# Westinghouse Responses to U.S. Nuclear Regulatory Commission Request for Additional Information for the Topical Reports (TRs) WCAP-17503-P/WCAP-17503-NP, Revision 0, 'Westinghouse Generic Setpoint Control Program Recommendations' and WCAP-17504-P/WCAP-17504-NP, Revision 0, 'Westinghouse Generic Setpoint Methodology' (TAC No. ME8115) (Non-Proprietary)

**June 2015**

Westinghouse Electric Company
1000 Westinghouse Drive
Cranberry Township, PA 16066

# Westinghouse Responses to NRC RAIs on WCAP-17503-P

## 1. Intent of WCAP 17503-P, Revision 0, and WCAP-17503-NP, Revision 0, Topical Report

The title of the TR is "Westinghouse Generic Setpoint Control Program Recommendations." From this title, the staff anticipated that the purpose of this document is to provide licensees who intend to use the Westinghouse Setpoint Methodology for determination of CSA, nominal trip setpoint, as-found tolerance, and ALT values (etc.) as described within Westinghouse WCAP-17504-P/WCAP-17504-NP, Revision 0, with guidance for ensuring that inputs and information needed for determination of these values are properly identified, controlled, interpreted, and used or applied. Further, it appears to the NRC staff that WCAP-17503-P/ WCAP-17503-NP, Revision 0, is intended to provide guidance for ensuring that outputs from these calculations are appropriately fed back to applicable maintenance, surveillance, and calibration procedures and other plant documents so appropriate plant corrective action program actions can take place, leading to proper update of the affected setpoint calculations when needed. However, the NRC staff notes that while the document provides detailed information identifying the inputs and outputs to be controlled, there is little or no guidance describing how or why such information needs to be controlled. The Program Goals and Objective section states: "the setpoint control program (SCP) provides a means of continuous evaluation of changes to equipment, procedures and processes that provide design input to the Westinghouse Setpoint Methodology. This document describes the scope of the SCP and provides insight to the hierarchy of the various components of the SCP."

However, the NRC staff notes there is little or no guidance for implementing programmatic controls to assure the Westinghouse Setpoint Methodology will be appropriately, routinely, and consistently applied. There are statements within the Scope section as follows:

> "Detailed descriptions of the various plant processes and plant administrative controls are not provided as these will be provided on a plant specific basis. However, key points and functions are identified to provide an understanding of the purpose of each component of the SCP. Further definition of each of the plant processes will be provided via the generation of reports or procedures or implementation plans that are produced on a plant specific basis."

The staff views the title of this report to be a bit misleading, in that the document does not provide actual recommendations to licensees for implementing a program/process for setpoint information control, but only describes the inputs, outputs, and relationships that need to be controlled, if one were to implement a setpoint control program incorporating the Westinghouse Setpoint Methodology. A more appropriate title might be "Westinghouse Setpoint Methodology Data Considerations for Inclusion within a Licensee-Developed Setpoint Control Program."

Please describe the actual intent, scope, and limitations of this document.

Westinghouse Response:

In the above, Westinghouse has determined that three significant points were identified. They will be addressed in sequence below.

First paragraph excerpt: "However, the NRC staff notes that while the document provides detailed information identifying the inputs and outputs to be controlled, there is little or no guidance describing how or why such information needs to be controlled."

With respect to guidance on how to control information; each plant has its own system for generation and control of procedures. With neither regulatory authority nor contractual oversight, Westinghouse must work with a utility on a plant specific basis with the system in place at their plant to meet the guidance of WCAP-17503-P. Westinghouse proposes to do exactly that. When a utility contracts with Westinghouse for setpoint calculations, Westinghouse requests and reviews the appropriate information, i.e., procedures, vendor documents, safety analyses, etc., recognizing up front that the calculation is a "snapshot in time" that may not reflect (or bound) the effects of changes made in the future to those same procedures, vendor documents (hardware) or safety analyses. Thus, when discussing a Setpoint Control Program (SCP) in the generic sense, Westinghouse must limit the discussion to identification of the characteristics and sensitive parameters of the Westinghouse Setpoint Methodology (WSM) and to recommend control of those procedures, vendor documents and safety analyses. Recognizing this, Westinghouse will address these limitations by ensuring that the plant specific SCP reflects the additional control expected by the NRC. Therefore, for utilities that contract with Westinghouse for work on and assistance with an SCP, the NRC can expect the following:

[ ] a,c

a,c

The above addresses the "how." As to the "why," it is suggested that any input parameter that is utilized in a protection function uncertainty calculation should be controlled. While the uncertainty magnitude may be small, in many cases the magnitude is controlled by the process, e.g., calibration (As Left), drift determination (As Found), M&TE (actual hardware utilized and its calibration and maintenance). Therefore, it is appropriate to control all input parameters to an uncertainty calculation, per the guidance of this WCAP.

Second paragraph excerpt: "However, the NRC staff notes there is little or no guidance for implementing programmatic controls to assure the Westinghouse Setpoint Methodology will be appropriately, routinely, and consistently applied."

As noted above, with neither regulatory authority nor contractual oversight, Westinghouse has limited the scope of WCAP-17503 to identification of the WSM sensitivities and programmatic guidance. Once contracted, it is Westinghouse's preferred approach to work with the utility's plant specific existing programs and procedures to provide the appropriate controls. It is believed that WCAP-17503, in conjunction with WCAP-17504, does provide the information necessary to define where Westinghouse will be looking for the presence or establishment of the appropriate procedures and controls. In many cases, it is expected that a review of existing procedures and programs will result in low to moderate level changes to provide the controls necessary.

Third paragraph excerpt: "The NRC staff views the title of this report to be a bit misleading, in that the document does not provide actual recommendations to licensees for implementing a program/process for setpoint information control, but only describes the inputs, outputs, and relationships that need to be controlled, if one were to implement a setpoint control program incorporating the Westinghouse Setpoint Methodology. A more appropriate title might be "Westinghouse Setpoint Methodology Data Considerations for Inclusion within a Licensee-Developed Setpoint Control Program."

If after further discussion with the NRC staff it is determined appropriate, Westinghouse will change the document title of the approved version of WCAP-17503, and where required in the approved version WCAP-17504, which references WCAP-17503.

## 2. Current Version of Staff Guidance for Technical Specification Task Force (TSTF) Traveler TSTF-493 Option B.

The NRC staff notes the "Introduction" section and Section 5.1.10 of WCAP-17503-P/WCAP-17503-NP, Revision 0, makes reference to the TSTF-493, Revision 4, (TSTF-493) - Option B, for current NSSS plants. This Option, if voluntarily exercised, would enable licensees to revise their plant-specific TSs by relocating allowable values and nominal trip setpoints from TS Section 3.3, "Instrumentation," to the plant's Final Safety Analysis Report (FSAR) reference or to a document incorporated into the facility FSAR by reference and by adding Administrative Control TS 5.5.[ ], "Setpoint Control Program (SCP)." The TSs SCP program would require assessment of channel performance during testing to verify that instrument channel settings are consistent with values established by the NRC-approved setpoint methodology/ies for each plant. The TS SCP would also apply new surveillance test evaluation criteria to certain instrument functions, consistent with Attachment A of NRC-approved TSTF-493, Revision 4. The availability of this TSs voluntary improvement was announced in the Federal Register.

Subsequent to the initial issuance of the Federal Register Notice of Availability, the NRC staff developed additional guidance and provided clarification regarding its expectations for licensee submittals describing the licensee's intent to develop a SCP under TSTF-493 Option B. This additional guidance was provided in draft form to the BWR/PWR Owner's Group TSTF for comments in January 2013. The NRC staff's understanding is that Westinghouse may have received a copy of this draft additional guidance for its comments and use. If not, please let the NRC staff know and the staff will ensure that a copy is forwarded to you.

If you have had an opportunity to review and comment on the staff's draft additional guidance, please provide your evaluation comparing the guidance contained in WCAP-17503-P/ WCAP-17503-NP, Revision 0, with the staff's additional guidance transmitted to the TSTF.

Westinghouse Response:

Westinghouse has given the draft guidance document considerable thought since it was made available to the BWR/PWR Owner's Group Technical Specification Task Force. In general, Westinghouse is in agreement with the information believed to be appropriate for NRC review of an SCP submittal. Westinghouse has identified where and how this information may be contained, i.e., in Westinghouse generic WCAPs, Westinghouse plant specific WCAPs and/or plant supplied documents and procedures in the attached commented draft guidance document, noted as "Appendix A." While the basic document is open literature to the public, Westinghouse considers the highlighting and comments of a highly commercial nature and thus has marked the attached as Westinghouse Proprietary information.

## 3. Interaction with other Technical Specification Initiatives—TSTF-425

TS Initiative 5b, "Relocation of Most Surveillance Requirement Frequency Requirements from Technical Specifications to a Licensee-Controlled Program" resulted in the development of TSTF-425, which, if adopted, permits most surveillance requirement frequencies to be determined by the licensee through a process defined in an administrative TSs program (approved July 2009). If a licensee were to adopt this program, it would be permitted to follow the guidance of NEI 04-10, which requires performance monitoring of structures, systems & components whose surveillance frequency has been revised as part of a feedback process to assure the change in test frequency has not resulted in degradation of equipment performance and operational safety. The surveillance frequency/interval is an input to the determination of the amount of uncertainty in instrument channel performance due to drift. Uncertainty due to drift, is to be accounted for in both the total loop uncertainty calculations and the determination of appropriate as-found tolerance.

