



# Industry Plan to Assess Clad Performance Margins for LOCA

PWR and BWR Owners Groups  
NRC Public Meeting  
August 12, 2010

# Agenda

- Presentation Objectives
- Background
- Industry Response Activities
- Industry Participation
- Industry Approach
- Milestones/Targets
- