

April 3, 1997

LICENSEE: IES UTILITIES INC.

FACILITY: DUANE ARNOLD ENERGY CENTER (DAEC)

SUBJECT: SUMMARY OF MARCH 20, 1997, MEETING ON TECHNICAL SPECIFICATION SETPOINTS AND THE PRACTICE OF NOT ENTERING LIMITING CONDITION OF OPERATION (LCO) ACTION STATEMENTS DURING CERTAIN SURVEILLANCES

On March 20, 1997, a public meeting was held between the NRC and IES Utilities Inc. (licensee) to gather information on the practices at DAEC of treating Technical Specification setpoints as nominal values and not entering LCO action statements when certain equipment is inoperable because of the performance of a surveillance test procedure. The list of attendees is found in Enclosure 1. The staff and the licensee discussed these issues, and the licensee provided handouts in the meeting that are contained in Enclosures 2 and 3. No final decisions were made by the staff at the meeting, and no action items were identified.

Original signed by:

Glenn B. Kelly, Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosures: As stated

cc w/encls: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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A handwritten signature in cursive script, reading "Glenn B. Kelly", is positioned above the typed name and title.

Glenn B. Kelly, Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

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LIST OF ATTENDEES FROM MARCH 20, 1997, MEETING

<u>Name</u>	<u>Organization</u>
Ken Peveler	IES Utilities Inc.
Tony Browning	"
Chuck Nelson	"
Jeff Mahannah	"
Ken Putnam	"
Rob Anderson	"
Dean Curtland	"
William Simmons	"
John Franz	"
Glenn Kelly	NRC
Elinor Adensam	"
Christine Lipa	"
Carl Shulten	"
Chris Grimes	"
Stevie Dupont	"
Jim Luehman	"
Cliff Douth	"
Bob Tjader	"
Doug Weaver	"

Distribution w/encls: for Meeting Summary to IES Utilities Inc. dated 4/3/97

Docket File (50-331)
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PD3-3 Reading File
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E-Mail

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G. Kelly (GBK)
C. Boyle (CJB)
D. Ross (SAM)
C. Lipa (CAL)
C. Schulten (CSS1)
C. Grimes (CIG)
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J. Luehman (JGL)
C. Douth (CKD)
D. Weaver (DWW)
S. Dupont (SGD)
B. McCabe (BCM)
W. Axelson (WLA)
J. Caldwell, RIII

DW1
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Duane Arnold Energy Center

Meeting with NRC on Technical Specification Setpoints and Entry Into LCO Conditions

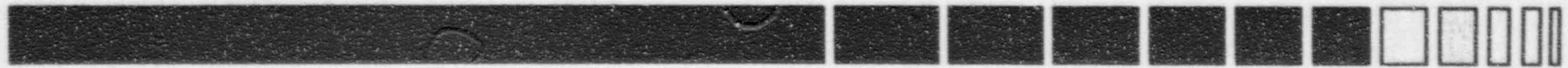
March 20, 1997

Enclosure 2

AGENDA

INTRODUCTION	J. FRANZ
INSTRUMENTATION HISTORY	K. PUTNAM
SETPOINT CONTROL PROGRAM	C. NELSON
SETPOINT EXAMPLES	J. MAHANNAH
DISCUSSION	AS NEEDED
CLOSURE ON SETPOINTS	K. PEVELER
ENTRY INTO LCO'S FOR SURVEILLANCE	T. BROWNING
SUMMARY	J. FRANZ

DAEC Target - 97



- **Assure continued compliance with DAEC Technical Specifications.**
- **Rigorous Setpoint Control Program in accordance with standard methodology that supports outstanding level of safety.**
- **Improved Standard Technical Specifications implemented that are supported by the Setpoint Control Program.**

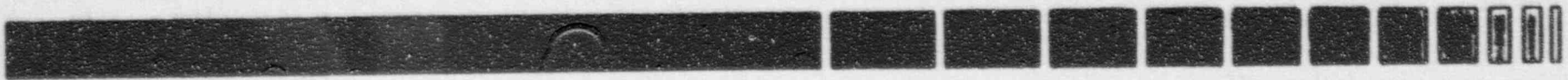
DAEC - Licensed 2/22/74



- Custom T.S. with Plant Unique LSSS and Instrument Calibration Definition
- Pre-Standard Review Plan
- No Standard Setpoint Methodology

DAEC Technical Specification

Definition 1.0.2



Limiting Safety System Setting (LSSS)

... The limiting safety system setting plus the tolerance given in the system design control document gives the limiting trip point for operation. . . The inequality sign which may be given merely signifies the preferred direction of operational trip setting.

Docketed Examples



Two-sided tolerance under design control re-affirmed in the licensing basis for DAEC.

--Amendment 1, 4/11/74

--AO 75-49

--LER 77-61

--IR 81-13

--AO 75-52

--LER 78-05

--LER 82-04

--IR 75-13

--LER 79-34

--LER 83-03

--LER 76-09


--LER 80-08

--LER 77-05

--LER 81-31

--And Others

Amendment 1 to DAEC License



“It is not necessary to include tolerances in the Technical Specification. Tolerances are given in the system design control documents as stated in Specification 1.0.2 of these Technical Specifications.”

LER 76-009




**“In accordance with the Technical Specifications,
the limiting setpoint for operation is 204 °F (200 °F
Tech Spec limit plus 4 °F instrument tolerance).”**

DAEC Integrated Plan Initiative



DAEC Integrated Plan Initiative to reconstitute and upgrade design bases of Technical Specification instrument setpoint margins. (11/4/91)

Inspection Report 93-23



“The LSSS trip set point in TS was the minimum “as-left” value, and the acceptable “as-found” range in the STP was based on the instrument tolerance and trending program. The “allowable value” was developed with adequate margin to ensure the TS safety limit was never exceeded. As long as the “as-found” value was above the “allowable value” and the “as-left” value was above the TS trip setpoint, the instrument was considered operable.”