Please describe any additional guidance or recommendations to ensure that technical specification improvement programs and initiatives (such as the surveillance frequency control program described above) adopted by licensees will be closely coordinated as inputs (potentially subject to occasional changes) to the instrument setpoint and surveillance requirements portion of a licensee's SCP.

Westinghouse Response:

The SCP guidelines proposed in this document define a defense in depth approach. For example, Page 6 of WCAP-17503 provides a reasonable list of items that could result in a change to an input to an uncertainty calculation that could have an effect on a control or protection function setpoint. That list should be incorporated into the plant's Change Control Program. Then programs like TSTF-425, would be included as a potential initiator of a setpoint change, e.g., [

]a,c. While TSTF-425 may not provide guidance on what evaluations must be performed, WCAP-17504 does, [

]a,c. Thus, the tools would be in place to evaluate the effects of changes prior to implementation, e.g., [

]a,c. The same can be said for changes [

]a,c

a,c

## 4. Consideration of Vendor Documents

Section 5.3 of WCAP-17503-P/WCAP-17503-NP, Revision 0, describes the applicability of vendor documents to the Westinghouse Setpoint Methodology, and provides a list of example vendor documents to be considered in the application of the Setpoint Methodology. The statement is made: "There are aspects of various documents that Westinghouse does not consider appropriate for the WSM and thus does not comply with or utilize in the Westinghouse methodology or calculations." Please elaborate on this statement; i.e., describe the aspects or types of information described in the example vendor documents that are not considered appropriate for use with the Westinghouse Setpoint Methodology.

Westinghouse Response:

Westinghouse will revise the statement in WCAP-17503 to provide clarification. Westinghouse, in conjunction with the utility, reviews the applicability of the vendor documentation to the plant when performing uncertainty calculations. Westinghouse and the utility then agree on the use of the vendor information as design input to the uncertainty calculations. The vendor information should then be controlled by the plant SCP. There may be instances where the vendor specifications are not applicable as written. For example, the specifications may have been prepared for the larger I&C industry, not specifically for use in the nuclear industry. Therefore, the specifications may not address all the necessary information for the uncertainty calculations, and other sources of information may be required, e.g., supplemental vendor test information, or industry operating history. Also, after sufficient plant surveillance data has been introduced into the trending program and device drift has been determined, it would be appropriate to use the plant drift value in lieu of vendor specifications.

Westinghouse proposes to reword this section in the approved version of WCAP-17503 as follows:

Noted below are typical industry equipment vendor documents Westinghouse considers in the WSM or SCP depending on the transmitters installed. It should not be construed that consideration implies unqualified endorsement. Westinghouse reviews the applicability of the vendor information to the uncertainty calculations and uses the information as appropriate.

## 5. Consideration of Worst-Case M&TE

Section 5.4.3 of WCAP-17503-P/ WCAP-17503-NP, Revision 0, describes the relationship of the use of plant surveillance procedures as input to the application of the Westinghouse Setpoint Methodology. Section 5.4.3 states: "Operating plant surveillance procedures typically identify M&TE by make and model or equivalent accuracy that must be used in the performance of the procedure. The WSM reflects the accuracy of operating plant worst case M&TE or makes recommendations with regards to new plant M&TE, e.g., DMM, digital pressure gauge, decade resistance box, for a given surveillance procedure. The SCP shall assure that a formal hierarchy of review is established via the plant surveillance procedures to address changes to M&TE used in the plant."

a) Please clarify, using examples, what is meant by assurance of a "formal hierarchy of review".

Westinghouse Response:

There are multiple means to identify the M&TE or the accuracy of M&TE that must be used in the performance of calibration or surveillance. The most straight forward approach is to explicitly identify in a calibration or surveillance procedure the minimum accuracy required, e.g., X psig, Y millivolts, Z Ohms. Another approach is to specify a specific device, e.g., Fluke 8842A on the 20 VDC range, Keithley 2000 on the 1 VDC range. In many cases when the latter approach is used the phrase "or equivalent," is also specified, to allow the use of an equal or more accurate device if the specified device is not available. The "or equivalent" M&TE may be used once equivalency (or better) has been established and documented. In the event that a transmitter or process rack is changed to a different vendor, the M&TE requirements may change. At which point, a thorough review of the M&TE requirements is in order. [

]$^{a,c}$

a,c

b) This approach to handling M&TE data seems at odds with the description of M&TE uncertainty in the Westinghouse Setpoint Methodology TR, where it appears to the staff that the Westinghouse uncertainty expressions assume that the accuracy rating of the reference measuring means for calibrating (M&TE) is always one-tenth or better than that of the M&TE device being calibrated, and the resulting M&TE uncertainty is always one-tenth or better than that of the sensor or group of rack devices under test. Is the plant actual or worst-case M&TE uncertainty to be considered in the application of the Westinghouse Setpoint Methodology, or not?

Westinghouse Response:

Please see the Westinghouse responses to NRC RAI 3 on WCAP-17504-P. When uncertainty calculations are performed by Westinghouse, the calibration and surveillance procedure worst case (limiting) M&TE are determined. Thus, the SCA:SMTE and RCA:RMTE limiting ratios are evaluated for each function. If the limiting ratio of SCA:SMTE (or RCA:RMTE) is less than 10:1; Westinghouse includes the magnitude of SMTE (or RMTE) in the uncertainty calculation.

c) Section 6.2 of WCAP-17503-P/ WCAP-17503-NP, Revision 0, describes the effects of a 5:1 ratio of calibrated device to M&TE uncertainty is acceptable. However, no guidance is provided describing the conditions under which the uncertainty of M&TE needs to be specifically accounted for in the calculations of nominal trip setpoint or As-Found and As-Left Tolerances, as opposed to the conditions when one can assume the uncertainty is negligible and not to be specifically accounted for.

Westinghouse Response:

With respect to determination of the CSA, which evaluates the acceptability of the NTS, as noted above, the M&TE should be explicitly addressed when the SCA:SMTE or RCA:RMTE ratio is less than 10:1. With respect to As Left and As Found tolerances (ALT and AFT), Westinghouse does not recommend the inclusion of M&TE errors in their determination. Using the Westinghouse Setpoint Methodology defined in WCAP-17504-P:

- Transmitters
    - ALT = SCA – vendor defined reference accuracy
    - AFT = SD – initially vendor defined drift magnitude
- Process Racks
    - ALT = RCA – vendor defined reference accuracy
    - AFT = ALT = RCA – vendor defined reference accuracy

It is a Westinghouse position that neither SMTE nor RMTE should be included in the definition of ALT or AFT.

With respect to the acceptability of a 5:1 Calibration Accuracy:M&TE ratio noted in the section, it was intended to identify that strict adherence to a 10:1 ratio is not required. However, as noted above, any ratio less than 10:1 must be explicitly addressed in the uncertainty calculation and the equation: $CSA \leq |SAL - NTS|$ must be satisfied, i.e., Margin ≥ 0.0 % span.

## 6. Documentation of the Source of Data Derived from Plant Safety Analyses

Section 5.5 of WCAP-17503-P/ WCAP-17503-NP, Revision 0, describes the use of safety analysis data as input to the Westinghouse Setpoint Methodology, however there is no guidance provided to licensees to document and control the source of the data derived from plant safety analyses. Please describe the guidance that will be provided to licensees on the need for coordination of setpoint calculation input data with any changes made to plant safety analyses as a result of updated safety analysis modeling or plant configuration changes (e.g., as a result of the installation of new design steam generators.)

Westinghouse Response:

Section 5.5 identifies that the plant Safety Analyses contained in Chapter 15 of the UFSAR are a source of input for the control and protection function uncertainty calculations, specifically, the Safety Analysis Limit (SAL) [ ]$^{a,c}$. This information is reviewed by the holder of the Analysis of Record (AOR) for each reload and major plant modification. Section 3 of WCAP-17503, page 6, provides a detailed listing, with examples, of equipment modifications, plant changes, procedure changes, and items to which the Westinghouse Setpoint Methodology has demonstrated sensitivity. However, a more comprehensive listing is contained in the Section 3 tables in the Westinghouse provided plant specific uncertainty calculation (WSM) WCAP that is a necessary part of any Setpoint Control Program for a Westinghouse NSSS. The most comprehensive evaluation of Westinghouse Setpoint Methodology parameter to transient or modification sensitivity would be performed by Westinghouse. Westinghouse includes in the plant specific Westinghouse Setpoint Control Program WCAP statements providing equivalent guidance. Regulatory requirements already exist for control of the AOR on the holder of the safety analyses. However, to ensure appropriate treatment and coordination, Westinghouse will provide guidance identifying an explicit requirement within the plant procedures for review of the effects on the setpoint uncertainty calculations of changes in any of the following:

[ ]a,c

a,c

## 7. Drift Evaluation

Section 5.2.1 of WCAP-17503-P/ WCAP-17503-NP, Revision 0, describes compliance of the Westinghouse Setpoint Methodology with Regulatory Guide 1.105, Rev. 3. In its description of the evaluation of drift data, Reference 22 is noted. The staff could not locate this reference in its ADAMS repository. Please furnish an ADAMS Accession number for this report, if one is known, or provide an additional copy of this report for use in evaluating WCAP-17503-P/WCAP-17503-NP, Revision 0, and WCAP-17504-P/ WCAP-17504-NP, Revision 0.

