GE Energy

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Proprietary Notice
This letter forwards proprietary information in accordance with 10CFR2.390. Upon the removal of Enclosure 1, the balance of this letter may be considered non-proprietary.

MFN 07-273

Docket No. 52-010

May 18, 2007

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Subject: **NRC Meeting with GE on May10, 2007, titled "*GE New Plant Instrument Setpoint Methodology*."**

Enclosures 1 and 2 contain GE's presentation slides used in the meeting held with NRC staff members on May 10, 2007.

Enclosure 1 contains proprietary information as defined in 10CFR2.390. The affidavit contained in Enclosure 3 identifies that the information contained in Enclosure 1 has been handled and classified as proprietary to GE. GE hereby requests that the proprietary information in Enclosure 1 be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 9.17. Enclosure 2 contains a non-proprietary version.

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,

Kathy Sedney for

James C. Kinsey
Project Manager, ESBWR Licensing

D068
NRO

Reference:

None

Enclosures:

1. NRC Meeting with GE on May10, 2007, titled "*GE New Plant Instrument Setpoint Methodology.*" – GE Proprietary Information
2. NRC Meeting with GE on May10, 2007, titled "*GE New Plant Instrument Setpoint Methodology.*" – Non-Proprietary Version
3. MFN 07-273 - Affidavit – James C. Kinsey – dated May 18, 2007

cc: AE Cubbage USNRC (with enclosures)
GB Stramback GE/San Jose (with enclosures)
RE Brown GE/Wilmington (with enclosures)

MFN 07-273

Enclosure 2

NRC Meeting with GE on May10, 2007, titled
"*GE New Plant Instrument Setpoint Methodology.*"

Non-Proprietary Version

AGENDA

NRC Meeting with General Electric on May 10th, 2007

GE New Plant Instrument Setpoint Methodology

{ Proprietary Session }

- 8:30 - Overview of meeting purpose/Introductions — W. Marquino
- 8:45 - Overview of GE Setpoint methodology (NEDE-31336) — Andrew Poulos
- 9:25 – New Plant Implementation of GE setpoint methodology (considering RIS 2006-17) — Yogi Dayal
- 10:00 – Questions

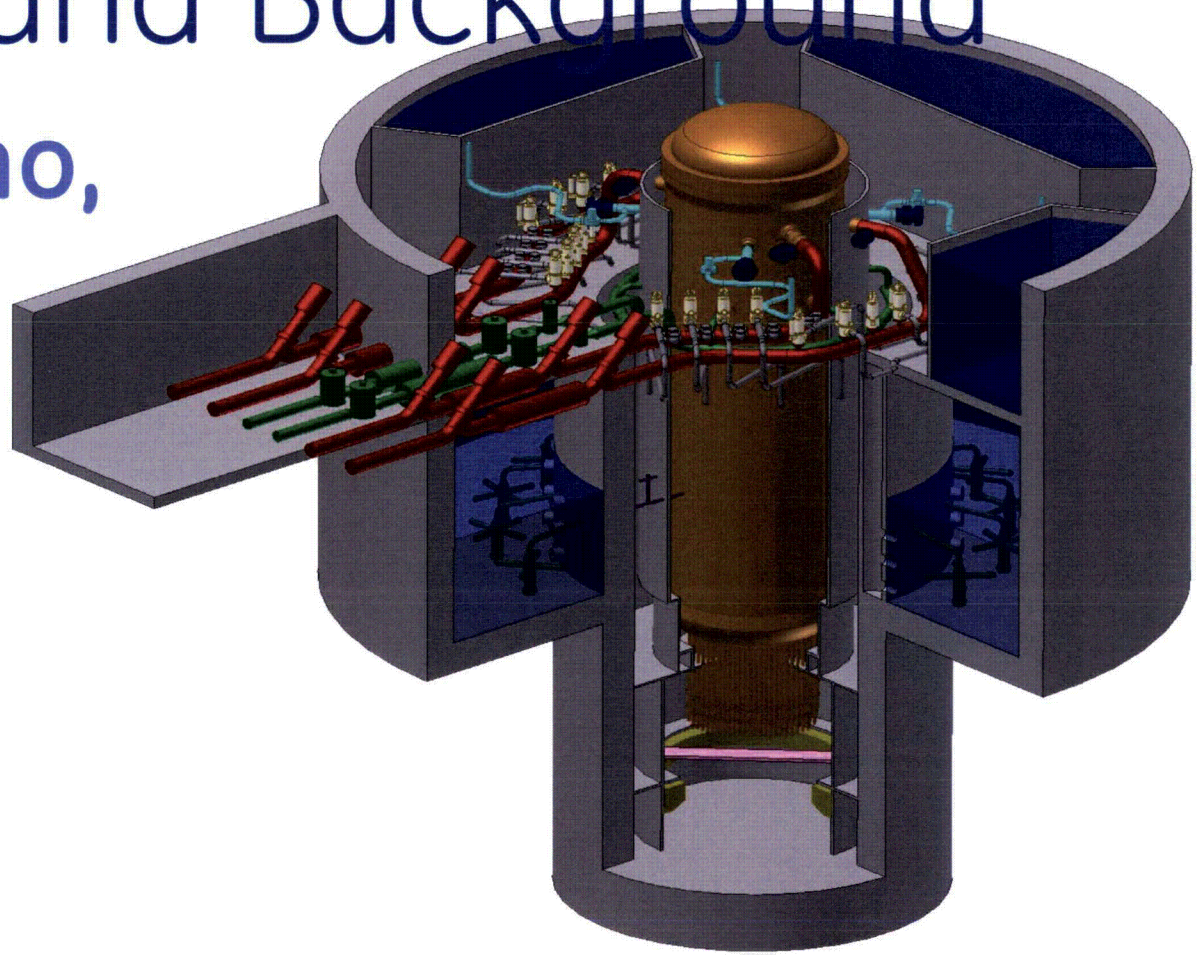
{ Non-Proprietary Session }

- 10:25 - RAI-7.2-36 S1 Graded Approach — Ted Quinn
- 10:45 - Tech Spec representation of setpoints — Dan Williamson
- 11:05 - Questions / Wrap-up — All
- 12:00 – Adjourn (NLT)

GE New Plant Instrument Setpoint Methodology – Introduction and Backaround

- Wayne Marquino, GE Energy – Nuclear

- 10 May 2007



imagination at work

Background

- 1970's GE setpoint calculation/calibration instruction
- Early 80's: GE/BWROG Setpoint Methodology
  - Began work with industry groups on methodologies
  - Submitted LTR 1986; NRC final acceptance 1995
- Mid/Late 90's: overseas ABWR project applied current (RG 1.105 R2, HICB-12, Draft R4, S67.04, Pt I, 9/94) guidance to setpoint calculations
  - Graded approach
  - Quantification of confidence levels
  - Completed calculations for overseas plant
- ESBWR DCD references GE/BWROG Method

Recent NRC / Industry Interactions:

- NRC concerns on ISA Method 3 margins
- Review expanded to include Operability considerations
  - Performance monitoring (evaluate excessive drift)
  - Reset tolerance
- LSSS definition
- RIS 2006-17 (August 2006)
  - TSTF-493 document submitted to NRC
  - RIS 2006-17 / TSTF-493 implementation guidance being prepared to supplement NEDC-31336

