TSTF-493
3. Final Nominal Trip Setpoint ($NTSP_F$)

The GEH TSTF-493 Methodology is then used to determine the AFT and ALT based on TSTF-493 guidance for instrument performance monitoring and instrument resetting, or to confirm that similar margins in the GEH Instrument Setpoint Methodology meet the TSTF-493 guidance. The GEH TSTF-493 Methodology is dependent on **the instrument loop (channel) configuration** [[ ]], and the specific plant procedures used to demonstrate compliance with the Technical Specification Surveillance Requirements for loop and trip unit (if applicable) calibration. The GEH TSTF-493 Methodology only applies to the calculation of AFT and ALT values for the specific instrument functions identified in TSTF-493, and does not affect the setpoints calculated by GEH Instrument Setpoint Methodology.

Figure 3-1 provides an overview of the GEH Instrument Setpoint Methodology as it relates to the development of the GEH TSTF-493 Methodology. The GEH Instrument Setpoint Methodology is based on the methodology used in GEH safety analysis process that demonstrates all applicable safety analysis limits are satisfied. The Analytical Limits (ALs) used in the safety analysis for instrument trips provide the starting point for the determination of the instrument setpoints that are included in the plant Technical Specifications and surveillance procedures for instrument calibration.

As shown in Figure 3-1, there are two required margins that are considered in the determination of the instrument setpoints:

1. Required AV Margin – The Required AV Margin is the margin between the AL and AV that includes all instrument uncertainties under trip conditions except instrument drift. The Required AV Margin establishes the AV specified in the Technical Specifications and is calculated with sufficient margin to ensure that there is a high probability that the AL would not be exceeded if the as-found value of the instrument setting (hereafter referred to as the "as-found instrument setting") during calibration is at the AV. Thus, the AV in the GEH Instrument Setpoint Methodology is considered an important parameter in protecting the AL and assuring the validity of the safety analysis.
2. Required NTSP Margin – The Required NTSP Margin is the margin between the AL and the nominal trip setpoint that includes all instrument uncertainties under trip conditions.

The Required NTSP Margin establishes $NTSP_1$ and is calculated with sufficient margin to ensure that there is a high probability that the AL will not be exceeded for the limiting event occurring from normal operating conditions. This margin represents the minimum margin between the NTSP and the AL required by the GEH Instrument Setpoint Methodology.

In addition to these required margins, the GEH Instrument Setpoint Methodology also provides for margin between the AV and the final nominal trip setpoint ($NTSP_F$). The AV – $NTSP_F$ margin includes all instrument uncertainties under calibration conditions and is provided to reduce the probability that the AV will be exceeded during calibration conditions, and generally results in an $NTSP_F$ that is more conservative than $NTSP_1$. This margin is called the Licensee Event Report (LER) Avoidance Margin ~~(hereafter referred to as the LER Margin)~~. The LER **Avoidance** Margin provides additional assurance that the AV will not be exceeded during the required surveillance testing and to demonstrate compliance with the Technical Specifications.

3.1 Overview of Surveillance Requirement Calibration

For each annotated setpoint, the TSTF-493 Notes are applied to two typical improved Standard Technical Specification Surveillance Requirements for BWR instrument loop calibration:

1. Trip Unit (if applicable)
2. Loop (channel)

These surveillance tests are required to first measure the as-found instrument setting before any adjustments are made. This allows an evaluation of whether or not the instrument performed within its expected tolerance. The test procedures are dependent on whether or not the instrument loop is comprised of a single device (e.g., a pressure indicating switch or bistable) or multiple devices (e.g., a transmitter and trip unit).

For a single device loop calibration, the loop is bypassed and the process input is replaced by a calibrated input source. The test input that produces the trip signal is the as-found instrument setting for the loop in terms of the process parameter units. This value is then compared to the AV to demonstrate compliance with the Technical Specification Surveillance Requirements and to the AFT to demonstrate acceptable instrument performance. Assuming the as-found instrument setting is within the predetermined loop AFT, the device is then calibrated (if necessary) and left within the predetermined ALT to meet TSTF-493 guidance.