Westinghouse Response:

A copy of the referenced letter, LTR-NRC-07-14, noted as "Appendix B," and its attachment, noted as "Appendix C," are attached.

**Westinghouse Responses to NRC RAIs on WCAP-17503-P**

**Appendix A**

**Notice of Availability Supplement to NRC–2009–0487**
**NRC Staff Guidance for License Amendment Requests to Implement a TSTF-493 Option B Setpoint Control Program**

## Introduction

In accordance with the U.S. Nuclear Regulatory Commission (NRC) staff's May 11, 2010 Notice of Availability of the TSTF-493 Instrument Setpoint Control Program guidance (75 FR 26294, available at www.regulations.gov, ID: NRC-2009-0487) licensees may elect to submit a license amendment request for NRC staff evaluation which contains a description of their proposed Setpoint Control Program that meets Option B of TSTF-493, Revision 4 "Clarify Application of Setpoint Methodology For LSSS Functions." Using TSTF-493 Option B, licensees may relocate the Allowable Values (AVs) and Nominal Trip Setpoints (NTSPs) of instrument channels implementing certain limiting safety system setting (LSSS) safety functions from Technical Specifications Section 3.3, "Instrumentation," to the Final Safety Analysis Report (FSAR) or another document (e.g. Technical Requirements Manual) incorporated into the facility FSAR by reference, and add an Administrative Control Technical Specification into Section 5 of the Technical Specifications, entitled "Setpoint Control Program."

The Setpoint Control Program establishes the technical specification requirements for ensuring that setpoints for automatic protective devices are initially within and remain within the assumptions of the applicable safety analyses. The program provides a means for processing changes to instrumentation setpoints, and identifies setpoint methodologies to ensure instrumentation will function as required. The program ensures that testing of automatic protective devices related to variables having significant safety functions as delineated by 10 CFR 50.36(c)(1)(ii)(A) verifies that instrumentation will function as required. Specifically, the Setpoint Control Program establishes the following programmatic requirements:

a. The program lists the Functions in the following specifications to which it applies (Note: The following is a typical list of functions for a BWR-6 reactor design, as identified in a letter from the TSTF Owners Group to the NRC dated April 23, 2010, (ML101160026) containing a marked version of the BWR-6 Standardized Technical Specifications. Other marked Standardized Technical Specifications in that letter have different affected Functions, as appropriate):

    1. LCO 3.3.1.1, "Reactor Protection System (RPS) Instrumentation;"
    2. LCO 3.3.1.2, "Source Range Monitor (SRM) Instrumentation;"
    3. LCO 3.3.2.1, "Control Rod Block Instrumentation;"
    4. LCO 3.3.2.2, "Feedwater and Main Turbine High Water Level Trip Instrumentation;"
    5. LCO 3.3.4.1, "End of Cycle Recirculation Pump Trip (EOC-RPT) Instrumentation;"
    6. LCO 3.3.4.2, " Anticipated Transient Without Scram Recirculation Pump Trip (ATWS-RPT) Instrumentation;"
    7. LCO 3.3.5.1, "Emergency Core Cooling System (ECCS) Instrumentation;"
    8. LCO 3.3.5.2, "Reactor Core Isolation Cooling (RCIC) System Instrumentation;"

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**Detailed Guidance for the Content of License Amendment Request Submittals for TSTF-493 Option B Setpoint Control Programs**

To be considered for NRC review, the licensee's 10CFR50.90 submittal proposing a TSTF-493 Option B Setpoint control program must contain detailed descriptions of two processes:

1. Detailed Setpoint Methodology Description, and
2. Detailed Setpoint Control Program Description

These process descriptions are discussed below.

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# Westinghouse Responses to NRC RAIs on WCAP-17503-P

# Appendix B

Westinghouse

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e-mail: maurerbf@westinghouse.com

Our ref: LTR-NRC-07-14

March 15, 2007

Subject: Westinghouse Presentation to the NRC, "Westinghouse Transmitter and Process Rack Surveillance Extension Program" (Proprietary)

Enclosed is a copy of presentation slides, "Westinghouse Transmitter and Process Rack Surveillance Extension Program," for a discussion with the NRC to be held March 22, 2007.

Also enclosed is:

1. One (1) copy of the Application for Withholding, AW-07-2253 (non-proprietary) with Proprietary Information Notice.
2. One (1) copy of Affidavit (Non-Proprietary).

This submittal contains proprietary information of Westinghouse Electric Company LLC. In conformance with the requirements of 10 CFR Section 2.390, as amended, of the Commission's regulations, we are enclosing with this submittal an Application for Withholding from Public Disclosure and an affidavit. The affidavit sets forth the basis on which the information identified as proprietary may be withheld from public disclosure by the Commission.

Correspondence with respect to this affidavit or Application for Withholding should reference AW-07-2253 and should be addressed to J. A. Gresham, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

Very truly yours,

B. F. Maurer, Acting Manager
Regulatory Compliance and Plant Licensing

Enclosures

cc: Jon Thompson (NRC O-7E1A)

## DISTRIBUTION FOR LTR-NRC-07-14

bcc: J. A. Gresham, 1L
R. Bastien (Nivelles, Belgium) 1L, 1A
C. B. Brinkman (Rockville) 1L, 1A
RCPL Administrative Aide (ECE 4-7) 1L w/affidavit

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Our ref: AW-07-2253

March 15, 2007

APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE

Subject: "Westinghouse Transmitter and Process Rack Surveillance Extension Program" (Proprietary)

Reference: Letter from B. F. Maurer to Document Control Desk, LTR-NRC-07-14, dated March 15, 2007

The Application for Withholding is submitted by Westinghouse Electric Company LLC (Westinghouse), pursuant to the provisions of Paragraph (b) (1) of Section 2.390 of the Commission's regulations. It contains commercial strategic information proprietary to Westinghouse and customarily held in confidence.

The proprietary material for which withholding is being requested is identified in the proprietary version of the subject report. In conformance with 10 CFR Section 2.390, Affidavit AW-07-2253 accompanies this Application for Withholding, setting forth the basis on which the identified proprietary information may be withheld from public disclosure.

Accordingly, it is respectfully requested that the subject information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.390 of the Commission's regulations.

Correspondence with respect to this Application for Withholding or the accompanying affidavit should reference AW-07-2253 and should be addressed to J. A. Gresham, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

Very truly yours,

B. F. Maurer, Acting Manager
Regulatory Compliance and Plant Licensing

cc: Jon Thompson (NRC O-7E1A)

Enclosures

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared B. F. Maurer, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC (Westinghouse), and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:

B. F. Maurer, Acting Manager
Regulatory Compliance and Plant Licensing

Sworn to and subscribed before me
this 15th day of March, 2007

Notary Public

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Sharon L. Markle, Notary Public
Monroeville Boro, Allegheny County
My Commission Expires Jan. 29, 2011
Member, Pennsylvania Association of Notaries

(1) I am Acting Manager, Regulatory Compliance and Plant Licensing, in Nuclear Services, Westinghouse Electric Company LLC (Westinghouse), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Westinghouse "Application for Withholding" accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitutes Westinghouse policy and provides the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of

Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.

(c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

There are sound policy reasons behind the Westinghouse system which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iii) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, it is to be received in confidence by the Commission.

(iv) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(v) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in, "Westinghouse Transmitter and Process Rack Surveillance Extension Program" (Proprietary) for a meeting to be held on March 22, 2007, for submittal to the Commission, being transmitted by Westinghouse letter LTR-NRC-07-14 and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse is that associated with methods utilized to determine the magnitude and characteristics of transmitter and process rack drift such that surveillance intervals may be extended.

This information is part of that which will enable Westinghouse to:

(a) Determine and justify extended transmitter surveillance intervals.

(b) Determine and justify extended process rack surveillance intervals.

(c) Determine and justify different instrument uncertainty calculation methodologies.

Further this information has substantial commercial value as follows:

(a) Westinghouse plans to sell the use of the information to its customers for the purpose of transmitter and process rack surveillance extension.

(b) Westinghouse can sell support and defense of transmitter and process rack surveillance extension.

(c) The information requested to be withheld reveals the distinguishing aspects of a methodology which was developed by Westinghouse.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar surveillance extension and instrument uncertainty calculation methodologies and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

## PROPRIETARY INFORMATION NOTICE

Transmitted herewith are proprietary and/or non-proprietary versions of documents furnished to the NRC in connection with requests for generic and/or plant-specific review and approval.

In order to conform to the requirements of 10 CFR 2.390 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the affidavit accompanying this transmittal pursuant to 10 CFR 2.390(b)(1).

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## Westinghouse Responses to NRC RAIs on WCAP-17503-P

## Appendix C

# Westinghouse Transmitter and Process Rack Surveillance Extension Program

Discussion with NRC
March 22, 2007



Westinghouse

# Objectives

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# THANK YOU

Westinghouse would like to thank the NRC Staff for this opportunity to discuss possible approaches to increased protection system instrument surveillance intervals.

Westinghouse

# Westinghouse Responses to NRC RAIs on WCAP-17504-P

**1. Applicability of WCAP-17504-P, Revision 0, and WCAP-17504-NP, Revision 0, Westinghouse Generic Setpoint Methodology**

Please elaborate upon the statement of intended applicability for the Westinghouse generic setpoint methodology that is contained in Section 1.0 "Introduction." Specifically, state whether this methodology document is applicable only to the Nuclear Steam Supply Systems (NSSS) of current operating 2-loop, 3-loop, and 4-loop Westinghouse plants, or whether it is intended for use in safety applications for other types of reactors.