Inspection Report 93-23



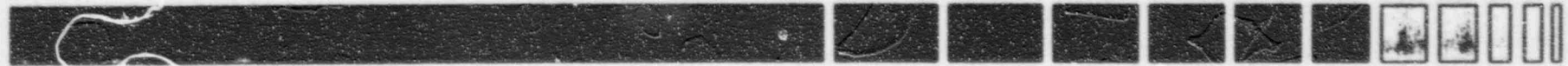
“Management from Region III and the Office of Nuclear Reactor Regulation initially determined the use of “allowable values” to determine the operability of an instrument was acceptable even though not described in the licensee’s T.S. or surveillance procedures. The licensee had been in the process of developing and documenting the “allowable values” for the instruments in TS in order to support a TS amendment change. The licensee planned to submit the TS amendment change in late 1995 or early 1996.”

STS Conversion



**December 1994 IES commits to conversion to STS
NUREG 1433 and revises commitment for
instrument setpoint to coincide with STS conversion.**

Conclusions:



- Original Licensing Bases allowed two sided tolerance around nominal trip setting.
- Reconstitution and upgrade of Setpoint Control Program performed in accordance with DAEC Commitment.
- Commitments made on 2/25/97 ensure compliance to current Technical Specifications.
- Transition from Custom T.S. approach for Instrument Setpoint to STS approach in accordance with DAEC Commitment.

Setpoint Methodology
Presentation to NRC
March 20, 1997

Chuck Nelson

Principal Engineer, DBD/UFSAR Team

IES Utilities

Introduction

- The DAEC Setpoint Control Program assures safe and conservative operation of the plant.
- The DAEC Setpoint Control Program complies with the current Technical Specifications, and supports the transition to the Standard Technical Specifications.
- The DAEC Setpoint Control Program is founded on the design and licensing bases.

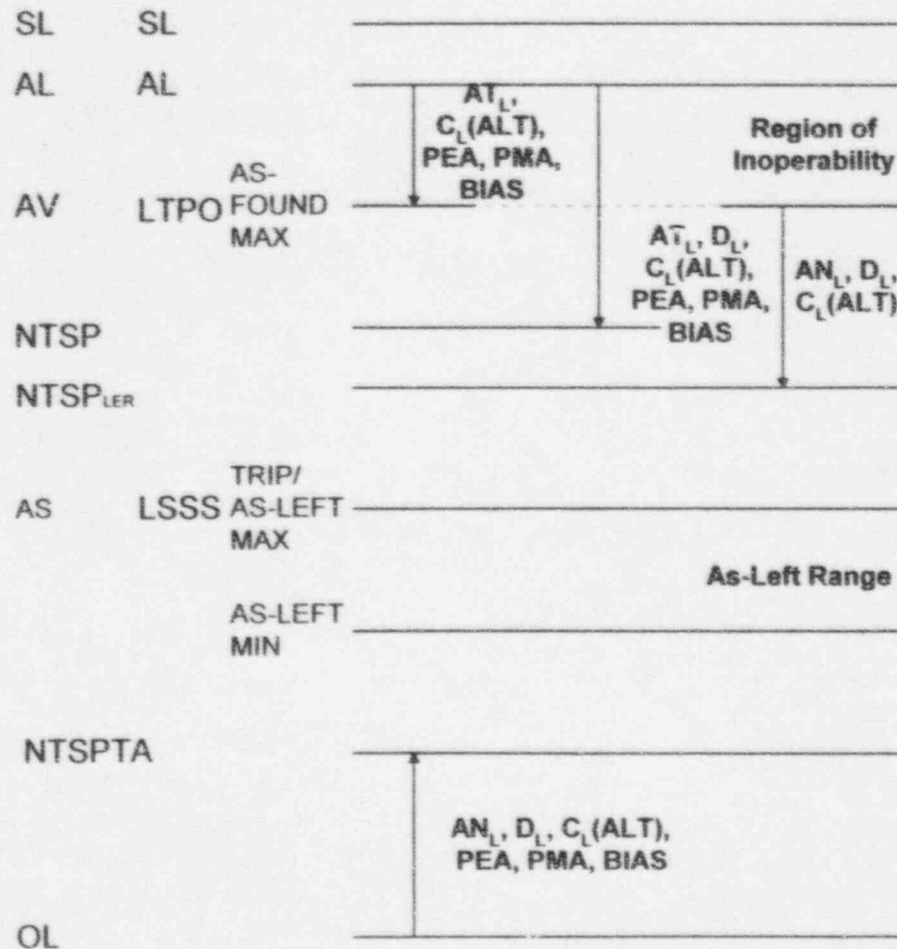
Agenda

- Vocabulary
- Methodology
- Design Basis Reconstitution
- Setpoint Changes
- Process Highlights

Vocabulary

Terminology

ITS/GE CTS STP



- Safety Limit
- Analytic Limit
- Operational Limit
- Allowable Value
- Limiting Trip Point for Operation
- As-Found Tolerance
- Limiting Safety System Setpoint
- Trip Level Setting
- Nominal Trip Setpoints
 - LER Avoidance
 - Spurious Trip Avoidance
- As-Left Tolerance
- Actual Setpoint
- Instrument Uncertainties
- Instrument Drift

Setpoint Control

Current Technical Specifications

-
- Margin
-

INOP

OP

-
- Tolerance of the Instrument given in system design documents
-

- **Safety Limit**
 - Original Plant Design (AE Analysis)
- **Analytical Limit**
- **Limiting Trip Point for Operation**
 - STP As-Found Limit
- **Trip Level Setting, Limiting Safety System Setting**
 - Technical Specification Value

Setpoint Control

Standard Technical Specifications

INOP
OP

-
- Margin
-

- Allowance for Instrument Accuracy and Calibration, and other Uncertainties per GE Methodology, ISA-STD-67.04
-

- Allowance for Drift
-

- Safety Limit
- Analytic Limit
 - From Plant Safety Analysis or Design Basis Reconstitution
- Allowable Value
 - STP As-Found Limit
 - Tech Spec Limit
- Actual Setpoint
 - STP Values

DAEC Setpoint History

- 1974 - 1985 AE/NSSS Vendor Supplied Setpoints (Turnkey) - Amendment 1 to Technical Specifications
- 1985 - 1991 Engineering Calculations based on some uncertainties, calculated head corrections replaced previously measured head corrections
- 1991 - 1996 Industry Standard Methodology Design Basis Reconstitution
- 1996 - 1997 Conversion to Standard Technical Specifications