NRC Review of ESBWR DCD

- Request for Additional Information identical to that directed at operating plants
- Response references approved methods & describe implementation differences to address post GE/BWROG regulatory guidance
  - Minimize NRC Review effort/schedule
  - Leverage utilities experience with GE/BWROG Methodology

Meeting objectives

- Familiarization with GE setpoint methodology
- Promote common understanding of terms
- GE Implementation of RIS 2006-17
- Summarize RAI 7.2-36 S1 response
- Provide basis for which setpoint value is in the TS (e.g., Allowable Value, Analytical Limit...)
- Show notes added to LSSS

Agenda
Start Time-Topic > Presenter

- 8:30 - Overview of meeting purpose/Introductions.> W. Marquino
- 8:45 - Overview of GE Setpoint methodology (NEDE-31336) > Andrew Poulos
- 9:25 – New Plant Implementation of GE setpoint methodology (considering RIS 2006-17) > Yogi Dayal
- 10:00 – Questions

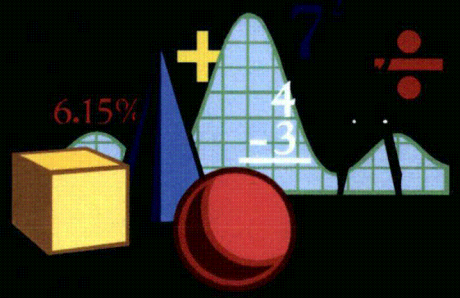
{ *Conclusion of Proprietary Session* }

- 10:25 - RAI-7.2-36 S1 Graded Approach > Ted Quinn
- 10:45 - Tech Spec representation of setpoints > Dan Williamson
  - Analytical Limit/Allowable Value
  - Safety Limit SL-LSSS
- 11:05 - Questions / Wrap-up
- 12:00 – Adjourn (NLT)

GE New Plant Instrument Setpoint Methodology -

Current Methodology

Non-Proprietary Version



Andrew Poulos – GE

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Setpoints

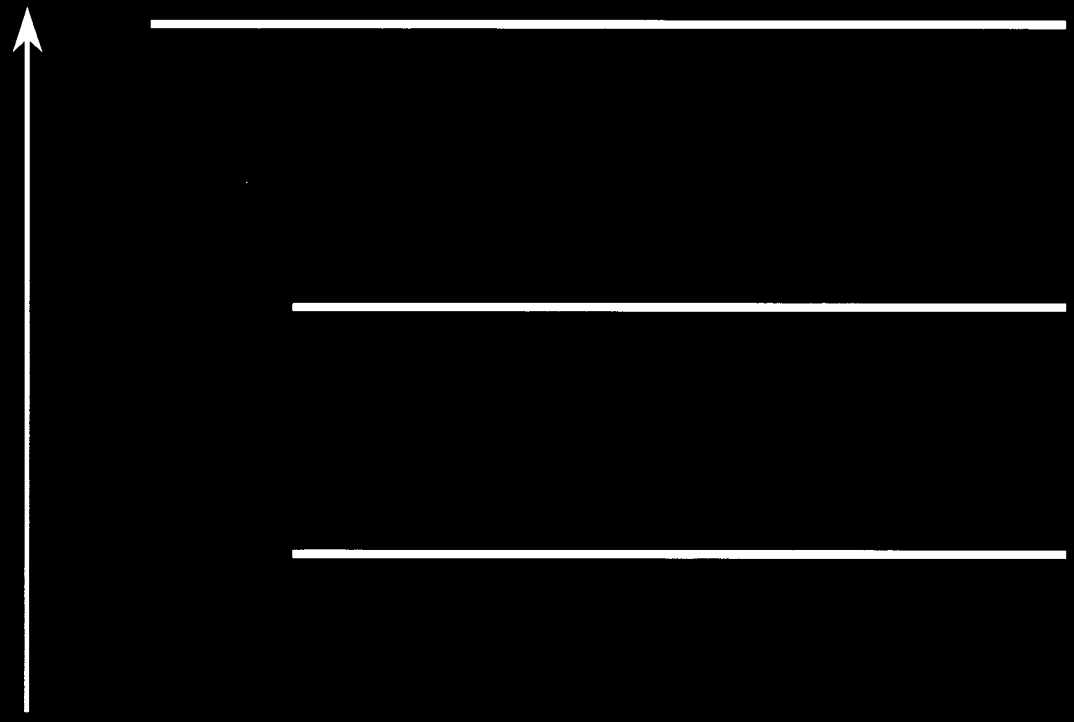
Setpoints: instrument limits, specified in terms of measurable process variables, at which system automatic actions must take place to preserve assumptions of plant safety analysis.

Setpoint Methodology: set of methods used to establish Allowable Value (AV) & Nominal Trip Setpoint (NTSP).

GE Reference: NEDC-31336P-A, Class 3, "General Electric Instrument Setpoint Methodology", September 1996 (accepted per U.S.N.R.C. staff SER, November 1995)

- Starting point for ESBWR RAI 7.2-36 S1 response

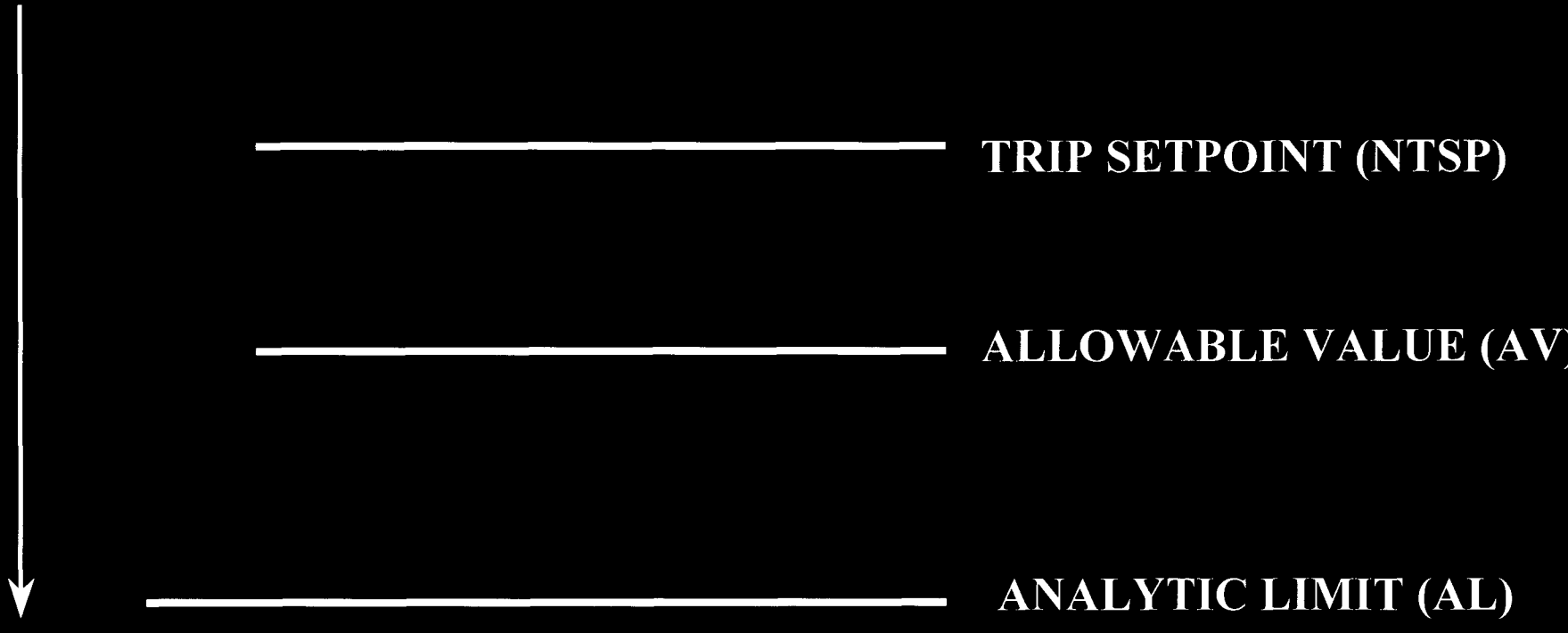
Setpoints



Shown for a measured parameter that **increases** from **normal operation** to **setpoint function.**

Used in examples.