Westinghouse Response:

WCAP-17504-P provides the basic instrument uncertainty algorithms for the Reactor Trip System (RTS) trip functions, Engineered Safety Features Actuation System (ESFAS) protection functions, Emergency Operating Procedure (EOP) operator action points, control system functions assumed as initial condition assumptions in the safety analyses, and control board and computer indication of plant parameters utilized by the plant operators to confirm proper operation of the control and protection instrumentation. This includes the following:

- RTS functions identified in Table 3.3.1-1 of NUREG-1431 (or equivalent for other NSSS vendor designs),
- ESFAS functions identified in Table 3.3.2-1 of NUREG-1431 (or equivalent for other NSSS vendor designs),
- Operator action points associated with instrumentation identified in Table 3.3.3-1 of NUREG-1431 (or equivalent for other NSSS vendor designs),
- Setpoints associated with LCO 3.3.5," Loss of Power Diesel Generator Start Instrumentation" of NUREG-1431 (or equivalent for other NSSS vendor designs),
- Instrumentation associated with the control and indication functions identified in WCAP-8567-P-A, "Improved Thermal Design Procedure" and
- Instrumentation associated with the control and indication functions identified in WCAP-11397-P-A, "Revised Thermal Design Procedure."

The plants for which this methodology is considered applicable (when explicitly noted in the plant Updated Final Safety Analysis Report (UFSAR) in the equivalent of NUREG-1431, Vol. 2, Rev. 3.0, Sections B 3.3.1, B 3.3.2, B 3.3.3 and B 3.3.5, References) are:

- Westinghouse designed 2, 3 and 4 loop NSSS,
- Westinghouse designed AP1000®[1],
- Toshiba designed Advanced Boiling Water Reactor and
- Combustion Engineering (C-E) designed NSSS.

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[1] **AP1000** is a trademark or registered trademark of Westinghouse Electric Company LLC, its affiliates and/or subsidiaries in the United States of America and may be registered in other countries throughout the world. All rights reserved. Unauthorized use is strictly prohibited. Other names may be trademarks of their respective owners.

The methodology is not considered applicable to the uncertainty calculations identified in the C-E document CEN-356(V)-P, "Modified Statistical Combination of Uncertainties," which are associated with the operation of the C-E designed digital monitoring and protection systems, i.e., Core Operating Limit Supervisory System (COLSS) and Core Protection Calculator System (CPCS). This document was approved by the NRC in October, 1987.

2. **Uncertainties Defined by Plant Specific Baseline Documentation**

   Please clarify the intent of the statement in the introductory paragraph to Section 2.0, where it states: "All appropriate and applicable uncertainties, ***as defined by a review of plant specific baseline design input documentation***, are included in each protection, control or indication function CSA calculation." (Emphasis added) For example, which uncertainty terms are defined by Westinghouse and which terms are defined by plant specific baseline design documents? Are there any uncertainty terms that would not have been included in the expressions presented, if there had not been a review of plant specific baseline design input documentation? Or, is it intended to state that the *values* for each of the uncertainties in the expressions that follow are to be obtained through a review of the plant specific baseline design input documentation? Also, please explain what is meant by the term "baseline" documentation. How are baseline documents differentiated from other plant documents?

Westinghouse Response:

There are many potential differentiators with respect to documentation of instrument uncertainties, e.g., the vendor, supplier, licensee, purchaser, environmental conditions, all of which can influence an uncertainty value. In addition, there is no single answer as to who is responsible for a specific uncertainty term as it is dependent on several variables, e.g., did Westinghouse specify and qualify the device, or did the licensee purchase a vendor specified device? Westinghouse works with the licensee to determine each uncertainty component based on the device specifications and plant control of the device. Starting at the top, Westinghouse would consider the following as baseline design input documentation for an uncertainty calculation:

- UFSAR Chapters 7 and 15,
- Technical Specifications,
- Supporting safety analyses,
- Supporting control system analyses,
- Functional requirements documents,
- Process block diagrams,
- P&IDs, As-Built drawings,
- Equipment vendor manuals,
- Equipment supplier information – purchasing specifications,
- Qualification test reports,
- Licensee environmental calculations,
- Scaling calculations,
- Sensor/transmitter calibration procedures and As Left data,
- Sensor/transmitter surveillance procedures and As Found data,
- Process rack calibration procedures and As Left data,

- Process rack surveillance procedures and As Found data and
- Plant measurement and test equipment specifications.

With respect to who defines the uncertainty terms – for a Westinghouse performed uncertainty calculation following the methodology outlined in WCAP-17504, Westinghouse is ultimately responsible for defining the terms utilized and the corresponding values with licensee oversight and concurrence. Westinghouse will use appropriate information from the list above to make the determination of what to include and the value. Even a simple protection function uncertainty calculation will use information from multiple sources; equipment suppliers, contractors, licensee and Westinghouse, i.e., there is no single source that can be defined for a given term. An example is a pressure transmitter purchased by the licensee:

[ ]a,c

With respect to uncertainty term inclusion or exclusion, evaluations of plant component design, scaling, safety analyses and calibration procedures are appropriate to determine PMA term applicability and even the basic uncertainty terms to be considered or modeled, e.g., Steam Generator Level [ ]a,c, Overtemperature ΔT [ ]a,c and Overpower ΔT [ ]a,c. Thus, there is significant sensitivity to more than a basic understanding of the plant design and operation that is not evident from a cursory evaluation of the basic uncertainty equations. A review of the uncertainty

equations will also note the absence of a dynamic effects uncertainty term. Westinghouse uncertainty calculations reflect a steady state condition. Westinghouse assumes that transient dynamic effects, e.g., transient and electronic filtering effects (lead, lag, rate lag), are modeled explicitly in the safety analyses, as they are in a Westinghouse performed safety analysis. Westinghouse considers it appropriate to confirm this aspect if the safety analyses are performed by others, e.g., fuel reloads, containment integrity analyses. Finally, there is the absence of EMI/RFI uncertainties in the uncertainty equations. It is impossible to model the unknown magnitudes due to these effects. Westinghouse requires the shielding for EMI or administrative controls preventing the presence of RFI around control and protection system components.

3. **M&TE Uncertainty and Calibration Standard Uncertainty Contribution to Total Instrument Channel Uncertainty**

The NRC staff notes the expressions presented in Section 2.1 do not include a term representing the uncertainty of the calibration transfer standard (Calibration Standard) used at the plant to calibrate the measurement and test equipment (M&TE) used for calibrating the installed plant instrumentation. Similarly, there does not appear to be an expression for calculating or evaluating an upper bound limit of the magnitude of either Rack or Sensor M&TE uncertainty to be included in total channel statistical allowance. The explanation on page 19 for the term "RMTE" (Rack Measurement & Test Equipment Accuracy) states:

> "When the magnitude of RMTE meets the requirements of ANSI/ISA-51.1-1979 (R 1993) (Reference 12, p. 61) it may be considered an integral part of RCA or RD. Uncertainties due to M&TE that are 10 times more accurate than the device being calibrated are considered insignificant and may not be included in the uncertainty calculations."

Similarly, on page 21 the explanation for the term "SMTE" (Sensor Measurement and Test Equipment Accuracy) states:

> "When the magnitude of SMTE meets the requirements of ANSI/ISA-51.1-1979 (R1993) (Reference 12, p. 61) it may be considered an integral part of SCA. Uncertainties due to M&TE that are 10 times more accurate than the device being calibrated are considered insignificant and may not be included in the uncertainty calculations."

However, ANSI/ISA-51.1-1979 (R 1993) actually states:

> "When the accuracy rating of the reference measuring means is one tenth or less than that of the device under test, the accuracy rating of the reference measuring means may be ignored. *When the accuracy rating of the reference measuring means is one third or less, but greater than one tenth that of the device under test, the accuracy rating of the reference measuring means shall be taken into account.*" (Emphasis added)

In Section 4.0 "Westinghouse Calibration and Drift Evaluation Process" of WCAP-17504-P, Revision 0, and WCAP-17504-NP, Revision 0, Section 4.1 "Input Data" states:

> [
>
> ] (Emphasis added)

The NRC staff also notes that Clause 5 of IEEE Standard 498-1985, "IEEE Standard Requirements for the Calibration and Control of Measuring and Test Equipment Used in Nuclear Facilities," (which is not endorsed within NRC Regulatory Guide 1.105) states:

> "In general, the inaccuracy of the reference standards shall contribute no more than one fourth of the allowable measuring and test equipment tolerance. However, when the actual inaccuracy of the measuring and test equipment is less than one fourth of the plant equipment tolerance, or if reference standards less than one fourth of the tolerance of the measuring and test equipment are not available, the requirement for one fourth may not be necessary. *The rationale for deviating from these requirements shall be justified and documented.*" (Emphasis added.)