Derivation of DAEC Setpoint Control

- 10 CFR 50.2 “Design Bases”
- 10 CFR 50 Appendix B “Design Control”
- RG 1.105
- ISA-S67.04
- GE Setpoint Methodology NEDC-31336
- DAEC Instrument Setpoint Guide DGC-E111
- Administrative Procedures 1203.70, 1203.701

ISA S67.04 Methodology

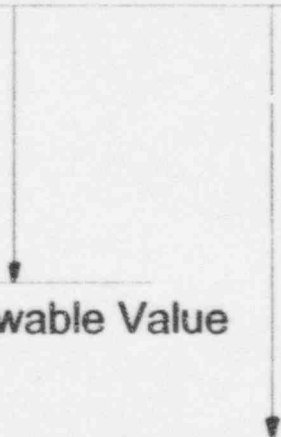
- NRC Endorsed by RG 1.105

Safety Limit

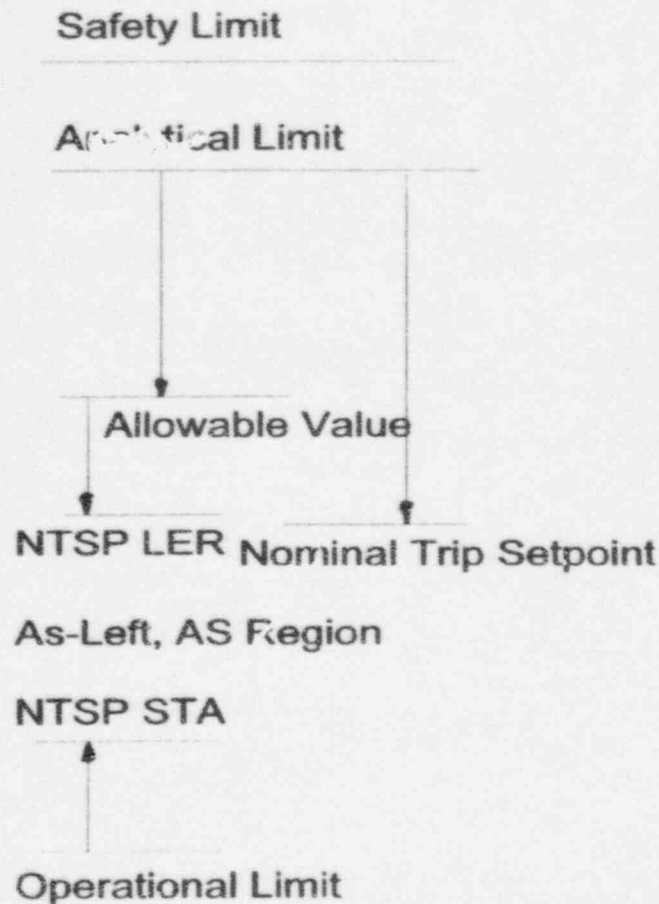
Analytical Limit

Allowable Value

Nominal Trip Setpoint

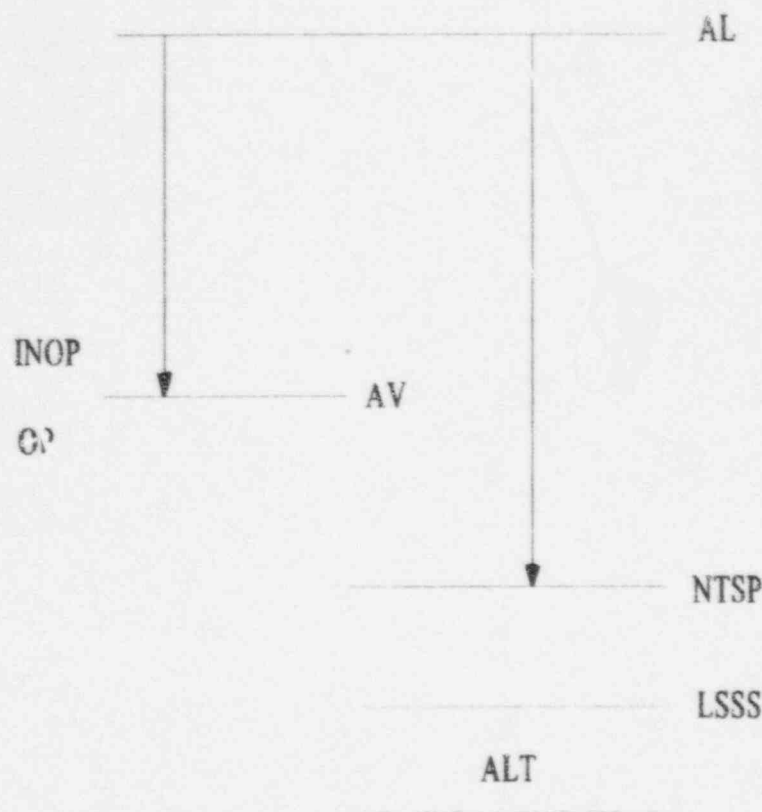


GE Setpoint Methodology



- NRC Endorsed by SER
- Use more conservative of NTSP and NTSP LER as bound for as-left, actual setpoint
- Spurious Trip Avoidance