Setpoints



Shown for a measured parameter that **decreases** from **normal operation** to **setpoint function.**

Not used in examples.

Setpoint Methodology

Agenda:

- GE Setpoint Methodology - Current
  - Overview
  - Calculation of AV, NTSP1, NTSP2, & NTSP(ADJ); examples
  - LER Avoidance evaluations (overview)

- Brief Comparison of I.S.A. Method 3 vs. GE Setpoint Methodology

Terminology

AL = Analytical Limit
AV = Allowable Value
NTSP = Nominal Trip Setpoint
A_T = Instrument Accuracy under Trip conditions
A_N = Instrument Accuracy under Normal conditions
A_C = Instrument Accuracy under Calibration conditions
C = Calibration Inaccuracy
D = Instrument Drift
PEA = Primary Element Accuracy
PMA = Process Measurement Accuracy
ALT = As Left Tolerance
LAT = Leave Alone Tolerance

Example Setpoint Calculations

Assumed numbers for example setpoint calculations for multiple-channel loop:

(All random; errors at 2σ)

– **Analytical Limit**	**AL**	=	**100**
– **Accuracy -- Trip conditions**	**A_T**	=	**8**
– **Accuracy -- Normal conditions**	**A_N**	=	**5**
– **Accuracy -- Calib. conditions**	**A_C**	=	**4.5**
– **Primary Element Accuracy**	**PEA**	=	**1**
– **Process Measurement Accuracy**	**PMA**	=	**1**
– **Calibration inaccuracies**	**C**	=	**2**
– **Drift errors**	**D**	=	**3**

GE Setpoint Methodology
Part 1

GE NRC-Accepted Methodology - Current (overview)

Instrument Society of America (ISA) Setpoint Method 3 vs. GE Setpoint Methodology (quick comparison / contrast)

[[ ]]

GE Setpoint Methodology

AV = AL - AV Margin

- Calculated from AL
- Setpoint at GE AV protects AL (and Safety Limit)

NTSP1 = AL - NTSP Margin

- Calculated from AL

Setpoint Probability Criteria

Statistical methodology requires desired probability for setpoint actions

Probability target = 95%
Setpoint function (interlock) should occur below AL 95% of the time.

However, data has normal distribution with 95% in center

Corresponds to approximately ± 2 Standard Deviations [± 2 Sigma] [± 2.5%]

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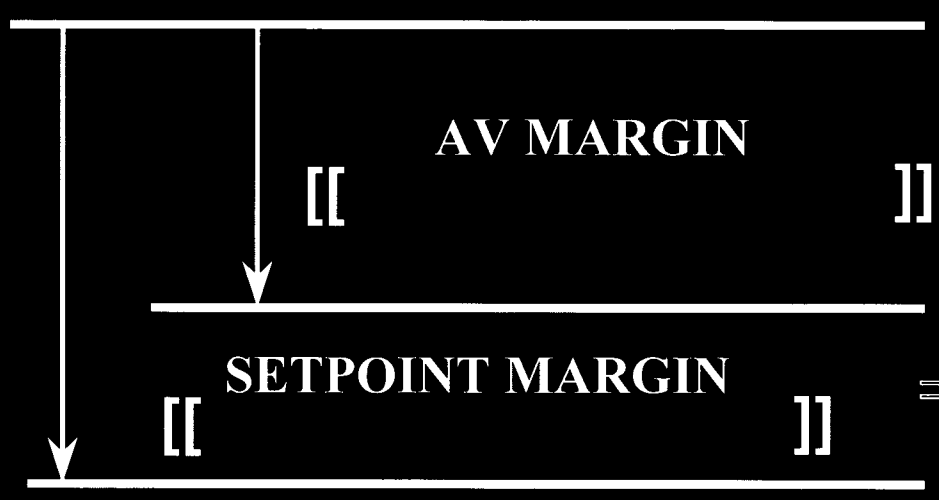
GE Setpoint Methodology Step 1 [[ ]]



[[ ]]:	
AV	= 93.1
NTSP1	= 92.6

GE Setpoint Methodology

AV Margin =

[[

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= 6.881529

AV = AL - AV Margin

= 93.118471

= 93.1

GE Setpoint Methodology

NTSP1 Margin =

[[

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= 7.310540

NTSP1 = AL - NTSP Margin

= 92.689460

= 92.6

Note: this is NTSP1, the closest NTSP may be to AL.

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GE Setpoint Methodology
LER Avoidance Evaluation

If the margin is not sufficient, NTSP is adjusted to provide added margin

New NTSP is **NTSP2**

GE Setpoint Methodology Result Comparisons [[ ]]

NTSP	Result
NTSP1	92.6
NTSP2	90.7
NTSP(ADJ)	90.6

GE Setpoint Methodology Result Comparisons

NTSP	[[ ]] (3 decimals)	Probability of NOT exceeding AL
NTSP1	[[ ]]	95
NTSP2	[[ ]]	> 98.1
NTSP(ADJ)	[[ ]]	> 98.2

Allowable Value (AV)

At least 95% probability of trip action before process variable reaches AL

Tech Spec limit

Accounts for Channel:

- Accuracy (Trip)
- Calibration
- PMA
- PEA

Nominal Trip Setpoint (NTSP)

At least 95% probability of trip action before process variable reaches AL

Accounts for Channel:

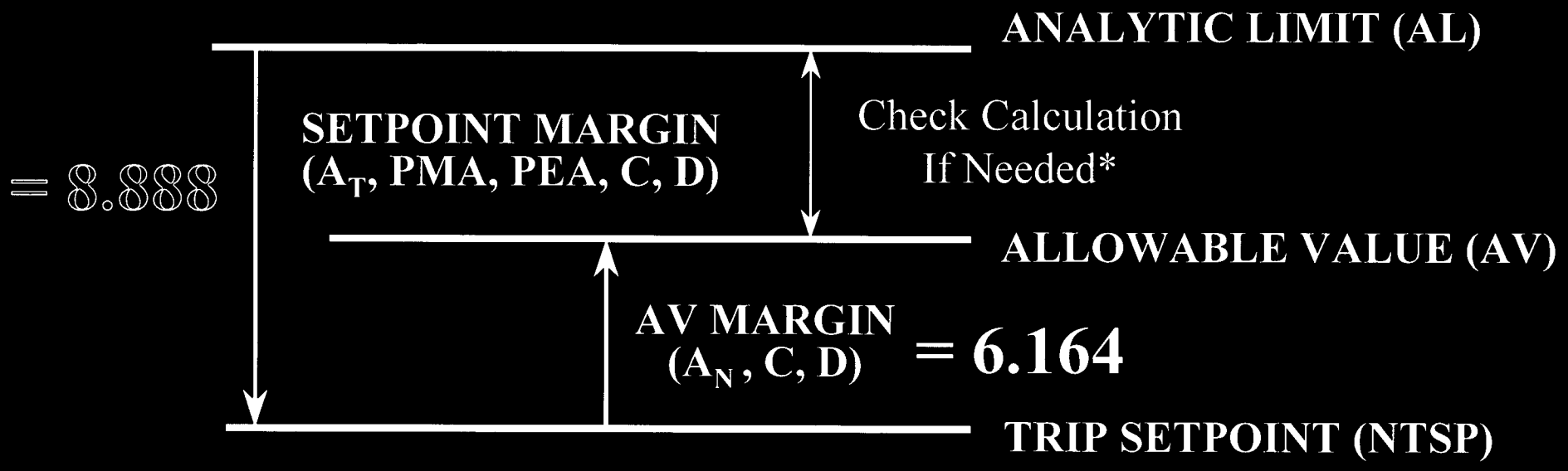
- Accuracy (Trip)
- Calibration
- PMA
- PEA
- Drift