For calibration of a multiple devices loop, the as-found instrument settings need to be determined for the trip unit when doing the trip unit test (which is typically done every 3 months), and for the entire loop when doing the full loop test (which is typically done every 18 to 24 months or each refueling outage). A typical surveillance test would proceed as follows:

1. For the trip unit calibration Surveillance Requirement, the channel is put in bypass and the trip unit input is replaced by input from a calibration source. The test input that produces the trip signal is the as-found instrument setting, which can be converted to process units as required, and compared to the AV to demonstrate compliance with the

Technical Specification Surveillance Requirements and to the AFT to demonstrate acceptable trip unit performance. Assuming the as-found instrument setting is within the predetermined trip unit AFT, the trip unit is then calibrated (if required) and left to within the predetermined ALT to meet TSTF-493 guidance.

2. For the full loop surveillance procedure for device calibration to satisfy the Surveillance Requirement, there are typically two ways the calibration may be performed to demonstrate compliance with TSTF-493, consistent with current plant surveillance procedures:

   - The first way is for the entire loop to be bypassed and tested by putting a calibration source in terms of the process parameter to the instrument input of the loop and determining the input required to initiate a trip. This becomes the as-found instrument setting for the loop and can be compared to the loop AV to demonstrate compliance with the Technical Specification Surveillance Requirements and to the AFT to demonstrate acceptable loop performance. Assuming the loop as-found instrument setting is within the predetermined loop AFT, the devices in the loop are then calibrated (if required) and left to within their predetermined loop ALT consistent with current plant surveillance procedures for device calibration to meet TSTF-493 guidance.
   - The second way is that each of the devices or device units (e.g., transmitter and square root converter for flow measurements) in the loop is tested separately, consistent with current plant surveillance procedures and the full loop is not tested as a unit. [[

]]

Based on the current plant surveillance testing, appropriate ALTs and AFTs need to be developed [[ ]] to meet TSTF-493 guidance. [[

]] A summary of the GEH TSTF-493 Methodology is provided in Section 3.4.

3.2 GEH TSTF-493 Methodology – [[ ]]

3.2.1 Objective

The objective of this section is to describe the GEH TSTF-493 Methodology used to implement the performance monitoring guidance of TSTF-493 [[ ]].

3.2.2 Terminology

The following terminology is applicable to [[ ]] that has the TSTF-493 Notes applied in the plant-specific Technical Specifications.

A_C = Instrument Accuracy under calibration conditions [[ ]]

AFT_{TSTF} = AFT consistent with the AFT allowance established in TSTF-493 [[ ]]

AFT = AFT [[ ]] determined by the GEH TSTF-493 Methodology

ALT_{TSTF} = ALT consistent with the ALT allowance established by TSTF-493 [[ ]]

ALT = ALT [[ ]] determined by the GEH TSTF-493 Methodology

AV = Allowable Value derived for the loop using the GEH Instrument Setpoint Methodology

C = Calibration Error for the loop used as the calibration error input to the GEH setpoint calculation using the GEH Instrument Setpoint Methodology

C_{TSTF} = Calibration Error (determined using TSTF-493 definition) [[ ]], defined by TSTF-493 to be equal to $[(M\&TE)^2+(M\&TEr)^2]^{1/2}$

where:

M&TE = Measurement and Test Equipment Accuracy, and

M&TEr = Measurement and Test Equipment Readability Error

D = Instrument Drift [[ ]] in the time period between calibrations

$NTSP_F$ = Final Nominal Trip Setpoint, which is the final NTSP for the instrument loop derived using the GEH Instrument Setpoint Methodology or an NTSP that is more conservative

All instrument errors used [[
]] **± 2σ (i.e., 2 standard deviations errors). This means that approximately 95% of the error data will be contained within the calculated tolerance intervals.** The errors assumed in the determination of the AV, $NTSP_1$ and $NTSP_F$ are consistent with the GEH Instrument Setpoint Methodology.

3.2.3 GEH Methodology for Determining AFT and ALT

The following methodology is used to calculate the AFT and ALT [[
]], and to ensure that they are conservatively consistent with the guidance of TSTF-493.

1. TSTF-493 AFT and ALT Guidance

   $AFT_{TSTF} = (A_C^2 + C_{TSTF}^2 + D^2)^{1/2}$

   $ALT_{TSTF} = (A_C^2 + C_{TSTF}^2)^{1/2}$

2. GEH TSTF-493 Methodology AFT and ALT

   [[

   ]]

This formulation ensures that the AFT and ALT for the loop are conservatively less than (or equal to) the allowances in TSTF-493.