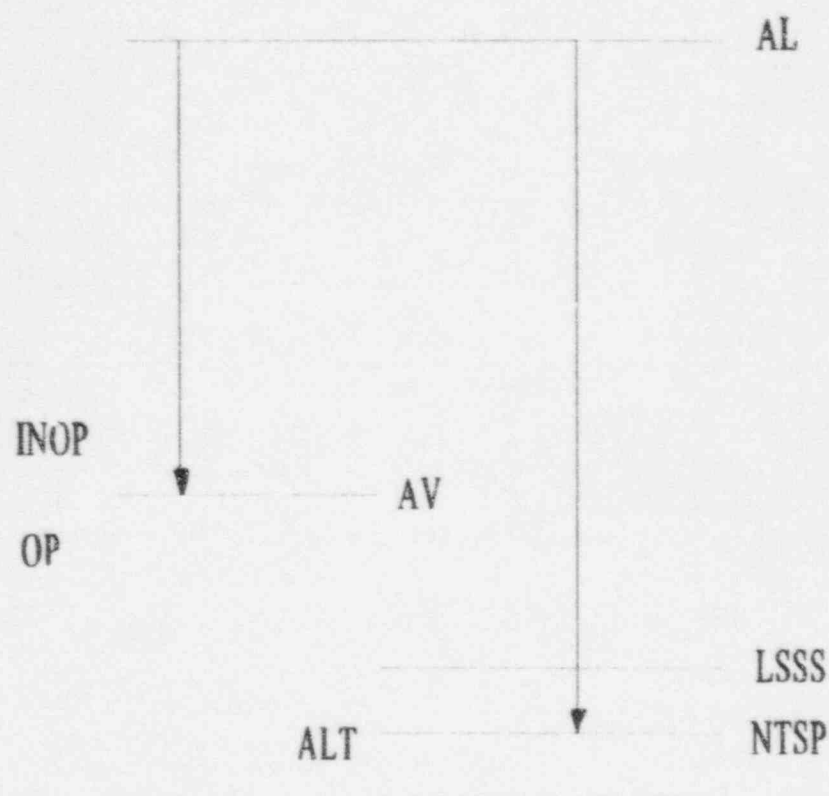
Design Basis Reconstitution From AL with Acceptable LSSS



- Most common case during setpoint design basis reconstitution
- Implement AV in Surveillance Procedure
- No Technical Specification Change until ITS (AV)

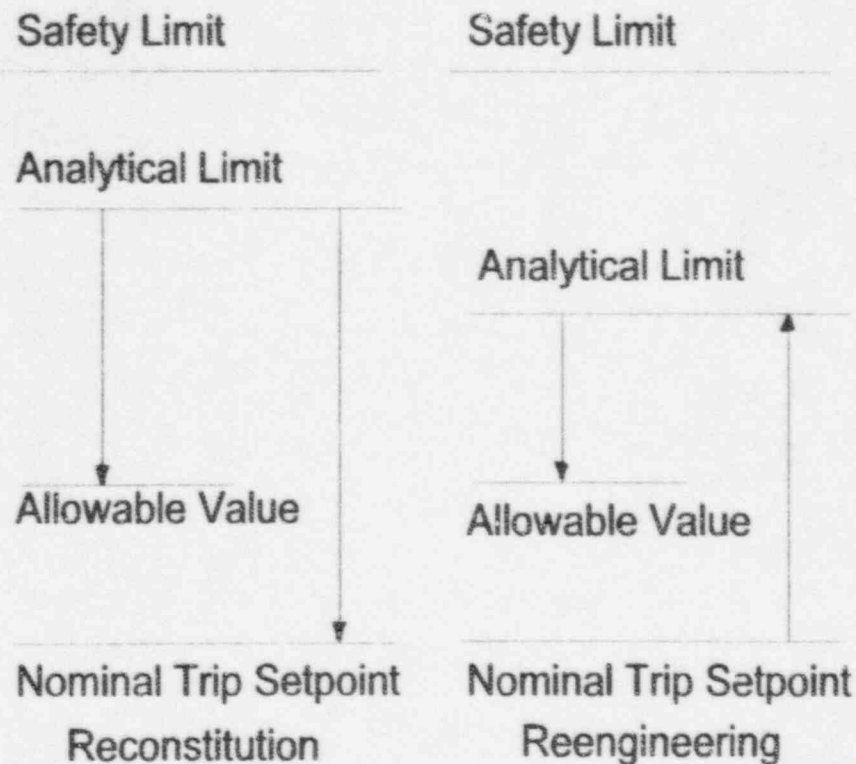
Design Basis Reconstitution

From AL with a More Restrictive NTSP



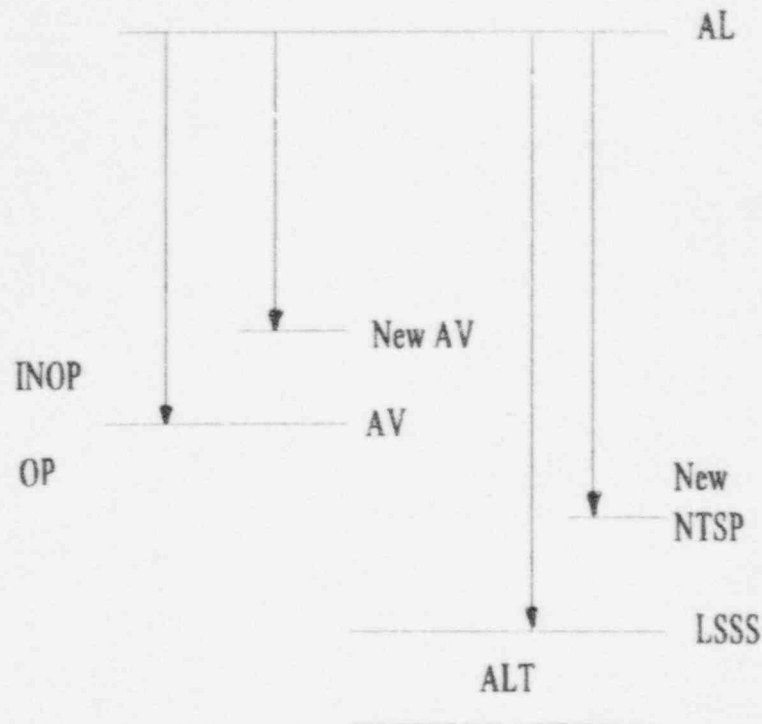
- Must lower LSSS
- Issue AR for Operability/Reportability based on AV
- TS Change Submitted with ITS (October, 1996)
- AV implemented in Surveillance
- Alternative is to reanalyze, justify LSSS

