

# **BWROG PRESSURE-TEMPERATURE CURVE FRACTURE MECHANICS METHODOLOGY**

**Presentation to NRC**

**March 16, 2005**

**White Flint**

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# **PRESENTATION OBJECTIVES**

- Review BWROG PTC activities.
- Solicit NRC observations.
- Obtain estimates of NRC review resources and schedule.

# **PRESENTATION OUTLINE**

- Background
- Concept
- Purpose
- Scope
- Supporting Bases
- Relationship with Other Industry Activities
- Coordination with Other Industry Organizations
- Issues Potentially Affecting NRC Acceptance
- Completeness of LTR Submittals
- Improved Industry Efficiency
- Planned LTR Submittal Schedule

## **BACKGROUND**

- Tech Specs (TS) currently include limiting conditions for operation that establishes Pressure-Temperature (PT) limits for the reactor coolant system.
- During startup and shutdown, the rates of PT changes are limited so that maximum specified heat up and cool down rates are consistent with design assumptions and satisfy operating limits that provide a wide margin of safety for brittle-fracture criteria for the reactor vessel.
- The PT limits are periodically modified as the reactor vessel material toughness decreases as a result of material embrittlement caused by neutron irradiation during plant operation.

## BWROG Pressure-Temperature Curves

# CONCEPT

- Licensees must submit a license amendment to update reactor pressure vessel Pressure-Temperature Curves (PTC) located in TSs.
- GL 96-03 allows license amendments to relocate PTCs from plant TSs to a licensee-controlled document provided that:
  - The PTC methodology is approved by the NRC,
  - A report (such as a PT Limits Report-PTLR) is developed to contain the PTCs, and
  - TSs are modified to note the relocation.
- Most BWRs employ either General Electric (GE) or Structural Integrity Associates (SIA) PTC fracture mechanics methodology.
- BWROG plans to submit both GE and SIA PTC fracture mechanics methodology for generic NRC approval via separate Licensing Topical Reports (LTR).
- These LTRs will allow “plug and play” with NRC-approved vessel fluence methods currently used by licensees.

## **PURPOSE**

Develop LTRs for NRC submittal of both GE and SIA PTC fracture mechanics methodologies that, if approved by the NRC, can be then referenced by BWR licensees (in concert with NRC-approved vessel fluence methods) to allow PTCs (and limits) to be relocated from plant TSs to a PTLR, a licensee-controlled document.

## **SCOPE**

- Develop and document separate GE and SIA PTC fracture mechanics methodologies and submit to the NRC for review/approval via separate LTRs.
  - GE LTR will have proprietary and non-proprietary versions.
  - SIA LTR will be non-proprietary.
- In accordance with GL 96-03, develop a BWR model for a license amendment request to adopt GL 96-03, including a template for the PTLR, and provide these for NRC review at the time of LTR methodology submittals.

## **SUPPORTING BASES**

- The BWROG effort will take advantage of industry lessons learned with GL 96-03, in addition to previous BWR licensee PTC amendment request experience, including past Staff Requests for Additional Information (RAI).
- The LTRs will be similar to PWR LTRs previously approved by the NRC (e.g., WCAP-14040).



# **RELATIONSHIP TO OTHER INDUSTRY ACTIVITIES**

Although not directly related, there may be interfaces related to vessel materials issues such as the Integrated Surveillance Program (ISP).

# **ISSUES THAT COULD AFFECT NRC ACCEPTANCE**

The BWROG does not foresee any issues that could negatively affect NRC acceptance based on previous NRC and industry experiences with PTC submittals and GL 96-03.

## **COMPLETENESS OF LTRs**

The content of planned LTRs will be based on existing industry experience with individual licensee TS PTC amendment submittals, sufficient for thorough Staff review and a basis for the issuance of Safety Evaluation Reports (SER).

## **IMPROVED INDUSTRY EFFICIENCY**

- As stated in GL 96-03, processing amendment requests to relocate PTCs outside TSs to a licensee-controlled document will allow more efficient utility maintenance of PTCs at significantly reduced costs to licensees.
- With NRC approval of these generic PTC fracture mechanics methodology LTRs, licensees can seek NRC approval to adopt GL 96-03 by merely referencing the pre-approved methods saving NRC valuable resources in individual plant reviews.

## **PLANNED LTR SUBMITTALS**

- The BWROG is targeting the submittal of both GE and SIA LTRs by end of May 2005.
- The BWROG will be requesting NRC review/acceptance by May 2006.

What is the anticipated impact (if any) on NRC schedule of planned NRC Rulemaking on PT limits?

# **PRELIMINARY LTR OUTLINE**

*(Requirements for methodology submittals per GL 96-03)*

1. Fluence Methodology: Fluence methodology will not be included in the PTC fracture mechanics LTRs. Licensees must reference the fluence methodology they currently have adopted when submitting their GL 96-03 license amendment request.
2. RPV Surveillance Program Description: The LTRs will cite the ISP as all BWRs are participating.
3. Low-Temperature Overpressure Protection (LTOP): Not applicable to BWRs.
4. Adjusted Reference Temperature (ART): Will be covered by the LTRs.

# **PRELIMINARY LTR OUTLINE**

*(Requirements for methodology submittals per GL 96-03)*

5. Limiting ART Incorporated into PT Calculations: Will be covered in the LTRs.
6. Minimum Temperature Requirements of 10CFR50: Will be covered in the LTRs.
7. Test Capsule Removal: The LTRs will address this. ISPs control all capsules, including the definition/specification of values to be used on plants per BWRVIP-135 Databook and implementation methodology per BWRVIP-102.

BWROG Pressure-Temperature Curves

# **NRC OBSERVATIONS**

- NRC observations?
- Estimate of NRC review resources?
- Estimate of NRC review schedule?