The result of applying the GEH TSTF-493 Methodology [[ ]] for the AFT and ALT is shown in Figures 3-2 and 3-3, respectively. The determination of the limiting or controlling values for the AFT and ALT are dependent on the results of the application of the GEH TSTF-493 Methodology and the magnitude of the instrument uncertainties used.

As shown in Figure 3-2, there are two possible controlling values for the AFT:

1. AV / $NTSP_F$ Margin Controlling – For GEH Instrument Setpoint Methodology, | AV – $NTSP_F$ | is the LER **Avoidance** Margin. Because of the statistics used in the determination of the LER **Avoidance** Margin, it is expected that this will generally be the controlling case.
2. TSTF-493 Controlling – The AFT calculated using the TSTF-493 guidance may be limiting in certain cases. The most likely example is for a setpoint calculation in which the Licensee has included extra margin (greater than the LER **Avoidance** Margin) between the AV and $NTSP_F$.

As shown in Figure 3-3, there are two possible controlling values for the ALT:

1. GEH ALT Controlling – The GEH ALT is an input to the setpoint calculation. It is based on Licensee input and is [[ ]]. As a result, it is expected that this will generally be the controlling case.

2. TSTF-493 Controlling – The ALT calculated using the TSTF-493 guidance may be limiting in certain cases. The most likely case is for a setpoint calculation in which the Licensee has included extra margin in the ALT, and that is used as input to the setpoint calculation.

3.3 GEH TSTF-493 Methodology – [[ ]]

3.3.1 Objective

The objective of this section is to describe the GEH TSTF-493 Methodology used to implement the performance monitoring guidance of TSTF-493 [[

]]

The GEH TSTF-493 Methodology [[

]]

To implement the TSTF-493 Methodology [[

]] $NTSP_F$ is the setpoint used in the trip unit calibration process and also corresponds to the nominal value for the output of the devices in the loop that provide input to the trip unit but do not themselves initiate a trip. [[

]]

3.3.2 Terminology

[[ ]], some plant surveillance procedures allow calibration of a group of devices in the loop as a unit (e.g., calibration of a transmitter and square root converter as a flow unit). In the GEH TSTF-493 Methodology, [[

]]

The following terminology is applicable to any [[ ]] that has the TSTF-493 Notes applied in the plant Technical Specifications.

[[

]]

AV = Allowable Value for the entire loop (channel) derived using the GEH Instrument Setpoint Methodology

[[

]]

$NTSP_F$ = Final Nominal Trip Setpoint, which is the final NTSP [[
]] using the GEH Instrument Setpoint Methodology

All instrument errors used [[
]] **± 2σ errors. This means that approximately 95% of the error data will be contained within the calculated tolerance intervals**. The errors assumed in the determination of the AV and $NTSP_F$ are consistent with the GEH Instrument Setpoint Methodology.

3.3.3 GEH Methodology for Determining AFT and ALT

The following methodology is used to calculate the AFT and ALT [[
]] consistent with the guidance of TSTF-493 for the loop [[
]].

1. TSTF-493 As-Found and As-Left Tolerance Guidance

   [[

]]

The result of applying the GEH TSTF-493 methodology [[ ]] for the AFT and ALT is shown in Figures 3-4 and 3-5, respectively. The determination of the limiting or controlling values for the AFT and ALT are dependent on the results of the application of the GEH TSTF-493 Methodology and the magnitude of the instrument uncertainties used.

As shown in Figure 3-4, there are two possible controlling values for the AFT:

1. AV / $NTSP_F$ Margin Controlling – For GEH Instrument Setpoint Methodology, | AV – $NTSP_F$ | is the LER **Avoidance** Margin. Because of the statistics used in the determination of the LER **Avoidance** Margin, it is expected that this will generally be the controlling case. For this case, [[

]]

2. TSTF-493 Controlling – [[

]], the most likely case is for a setpoint calculation in which the Licensee has included extra margin between the AV and $NTSP_F$ than that required by GEH Instrument Setpoint Methodology for LER avoidance. For this case, [[

]]

As shown in Figure 3-5, there are two possible controlling values for the ALT:

1. GEH ALT Controlling – The GEH ALTs [[ ]] are based on utility input and are [[ ]]. As a result, it is expected that this will generally be the controlling case. For this case, [[ ]] According to GEH Instrument Setpoint Methodology, the GEH ALT is an input to the setpoint calculation and provides additional conservatism in the setpoint margins.
2. TSTF-493 Controlling – The ALT calculated using [[ ]] TSTF-493 guidance may be limiting in certain cases. The most likely case for this to occur is for a setpoint

calculation in which the Licensee has included extra margin in the ALTs provided as input to the setpoint calculation. For this case, [[

]]

3.4 Summary Application of GEH TSTF-493 Methodology

The TSTF-493 Notes for BWRs are applied to Surveillance Requirements for calibration of the entire instrument loop and for the loop trip units (if applicable). As shown in Sections 3.2 and 3.3, the applicable tolerances depend on whether [[

]]

3.4.1 [[ ]]

[[

]]

3.4.2 [[ ]]

[[

]]

3.4.3 Sample Calculations

Sample calculations for [[ ]] are provided in Appendix A. These calculations are provided to illustrate the application of the combined approved GEH Instrument Setpoint Methodology with the GEH TSTF-493 Methodology contained in this document. The calculations are not applicable to any specific plant.

The sample calculations [[ ]] are for a high dome pressure scram. [[ ]], the loop consists of a pressure indicating switch (bistable), and [[ ]] the loop consists of a transmitter and trip unit.

[[ ]] uses typical uncertainties for a high pressure scram initiated by a transmitter and trip unit. The AV and $NTSP_F$ are calculated using the GEH Instrument Setpoint Methodology. The ALTs and AFTs [[ ]] are calculated using the GEH TSTF-493 methodology.

For comparison purposes, the loop uncertainties [[ ]] The same methodologies are used to calculate the AV, $NTSP_F$, and [[ ]]

3.4.4 Compatibility with Site Calibration Procedures

The GEH TSTF-493 methodology for calculating the AFT and ALT [[ ]] does not require any change to the way the devices are currently calibrated. The GEH TSTF-493 Methodology is compatible with existing plant surveillance procedures for calibration of [[ ]], and is consistent with the guidance in TSTF-493. Licensees implementing the GEH TSTF-493 Methodology only need to ensure that the AFT and ALT in the plant surveillance procedures are consistent with the values calculated using this methodology and that the Technical Specification Notes are implemented. No other changes to the existing calibration procedures are required.

3.4.5 Application to Other Setpoint Methodologies

The methodology for calculating the AFT and ALT [[ ]] described in this LTR is based on setpoints that are initially calculated by the GEH Instrument Setpoint Methodology. However, the methodology can be applied to AV and $NTSP_F$ setpoints determined by another NRC-approved setpoint methodology because the formulation for determining the AFTs and ALTs [[ ]] consists of the statistical combination of the uncertainties consistent with the guidance in TSTF-493, and is not dependent on the methodology used to determine the AV and $NTSP_F$ values. Therefore, the setpoint tolerances for [[ ]] determined by the GEH TSTF-493

Methodology can be applied to AV and $NTSP_F$ values calculated by another NRC-approved setpoint methodology.