The NRC staff notes that M&TE maintained and calibrated in tightly controlled ambient environments (e.g., a plant I&C maintenance calibration laboratory controlled to 77 °F ± 2 °F) and then brought into plant areas where a broad range of ambient temperature and humidity conditions exist, it is possible to exceed the M&TE manufacturer's reference conditions for its accuracy specifications, and it would be prudent to apply the manufacturer's degraded accuracy specification effect terms. When employing such equipment for calibration of safety channel process measurement devices located in areas where the plant ambient temperature conditions can vary significantly depending on seasonal variations or plant operating status, the magnitude of M&TE uncertainty contributing to the measured device uncertainty can vary. As an example, a Fluke Model 45 Digital Voltmeter set on fast reading rate and used for measuring a 20 mA output of a transmitter would have a reference accuracy of ± (0.05% of Reading + 2 digits) and a resolution of 0.1 mA over a 18°C to 28°C ambient temperature range, but has an accuracy de-rating temperature effect of ±(0.1 X (Accuracy Spec/°C)($\Delta$T) when operated outside the 18°C to 28°C (64.4 to 82.4°F) ambient temperature range. Thus, a measurement reading of the 20 mA transmitter output taken within the (64.4 to 82.4°F) reference condition band would have a 1-sigma uncertainty of ± 0.145 mA, but would have a 1-sigma uncertainty of ± 0.252 mA when operated at 85°F - 90°F ambient conditions.

The NRC staff also notes that the magnitude of M&TE uncertainty contribution to total channel uncertainty is based on several factors, including the M&TE manufacturer's published reference accuracy when operated within the reference conditions applicable to that accuracy specification; the use of factors or alternate uncertainty terms for de-rating M&TE accuracy if the M&TE is used under reference conditions outside the

published reference conditions (e.g., at elevated or cold ambient temperature conditions.) The M&TE uncertainty contribution is also dependent on the calibration standard accuracy used to calibrate the M&TE equipment, and the readability of the M&TE. It is also often based on the use of a combination of M&TE devices during a calibration process, such as the application of an accurate test pressure gauge to measure the applied test pressure to the input of a pressure or differential pressure sensor, in conjunction with a digital voltmeter to measure the current output of the transmitter dropped across a precision test resistor. The input M&TE device uncertainty must be propagated and combined appropriately with that of the output M&TE device to arrive at total uncertainty due to M&TE.

There are no terms in the Westinghouse uncertainty expressions of Section 2.0 representing calibration standard uncertainty, and there are no formulas or expressions provided for evaluating the magnitude of SMTE and RMTE. Therefore, it appears to the NRC staff that the Westinghouse uncertainty expressions presume the accuracy rating of the reference measuring means for calibrating (M&TE) is *always* one-tenth or less than that of the M&TE device being calibrated, and also presume the resulting M&TE uncertainty is always one-tenth or less than that of the sensor or group of rack devices under test.

a) Please explain the basis for this apparent presumption or provide clarification. Include a description of any specific expectations Westinghouse has licensees to ensure: (1) proper application of Westinghouse uncertainty expressions when verifying that the accuracy rating of calibration standard equipment used for calibrating measurement and test equipment (M&TE) is ten times better than that of the device under test, and (2) that M&TE equipment accuracy is always better than or equal to the rack or sensor device being calibrated. If appropriate, please include a statement as to the relative significance of the calibration standard uncertainty on the determination of M&TE uncertainty. Also include a statement regarding the significance of M&TE uncertainty on total loop uncertainty in the event that the accuracy of such calibration standards is not at least ten times better than the M&TE devices being calibrated, or the uncertainty of the M&TE devices is not one-tenth or better than the uncertainty of instrument channel devices being calibrated.

   For example, in the event the accuracy of selected plant calibration standards used for calibrating M&TE equipment is no better than three or four times better than the accuracy of the M&TE devices being calibrated (rather than the expected accuracy of ten times or better, indicate the impact this result would have on the estimate of total loop uncertainty and on rack calibration allowances, along with any safety margin that may exist within the methodology expressions that may bound the additional uncertainty due to M&TE equipment. Similarly, in the event that the M&TE uncertainty is not consistently one-tenth or less than that of the loop devices being calibrated, indicate the impact this condition would have on the estimate of total loop uncertainty and on rack calibration allowances, as well as the impact on any safety margin that may exist within the methodology expressions that may bound the additional uncertainty due to M&TE equipment.

Westinghouse Response:

It should not be construed that the generic magnitudes of SMTE and RMTE in Westinghouse uncertainty calculations are always one tenth of the SCA or RCA. This statement in the definition identifies that when plant specific M&TE for a function meets the 10:1 requirement, as demonstrated by calculation for the conditions under which the M&TE will be used, i.e., after accounting for temperature variation from the M&TE calibration environment, the effect of the M&TE magnitude on the CSA magnitude is minimal. Westinghouse always evaluates the magnitudes of SMTE and RMTE for a Westinghouse performed uncertainty calculation. Examples of explicitly accounting for SMTE and RMTE magnitudes are WCAP-16361-P Rev. 1, "Westinghouse Setpoint Methodology for Protection Systems – AP1000," (see as an example Table 3-8, "Pressurizer Pressure – Low & High") and WCAP-17119-P Rev. 2, "Methodology for South Texas Project Units 3 and 4, ABWR Technical Specification Setpoints, Advanced Boiling Water Reactor South Texas Project – Units 3 & 4," (see as an example Table 3-8, "Reactor Vessel Steam Dome Pressure High – RPS Trip Initiation"), both of which were generated under Westinghouse control and are attached for convenience. There are many other examples of Westinghouse performed plant specific uncertainty calculations that demonstrate this aspect of the Westinghouse Setpoint Methodology. There are instances where [ ]$^{a,c}$. There are more instances where [ ]$^{a,c}$. There are other plant specific examples where [ ]$^{a,c}$.

However, to explicitly address the NRC points, the following is noted.

- Westinghouse recommends to plants that M&TE should be as accurate as reasonably achievable. In some instances this results in a ratio of 10:1 or better. It should be understood that Westinghouse makes recommendations, but in the actual analysis, reflects the M&TE hardware the plant has procured and specified in its procedures. It is incumbent upon the plant to then maintain consistency with the plant procedures and the applicable uncertainty calculation.
- An M&TE ratio of less than 10:1 must be explicitly included in the uncertainty calculation.
- Westinghouse determines temperature effects on M&TE, as defined by the M&TE vendor, based on the plant specific environment and includes this effect when appropriate. This is consistent with NRC Information Notice 96-22 and is included in the determination of meeting the 10:1 ratio.
- While not explicitly applicable (because the standard has been withdrawn), Westinghouse recommends that the IEEE-498 requirement (identified for calibration reference standards, i.e., working standards) of 4:1 be applied when possible to M&TE as a lower limit, i.e., the ratio no less than.
- However, Westinghouse also recognizes that due to elevated zeroes or instrument turndown ratios, even a 1:1 ratio may not be reasonably achievable, e.g., [ ]$^{a,c}$. It is then clearly a requirement of the Westinghouse Setpoint Methodology that SMTE and/or RMTE must be explicitly addressed in the uncertainty calculation. Westinghouse has no

recollection of a Westinghouse performed uncertainty calculation where ratios of 1:1 or less were not explicitly included in the calculation.

- As a general rule, Westinghouse [

]a,c

- With the use of digital electronics in both transmitters and process racks, it is becoming more difficult to achieve a 10:1 ratio for M&TE. Westinghouse has performed example calculations for two different functions to demonstrate the overall effect of calibration reference standard magnitudes on the Channel Statistical Allowance (CSA). The first calculation uses currently installed hardware – Pressurizer Pressure with a Rosemount 1154SH9 transmitter and Westinghouse 7300 analog process racks. The second uses the latest hardware, transmitter, racks and M&TE – Feedwater Pressure with a Rosemount 3051CG5 transmitter and Ovation digital process racks. Tables are presented with a range of M&TE to calibration reference standard ratios for both sets of calculations.

**TABLE 3-8**
**PRESSURIZER PRESSURE - LOW & HIGH**

| Parameter | Allowance* |
|---|---|
| | a,c |
| Process Measurement Accuracy | |
| Primary Element Accuracy | |
| Sensor Reference Accuracy | |
| Sensor Calibration Accuracy | |
| Sensor Measurement & Test Equipment Accuracy | |
| Sensor Pressure Effects | |
| Sensor Temperature Effects | |
| Sensor Drift | |
| Bias | |
| Rack Calibration Accuracy | |
| Rack Measurement & Test Equipment Accuracy | |
| Rack Temperature Effect | |
| Rack Drift | |

* In percent span (800 psi)

Channel Statistical Allowance =

a,c

**WCAP-17119-P Revision 2, "Methodology for South Texas Project Units 3 and 4, ABWR Technical Specification Setpoints, Advanced Boiling Water Reactor South Texas Project Units 3 and 4"**



**Table 3-8 Reactor Vessel Steam Dome Pressure High – RPS Trip Initiation**

| Parameter | Allowance(1) |
|---|---|
| Process Measurement Accuracy | |
| Primary Element Accuracy | |
| Sensor Reference Accuracy | |
| Sensor Calibration Accuracy | |
| Sensor Measurement & Test Equipment Accuracy | |
| Sensor Pressure Effects | |
| Sensor Temperature Effects | |
| Sensor Drift | |
| Environmental Allowance | |
| Bias | |
| Rack Reference Accuracy | |
| Rack Calibration Accuracy | |
| Rack Measurement & Test Equipment Accuracy | |
| Rack Temperature Effect | |
| Rack Drift | |

a,c

1. In percent span (10 MPaG (1450.38 psig))

Channel Statistical Allowance =

$$\left\{\begin{matrix}(PMA)^2+(PEA)^2+(SCA+SMTE)^2+(SPE)^2+(STE)^2+(SRA)^2+\\(SD+SMTE)^2+(RRA)^2+(RCA+RMTE)^2+(RTE)^2+(RD+RMTE)^2\end{matrix}\right\}^{\frac{1}{2}}+EA+BIAS$$

a,c

a,c

a,c

a,c

a,c

b) If it is the intent to follow the guidance of ANSI/ISA 51.1-1979 (R 1993), please provide specific directions for licensees to follow when implementing the ANSI/ISA 51.1-1979 guidance stating "When the accuracy rating of the reference measuring means is one third or less, but greater than one tenth that of the device under test, the accuracy rating of the reference measuring means shall be taken into account." Provide precautions, limitations, and minimum required steps to be taken when identifying and accounting for M&TE uncertainty. If appropriate, discuss the means to account for calibration standard accuracy and readability.

