# Industry/TSTF Standard Technical Specification Change Traveler

**Revise Channel Calibration Definition to Address Non-Adjustable Sensors**

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

Classification: 1) Technical Change Recommended for CLIIP?: Yes

Priority: 1)High

Simple or Complex Change: Simple

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## 1.0 Description

The third sentence in the definition of CHANNEL CALIBRATION is modified to state, "Calibration of instrument channels with *sensors that are not adjustable, such as* resistance temperature detector (RTD) or thermocouple sensors, may consist of an inplace qualitative assessment of sensor behavior and normal calibration of the remaining adjustable devices in the channel."



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## 2.0 Proposed Change

The definition of CHANNEL CALIBRATION is modified to state, "Calibration of instrument channels with *sensors that are not adjustable, such as* resistance temperature detector (RTD) or thermocouple sensors, may consist of an inplace qualitative assessment of sensor behavior and normal calibration of the remaining adjustable devices in the channel." This change will allow the CHANNEL CALIBRATION definition to be applied verbatim.

## 3.0 Background

The definition of CHANNEL CALIBRATION states:

> A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output such that it responds within the necessary range and accuracy to known values of the parameter that the channel monitors. The CHANNEL CALIBRATION shall encompass all devices in the channel required for channel OPERABILITY. Calibration of instrument channels with resistance temperature detector (RTD) or thermocouple sensors may consist of an inplace qualitative assessment of sensor behavior and normal calibration of the remaining adjustable devices in the channel. The CHANNEL CALIBRATION may be performed by means of any series of sequential, overlapping, or total channel steps.

The exception for RTDs and thermocouple sensors (T/Cs) is supplied because these devices are not adjustable and cannot readily be manipulated to provide the range of input signal needed to calibrate the channel "within the necessary range and accuracy to known values of the parameter that the channel monitors." Therefore, an exception is provided to the requirement for the calibration to "encompass all devices in the channel required for channel OPERABILITY." The definition allows a signal to be injected down stream of the sensor to calibrate the remainder of the channel, without including the RTD or T/C in the calibration.

The current definition of CHANNEL CALIBRATION is misleading. RTDs and T/Cs are not the only sensors that cannot be readily manipulated to provide the range of input signals needed to calibrate the channel. For instance, potential transformers, used in undervoltage sensing, and flow elements (e.g., orifices, annubars, or pitot tubes), such as those used to monitor AFW flow, also cannot be readily manipulated to provide a range of signals for channel calibration. Therefore, calibration of channels using these additional types of devices also does not meet the verbatim definition of a CHANNEL CALIBRATION and an exception is needed.



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## 4.0 Technical Analysis

The purpose of a CHANNEL CALIBRATION is to verify that an instrument channel responds as predicted over the range of conditions for which the instrument channel is assumed to function. A CHANNEL CALIBRATION is typically performed by manipulating the input sensor to provide values over the expected range and adjusting the channel devices such that the output of the channel responds appropriately to the sensor input. However, some sensors cannot be adjusted to provide a range of outputs. For example, the only method of using an RTD or thermocouple to provide a range of values is to remove the RTD or thermocouple from the system and place it in a controlled temperature bath. That is not practical for the temperatures experienced in the Reactor Coolant System. Therefore, the existing definition of CHANNEL CALIBRATION contains an allowance for a signal to be injected downstream of the sensor for the purpose of calibrating the remainder of the channel and performance of an inplace qualitative assessment of the sensor behavior.

There are other sensors in addition to RTDs and thermocouples which cannot be manipulated to provide a range of output signals for the purpose of calibrating the remainder of the channel. For instance, potential transformers are used to sense undervoltage conditions. Manipulating a potential transformer over the expected range of conditions it might experience would require removal of the potential transformer from the system. Also, the potential transformer is not adjustable in that it maintains a consistent input / output relationship which cannot be altered without physically altering the transformer. Another non-adjustable sensor is a flow element. Flow elements sense flow rates based on pressure drops across orifices, annubars, or pitot tubes. These devices also have a fixed input / output relationship and conditions cannot be readily manipulated to provide a range of sensor output values to be used in a CHANNEL CALIBRATION.