Setpoint Methodology
Part 2

GE NRC-Accepted Methodology (overview)

Instrument Society of America (ISA) Setpoint Method 3 vs. GE Setpoint Methodology (quick comparison / contrast)

ISA Setpoint Method 3 Results



* Check Calculation:

- Performed if AV Margin not determined in consistent method as Setpoint Margin.
- For example, if SRSS used for Setpoint Margin and algebraic combination used for AV Margin, then Check Calculation needed. N/A in this example.

AV	= 97.2
NTSP	= 91.1

Setpoint Methodology Result Comparisons

AL = 100

Method	AV	NTSP
ISA 3	97.2	91.1
GE NTSP(ADJ)	93.1	90.6

AV very close to AL

Conservative AV protects AL & SL

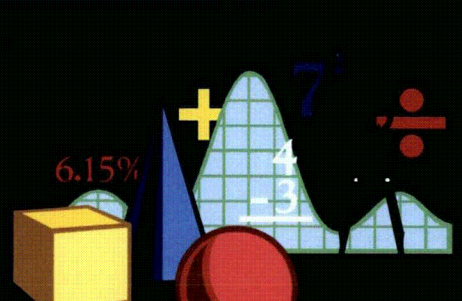
Setpoint Methodology Summary

- ISA Methods meet criteria of ≤ 5% Probability of Exceeding Analytical Limit for NTSP
- The 3 ISA Methods can yield significantly different results
- ISA Method 2 is NOT the same as GE Methodology; GE adds additional margin to NTSP away from AV (& AL)
- ISA Method 3 discussions between NRC & Industry
- GE Methodology accepted in numerous applications
  - Starting point for ESBWR RAI 7.2-36 S1 response

GE New Plant Instrument Setpoint Methodology - Implementation of RIS 2006-17

Non-Proprietary Version

Dr. Y. Dayal - GE



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GE Setpoint Methodology - Process Overview Referred to as "Method 2 Plus"

- **GE Setpoint Methodology USNRC accepted**
  - ✓NEDC 31336 P-A
- **Continues to meet existing regulatory requirements (specifically RG 1.105) and incorporates RIS 2006-17 guidance**
- **Described in RAI 7.2-36 S1 response**

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GE Setpoint Methodology - Method 2 Plus Process Overview (cont'd)

- **AV derived from AL with sufficient margin to AL so that:**
  - ✓If As-Found setpoint during calibration equals the GE AV, then AL protected
  - ✓AV margin to AL meets requirement that if setpoint had really drifted to AV (i.e., As-Found reading was not due to errors in calibration process), then AL still protected
  - ✓AV meets GE safety analysis process requirement
- [[ ]]

GE Setpoint Methodology - Method 2 Plus Process Overview (cont'd)

- **$NTSP_1$ derived from AL with all errors, including Drift:**
  - ✓[[
  - ✓]]
    (Minimum required margin)
  - ✓$NTSP_1$ is conceptually similar to:
    - ISA Method 3 nominal trip setpoint
    - Limiting Trip SetPoint (LTSP)
- **$NTSP_1$ <u>not</u> used as final setpoint if insufficient margin to AV. It is an intermediate calculation step.**

GE Setpoint Methodology - Method 2 Plus Process Overview (cont'd)

- **Final NTSP ($NTSP_F$) is more conservative than $NTSP_1$**
  - ✓ Meets minimum required margin to AL
  - ✓ Also has required margin to AV based on expected Drift & Calibration errors
  - ✓ [[ ]]
- **$NTSP_F$ to AV margin equiv to the Instrument Performance margin in RIS 2006-17 / TSTF-493**
  - ✓ [[

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GE Setpoint Method 2 Plus Feature Summary

- For new plants, GE Method 2 Plus AV serves as both "Operability Limit" & "Performance Limit". Method 2 Plus AV …
  - ✓… has required "Top-down" safety margin to protect AL based on NRC approved setpoint methodology (NEDC-31336 P-A). Meets Tech Spec, RG 1.105 and GE safety analyses process requirements for Operability Limit.
  - ✓… has "Bottoms-up" margin to $NTSP_F$ to be Performance Limit. Margin meets RIS 2006-17 performance requirement with 2-sided application.

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GE Setpoint Methodology - Method 2 Plus Summary

- *GE Method 2 Plus is Conservative*
- *AV protects AL, meets TS Operability Requirements and GE Safety Analysis process*
- *$NTSP_F$ protects AV and has more than required minimum margin to AL*
- *$NTSP_F$ to AV margin meets RIS 2006-17 Performance Requirements*
- *AV & $NTSP_F$ together provide for Safe Operation & TS compliance*

GE New Plant Instrument Setpoint Methodology - Graded Approach

Ted Quinn - GE

May 10, 2007

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Topics:

- Provide an overview of the scope and requirements of the graded approach portion of the GE Instrument Setpoint Methodology to be applied to the ESBWR/ABWR
- Provide an opportunity to discuss the response to RAI 7.2-36 Supplement 1

Applicable Documents

Note: The previous presentation covered how the accepted methodology is being applied to address the recently issued NRC guidance in RIS 2006-17

- Codes and Standards
  - > **ISA S67.04.01-2006**
  - > **NRC Reg. Guide 1.105 Rev. 3**
- Other Documents
  - > **BTP-12**
  - > **ISA S67.04.02-2000**
  - > ANSI/NCSL Z540-1-1994
  - > ESBWR DCD Ch 14, Initial Test Program, Rev 3
  - > ABWR DCD Ch 14, Initial Test Program
  - > RIS 2006-17
  - > **ISA TR67.04.09-2005 – Graded Approach TR**
  - > NEDC 31336P-A

Setpoint Methodology

GE's Graded Approach

- Group A
- Group B
- Group C
- Group D

Graded Categories

Group A

- Those setpoints associated with automatic I&C functions and equipment on which reliance is placed for the achievement or maintenance of the nuclear safety function.
- Associated with an established analytical limit.
- These trips actuate systems necessary for the safe shutdown of the plant following an accident or transient and to mitigate the consequences of accidents.
- Examples include Reactor Protection system (RPS), Engineered Safety Functions (ESF) and Containment Isolation functions.