Reconstitution from AL VS Reengineered AL



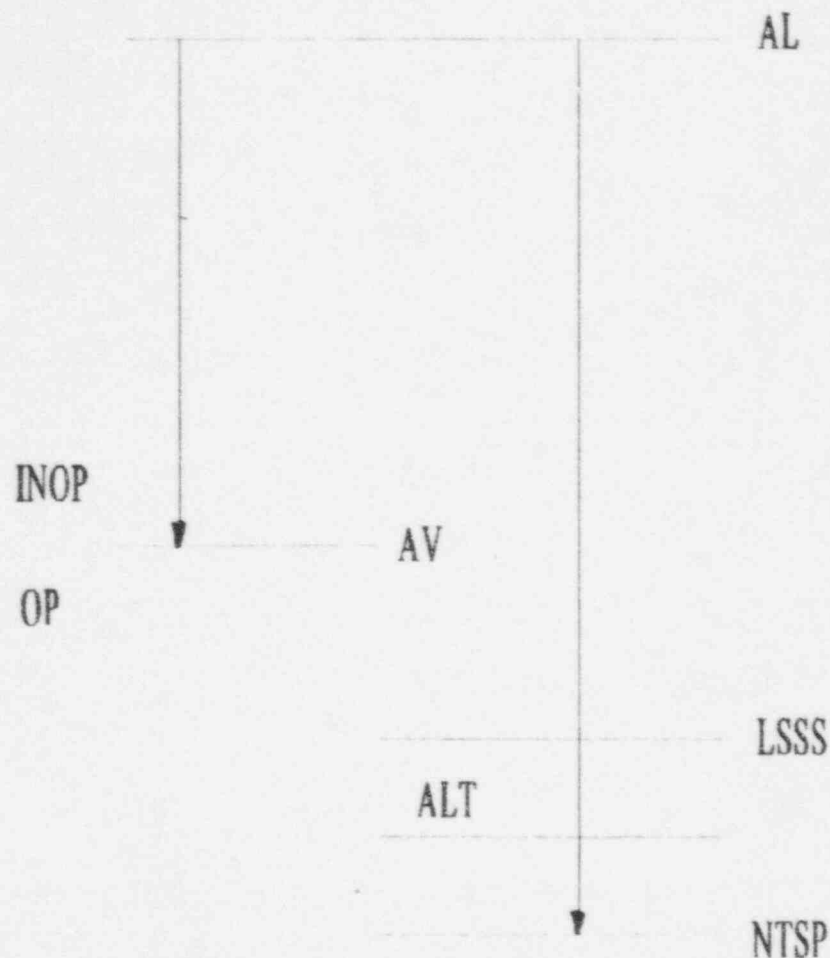
- Maximize Uncertainties (Margin) when working from Analytic Limits
- Minimize Uncertainties when back-calculating to derive conservative candidate AL and AV
- Future work based on this AL, look for better basis, or reanalyze
- Example - SLDS

Modification to Install a More Accurate Instrument



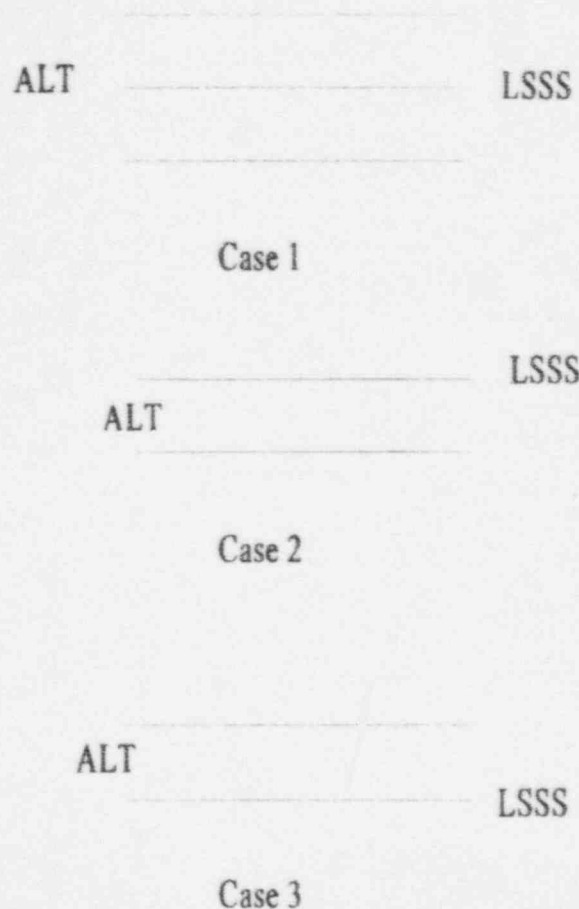
- No TS Change if keep current LSSS
- TS Change to use new NTSP - example HPCI/RCIC Steamline High Flow
- New AV implemented in Surveillance

Instrument Degradation - Increased Drift



- Case may arise from trending or root cause of LER
- Revise ALT to more Conservative NTSP
- TS Change under CTS
- AV unaffected
- ➡ Note that under Standard TS, no TS change is needed (AV doesn't change)

As-Left Tolerances



- Cases 1 and 2 were consistent with initial Licensing Basis
- Case 3 would be permitted by methodology provided full ALT is within NTSP
- Per February 25, 1997 Commitment Letter NG-97-0395 only Case 2 will be used until ITS is approved

Process

● Design Bases Research

- Transient Analyses
- Accident Analyses
- Tech Specs, SAR, FSAR, UFSAR
- System Specifications, Drawings, Calculations
- Startup Testing
- DBDs - especially Design Safety Standards, Nuclear Safety Criteria, Nuclear Safety Operational Analyses, List of Safety Structures, Systems, and Components
- LERs, SILS, Operating Experience, Topical Reports, Modifications, Procedures

Process

- Multi-disciplinary Setpoint Control Review and Discussions to ensure understanding of the design bases
- Engineering Calculations using GE Setpoint Methodology
 - Independent Verification
 - Actual plant calibration, drift data checked against assumptions

Process

- Setpoint Control Program Owner
- Setpoint Controls Interfaces
 - Corrective Action Program
 - Operability and Reportability
 - Operating Experience
 - UFSAR, Technical Specifications
 - Modifications, Repairs, Replacements
 - Maintenance, Surveillance Procedures
 - Measurement and Test Equipment
 - Instrument Trending
 - Safety, Transient Analyses