Westinghouse Response:

Westinghouse would recommend that the magnitude of SMTE and RMTE be determined for all uncertainty calculations. If the ratio of SCA:SMTE (or RCA:RMTE) is less than 10:1; Westinghouse would recommend that the magnitude of SMTE (or RMTE) be explicitly addressed, i.e., included, in the uncertainty calculation. As demonstrated in the above examples, [

]a,c

c) Please explain and clarify the intent of the statement: [

] This statement seems to imply that if the licensee procedures do not have any information describing required M&TE accuracy or do not delineate which calibration devices are required or acceptable for use in performing specific safety related instrument calibrations, then the licensee is free to ignore any effects of M&TE uncertainty. At a minimum, each licensee should have a list of all available M&TE equipment at its disposal, and have a good idea of which subset of that equipment should be allowed for use in performing each type of instrument channel calibration. However, the Westinghouse Setpoint Methodology is silent on how to perform an estimate of the worst-case potential M&TE uncertainty to account for the M&TE contribution to total instrument channel uncertainty when the M&TE uncertainty is greater than one tenth that of the device(s) under test.

Westinghouse Response:

Westinghouse suggests the statement above is being taken out of context with regards to the treatment of M&TE magnitudes in uncertainty calculations. As noted in the response to (b) above, Westinghouse recommends that the magnitude of SMTE and RMTE be determined for all uncertainty calculations and to be explicitly addressed, i.e., included, in the uncertainty calculation any time the SCA:SMTE or RCA:RMTE ratio is less than 10:1. With regards to the statement excerpted above; [

]a,c

a,c

d) If appropriate, provide clarification or guidance for use of the uncertainty expressions to address the possibility that the available M&TE equipment may not always be one-tenth the accuracy of the devices being calibrated, including the need to verify the relative uncertainties between the M&TE available for use and the equipment being tested.

Westinghouse Response:

Westinghouse recommends (and generally finds in plant specific calibration and surveillance procedures) the determination of a maximum M&TE uncertainty allowed for the calibration or surveillance of a transmitter or instrument channel, e.g., ±0.2 mV on the 20 V range for a DMM. If a specific device is noted, there is also a general statement to allow the utilization of a device with an equivalent or better accuracy. Since Westinghouse would explicitly utilize this DMM uncertainty magnitude in the function uncertainty calculation, this specification and the equivalency requirement should be adequate instruction for the plant. However, to provide additional clarity as to the Westinghouse intent of treatment of M&TE, the definitions of RMTE and SMTE will be revised to as follows in the approved version of WCAP-17504, Revision 0.

- **Rack Measurement & Test Equipment Accuracy** (RMTE)

The accuracy of the test equipment (typically a transmitter simulator, voltage or current power supply, and DVM) used to calibrate a process loop in the racks. Westinghouse recommends that RMTE should be as accurate as reasonably achievable. A ratio of RCA:RMTE or RD:RMTE of less than 10:1 must be explicitly included in the uncertainty calculation. Temperature effects on RMTE, as defined by the M&TE vendor, based on the location specific environment should be included when appropriate. This is consistent with NRC Information Notice 96-22 (Reference 31) and is included in the determination of the RCA:RMTE or RD:RMTE ratio. When the magnitude of RMTE meets the requirements of ANSI/ISA-51.1-1979 (R1993) (Reference 12, p. 61) it may be considered an integral part of RCA or RD. Uncertainties due to M&TE that are 10 times more accurate than the device being calibrated are considered insignificant and need not be included in the uncertainty calculations. [ ][a,c]

a,c

- **Sensor Measurement & Test Equipment Accuracy** (SMTE)

The accuracy of the test equipment (typically a high accuracy local readout gauge and DMM) used to calibrate a sensor or transmitter in the field or in a calibration laboratory. Westinghouse recommends that SMTE should be as accurate as reasonably achievable. A ratio of SCA:SMTE or SD:SMTE of less than 10:1 must be explicitly included in the uncertainty calculation. Temperature effects on SMTE, as defined by the M&TE vendor, based on the location specific environment should be included when appropriate. This is consistent with NRC Information Notice 96-22 (Reference 31) and is included in the determination of the SCA:SMTE or SD:SMTE ratio. When the magnitude of SMTE meets the requirements of ANSI/ISA-51.1-1979 (R1993) (Reference 12, p. 61) it may be considered an integral part of SCA or SD. Uncertainties due to M&TE that are 10 times more accurate than the device being calibrated are considered insignificant and need not be included in the uncertainty calculations.

a,c

## 4. Westinghouse Process Measurement Accuracy (PMA) Normalization Process

In Sections 2.5 and 3.2 of WCAP-17504-P, Revision 0, and WCAP-17504-NP, Revision 0, dealing with complex digital functions and definitions, respectively, there is a discussion pertaining to the need for "normalizing" certain process measurement effects. For instance, in the [

]

a) Please describe the normalization process in greater detail. Specifically, which instrument channel functions or portions of instrument channel functions require a normalization process to benchmark safety channel readings or to estimate process measurement uncertainties?

Westinghouse Response:

Noted below are two tables of Westinghouse Control and Protection functions that are normalized and the associated reference parameter. How each is normalized and treated in the function's uncertainty calculation is provided below the tables.

| Protection Function - Parameter | Reference |
|---|---|
| NIS Intermediate Range – [ ]a,c | |
| NIS Power Range – [ ]a,c | |
| Overtemperature ΔT – [ ]a,c | |
| Overtemperature ΔT – [ ]a,c | |
| Overtemperature ΔT – [ ]a,c | |
| Overpower ΔT – [ ]a,c | |
| Overpower ΔT – [ ]a,c | |
| RCS Low Flow – [ ]a,c | |
| RCS Loop ΔT Equivalent to Power – [ ]a,c | |
| Steam flow/Feedwater flow mismatch – [ ]a,c | |

a,c

- NIS Intermediate Range – [ ]a,c: The Nominal Trip Setpoint (NTS) for this function is in the range of 25 % Rated Thermal Power (RTP). However, [

  ]a,c in the function's Channel Statistical Allowance (CSA) calculation.
- NIS Power Range – [ ]a,c: [

  ]a,c
- Overtemperature ΔT – [ ]a,c: The Overtemperature ΔT reactor trip function provides DNB protection by restricting reactor power. It performs this function through monitoring the temperature equivalent of reactor power, RCS loop specific ΔT. However, [

  ]a,c

[

]$^{a,c}$

- Overtemperature ΔT – [ ]$^{a,c}$: A second aspect of the Overtemperature ΔT's DNB protection is [

]$^{a,c}$

- Overtemperature ΔT – [ ]$^{a,c}$: Another aspect of the Overtemperature ΔT's DNB protection is the effect of axial power distribution. This is evaluated through the use of [

]$^{a,c}$

- Overpower ΔT – [ ]$^{a,c}$: The Overpower ΔT reactor trip function is a diverse protection function to the NIS Power Range over power reactor trip. It performs this function through monitoring the temperature equivalent of reactor power, RCS loop specific ΔT. However, [

]$^{a,c}$

a,c

- Overpower ΔT – [ ] a,c: A second aspect of the Overpower ΔT protection is the [

]a,c

- RCS – Low Flow – [ ]a,c: Originally, RCS Flow was verified using a Precision RCS Flow Calorimetric measurement. [

]a,c

- RCS Loop ΔT Equivalent to Power – [ ]a,c: Several Westinghouse plants have a modification to the Steam Generator Water Level – Low-Low reactor trip/startup of auxiliary feedwater. An SG Level trip time delay varies discretely as a function of indicated power. As the uncertainty with the NIS Power Range channels increases significantly with decreasing power, it was determined to use the temperature equivalent to reactor power (ΔT), which is linear as a function of power, as the input. However, [

]a,c

- Steam flow/Feedwater flow mismatch – [ ]a,c: [

]a,c

| Control Function - Parameter | Reference |
|---|---|
| Cold Leg Elbow Tap indication – [ ]a,c | |

a,c

Cold Leg Elbow Tap indication – [ ]a,c: [

]a,c

b) When plant process measurement data is recorded during the normalization process, that data contains uncertainty, such as reference accuracy, M&TE uncertainty, reading error, and other terms. How is this uncertainty information accounted for in the calibration of the instrument channels being normalized against plant readings? For example, are there acceptance limits of process measurement uncertainty that are treated as upper and lower bounds, or is the exact result of a recorded value used during the normalization adjustment? Please describe this process.

Westinghouse Response:

a,c

c) For each plant surveillance in which normalization is required to be performed, please describe in detail which specific measurements or computations are made to support or compare against specific instrument channel uncertainty terms and identify the applicable specific safety related instrument functions affected. Please provide a summary table that describes these required normalization processes.