Group A (cont'd)

There are two subcategories included in Group A:

A1: Safety Limit (SL)-Related Limiting Safety System Settings (LSSS)

- Includes safety limit (SL) related LSSS shown for ESBWR in Table 2 of RAI 7.2-36 Supplement 1 response

A2: Non-SL-Related LSSS

- Includes non-SL related LSSS shown for ESBWR in Table 3 of RAI 7.2-36 Supplement 1 response

Graded Categories

Group B

- Those setpoints associated with automatic I&C functions and equipment that are secondary to functions accomplished by Group A setpoints or that support those functions in the achievement or maintenance of a safety function.
- The documented calculational rigor of the Group B setpoints need not be as high as that of Group A.
- Examples include those setpoints related to Technical Specification listed Functions that are not included in Group A, or that establish the operability of a safety system or function.

Graded Categories

Group C

- Setpoints that have an auxiliary or indirect role in the achievement or maintenance of safety functions.
- Group C includes those setpoints that have some safety significance but are not assigned to Groups A or B.
- They are part of the overall response to an accident but are not the primary mitigation capability.
- The documented calculational rigor of the Group C setpoints need not be as high as that of Group A or B.
- Examples include alarms to alert the operator to abnormal operation of safety systems.

Graded Categories

Group D

- Setpoints that have limited safety significance and include all non-safety related setpoints.
- Includes those where limits are not stated or established by the design basis or safety analysis
- Where documented engineering judgment based on common industry practice or manufacturers guidance has been shown to be appropriate.

Setpoint Methodology Documentation by GE

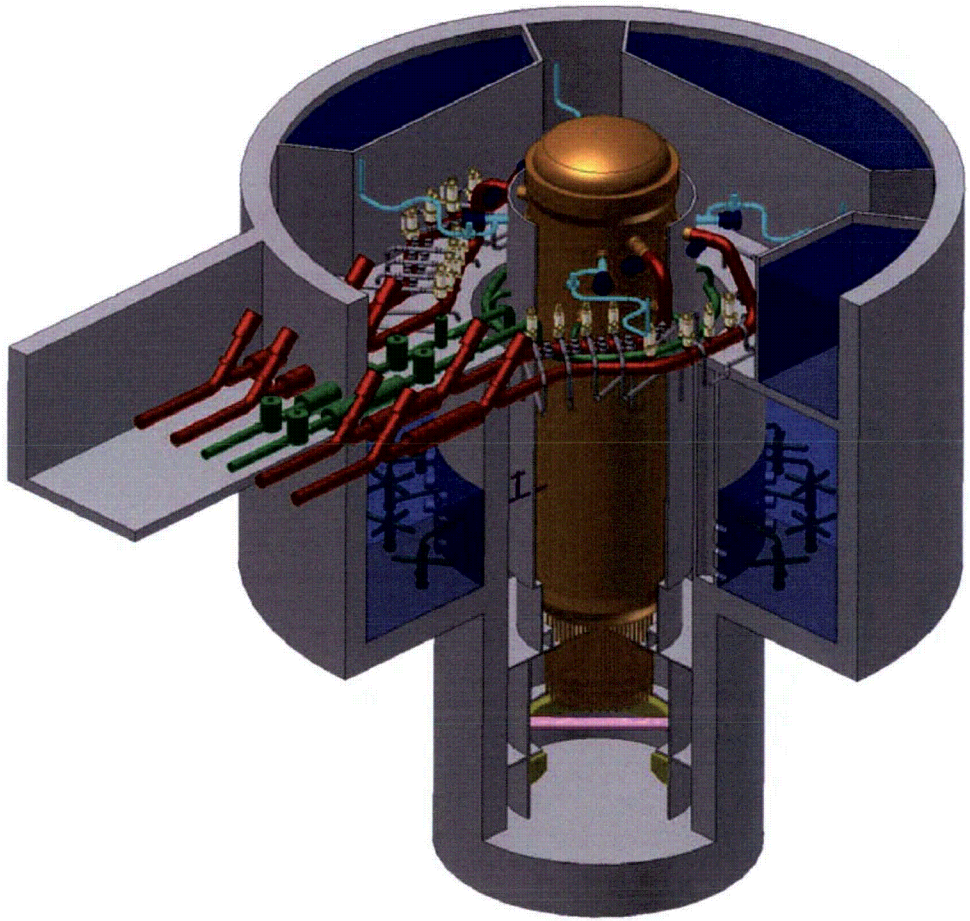
- **Groups A, B and C**
  - > detailed setpoint calculations will be documented with explicit combination of uncertainties in a graded manner.
- **Group D**
  - > basis documented subject to normal engineering verification using engineering judgment.

Summary

- GE Setpoint methodology for new plants utilizes NEDC-31336P-A
- RAI 7.2-36 Supp 1 discusses GE setpoint methodology for ESBWR, including graded approach
- Revisions to the DCD will address conformance to RIS 2006-17

GE New Plant Instrument Setpoint Methodology

- ESBWR Technical Specification Implementation



Dan Williamson - GE

May 10, 2007

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ESBWR Technical Specification Implementation

- Background:
  - ESBWR DCD Revision 2
  - Client Input and GE Re-Evaluation of ESBWR TS
  - RAI 7.2-36, Supplement 1
- OPERABILITY
  - Safety Assured
  - Performance Evaluated
- Allowable Value Provides the Appropriate Focus on Technical Specification OPERABILITY and Safety
- Consistent with Issued NRC Guidance

OPERABILITY Defined

- **Technical Specification (TS) OPERABILITY**
  - Capable of Perform its Specified Safety Function (TS Definition)
  - 50.36(c)(1)(ii)(A): "automatic action will correct the abnormal situation before the safety limit [SL] is exceeded"
  - 50.36(c)(2)(i): Limiting Condition for Operation (LCO) = "functional capability or performance levels ... required for safe operation"
- **Allowable Value (AV) in GE New Plant Methodology**
  - Sufficient Margin to the Analytical Limit (AL) to Protect the SL
  - Designed for the AV to be the LCO / OPERABILITY Limit
  - Supported by Regulatory Guide 1.105, Revision 3
  - GE AV = OPERABILITY & LCO Compliance for In Situ Condition
  - GE AV as Performance Limit is Supported by Required "Reset" consistent with RIS 2006-017 Guidance

OPERABILITY Assured

- **RIS 2006-017: Pre-defined Performance Limits** (As-Found)
  - Appropriate "Evaluation" if Outside Pre-defined Limits (TS Note 1)
  - **GE AV** = As-Found Acceptance Criterion and Trigger for Evaluation
- **RIS 2006-017: Resetting to $NTSP_F$** (As-Left)
  - Requirement to "reset" to $NTSP_F$ Addresses RIS Concern (TS Note 2)
- **Technical Specification OPERABILITY**
  - As-Found within **GE AV**; Otherwise INOP & "Evaluate" (TS Note 1)
  - "Reset" to $NTSP_F$ Required on Each Channel Calibration (TS Note 2)
  - Both OPERABILITY Criteria Tied to **GE Allowable Value** Margins:
    1) Safety Margin to Analytical Limit
    2) Performance Margin from $NTSP_F$

OPERABILITY Assured

- **NRC Approved NEDC-31336 // RIS-Supplemented**
  - **GE AV** Provides Limit Reflecting Adequate Safety Margin to AL / SL
  - **GE AV** Provides Limit for Performance Margin per RIS
  - **GE AV** is the TS "Limiting Condition for Operability"
  - **GE AV** to $NTSP_F$ Margin Establishes AFT Instrument Performance Margin