Figure 3-1 GEH Instrument Setpoint Methodology Overview

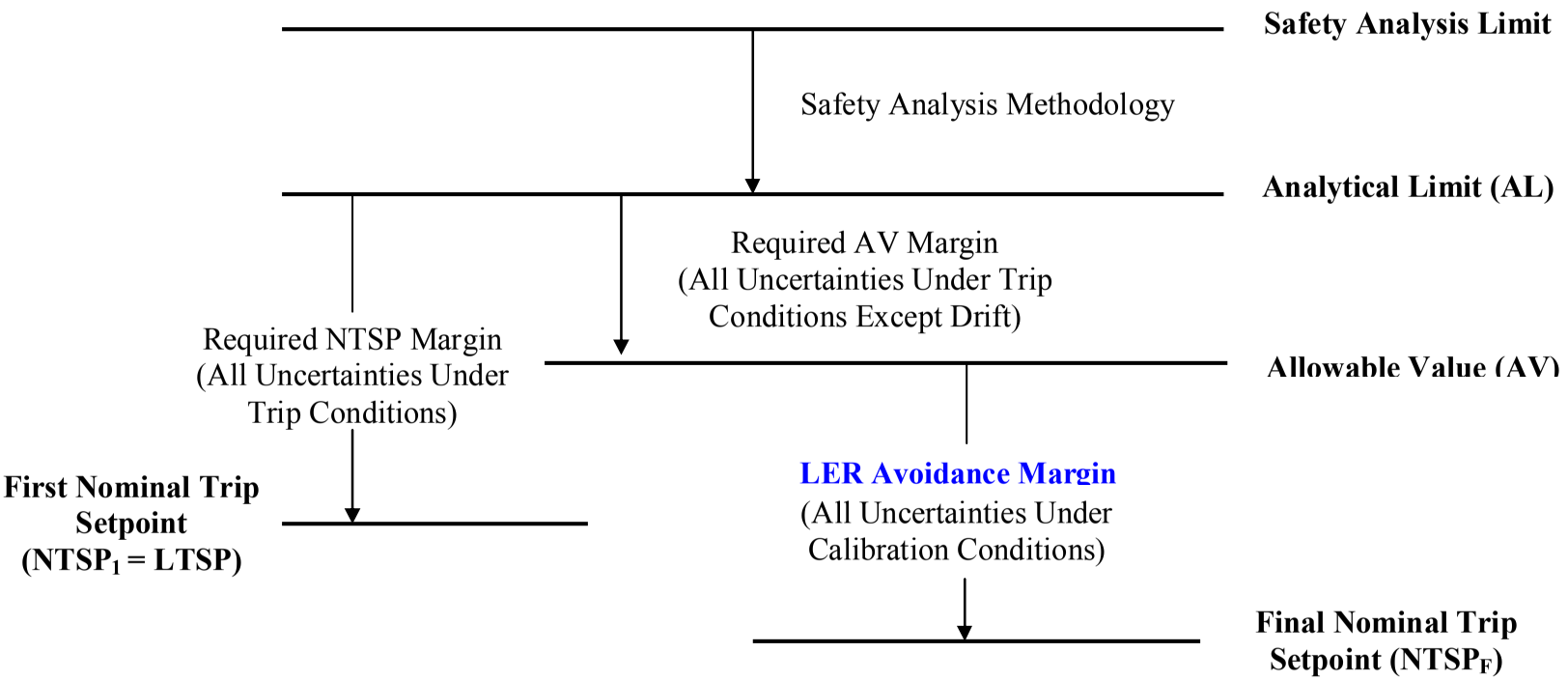


Figure 3-2 GEH AFT Implementation [[ ]]

