

# AREVA BWR LOCA Methods Applicability

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### Agenda

**Discuss the current condition** 

Potential need to introduce a modified analysis approach for EXEM BWR-2000 Methodology

Impact of modified analysis approach on current plant analyses

**Proposed implementation strategy** 

**Proposed licensing strategy** 



**Current Condition** 

A unique ADS configuration at a supported plant was identified

NRC Staff expressed concern that the configuration resulted in conditions that were outside the range of applicability of approved EXEM BWR-2000 methodology

◇ Operating under degraded/nonconforming condition

♦ ADS will be modified during next refueling outage to be consistent with other plants

Revised analyses for the plant with corrected ADS have been performed and audited by NRC

◇ Open items remain but it is expected that they will be resolved

AREVA has determine that the approved EXEM BWR-2000 method is appropriate for application to other currently supported plants with a typical ADS configuration



### **Methodology Evaluation Summary**

Bounding evaluation for integral LBLOCA tests (LTR)

Bounding evaluation for integral SBLOCA test (LTR)

Generic NRC approval for application to jet pump BWR for large and small break analyses

Appendix K conservatism applied in method

Additional implementation conservatisms applied in method

Recent results of NRC SBLOCA analyses for a plant with a typical ADS configuration were similar to EXEM BWR-2000 results and NRC found that method was acceptable for SBLOCA analyses

In the aggregate the EXEM BWR-2000 methodology is conservative and appropriate for typical BWR application



### **Adequate for Future Application?**

Analysis approach reviewed in July NRC audit addressed NRC concern



### **Proposed Analysis Approach**





## Impact on Current Plant Analyses

Scoping LOCA analyses were performed for several plants using the revised analysis approach

In all cases the PCT was less than 2200F with the revised approach

♦ Current MAPLHGR limits continue to be supported



## Implementation Strategy

Analyses for currently supported plants are conservative and adequate

◇ Approved EXEM BWR-2000 method is conservative for the standard ADS configuration of all plants currently supported





## **Licensing Strategy**







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#### Summary of NRC meeting on August 16, 2011 and Proposed Implementation Strategy for Modified Analysis Approach for the EXEM BWR-2000 ECCS Evaluation Model.

On August 16, 2011 the NRC and AREVA participated in a closed meeting to discuss implementation of a modified analysis approach for the EXEM BWR-2000 ECCS evaluation model. AREVA provided the following discussion during the meeting.

#### Summary:

A unique ADS configuration was identified at an AREVA supported plant. NRC Staff review of the LOCA analysis for that plant led to a concern that the configuration resulted in conditions that were outside the range of applicability of the approved EXEM BWR-2000 methodology. [

As a result of the NRC concern AREVA developed a modified application approach for the EXEM BWR-2000 Method that [

] In July 2011 the NRC audited analyses for the affected plant with the modified analysis approach. While open items remain, it is believed that the NRC will find the modified approach acceptable for application.

#### Method Evaluation:

AREVA has assessed the approved EXEM BWR-2000 method and determined that it is appropriate for application to other currently supported plants with a typical ADS configuration. Specifically AREVA considered the following items to arrive at this conclusion:

- The Licensing Topical Report (LTR) contains analyses that demonstrate the EXEM BWR-2000 method is bounding for integral LBLOCA tests.
- The LTR contains analyses that demonstrate the EXEM BWR-2000 method is bounding for an integral SBLOCA test.
- The EXEM BWR-2000 ECCS Method has generic NRC approval for application to jet pump BWR for large and small break analyses.
- The method applies Appendix K conservatisms.
- The method applies additional implementation conservatisms.
- Recent results of an NRC SBLOCA analyses for a plant with a typical ADS configuration were similar to EXEM BWR-2000 results and the NRC found that method was acceptable for SBLOCA analyses in that review.
- [

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However, AREVA also concluded that plant configurations at future customers or for current customers after plant modifications, could result in [

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] It was also recognized that the

conservative modified analysis approach used for the analyses reviewed in the July 2011 audit would address the NRC concern. Therefore, AREVA believes it would be appropriate to implement the modified analysis approach in future applications of the EXEM BWR-2000 methodology.

### Description of Proposed Analysis Approach:

The proposed analysis approach [

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#### Assessment:

To assess the expected impact when the modified analysis approach is implemented, AREVA performed preliminary scoping analyses<sup>\*</sup> for several BWRs plants (2 BWR/5, 2 BWR/4, and 1 BWR/3). For these analyses a full range of break spectrum and single failures were considered.

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Implementation: The specific implementation strategy is that [

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<sup>\*</sup> Preliminary analyses have not received quality assurance review that would be required for licensing analyses by 10 CFR 50 Appendix B

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