Allowable Value (AV) in Technical Specifications

- **Reg Guide 1.105, Rev 3, Dated 1999**
  - Referenced in 2007 SRPs Issued to Support "New Plant" Licensing
  - States NRC Staff "Designated Allowable Value as the LSSS" (to meet 10CFR 50.36)
  - Regulatory Position C.3: The LSSS Must Be Listed in Tech Specs
  - Regulatory Position C.4: Equates Meeting AVs with OPERABILITY

GE Allowable Values in Technical Specifications Meets Regulatory Guidance

Consistent with Existing Guidance

- **Industry Consistency: NUREG-1434 & ABWR Use of AV in TS**
  - Consistency with Existing Operating Fleet Use of AV
    - Allows Uniform Inspection Guidance
    - Allows Consistent Implementation of New Guidance
    - Broadest Participation in Establishing New Guidance
  - Consistent with "New Plant" Approved Certification: ABWR
- **No Technical Basis for Deviation from RG 1.105, r3**
- **Prospective Client Base: Address Once / Address Consistently**
- **GE AV Basis Well Established – Augmented Consistent with RIS**
- **GE Continues to Increase Participation in Evolving Generic Guidance Discussions**

SUMMARY:
GE New Plant Instrument Setpoint Methodology

- **GE Methodology NRC Accepted**
- **GE Methodology Supplemented (RIS 2006-017 Guidance)**
- **RAI 7.2-36, Supplement 1, Response**
- **Technical Specification Implementation**
  - **TS Use of GE AVs Satisfies Safety Analysis Basis**
  - **TS Use of GE AVs Satisfies Regulatory Guidance**
    - 10CFR 50.36
    - RG 1.105 r3
    - RIS 2006-017

SURVEILLANCE REQUIREMENTS

- NOTE -

Refer to Table 3.3.1.1-1 to determine which SRs apply for each RPS Function.

SURVEILLANCE		FREQUENCY
SR 3.3.1.1.1	Perform CHANNEL CHECK on each required channel.	24 hours
SR 3.3.1.1.2	Perform CHANNEL FUNCTIONAL TEST on each required channel.	184 days
SR 3.3.1.1.3	Perform CHANNEL CALIBRATION on each required channel. ~~consistent with Specification 5.5.11, "Setpoint Control Program (SCP)."~~	24 months
SR 3.3.1.1.4	Verify the RPS RESPONSE TIME of each required channel is within limits.	24 months on a STAGGERED TEST BASIS for four channels

Table 3.3.1.1-1 (page 1 of 32)
Reactor Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	~~SETTING BASIS~~ ALLOWABLE VALUE
1. Neutron Monitor System Input - Startup Range Neutron Monitors	2	G	SR 3.3.1.1.2	NA
	6[(a)]	H	SR 3.3.1.1.2	NA
2. Neutron Monitor System Input - Average Power Range Monitors / Oscillation Power Range Monitors	1,2	G	SR 3.3.1.1.2	NA
3. Control Rod Drive Accumulator Charging Water Header Pressure - Low	1,2	G	SR 3.3.1.1.1 SR 3.3.1.1.2 SR 3.3.1.1.3	≥ [{12.75 MPa G (1850 psig)}]
	6[(a)]	H	SR 3.3.1.1.1 SR 3.3.1.1.2 SR 3.3.1.1.3	≥ [{12.75 MPa G (1850 psig)}]
4. Reactor Vessel Steam Dome Pressure - High	1,2	G	SR 3.3.1.1.1 SR 3.3.1.1.2 SR 3.3.1.1.3[(b)] SR 3.3.1.1.4	≤ [7.619 MPa G (1105 psig)]
5. Reactor Vessel Water Level - Low, Level 3	1,2	G	SR 3.3.1.1.1 SR 3.3.1.1.2 SR 3.3.1.1.3[(b)] SR 3.3.1.1.4	≥ [19.78 m (778.7 inches)]

(a) With any control rod withdrawn from a core cell containing one or more fuel assemblies.

(b) 1. If the as-found channel setpoint is outside its predefined as-found tolerance then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

2. The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint - Final ($NTSP_F$) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the $NTSP_F$ are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures to confirm channel performance. The $NTSP_F$ and the methodologies used to determine the as-found and the as-left tolerances are specified in [a document controlled under 10 CFR 50.59].

Table 3.3.1.1-1 (page 2 of 32)
Reactor Protection System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	~~SETTING BASIS~~ ALLOWABLE VALUE
6.	Reactor Vessel Water Level - High, Level 8	≥ {25}% RTP	E	SR 3.3.1.1.1 SR 3.3.1.1.2 SR 3.3.1.1.3(b) SR 3.3.1.1.4	≤ [21.89 m (861.8 inches)]
7.	Main Steam Isolation Valve - Closure (Per Steam Line)	1	F	SR 3.3.1.1.2 SR 3.3.1.1.3 SR 3.3.1.1.4	≥ [85%] open
8.	Drywell Pressure - High	1,2	G	SR 3.3.1.1.1 SR 3.3.1.1.2 SR 3.3.1.1.3 SR 3.3.1.1.4	≤ [13.8kPaG (2.0 psig)]
9.	Suppression Pool Temperature - High	1,2	G	SR 3.3.1.1.1 SR 3.3.1.1.2 SR 3.3.1.1.3 SR 3.3.1.1.4	≤ [48.9°C (120)°F]
10.	Turbine Stop Valve Closure Trip	≥ {40}% RTP	D	SR 3.3.1.1.2 SR 3.3.1.1.3 SR 3.3.1.1.4	≥ [85%] open
11.	Turbine Control Valve Fast Closure Trip Oil Pressure - Low	≥ {40}% RTP	D	SR 3.3.1.1.1 SR 3.3.1.1.2 SR 3.3.1.1.3(b) SR 3.3.1.1.4	≥ [{ Mpa G (psig)}]

(b) 1. If the as-found channel setpoint is conservative with respect to the Allowable Value but outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

2. The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the $NTSP_F$ at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the $NTSP_F$ are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures to confirm channel performance. The $NTSP_F$ and the methodologies used to determine the as-found and the as-left tolerances are specified in [a document controlled under 10 CFR 50.59].

	SURVEILLANCE	FREQUENCY
SR 3.3.1.4.2	--- **- NOTE -** Not required to be performed until 12 hours after THERMAL POWER ≥ 25% RTP. --- Verify the absolute difference between the average power range monitor (APRM) channels and the calculated power ≤ 2% RTP while operating at ≥ 25% RTP for each required channel.	7 days
SR 3.3.1.4.3	--- **- NOTE -** For Functions 1.a, 1.b, 1.c, and 2.a not required to be performed when entering MODE 2 from MODE 1 until 12 hours after entering MODE 2. --- Perform CHANNEL FUNCTIONAL TEST on each required channel.	92 days
SR 3.3.1.4.4	Calibrate the local power range monitors on each required channel.	1000 MWD/T average core exposure
SR 3.3.1.4.5	--- **- NOTES -** 1. For Functions 1.a, 1.b, 1.c, and 2.a not required to be performed when entering MODE 2 from MODE 1 until 12 hours after entering MODE 2. 2. Neutron detectors may be excluded. --- Perform CHANNEL CALIBRATION on each required channel. ~~consistent with Specification 5.5.11, "Setpoint Control Program (SCP)."~~	24 months

Table 3.3.1.4-1 (page 1 of 2)
Neutron Monitoring System (NMS) Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	~~SETTING BASIS~~ ALLOWABLE VALUE
1. Startup Range Neutron Monitors (SRNM)				
a. Neutron Flux - High	2	E	SR 3.3.1.4.1 SR 3.3.1.4.3 SR 3.3.1.4.5 SR 3.3.1.4.7	≤ [45% RTP]
	6[(a)]	G	SR 3.3.1.4.1 SR 3.3.1.4.3 SR 3.3.1.4.5 SR 3.3.1.4.7	≤ [{ }]% RTP
b. Neutron Flux - Short Period	2	E	SR 3.3.1.4.1 SR 3.3.1.4.3 SR 3.3.1.4.5 SR 3.3.1.4.7	≥ [10 second] period
c. Inop	2	E	SR 3.3.1.4.3	N/A
	6[(a)]	G	SR 3.3.1.4.3	N/A

(a) With any control rod withdrawn from a core cell containing one or more fuel assemblies.