Westinghouse Response:

Please see the response to (a) above.

d) When plant data is taken to perform process measurement accuracy normalization using alternative plant measurements (e.g., measurement of core thermal power calorimetric parameters to normalize feedwater flow measurement), what processes/procedures are employed to ensure the accuracy of the data recorded meets required acceptance criteria limits? For example, how is the licensee expected to ensure that such normalization data meets the required accuracy for the instrument channel functions that use the normalization data? How does the licensee ensure the normalization measurements taken are traceable to appropriate standards? For instance, how would a licensee know the worst-case uncertainty limits to which the associated normalization data must be taken for a particular function? Describe/provide any Westinghouse guidelines to licensees that ensure such normalization readings are controlled so the data meets certain acceptance criteria?

Westinghouse Response:

a,c

a,c

5. **Effects of Propagation of Error through Non-Linear Instrumentation Components**

The NRC staff notes that Section 6.3.1 of the ISA Recommended Practice 67.04, Part II, and several licensee setpoint methodologies it has reviewed over the years describe the effects of propagation of random error from the input side of an instrument module to the output side of the module. When random error is propagated through nonlinear modules in which the signal is amplified or combined with random input errors coming from the outputs of several modules that feed it, the random portion of the error can become amplified. When multiple modules are strung together, the effects of propagation of input error to output can become magnified significantly. The staff notes that while sensor and rack uncertainties are described in WCAP-17504-P, Revision 0, and WCAP-17504-NP, Revision 0, the topical report is silent on the effects of such propagation of error from input to output of an instrument channel.

a) Please describe why WCAP-17504-P, Revision 0, and WCAP-17504-NP, Revision 0, does not discuss the effects of such random error propagation, or revise the WCAP to address this aspect. How has this effect been accounted for in the determination of Channel Statistical Allowance within the Westinghouse Setpoint Methodology (i.e., which error terms are estimated with sufficient margin to account for these effects)?

Westinghouse Response:

a,c

a,c

b) If there is a Westinghouse study or report that has evaluated the effects of such error propagation and found these effects to be negligible for the scope of instrument safety functions typical for a 2, 3, or 4-loop Westinghouse design plant, please make such a report available for staff evaluation.

Westinghouse Response:

[ ]a,c

**6. Estimating the Magnitude of Uncertainty Terms for New Instrument Channel Devices**

Section 4 of WCAP-17504-P, Revision 0, and WCAP-17504-NP, Revision 0, describes considerations and methods for estimating the magnitudes of several of the uncertainty terms described in Section 3.2, including the need for estimating uncertainty performance information at the 95/95 probability and confidence level for reactor trip and engineered safety features actuation systems. **[**

**]**

Please describe the Westinghouse Generic Setpoint Methodology steps one would need to take in estimating the magnitude of drift and other applicable uncertainty terms in the event that a safety channel instrument or groups of instruments were to be replaced due to obsolescence by an instrument or set of instruments comprised of equipment models not supplied by Westinghouse or that had never before been used at that site or for that particular safety function. For example, Section 5.1 states the initial sensor drift will be "based initially on the vendor specification data and subsequently on the periodic evaluation of SD data (As Found - As Left)." Is there a similar plan for evaluating and

accounting for the drift of rack components that are replaced with components that have not been used before?

Westinghouse Response:

a,c

7. **Basis of Assumptions for Estimating and/or Maintaining the Limits of Magnitude of Uncertainty Terms as Channel Operability Evaluation Limits**

Section 5.1 of WCAP-17504-P, Revision 0, and WCAP-17504-NP, Revision 0, describes some of the underlying assumptions and considerations that form the basis of the Westinghouse Generic Setpoint Methodology. Please provide clarification of the following assumptions and considerations.

a) The Westinghouse Generic Setpoint Methodology, states that "for operable process racks, AFT = ALT = RCA," and that "an ALT may be considered as an outer limit for the purposes of calibration and instrument uncertainty calculations." It is also stated that "Recalibration is explicitly required any time the As Found condition of the device or channel is outside of the ALT. A device or channel may not be left outside the ALT without declaring the device or channel "inoperable" and appropriate action taken."

Section 5.2 also states: "A channel found inside the RCA tolerance (ALT) on an indicated basis is considered to be operable. A channel found outside the RCA tolerance (ALT) is evaluated and recalibrated. The channel must be returned to within the ALT for the channel to be considered operable."

Many, if not most operating plants have technical specifications containing values for Reactor Trip and Engineered Safety Features Actuation functions as "Allowable Values." Also, the Model Application issued by the NRC staff with the publication of its approval of the BWR and PWR Owner's Groups Technical Specification Task Force traveler for TSTF-493 describes the use of Surveillance Note 1, pertaining to the use of ALT as a means for determining whether a channel is "functioning as required," rather than "operable."

Please clarify your use of the term "operable" and "inoperable" as described in the quoted sentences from Sections 5.1 and 5.2 above in light of the typical Plant Technical Specification use of these terms. In light of the discussion of Section 5.3 and Point 65 of Section 6.0 of the WCAP, it appears that a possible outcome of the use of the Westinghouse Setpoint Methodology is to compute and list the values representing the non-conservative direction limits of RCA or ALT Terms in the plant Technical Specifications as the "Allowable Values." Is this correct? Is Westinghouse WCAP-17504-P, Revision 0, and WCAP-17504-NP, Revision 0, intended to provide a basis for establishing a conservative limit of ALT as a new "Allowable Value" for Westinghouse PWRs? If not, please describe how the limits for RCA, ALT, and AFT relate to the values currently listed in plant Technical Specifications as "Allowable Values"? If so, please describe how this intent would be accomplished?

Westinghouse Response:

To ensure commonality of understanding, noted below is the definition of OPERABLE from NUREG-1431 Vol 1, Rev. 3.0, page 1.1-4:

| | |
|---|---|
| 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). |

Westinghouse would suggest that an instrument channel made up of a sensor/transmitter and an instrument rack (analog ending with a bistable, digital ending with a trip device) could be described as two principle components; 1) sensor/transmitter, 2) instrument rack. Both components must be "capable of performing their function" in order for a trip to take place at the appropriate point (parameter or process value). However, only one component has a setpoint which can be defined in the plant Technical Specifications, Table 3.3.1-1 or Table 3.3.2-1, i.e., the instrument rack bistable or trip device. This leaves open to question and interpretation the definition of operability for the sensor/transmitter. In order to address the rigor required to meet a two-sided 95/95 statement, as identified in RG 1.105 Rev. 3 and clarified in the proposed RG 1.105 Rev. 4, Westinghouse would suggest that a clear definition of operability must be specified for both sensor/transmitter and process racks. This cannot be supplied by the simple definition of an "Allowable Value," as currently utilized in NUREG-1431. With respect to plants with a Westinghouse NSSS, the Allowable Value is defined to be applicable only to the process rack setpoint. In addition, an older version of the Allowable Value was defined in a manner that when exceeded, allows the offsetting of a non-conservative As Found condition for process racks with a conservative As Found condition of the sensor/transmitter, i.e., the "five column methodology." It is far too easy to allow offsetting compensation through paper arithmetic of excessive process rack drift that if experienced should result in serious questioning of continued operability. In the instance of digital process racks with self-check/self-calibration capabilities, an As Found condition outside of the self-calibration As Left limit is a clear definition of an inoperable instrument channel, regardless of the condition of the sensor/transmitter. In fact, the Westinghouse Eagle-21 process racks will alarm when no longer able to satisfy the self-calibration criterion. Thus, allowing an offsetting compensation by a sensor/transmitter would be inappropriate and contrary to the operability definition in the plant Technical Specifications. With respect to analog process racks, Westinghouse has considerable data demonstrating that the expected As Found condition for an operable analog channel is within the As Left tolerance.

In order to address the two-sided nature of the Westinghouse Setpoint Methodology, it is necessary to define the allowed condition (As Left and As Found) of the process racks about the Nominal Trip Setpoint in both the conservative and non-conservative directions, reflecting the Westinghouse two pass evaluation of the As Found condition, i.e.,

As Left condition ≤ (NTS ± As Left Tolerance), where the ALT = RCA,

First Pass As Found condition ≤ (NTS ± As Found Tolerance), where the AFT = ALT (performed in the field) and

Second Pass As Found condition ≤ (As Left ± As Found Tolerance), where the AFT = RD = ALT (performed as part of the evaluation of rack drift).

With respect to a normally operating instrument channel and an instrument technician driving the As Left condition to a near zero % span calibration error, the expected As Found condition would be within the (NTS ± As Left Tolerance), which the Westinghouse evaluation of plant data demonstrates. Thus, for Westinghouse specified process racks, OPERABLE is defined as:

As Left condition ≤ (NTS ± As Left Tolerance), where the ALT = RCA,

First Pass As Found condition ≤ (NTS ± As Found Tolerance), where the AFT = ALT (as initially evaluated in the field) and

Second Pass As Found condition ≤ (As Left ± As Found Tolerance), where the AFT = RD = ALT (as subsequently evaluated as part of the evaluation of rack drift).

INOPERABLE process rack instrumentation would be defined as a condition where the As Left condition or As Found condition is in excess of the above, i.e.,

As Left condition > (NTS ± As Left Tolerance), where the ALT = RCA,

First Pass As Found condition > (NTS ± As Found Tolerance), where the AFT = ALT,

Second Pass As Found condition > (As Left ± As Found Tolerance), where the AFT = RD = ALT.