In order to address these, and potentially other, non-adjustable sensing devices in channels for which the Technical Specifications require a CHANNEL CALIBRATION, it is proposed to alter the definition to make RTDs and thermocouples examples of non-adjustable sensors, not an exclusive list. This does not change the intent of the CHANNEL CALIBRATION definition, but applies the existing exception for RTDs and thermocouples to other similar, non-adjustable devices.



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## 5.0 Regulatory Analysis

### 5.1 No Signficant Hazards Determination

The TSTF has evaluated whether or not a significant hazards consideration is involved with the proposed generic change by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

Response: No.

The proposed change revises the definition of CHANNEL CALIBRATION to allow any non-adjustable sensor, not only resistance temperature detectors (RTDs) and thermocouples, to be qualitatively assessed with the remainder of the channel being calibrated normally. Channel calibration is not an initiator to any accident previously evaluated. Consequently, the probability of an accident previously evaluated is not significantly increased. This change will not affect the ability of the channel being calibrated to respond as assumed in any accident previously evaluated. The qualitative evaluation of sensor behavior for non-adjustable sensors will provide an accurate indication of sensor operation and will assure that portion of the channel is operating properly. Therefore, the consequences of an accident previously evaluated are not significantly increased by this change. Therefore, this change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

Response: No.

The proposed change revises the definition of CHANNEL CALIBRATION to allow any non-adjustable sensor, not only resistance temperature detectors (RTDs) and thermocouples, to be qualitatively assessed with the remainder of the channel being calibrated normally. The proposed change does not involve a physical alteration of the plant (no new or different type of equipment will be installed) or a change in the methods governing normal plant operation. The qualitative evaluation of sensor behavior being added to the CHANNEL CALIBRATION definition is currently being performed on these types of sensors as it is physically impossible to calibrate these types of devices. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Does the proposed change involve a significant reduction in a margin of safety?

Response: No.

The proposed change revises the definition of CHANNEL CALIBRATION to allow any non-adjustable sensor, not only resistance temperature detectors (RTDs) and thermocouples, to be qualitatively assessed with the remainder of the channel being calibrated normally. This change to the CHANNEL CALIBRATION definition does not alter the ability of a channel to respond as designed or as assumed in the safety analyses. Therefore, this change does not involve a significant reduction in a margin of safety.

Based on the above, the TSTF 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.



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## 5.2 Applicable Regulatory Requirements / Criteria

The proposed change does not affect the application of any regulatory requirement. The proposed change clarifies the intent of existing requirements. Therefore, 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 approval of the proposed change will not be inimical to the common defense and security or to the health and safety of the public

## 6.0 Environmental Consideration

A review has determined that 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 effluent 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.

## 7.0 References

None

## Revision History

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

Revision Proposed by: North Anna

Revision Description:
Original Issue

### Owners Group Review Information

Date Originated by OG: 18-Jul-01

Owners Group Comments:
(No Comments)

Owners Group Resolution: Approved Date: 18-Jul-01

### TSTF Review Information

TSTF Received Date: 01-Nov-01 Date Distributed for Review: 13-Jan-02

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

TSTF Comments:

(No Comments)

TSTF Resolution: Approved Date: 05-Feb-02

### NRC Review Information



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

NRC Received Date: 03-Jun-02

## Affected Technical Specifications

1.0 Definitions - Channel Calibration



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## 1.0 USE AND APPLICATION

### 1.1 Definitions

**- NOTE -**

The defined terms of this section appear in capitalized type and are applicable throughout these Technical Specifications and Bases.

| Term | Definition |
|---|---|
| ACTIONS | ACTIONS shall be that part of a Specification that prescribes Required Actions to be taken under designated Conditions within specified Completion Times. |
| ALLOWABLE THERMAL POWER | ALLOWABLE THERMAL POWER shall be the maximum reactor core heat transfer rate to the reactor coolant permitted by consideration of the number and configuration of reactor coolant pumps (RCPs) in operation. |
| AXIAL POWER IMBALANCE | AXIAL POWER IMBALANCE shall be the power in the top half of the core, expressed as a percentage of RATED THERMAL POWER (RTP), minus the power in the bottom half of the core, expressed as a percentage of RTP. |
| AXIAL POWER SHAPING RODS (APSRs) | APSRs shall be control components used to control the axial power distribution of the reactor core. The APSRs are positioned manually by the operator and are not trippable. |
| CHANNEL CALIBRATION | A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output such that it responds within the necessary range and accuracy to known values of the parameter that the channel monitors. The CHANNEL CALIBRATION shall encompass all devices in the channel required for channel OPERABILITY and the CHANNEL FUNCTIONAL TEST. Calibration of instrument channels with resistance temperature detector (RTD) or thermocouple sensors may consist of an inplace qualitative assessment of sensor behavior and normal calibration of the remaining adjustable devices in the channel. The CHANNEL CALIBRATION may be performed by means of any series of sequential, overlapping, or total channel steps. |
| CHANNEL CHECK | A CHANNEL CHECK shall be the qualitative assessment, by observation, of channel behavior during operation. This determination shall include, where possible, comparison of |