Table 3.3.1.4-1 (page 2 of 2)
Neutron Monitoring System (NMS) Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	CONDITIONS REFERENCED FROM REQUIRED ACTION E.1	SURVEILLANCE REQUIREMENTS	~~SETTING BASIS~~ ALLOWABLE VALUE
2. Average Power Range Monitors				
a. Fixed Neutron Flux - High, Setdown	2	E	SR 3.3.1.4.1 SR 3.3.1.4.3 SR 3.3.1.4.4 SR 3.3.1.4.5(b) SR 3.3.1.4.7	≤ [15% RTP]
b. APRM Simulated Thermal Power - High	1	D	SR 3.3.1.4.1 SR 3.3.1.4.2 SR 3.3.1.4.3 SR 3.3.1.4.4 SR 3.3.1.4.5(b) SR 3.3.1.4.6 SR 3.3.1.4.7	≤ [115% RTP]
c. Fixed Neutron Flux - High	1	D	SR 3.3.1.4.1 SR 3.3.1.4.2 SR 3.3.1.4.3 SR 3.3.1.4.4 SR 3.3.1.4.5(b) SR 3.3.1.4.7	≤ [125% RTP]
d. Inop	1,2	E	SR 3.3.1.4.3	N/A
3. Oscillation Power Range Monitor				
{Period-Based Trip}	1	F	SR 3.3.1.4.3 SR 3.3.1.4.5(b) SR 3.3.1.4.7	[{Later}]

(b) 1. If the as-found channel setpoint is conservative with respect to the Allowable Value but outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

2. The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint - Final ($NTSP_F$) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the $NTSP_F$ are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures to confirm channel performance. The $NTSP_F$ and the methodologies used to determine the as-found and the as-left tolerances are specified in [a document controlled under 10 CFR 50.59].

SURVEILLANCE REQUIREMENTS

- NOTES -

Refer to Table 3.3.5.3-1 to determine which SRs apply for each ICS Function.

SURVEILLANCE		FREQUENCY
SR 3.3.5.3.1	Perform CHANNEL CHECK on each required channel.	24 hours
SR 3.3.5.3.2	Perform CHANNEL FUNCTIONAL TEST on each required channel.	184 days
SR 3.3.5.3.3	Perform CHANNEL CALIBRATION on each required channel. ~~consistent with Specification 5.5.11, "Setpoint Control Program (SCP)."~~	24 months
SR 3.3.5.3.4	Perform ICS RESPONSE TIME TEST on each required channel.	24 months on a STAGGERED TEST BASIS for four channels

Table 3.3.5.3-1 (page 1 of 1)
Isolation Condenser System (ICS) Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	SURVEILLANCE REQUIREMENTS	~~SETTING BASIS~~ ALLOWABLE VALUE
1.	Reactor Vessel Steam Dome Pressure - High	1,2,3[(a)],4[(a)]	SR 3.3.5.3.1 SR 3.3.5.3.2 SR 3.3.5.3.3 SR 3.3.5.3.4	≤ [7.447MPaG (1080) psig]
2.	Reactor Vessel Water Level - Low, Level 2	1,2,3,4,5	SR 3.3.5.3.1 SR 3.3.5.3.2 SR 3.3.5.3.3[(b)] SR 3.3.5.3.4	≥ [16.05 m (631.9) inches]
3.	Reactor Vessel Water Level - Low, Level 1	1,2,3,4,5	SR 3.3.5.3.1 SR 3.3.5.3.2 SR 3.3.5.3.3 SR 3.3.5.3.4	≥ [11.50 m (452.8) inches]
4.	Main Steam Isolation Valve - Closure	1	SR 3.3.5.3.1 SR 3.3.5.3.2 SR 3.3.5.3.3 SR 3.3.5.3.4	≥ [92%] open
5.	Power Generation Bus Loss	1	SR 3.3.5.3.1 SR 3.3.5.3.2 SR 3.3.5.3.3 SR 3.3.5.3.4	≥ [{ }] V

(a) When < 2 hours since reactor was critical.

(b) 1. If the as-found channel setpoint is conservative with respect to the Allowable Value but outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

2. The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint - Final ($NTSP_F$) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the $NTSP_F$ are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures to confirm channel performance. The $NTSP_F$ and the methodologies used to determine the as-found and the as-left tolerances are specified in [a document controlled under 10 CFR 50.59].

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. As required by Required Action C.1 and referenced in Table 3.3.6.1-1.	E.1 Declare associated MSIV(s) inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

- NOTE -
Refer to Table 3.3.6.1-1 to determine which SRs shall be performed for each isolation Function.

SURVEILLANCE		FREQUENCY
SR 3.3.6.1.1	Perform CHANNEL CHECK on each required channel.	24 hours
SR 3.3.6.1.2	Perform CHANNEL FUNCTIONAL TEST on each required channel.	184 days
SR 3.3.6.1.3	Perform CHANNEL CALIBRATION on each required channel. ~~consistent with Specification 5.5.11, "Setpoint Control Program (SCP)."~~	24 months
SR 3.3.6.1.4	Verify the ISOLATION SYSTEM RESPONSE TIME for each required channel is within limits.	24 months on a STAGGERED TEST BASIS for four channels

Table 3.3.6.1-1 (page 1 of 24)
MSIV Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	~~SETTING BASIS~~ ALLOWABLE VALUE
1.	Reactor Vessel Water Level - Low, Level 2	1,2,3,4	E	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3[(b)] SR 3.3.6.1.4	≥ [16.05 m (631.9 inches)]
2.	Reactor Vessel Water Level - Low, Level 1	1,2,3,4	E	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.4	≥ [11.50 m (452.8 inches)]
3.	Main Steam Line Pressure - Low	1	D	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3[(b)] SR 3.3.6.1.4	≥ [{5.17 MPaG (750 psig)}]
4.	Main Steam Line Flow - High (Per Steam Line)	1,2,3,4	E	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.4	≤ [{140}]%
5.	Condenser Pressure - High	1,2[(a)],3[(a)],4[(a)]	E	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.4	≤ [{ MPaG (psig)}]

{(a) With any turbine stop valve not closed.}

(b) 1. If the as-found channel setpoint is conservative with respect to the Allowable Value but outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

2. The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint - Final ($NTSP_F$) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the $NTSP_F$ are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures to confirm channel performance. The $NTSP_F$ and the methodologies used to determine the as-found and the as-left tolerances are specified in [a document controlled under 10 CFR 50.59].