Examples of the above are: assume an analog pressure channel with an instrument span of 1500 to 2500 psig (1000 psig), NTS = 2000 psig, RCA = ALT = AFT = 0.25 % span = 2.5 psig. Providing a voltage equivalent to 2000 psig at the input to the process racks, an OPERABLE instrument channel would be a bistable trip setpoint As Left and As Found between the voltage equivalents of 2002.5 psig and 1997.5 psig. This is the Channel Operability Test (COT) that is performed every 92 or 184 days, depending on the approved COT surveillance interval. However, this only addresses the bistable. Any modules in front of the bistable must maintain that same as left and as found magnitude (±2.5 psig) about any other calibration and surveillance points, e.g., 0, 25, 50, 75 and 100 % span (or 1500.0, 1750.0, 2000.0, 2250.0 and 2500.0 psig) points. These modules are inherently checked via a string surveillance at the NTS as part of the COT and explicitly checked via the process rack string calibration process once per cycle.

The statement in Section 5.1, "Recalibration is explicitly required any time the As Found condition of the device or channel is outside of the ALT. A device or channel may not be left outside the ALT without declaring the device or channel "inoperable" and appropriate action taken." is intended to identify that plant procedures require the recalibration of a sensor/transmitter or process rack instrument channel when the As Found condition is outside of the ALT. Westinghouse reviews of plant calibration and surveillance procedures confirm this requirement. It is necessary that the sensor/transmitter or instrument channel As Left condition be within the ALT at the beginning of each surveillance interval. This is an initial condition requirement of the Westinghouse Setpoint Methodology. When the As Found condition of the sensor/transmitter or instrument channel is outside the ALT and the As Left condition

cannot be returned to within the ALT, then the sensor/transmitter or the instrument channel must be declared "inoperable" and repaired or replaced.

The statement in Section 5.1, "an ALT may be considered as an outer limit for the purposes of calibration and instrument uncertainty calculations." is intended to identify that since the ALT is a procedure limit that cannot be exceeded, i.e., the As Left condition must be within the tolerance, it becomes better than a 95/95 limit because no "OPERABLE" sensor/transmitter or instrument channel As Left data will be outside that tolerance. Thus, while treated as a 95/95 limit, the ALT actually is a 100/100 limit, because 100 % of the As Left data will be within the ALT. This is substantiated by plant data.

The statement in Section 5.2, "A channel found inside the RCA tolerance (ALT) on an indicated basis is considered to be operable. A channel found outside the RCA tolerance (ALT) is evaluated and recalibrated. The channel must be returned to within the ALT for the channel to be considered operable." is intended to identify the two possible As Found conditions and the subsequent required actions with respect to the ALT, where for the instrument channel (process racks) AFT = ALT = RCA.

- The first is the As Found condition ≤ AFT ≤ ALT. In this instance, the channel is considered operable, the instrument technician may choose to recalibrate if the As Found condition is near the ALT, but it is not required.
- The second is the As Found condition > AFT > ALT. In this instance, the channel is initially declared inoperable and the instrument technician must recalibrate with the As Left condition ≤ ALT.
    - With successful recalibration, the As Left condition ≤ ALT, the channel is considered operable. The As Found condition > AFT > ALT must be entered into the plant's Corrective Action Program for further evaluation.
    - If the channel cannot be recalibrated, i.e., the As Left condition > ALT, the channel must be repaired or replaced. After repair or replacement, the channel must be successfully recalibrated, the As Left condition ≤ ALT, and the channel is then considered operable. The As Found condition > AFT > ALT and the repair/replacement action must be entered into the plant's Corrective Action Program for further evaluation.

With respect to the Allowable Value concept; in 1994, Westinghouse published an ISA paper which effectively withdrew Westinghouse support of the use of the Allowable Value (as defined at that time) for operability determination; please see WCAP-17504 Reference 16. Westinghouse has evaluated sufficient data to demonstrate that process racks operating in an appropriate manner, i.e., within design specifications, do not experience significant drift over a surveillance interval of [ ]$^{a,c}$ and therefore, with an As Left condition within the ALT about the NTS, should have an As Found condition within the same ALT about the NTS. It should also be understood that Westinghouse does not define operability of the process racks solely at the NTS; but also across the instrument span and confirmed at a set of calibration points (minimum of five, e.g., 0, 25, 50, 75 and 100 % span). Thus, Westinghouse defines an operable instrument channel (process racks) as an As Left condition within the ±ALT, defined to be the Reference Accuracy specification, and an As Found condition within the ±AFT = ±ALT, again defined to be the Reference Accuracy specification, at a minimum of five calibration

points across the instrument span and at the NTS. This suggests that an operable instrument channel is one that can be calibrated to within the Reference Accuracy specification and does not experience significant drift, i.e., As Found data confirms the instrument channel remains within the Reference Accuracy about the calibration points across the instrument span. An inoperable instrument channel is one that cannot be calibrated to within the Reference Accuracy or experiences significant drift on more than an occasional basis. This also suggests that the current definition of an Allowable Value does not meet the operability requirements of the Westinghouse Setpoint Methodology for several reasons.

- It is not two-sided.
- It is limited in application to the Channel Operability Test and thus to only the bistable calibration point of the NTS.
- The magnitude for the operating plants with a Westinghouse NSSS is greater than the Reference Accuracy.
- It is limited in application to the process racks and thus ignores the operability requirements of the Westinghouse Setpoint Methodology on the sensor/transmitter.

Thus, utilization of the Allowable Value concept is not sufficient to determine a control or protection function is operating within the Westinghouse Setpoint Methodology at a 95/95 basis. While a redefinition of the Allowable Value in the plant Technical Specifications is a possible outcome of the NRC application of the Westinghouse Setpoint Methodology, Westinghouse would not advocate that as a preferred outcome. Westinghouse would discourage reliance on an Allowable Value definition that is indirectly the ALT in the Technical Specifications. Westinghouse would encourage the control of the real parameter of interest, the NTS, in the Technical Specifications. As noted in Section 5.3, Westinghouse would recommend that the parameter of control in Tables 3.3.1-1 and 3.3.2-1 should be the NTS with reference to a plant specific document that provides the ALT and AFT values at calibration points across the instrument span for both the process racks and the sensor/transmitter, and the ALT and AFT values at the NTS for the bistable or digital trip device. This recommendation is applicable to both Option A and Option B of TSTF-493.

In answer to the final question of how the RCA, ALT and AFT relate to the Allowable Values in the current operating plant Technical Specifications – there is no direct relationship. It has been noted above that the currently defined Allowable Value results in an As Found condition that is in excess of that expected for an appropriately operating instrument channel, i.e., is in excess of RCA = ALT = AFT. Utilization of the Westinghouse Setpoint Methodology defined in WCAP-17504 would be expected to eliminate the Allowable Value in the Technical Specifications and definition of an OPERABLE channel as noted above. This is a direct result of the RG 1.105 95/95 requirement and in order to satisfy the basic expectation of how an instrument channel should be operating.

b) The channel statistical allowance equation 2.1 for a protection channel combines the algebraic sum of {sensor drift and sensor M&TE error} with the sum of {rack calibration accuracy and rack M&TE error} and the sum of {rack drift and rack M&TE error} using square root of the sum of the squares methods. For the discussion in

Section 5.5 regarding sensor/transmitter operability assessment, please describe how channel operability should be assessed assuming the sensor/transmitter is found to be at or near (but within) the non-conservative limit of its AFT value, while simultaneously the rack is found to be at its non-conservative ALT limit. Is this combined non-conservative as-found condition for both sensor and rack considered to be an "operable" condition under the Westinghouse Setpoint Methodology? Please describe why or why not.

Westinghouse Response:

a,c

Given any of the above, and the basic low probability of the occurrence of all six parameters (SCA, SD, SMTE, RCA, RD and RMTE) at the extremes of their allowances, but within their allowances, Westinghouse would suggest that there is no reason to conclude that the sensor/transmitter, process racks and the function were not considered operable.

**8. Estimating the Limits of Error at 95/95 Levels**

Several paragraphs throughout WCAP-17504-P, Revision 0, and WCAP-17504-NP, Revision 0, use the words "believed to be" when discussing the probability and confidence levels associated with estimates of uncertainty at the 95/95 level, when accounting for uncertainties to be bounded by the Channel Statistical Allowance. Under the conditions described in the WCAP, it appears that when evaluating sufficient historical data sets, [ ] a licensee following the Westinghouse Setpoint Methodology would have sufficient data to ensure that the 95/95 criterion will be achieved. Please provide a clarification or elaboration over what is intended by using the words "believed to be." Under what circumstances would this not be the case? Please provide examples.

Westinghouse Response:

It is certainly true that if a plant:

a,c

then, the CSA determined by Equations 2.1, 2.2 and 2.3 in WCAP-17504-P will meet the RG 1.105 two-sided 95/95 requirement. The "believed to be" wording noted in WCAP-17504-P was specifically to address equipment not specified by Westinghouse when the WCAP was submitted in February 2012.

a,c

If a vendor states that the instrument uncertainties provided in the vendor documentation are two-sided 95/95 values, then Westinghouse does not see the need to perform any additional verification.

That responsibility lies with the licensee. Westinghouse believes the trend program evaluating the As Left and As Found data will confirm any claims with regards to the reference accuracy and drift characteristics. If those two parameters are satisfied, Westinghouse would expect the other parameters to also be acceptable.