sensors that are not adjustable, such as

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| ACTIONS | ACTIONS shall be that part of a Specification that prescribes Required Actions to be taken under designated Conditions within specified Completion Times. |
| ACTUATION LOGIC TEST | An ACTUATION LOGIC TEST shall be the application of various simulated or actual input combinations in conjunction with each possible interlock logic state required for OPERABILITY of a logic circuit and the verification of the required logic output. The ACTUATION LOGIC TEST, as a minimum, shall include a continuity check of output devices. |
| AXIAL FLUX DIFFERENCE (AFD) | AFD shall be the difference in normalized flux signals between the [top and bottom halves of a two section excore neutron detector]. |
| CHANNEL CALIBRATION | A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output such that it responds within the necessary range and accuracy to known values of the parameter that the channel monitors. The CHANNEL CALIBRATION shall encompass all devices in the channel required for channel OPERABILITY. Calibration of instrument channels with resistance temperature detector (RTD) or thermocouple sensors may consist of an inplace qualitative assessment of sensor behavior and normal calibration of the remaining adjustable devices in the channel. The CHANNEL CALIBRATION may be performed by means of any series of sequential, overlapping, or total channel steps. |
| CHANNEL CHECK | A CHANNEL CHECK shall be the qualitative assessment, by observation, of channel behavior during operation. This determination shall include, where possible, comparison of the channel indication and status to other indications or status derived from independent instrument channels measuring the same parameter. |

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| ACTIONS | ACTIONS shall be that part of a Specification that prescribes Required Actions to be taken under designated Conditions within specified Completion Times. |
| AXIAL SHAPE INDEX (ASI) | ASI shall be the power generated in the lower half of the core less the power generated in the upper half of the core, divided by the sum of the power generated in the lower and upper halves of the core.<br><br>ASI = (LOWER - UPPER) / (LOWER + UPPER) |
| AZIMUTHAL POWER TILT ($T_q$) - Digital | AZIMUTHAL POWER TILT shall be the power asymmetry between azimuthally symmetric fuel assemblies. |
| AZIMUTHAL POWER TILT ($T_q$) - Analog | AZIMUTHAL POWER TILT shall be the maximum of the difference between the power generated in any core quadrant (upper or lower) ($P_{quad}$) and the average power of all quadrants ($P_{avg}$) in that half (upper or lower) of the core, divided by the average power of all quadrants in that half (upper or lower) of the core.<br><br>$T_q = Max \mid (P_{quad} - P_{avg}) / P_{avg} \mid$ |
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| ACTIONS | ACTIONS shall be that part of a Specification that prescribes Required Actions to be taken under designated Conditions within specified Completion Times. |
| AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR) | The APLHGR shall be applicable to a specific planar height and is equal to the sum of the [LHGRs] [heat generation rate per unit length of fuel rod] for all the fuel rods in the specified bundle at the specified height divided by the number of fuel rods in the fuel bundle [at the height]. |
| CHANNEL CALIBRATION | A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output such that it responds within the necessary range and accuracy to known values of the parameter that the channel monitors. The CHANNEL CALIBRATION shall encompass all devices in the channel required for channel OPERABILITY and the CHANNEL FUNCTIONAL TEST. Calibration of instrument channels with resistance temperature detector (RTD) or thermocouple sensors may consist of an inplace qualitative assessment of sensor behavior and normal calibration of the remaining adjustable devices in the channel. The CHANNEL CALIBRATION may be performed by means of any series of sequential, overlapping, or total channel steps. |
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