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)

1.0 INTRODUCTION

By letter dated February 20, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML120580701), Westinghouse Electric Company (Westinghouse) submitted 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," TRs for the U.S. Nuclear Regulatory Commission (NRC) review and approval.

2.0 REGULATORY REQUIREMENTS

The NRC staff evaluated the above listed Westinghouse submittals against the regulatory requirements and guidance listed below to ascertain whether there is reasonable assurance that the systems and components affected by setpoints calculated in conformance with the Westinghouse submittals listed in Section 1.0 will perform their required safety functions when called upon to do so.

2.1 Regulatory Requirements

Title 10 of the Code of Federal Regulations (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," establishes the fundamental regulatory requirements. Specifically, Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50 provides, in part, that an application for a design certification, combined license, design approval, or manufacturing license, respectively, must include the principal design criteria for a proposed facility. The principal design criteria establish the necessary design, fabrication, construction, testing, and performance requirements for structures, systems, and components important to safety; that is, structures, systems, and components that provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the public.

In 10 CFR 50.36, "Technical Specifications," the Commission established its regulatory requirements related to the contents of the technical specifications (TS). Specifically, 10 CFR 50.36 states that "each applicant for a license authorizing operation of a production or

utilization facility shall include in his application proposed technical specifications in accordance with the requirements of this section." Specifically, 10 CFR 50.36(c)(1)(ii)(a) states, "Where a limiting safety system setting is specified for a variable on which a safety limit has been placed, the setting must be so chosen that automatic protective action will correct the abnormal situation before a safety limit is exceeded. If, during operation, it is determined that the automatic safety system does not function as required, the licensee shall take appropriate action, which may include shutting down the reactor." Additionally, 10 CFR 50.36(c)(3) states, "Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions of operation will be met."

General Design Criterion (GDC) 13, "Instrumentation and Control," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50 requires that instrumentation be provided to monitor variables and systems and that controls be provided to maintain these variables and systems within prescribed operating ranges.

GDC 20, "Protection System Functions," of Appendix A to 10 CFR Part 50 requires that the protection system be designed to initiate the operation of appropriate systems to ensure that specified acceptable fuel design limits are not exceeded.

The regulation at 10 CFR 50.55a (h) Protection and Safety Systems, incorporates by reference the Institute of Electrical and Electronics Engineers (IEEE) Standard IEEE 279, "Criteria for Protection Systems for Nuclear Power Generating Stations," and the IEEE standard IEEE 603-1991, "Criteria for Safety Systems for Nuclear Power Generating Stations." Clause 6.8, "Setpoints," of IEEE 603-1991 requires that the allowance for uncertainties between the process analytical limits and the device setpoint be determined using a documented methodology. The IEEE standard makes reference to the Industry Standard Instrument Society of America (ISA) (now referred to as the International Society of Automation--ISA) Standard S67.04-1987.

Appendix B of Part 50, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants"

> Criterion III. Design Control
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> Measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in §50.2 and as specified in the license application, for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions. These measures shall include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled.

Measures shall also be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems and components.

Measures shall be established for the identification and control of design interfaces and for coordination among participating design organizations. These measures shall include the establishment of procedures among participating design organizations for the review, approval, release, distribution, and revision of documents involving design interfaces.
The design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. The verifying or checking process shall be performed by individuals or groups other than those who performed the original design, but who may be from the same organization. Where a test program is used to verify the adequacy of a specific design feature in lieu of other verifying or checking processes, it shall include suitable qualifications testing of a prototype unit under the most adverse design conditions. Design control measures shall be applied to items such as the following: reactor physics, stress, thermal, hydraulic, and accident analyses; compatibility of materials; accessibility for in-service inspection, maintenance, and repair; and delineation of acceptance criteria for inspections and tests.

Design changes, including field changes, shall be subject to design control measures commensurate with those applied to the original design and be approved by the organization that performed the original design unless the applicant designates another responsible organization.

Criterion VI. Document Control

Measures shall be established to control the issuance of documents, such as instructions, procedures, and drawings, including changes thereto, which prescribe all activities affecting quality. These measures shall assure that documents, including changes, are reviewed for adequacy and approved for release by authorized personnel and are distributed to and used at the location where the prescribed activity is performed. Changes to documents shall be reviewed and approved by the same organizations that performed the original review and approval unless the applicant designates another responsible organization.

2.2 Regulatory Guidance

Regulatory Guide (RG) 1.105, "Setpoints for Safety-Related Instrumentation," Revision 3, describes a method that the NRC staff finds acceptable for use in complying with the NRC's regulations for ensuring that setpoints for safety-related instrumentation are initially within, and will remain within, the TS limits. RG 1.105, Revision 3, endorses Part I of Instrument Society of

America (ISA)-S67.04-1994, “Setpoints for Nuclear Safety Instrumentation,” which is subject to NRC staff clarifications. Regulatory Position 1 of this RG states that Section 4 of ISA-S67.04-1994 specifies the methods, but not the criterion, for combining uncertainties in determining a trip setpoint and its allowable values. The NRC staff position states that the 95/95 tolerance limit is an acceptable criterion for uncertainties. That is, there is a 95 percent probability that the constructed limits contain 95 percent of the population of interest for the surveillance interval selected.

NRC Regulatory Issue Summary (RIS) 2006-17, “NRC Staff Position on the Requirements of 10 CFR 50.36, ‘Technical Specifications,' Regarding Limiting Safety System Settings During Periodic Testing and Calibration of Instrument Channels,” discusses issues that could occur during testing of LSSS (ADAMS Accession No. ML051810077). In a letter dated September 7, 2005, from Patrick L. Hiland (NRC) to the Nuclear Energy Institute’s (NEI) Setpoint Methods Task Force, “Technical Specification for Addressing Issues Related to Setpoint Allowable Values” (ADAMS Accession No. ML052500004), footnotes are described that should be added to surveillance requirements related to setpoint verification for instrument functions on which a safety limit has been placed. This letter also addresses the information that should be included within TS to ensure operability of the instruments following surveillance tests related to instrument setpoints.

2.3 Supplemental Guidance

Pressurized water reactor (PWR) and boiling water reactor (BWR) Owner’s Groups’ Technical Specification Task Force (TSTF) TSTF-493, Revision 4, dated January 5, 2011, and an errata sheet, dated April 23, 2010 (ADAMS No. ML100060064) addresses NRC staff concerns stated in RIS 2006-17, and *Federal Register* Notice, “Notice of Availability of the Models for Plant-Specific Adoption of Technical Specifications Task Force Traveler TSTF–493, Revision 4, ‘Clarify Application of Setpoint Methodology for LSSS Functions’,” Vol. 75, No. 90 / Tuesday, May 11, 2010, (ML093410581) documents NRC’s position on adoption of TSTF-493, Revision 4.

2.4 Review Guidance

Chapter 7 of NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition,” contains a Branch Technical Position (BTP), BTP 7-12, “Guidance on Establishing and Maintaining Instrument Setpoints.” This BTP provides guidelines for reviewing the process an applicant/licensee follows to establish and maintain instrument setpoints. These guidelines are based on reviews of applicant/licensee submittals and vendor topical submittals describing setpoint assumptions, terminology, methodology, and on experience gained from NRC inspections of operating plants.

The review guidance in BTP 7-12 identifies certain industry standards and NRC generic communications that provide relevant guidance pertaining to setpoint methodology topics. Among these are:

ISA-S67.04-1994, Part II, “Methodology for the Determination of Setpoints for Nuclear Safety-Related Instrumentation,” provides additional guidance, but Regulatory Guide 1.105, Revision 3, does not endorse or address Part II of ISA-S67.04-1994.

IEEE Std. 498-1990, "IEEE Standard Requirements for the Calibration and Control of Measuring and Test Equipment Used in Nuclear Facilities," and American National Standards Institute (ANSI)/National Conference of Standards Laboratories Std. Z540-1-1994, "Calibration Laboratories and Measuring and Test Equipment - General Requirements," provide guidance for the calibration and control of measuring and test equipment used in the maintenance of instrument setpoints.

Generic Letter 91-04, "Guidance on Preparation of a Licensee Amendment Request for Changes in Surveillance Intervals to accommodate a 24-Month Fuel Cycle," provides guidance on issues that should be addressed by the setpoint analysis when calibration intervals are extended from 12 or 18 to 24 months.

In addition, NRC RIS 2006-17 discusses issues that could occur during testing of limiting safety system setting (LSSS).

The industry standards ISA-S67.04 Part II and IEEE 498-1990 also make reference to applicable portions of the industry standard ANSI/ISA 51.1-1979, “Process Instrumentation Terminology.” This standard described the use, performance, operating influences, hardware, and product qualification of the instrumentation and instrument systems used for measurement, control, or both. It provides guidelines for a common vendor and user understanding when referring to terminology describing product specifications, performance, and operating conditions.

3.0 REQUEST FOR ADDITIONAL INFORMATION

The NRC staff has reviewed the instrumentation and controls aspects of the above Westinghouse submittals and the staff has concluded that additional information as described below is needed to complete the review: (Note: Portions of the following requests for additional information contain questions applicable to sections of WCAP-17504-P/WCAP-17504-NP, Revision 0, that has been identified as Westinghouse Proprietary Class 2 information. These proprietary portions are enclosed in brackets marked as **[ ]**.)

I. WCAP-17504-P/WCAP-17504-NP, Revision 0, Westinghouse Generic Setpoint Methodology

1. Applicability of WCAP-17504-P/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.

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 channel statistical allowance 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?

3. Measurement & Test Equipment 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 rack calibration accuracy (RCA) or rack drift (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/WCAP-17504-NP, Revision 0, Section 4.1 "Input Data" states:

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> **]** (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 instrumentation and control 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)(ΔT) 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 M&TE is ten times better than that of the device under test, and (2) that M&TE 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.

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.

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.

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.

4. Westinghouse Process Measurement Accuracy Normalization Process

In Sections 2.5 and 3.2 of WCAP-17504-P/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
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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?

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.

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.

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?

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 NRC staff notes that while sensor and rack uncertainties are described in WCAP-17504-P/WCAP-17504-NP, Revision 0, the TR 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/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)?

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.

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

Section 4 of WCAP-17504-P/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. **[**

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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 (SD) 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?

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/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 as-left tolerance (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/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?

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.

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

Several paragraphs throughout WCAP-17504-P/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 TR, 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.

II. WCAP-17503-P/WCAP-17503-NP, Revision 0, "Westinghouse Generic Setpoint Control Program Recommendations:"

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

The title of the TR is "Westinghouse Generic Setpoint Control Program Recommendations." From this title, the NRC 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 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." Please describe the actual intent, scope, and limitations of this document.

2. Current Version of Staff Guidance for Technical Specification Task Force 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.[18], "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 NRC 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.

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.

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.

5. Consideration of Worst-Case M&TE

Section 5.4.3 of WCAP-17503-P, Revision 0, and 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."

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?

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 ALT, as opposed to the conditions when one can assume the uncertainty is negligible and not to be specifically accounted for.

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.)

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 NRC 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.