

# RTDP/RTS&ESFAS

## Beaver Valley License Amendment Request

- **Goals**
  - Supports 1.4% Up-rating Project
  - Improves DNB Margin
  - Addresses Industry Issues (e.g. TB-97-01)
  - Removes 1998 BCO's
  - Provides new baseline for the current setpoint uncertainties and Transient Analyses (DNB events)
  - Allows optimization of cycle-specific Technical Specification parameters
  - Aligns BVPS Setpoint requirements with ISTS

# **RTDP/RTS&ESFAS**

## **Beaver Valley License Amendment Request**

- **Covers Five Areas:**
  - RTS/ESFAS Setpoints & Allowable Values**
  - RTDP Methodology Implementation**
  - Relocation of Cycle Specific parameters to COLR**
  - Relocation of Trip Setpoint values to LRM**
  - Miscellaneous changes**

# Differences between CLB and Present LAR

- **Changes to Algorithms**
- **Application of LSSS**

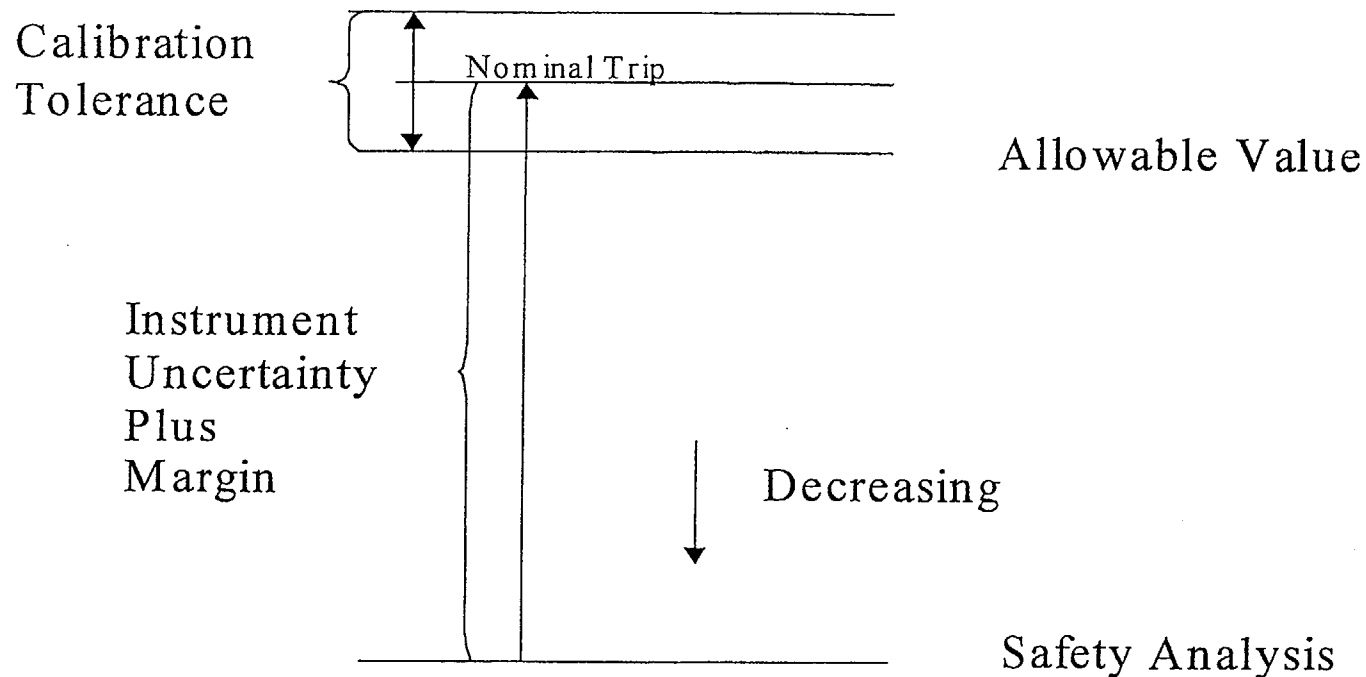
# **RTS/ESFAS SETPOINT METHODOLOGY**

- **Consistent with previously approved methodology as described in WCAP-11419 (Unit 1) and WCAP-11366 (Unit 2)**
- **Limiting Safety System Setting (LSSS) is the Allowable Value**
- **Methodology conforms with Reg. Guide 1.105, Revision 3**

# **Treatment of RTS/ESFAS Setpoint Nominal Value**

- **Ensures compliance with our Design Analysis**
- **Addresses Verbatim Compliance**
- **Follows Other Plant(S) NRC approved**

# REACTOR TRIP SETPOINT



**Reactor Trip System/Engineered Safety Features Actuation System**

(Example)

## **Allowable Value**

**Allows for “As-Left” Deviation from the Nominal Trip Setpoint**

**Criteria Used by Operations and Maintenance Personnel to Evaluate “As-Found” Nominal Trip Setpoints**

## **Nominal Trip Setpoint**

**Value at Which the Bistable is Set, as Accurately as Reasonably Achievable**

## **Thermal Design Procedures**

- **Standard Thermal Design Procedures (STDP)**
  - Reactor parameters are chosen such that there is ~ 100% probability that core FSARs limiting values will be met (i.e., lowest flow, highest temp, highest power, etc.) Design limit DNBR = correlation limit
- **Improved Thermal Design Procedure (ITDP) – WCAP-8567**
  - Design limit DNBR chosen with reactor parameters at nominal values. Variations (uncertainties) in parameters are considered in generation of this limit DNBR
- **Revised Thermal Design Procedure (RTDP) – WCAP-11397**
  - Extension of ITDP where DNBR correlation statistics are also combined into calculation of design limit DNBR
- **Mini-RTDP**
  - Plant System uncertainties are excluded from the statistical combination process (e.g. Plant system uncertainties on reactor power, flow, temperature, pressure and bypass flow are excluded).

# RTDP Methodology

- Submitted on March 16, 1987
- Approved on January 17, 1989
- Revised the previous ITDP Methodology treatment of uncertainties
- 26 Plants have employed RTDP
- Beaver Valley is currently a Mini-RTDP plant

# **RTDP Methodology**

**RTDP Methodology is used for predicting the DNBR design limit in Westinghouse PWRs.**

**Is a modification of the existing ITDP Methodology**

**Methodology employs a 95% confidence level**

**System and correlation uncertainties are statistically combined rather than deterministically.**

**Provides a more realistic prediction of the DNBR limit which satisfies the design criterion.**

# RTDP Methodology

- **Satisfies design criterion that protect against DNB**
- **Criterion is that DNB will not occur on the limiting fuel rod for a Condition I or Condition II Event.**