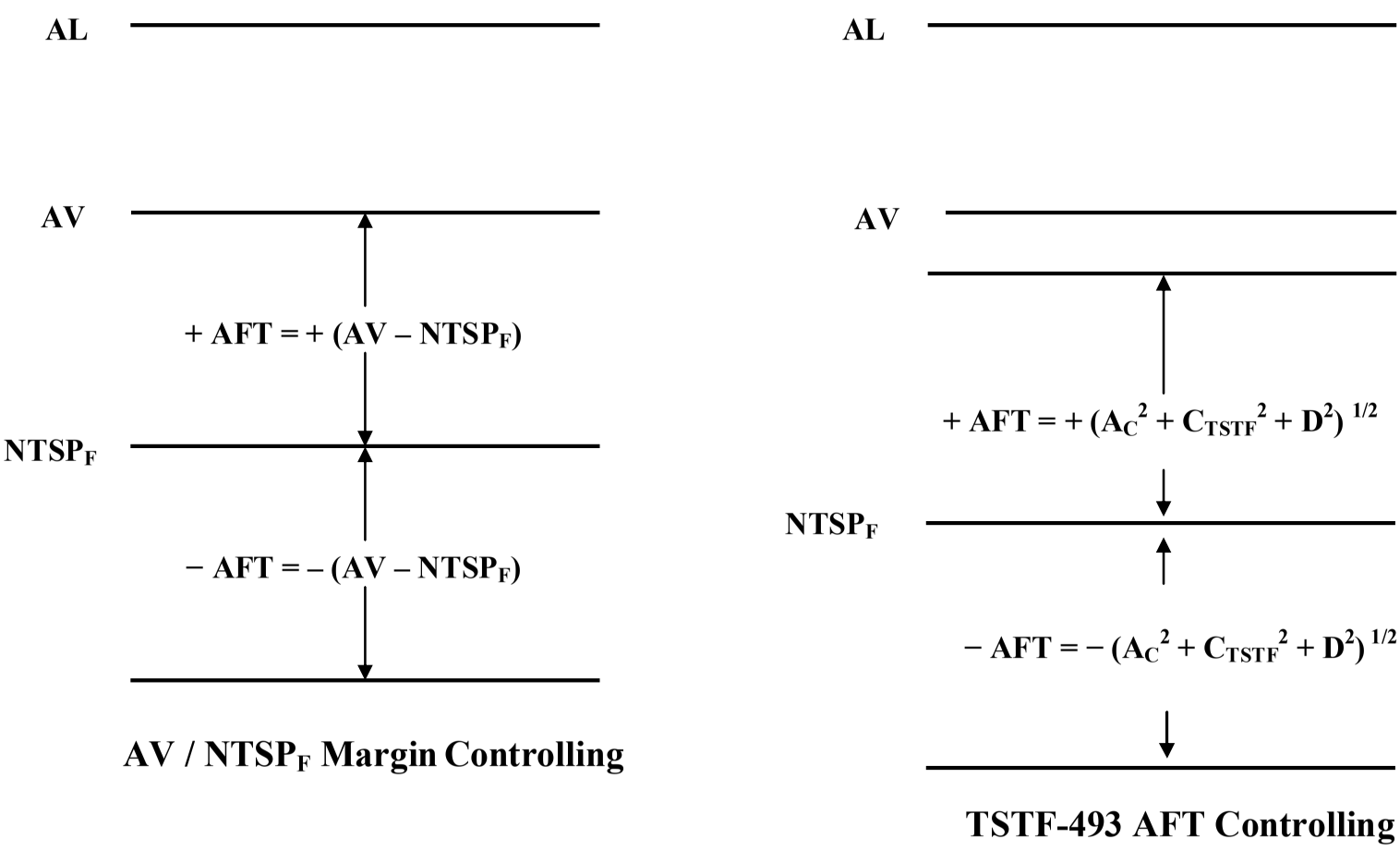


Figure 3-3 GEH ALT Implementation [[ ]]