Process (Historical)

- Low Low Low RPV Level Inaccuracy at Accident Conditions
 - LER 92-001
- HPCI/RCIC Steamline High Flow Isolation
 - RTS-244 Amendment 187
- RWCU Leak Detection
 - RTS-248 Amendment 188
- APRM High Flux SCRAM Margin DBD Issue
 - Revised Reload Transient Analysis
- Drywell Pressure SCRAM Margin DBD Issue
 - Revised Reloads Transient Analysis, LOCA Analysis
- APRM 125% Clamp Not Tested
 - LER 94-001
- RCIC Low Steam Pressure Instrument Drift
 - LER 94-002
- Degraded Voltage Relay Harmonics
 - LER 94-012
- EOC-RPT Technical Specification Acceptance Criteria
 - RTS-286A Amendment 216

Process Evaluations

- 1992 Safety Committee Audit
- 1994 Comparison of Calculations to STPs
- 1994 DAEC participated in Tech Specialist Exchange Audit at another plant
- 1995 Engineering, Technical Support NRC Inspection
- 1995 NRC System Based I&C Inspection
- 1996 Reviews for GL 96-01, new calcs for ITS
- 1997 Review for this meeting

Summary

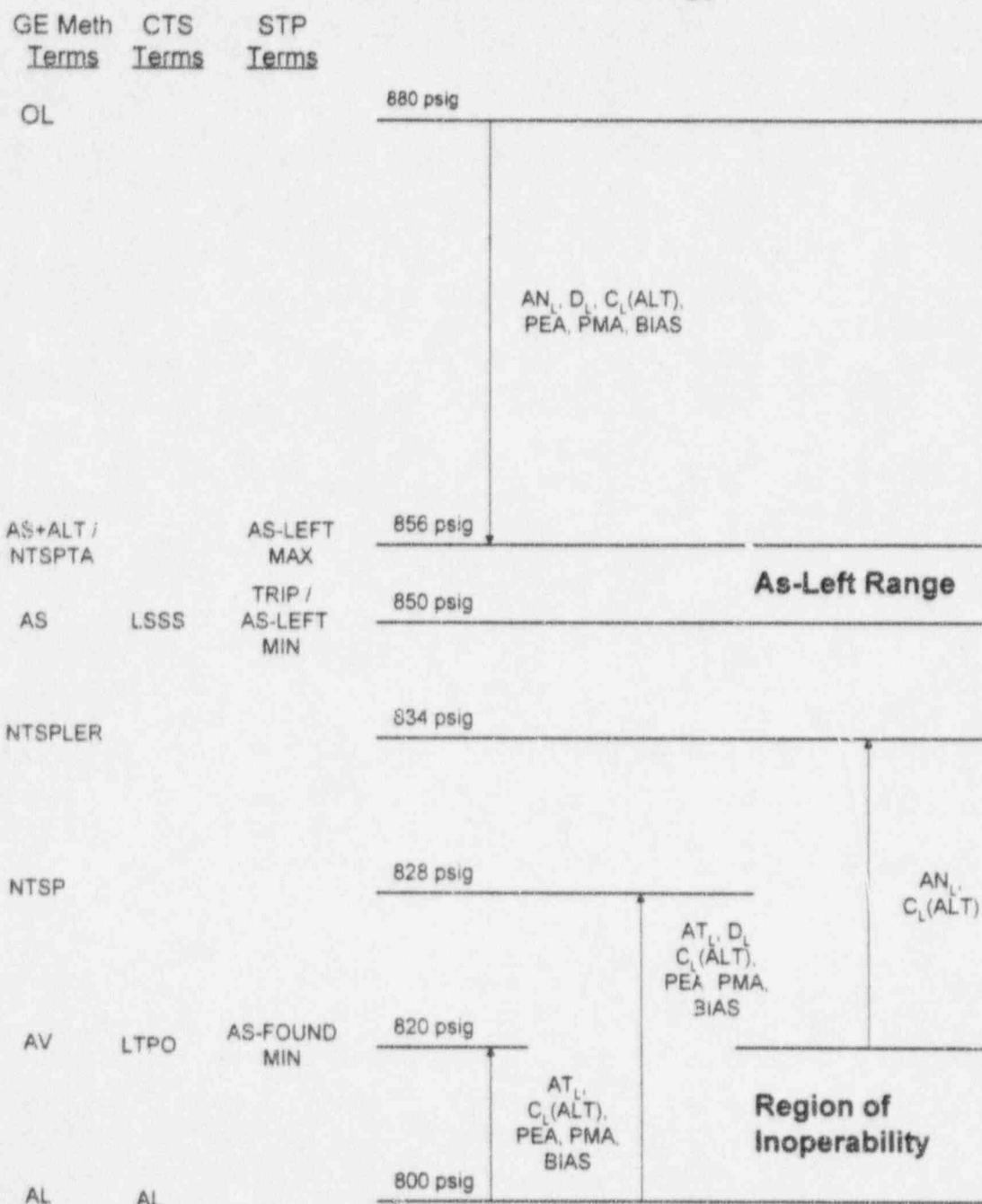
- The DAEC Setpoint Control Program is a **STRENGTH.**
 - Setpoint Control Program Ensures Compliance to Technical Specifications and Licensing Bases.
 - Setpoint Control Program has Improved Plant Knowledge and Understanding of Design Basis.
 - Setpoint Control Program is based on Approved Industry Methodologies and Conservative Decisions.
 - Setpoint Control Program has Improved Plant Safety and Reliability.