Table 3.3.6.1-1 (page 1 of 2~~1~~)
MSIV Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	~~SETTING BASIS~~ ALLOWABLE VALUE
6.	Main Steam Tunnel Ambient Temperature - High	1,2,3,4	E	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.4	≤ [{ °C (°F)}]
7.	Main Steam Turbine Area Ambient Temperature - High	1,2,3,4	E	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.4	≤ [{ °C (°F)}]

	SURVEILLANCE	FREQUENCY
SR 3.7.6.3	Perform a system functional test for the SRI Function.	24 months
SR 3.7.6.4	---------- - NOTES - 1. If the as-found channel setpoint is outside its predefined as-found tolerance then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service. 2. The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint - Final ($NTSP_F$) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the $NTSP_F$ are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures to confirm channel performance. The $NTSP_F$ and the methodologies used to determine the as-found and the as-left tolerances are specified in [a document controlled under 10 CFR 50.59]. ---------- Perform CHANNEL CALIBRATION of required SCRRI and SRI functions. The Allowable Value shall be [≤ °C (°F)].	24 months
SR 3.7.6.54	Verify electrical insertion rate is within limits for each required FMCRD over the required insertion range.	24 months

5.5 Programs and Manuals

5.5.10 Battery Monitoring and Maintenance Program

This Program provides for battery restoration and maintenance, based on the recommendations of IEEE Standard 1188-2005, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Valve-Regulated Lead-Acid (VRLA) Batteries for Stationary Applications," or of the battery manufacturer of the following:

a. Actions to restore battery cells with float voltage < 2.18 V, and

b. Actions to determine the cause and correct when cell temperatures deviate more than 3°C (5°F) from each other.

~~5.5.11 Setpoint Control Program (SCP)~~

~~a. The Nominal Trip Setpoints (NTSPs), Allowable Values (AVs), and As-Found and Leave Alone Tolerance Bands, and the methodologies used to determine these values shall be established and shall be documented in the SCP for each of the required Technical Specification Instrumentation Functions in the following:~~

~~1.Specification 3.3.1.1, "Reactor Protection System (RPS) Instrumentation,"~~
~~2.Specification 3.3.1.4, "Neutron Monitoring System (NMS) Instrumentation,"~~
~~3.Specification 3.3.5.1, "Emergency Core Cooling System (ECCS) Instrumentation,"~~
~~4.Specification 3.3.5.3, "Isolation Condenser System (ICS) Instrumentation,"~~
~~5.Specification 3.3.6.1, "Main Steam Isolation Valve (MSIV) Instrumentation,"~~
~~6.Specification 3.3.6.3, "Isolation Instrumentation," and~~
~~7.Specification 3.3.7.1, "Control Room Habitability Area (CRHA) Heating, Ventilation, and Air Conditioning (HVAC) Subsystem (CRHAVS) Instrumentation."~~

~~b. The analytical methods used to determine the NTSPs, and AVs, and As-Found and Leave Alone Tolerance Bands shall be those previously reviewed and approved by the NRC, specifically those described in the following document[s]:~~

5.5 Programs and Manuals

~~5.5.11 Setpoint Control Program (SCP) (continued)~~

~~[REVIEWER'S NOTE~~
~~The applicant must identify the Topical Report(s) by number and title or identify the staff Safety Evaluation Report for a plant specific methodology by NRC letter and date. The SCP will contain the complete identification for each of the Technical Specification referenced topical reports used to prepare the LTSPs, AVs, NTSPs (where applicable), and As-Found and As-Left Tolerance Bands included in the SCP (i.e., report number, title, revision, date, and any supplements).~~
~~]~~

~~[1. NEDC-31336P-A, "General Electric Instrument Setpoint Methodology,"]~~

~~c. The SCP shall also establish provisions for:~~

~~1. Evaluation of an instrumentation channel to verify it is functioning as required, before return to service, when the as-found channel setpoint is found conservative with respect to the Allowable Value but outside its predefined As-Found Tolerance Band; and~~

~~2. Resetting an instrumentation channel setpoint to a value that is within the Leave Alone Tolerance Band of the associated NTSP or of a value that is more conservative than the NTSP or, otherwise, declaring the channel to be inoperable.~~

{{ Renumber remainder and associated References throughout 16/16B }}

5.5.11~~12~~ Control Room Habitability Area (CRHA) Boundary Program

A Control Room Habitability Area (CRHA) Boundary Program shall be established and implemented to ensure that CRHA habitability is maintained such that, with an OPERABLE Control Room Habitability Area (CRHA) Heating, Ventilation, and Air Conditioning (HVAC) Subsystem (CRHAVS), CRHA occupants can control the reactor safely under normal conditions and maintain it in a safe condition following a radiological event, hazardous chemical release, or a smoke challenge. The program shall ensure that adequate radiation protection is provided to permit access and occupancy of the CRHA under design basis accident (DBA) conditions without personnel receiving radiation exposures in excess of 5 rem total effective dose equivalent (TEDE) for the duration of the accident. The program shall include the following elements:

a. The definition of the CRHA and the CRHA boundary.

b. Requirements for maintaining the CRHA boundary in its design condition including configuration control and preventive maintenance.

MFN 07-273

Enclosure 3

Affidavit

General Electric Company

AFFIDAVIT

I, James C. Kinsey, state as follows:

(1) I am Project Manager, ESBWR Licensing, General Electric Company ("GE") have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in Enclosure 1 of GE letter MFN 07-273, Mr. James C. Kinsey to U.S. Nuclear Regulatory Commission, entitled *NRC Meeting with GE on May10, 2007, titled "GE New Plant Instrument Setpoint Methodology",* dated May 18, 2007. The proprietary information in Enclosure 1, which is entitled *NRC Meeting with GE on May10, 2007, titled "GE New Plant Instrument Setpoint Methodology."* is delineated by a [[underlined red font inside double square brackets.{3}]]. Slides in which the entire slide is proprietary are identified with double square brackets before the slide title only, the slide title in a red font, and the superscript notation included after the slide title. Figures and large equation objects are identified with double square brackets before and after the object. In each case, the superscript notation {3} refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.

(3) In making this application for withholding of proprietary information of which it is the owner, GE relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), and 2.790(a)(4) for "trade secrets" (Exemption 4). The material for which exemption from disclosure is here sought also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by General Electric's competitors without license from General Electric constitutes a competitive economic advantage over other companies;
b. Information which, if used 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 of a similar product;

c. Information which reveals aspects of past, present, or future General Electric customer-funded development plans and programs, resulting in potential products to General Electric;
d. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a, and (4)b, above.

(5) To address 10 CFR 2.390 (b) (4), the information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GE, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GE, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within GE is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GE are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information identified in paragraph (2), above, is classified as proprietary because it identifies detailed GE ESBWR procedures and assumptions related to its setpoint methodology. The information is consistent in its scope of application with information in NEDC-31336P-A, September 1996, "General Electric Instrument Setpoint Methodology," which is maintained as proprietary.

The development of the evaluation process along with the interpretation and application of the regulatory guidance is derived from the extensive experience database that constitutes a major GE asset.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GE's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GE's

comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical and NRC review costs comprise a substantial investment of time and money by GE.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GE's competitive advantage will be lost if its competitors are able to use the results of the GE experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GE would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GE of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Executed on this 18th day of May 2007.

James C. Kinsey

James C. Kinsey
General Electric Company