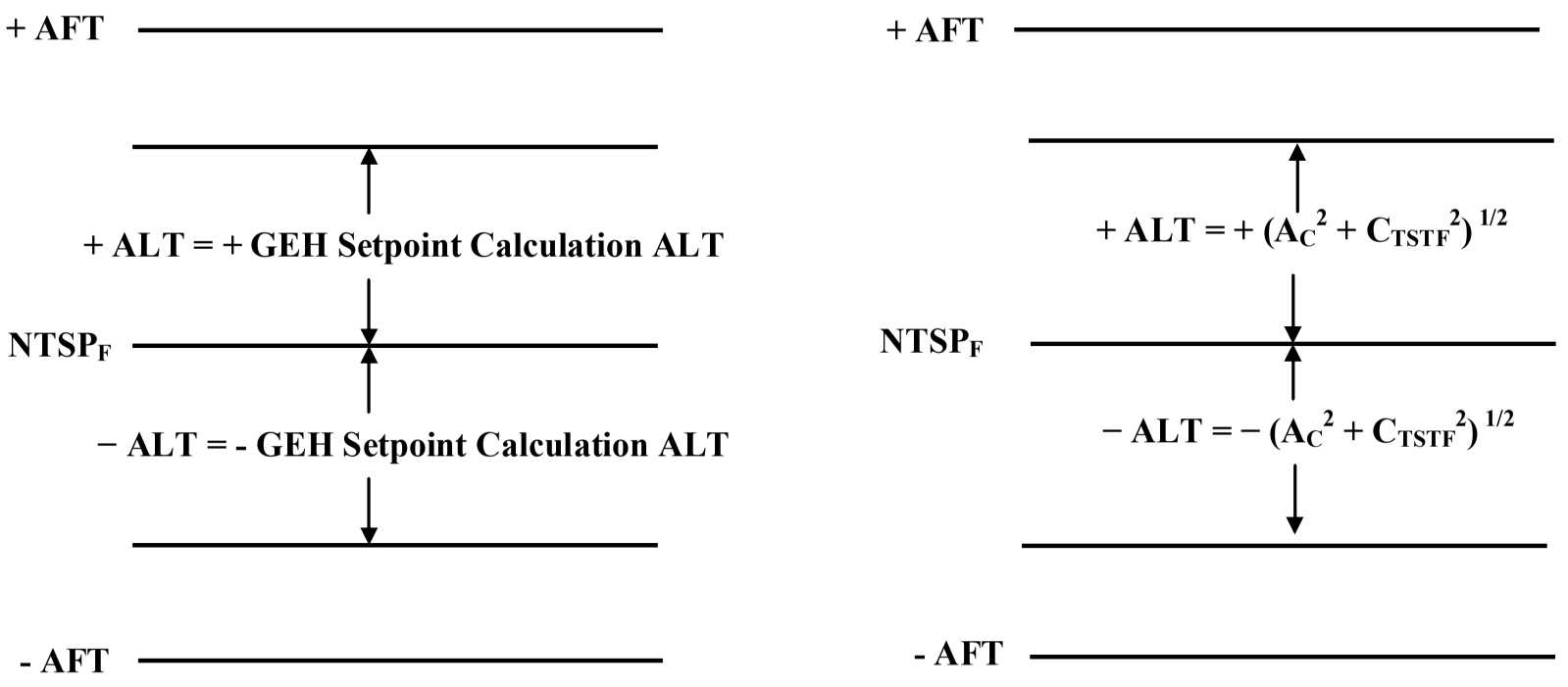


Figure 3-4 [[ ]]

[[

]]

Figure 3-5 [[ ]]

[[

]]

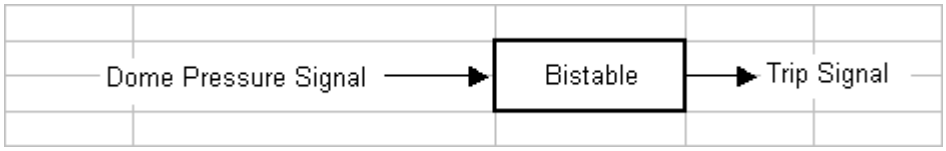
4.0 References

1. Letter, Technical Specifications Task Force (TSTF) to U.S. Nuclear Regulatory Commission (NRC), "Transmittal of Revised TSTF-493 Revision 4," TSTF-09-29, dated January 5, 2010 [ML100060064]; and Letter, TSTF to NRC, "Transmittal of TSTF-493 Revision 4, Errata," TSTF-10-07, dated April 23, 2010 [ML101160026].
2. NEDC-31336P-A, "General Electric Instrument Setpoint Methodology," September 1996.
3. NUREG 1433, Revision 3.1, Volume 1, "Standard Technical Specifications General Electric Plants, BWR/4;" and NUREG 1433, Revision 3.1, Volume 2, "Standard Technical Specifications General Electric Plants, BWR/4, Bases."
4. NUREG 1434, Revision 3.1, Volume 1, "Standard Technical Specifications General Electric Plants, BWR/6;" and NUREG 1434, Revision 3.1, Volume 2, "Standard Technical Specifications General Electric Plants, BWR/6, Bases."
5. NRC Regulatory Issue Summary 2006-17, "NRC Staff Position on the Requirements of 10 CFR 50.36, 'Technical Specifications,' Regarding Limiting Safety System Settings During Periodic Testing and Calibration of Instrument Channels," August 24, 2006.

Appendix A Sample Calculations

This appendix contains sample calculations for High Dome Pressure Scram implemented by both a loop containing a [[ ]] (bistable), and a [[ ]] (transmitter and trip unit), as described in Section 3.4.3. The setpoint calculation is based on GEH Instrument Setpoint Methodology and instrument accuracy and drift errors for a Rosemount Transmitter and Rosemount Trip Unit provided in Reference 2, and calibration equipment errors from typical site calibration procedures. [[ ]] (Example 1 of this Appendix) it was assumed that the errors [[ ]] shown in Example 2 of this Appendix.

Example 1: [[ ]]



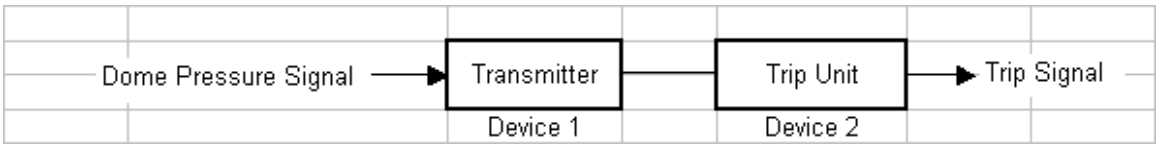
a) Input Parameters

b) Calculation Results

[[

]]

Example 2: [[ ]]



a) Input Parameters b) Calculation Results

[[

]]