Example Setpoints

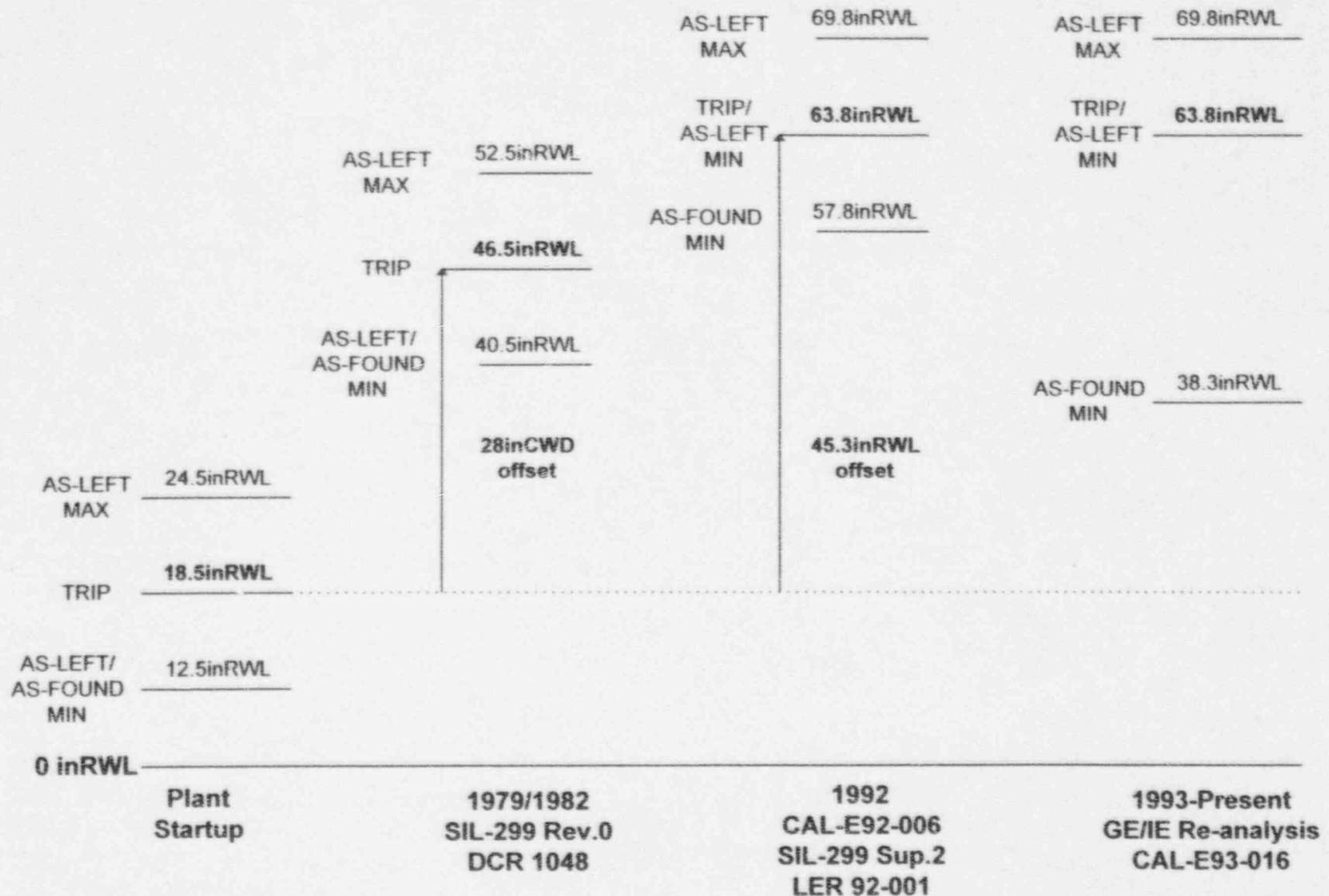
Presented by Jeff Mahannah

- ◆ **Main Steam Line Low Pressure**
- ◆ **Reactor Vessel Low-Low-Low Level**
- ◆ **Regulatory & Design Control of DAEC Technical Specification Setpoints**

Relationship Between Variables for Main Steam Line Low Pressure - PCIS Group I Isolation AFTER 2/25/97 (GE Setpoint Methodology)



DAEC Chronology of the Reactor Water Level Low-Low-Low Setpoint



DAEC Chronology of the Reactor Vessel Low-Low-Low Setpoint

<u>Time Period</u>	<u>Reactor Vessel Low-Low-Low Setpoint</u>
Plant Startup	Nominal Setting is 18.5 inRWL, As-Left Tolerance (ALT) = As-Found Tolerance (AFT) = +/-6 inRWL
1979-82	<p>GE SIL-299 Rev 0 identifies potential 12.7% (28 inCWD) offset due to LOCA environmental conditions. SIL-299 does not clearly identify that offset is specified in units of inCWD differential pressure rather than inRWL.</p> <p>IE (and other utilities) erroneously incorporate 28 inCWD offset. DCR 1048 changes in-plant setting from 18.5 inRWL to 46.5 inRWL (i.e. $18.5 + 28 = 46.5$ inRWL, ALT = AFT = +/- 6 inRWL)</p>
1992	<p>During setpoint reconstitution IE notices error in DAEC level setting and likely generic misinterpretation of SIL-299. IE immediately corrects DAEC settings and notifies GE that SIL-299 should indicate an 18% (45.3 inRWL) offset in terms of inRWL. In-plant setting changed from 46.5 inRWL to 63.8 inRWL (i.e. $18.5 + 45.3 = 63.8$ inRWL, ALT = +6/0 inRWL, AFT = -6)</p> <p>IE issues LER 92-001 and NRC commends DAEC for prompt corrective action and Setpoint Reconstitution Program. GE Issues Supplement 2 to SIL-299 with clarifications.</p>
1993-Present	GE/IE re-analyze setpoint and offset with latest information and methodology (CAL-E93-016). Results show existing in-plant settings are conservative. TRIP and ALT not changed. AFT revised to be consistent with latest analysis.

Regulatory & Design Control of DAEC Technical Specification Setpoints

BASIS FOR CONTROL:

1. Values in Technical Specifications have been reviewed by a formal Setpoint Reconstitution Project. Results of reviews are formally documented.
2. Per NG-97-0395 dated February 25, 1997, in-plant settings are left on the preferred side of the Technical Specification value or the setpoint calculation Nominal Trip Setpoint (which ever is more conservative). Instrument operability will be determined by use of Surveillance Test Procedure As-Found criteria which corresponds to the Allowable Value determined during the Setpoint Reconstitution Project.
3. DAEC uses an NRC Approved GE Setpoint Methodology that establishes appropriate margin between the Nominal Setting, Allowable Value and Analytical Limit to account for drift and other uncertainties.
4. The DAEC has a dedicated Setpoint Control Coordinator responsible for reviewing changes to setpoints to ensure proper use of the GE Setpoint Methodology and consistency between DAEC procedures, design and licensing documents.

CONCLUSION:

The combination of these controls ensure the current DAEC Technical Specifications adequately protect operability of critical instrumentation.

Entering LCOs during Tech Spec Surveillances

Tony Browning
Sr. Principal Licensing Eng.
IES Utilities

Entering LCOs during Tech Spec Surveillances

- ◆ History

- Original Licensing Basis
- Plant Design Basis
- Original Tech Spec Basis

- ◆ Hardships

- ◆ Discussion of Possible Actions

Entering LCOs during Tech Spec Surveillances

◆ Original Licensing Basis

■ Reliability Analyses

- » APED-5736: Guideline for Determining Safe Test Intervals and Repair Times for Engineered Safeguards, (ref. TS 3.5 Bases)
- » NEDO-10739: Methods for Calculating Safe Test Intervals and Allowable Repair Times for Engineered Safeguard Systems, (ref. UFSAR Section 6.3.4.2.1)

Entering LCOs during Tech Spec Surveillances

◆ Original Licensing Basis (cont.)

■ Reliability Analyses

- » Purpose - Optimize Overall Reliability
- » Test Time (Surveillance) = Maximize Availability
- » Repair Time (LCO) = Minimize Risk
- » Test Time \ll Repair Time

Entering LCOs during Tech Spec Surveillances

◆ Design Basis

■ Recovery from “Secondary Modes of Operation” Not Assumed in Accident Analysis

“It shall not be necessary that the closing speed of the valves in the system test lines be greater than the manufacturer’s standard (12”/min). This shall be based on the philosophy that the Emergency Core Cooling System (ECCS) are not designed to recover from secondary modes of operation, such as testing, because the period of time that the ECCS are in these secondary modes of operation is so short that the effect on overall reliability is insignificant.” (GE Spec. 22A1341)

Entering LCOs during Tech Spec Surveillances

◆ Design Basis (cont.)

- Key Assumption of Accident Analysis is that systems are in “standby readiness” at the beginning of the event.

“Engineered safeguard systems are standby systems. They are tested periodically to assure that they are operable and returned to standby status.”

(ref. APED-5736)

Entering LCOs during Tech Spec Surveillances

◆ Design Basis (cont.)

- They are not *assumed* to respond to the event from secondary modes of operation, even though they will re-align.

“The automatic control circuitry for the emergency core cooling systems is arranged to restore each of the systems to normal operation if a LOCA should occur during test operations. However, certain tests, such as flow tests of the emergency core cooling pumps, require manual override of the automatic circuitry and, following such tests, the system must be restored manually to automatic control.” (UFSAR Section 7.3.4.2)

Entering LCOs during Tech Spec Surveillances

◆ Design Basis (cont.)

- System recovery time from secondary modes was not intended to support accident analysis mission time.

Example: Core Spray (CS) system

Test Bypass Valve Stroke Time: 40 secs.

CS Mission Time (LOOP-LOCA) : 27 secs. (original)

CS Mission Time (LOOP-LOCA) : ~ 43 secs. (current)

Entering LCOs during Tech Spec Surveillances

◆ Original Tech Spec Basis

■ DAEC Tech Specs were not constructed with the assumption that systems were inoperable during required surveillances.

» “Conditional Surveillances”: if “A” is inoperable, then test “B” immediately and daily thereafter.

IF systems are considered inoperable during testing, and the LCO actions entered, then this requirement creates a paradox that requires a plant shutdown, i.e., no LCO (repair) time would be allowed.

Entering LCOs during Tech Spec Surveillances

◆ Original Tech Spec Basis (cont.)

- » ECCS “Keep -fill” System LCO action requires that the affected ECCS be placed into test mode OR to cascade and declare the ECCS inoperable. The “or” logic implies that these actions are not the same.
- » HPCI quarterly flow testing requires RHR alignment in Torus Cooling mode to maintain suppression pool temperatures within TS limits.

IF both systems are considered inoperable during this test, because they won't support the accident analysis requirements, and the LCO actions are entered, a plant shutdown would be required.

Entering LCOs during Tech Spec Surveillances

- ◆ Original Tech Spec Basis (cont.)

- DAEC has previously communicated this information to the Staff.

- » GL 89-10 (MOV Program) correspondence.

- ◆ Meeting at NRR - Sept. 22, 1994
 - ◆ IES Letter - Nov.. 30, 1994
 - ◆ IES Letter - Mar. 10, 1995

Entering LCOs during Tech Spec Surveillances

◆ Examples of “Hardships” with Entering LCO Actions during TS Surveillances

■ “It is not the intent of surveillances or other similar program requirements to cause unwarranted plant shutdowns or to unnecessarily challenge other safety systems.”(Generic Letter 91-18)

- » HPCI quarterly flow test , previously mentioned, would enter a shutdown action.
- » CS Simulated Auto Actuation test, affects both CS and its associated Diesel Generator, requiring entry into a shutdown action.

Entering LCOs during Tech Spec Surveillances

◆ Examples of “Hardships” with Entering LCO Actions during TS Surveillances (cont.)

- » Standby Liquid Control system quarterly flow test, affects both trains, requiring entry into a shutdown action.
- » Standby Gas Treatment system flow test, affects both trains, requiring entry into a shutdown action.

Entering LCOs during Tech Spec Surveillances

◆ Why Enter LCOs?

- Ensures Operator Awareness of Plant Status.
- Requires “cross-train/loss-of-function” checks.
- Limits the amount of time system is out-of-service.

Entering LCOs during Tech Spec Surveillances

◆ Current Practices:

- On-line work planning - coordinates system maintenance and surveillance testing.
- On-line risk guidelines - minimizes plant risk during planned maintenance outages.
- Planned Time in LCO is limited (~50% TS LCO Time).
- “Cross-train” checks done just prior to performing Surveillance.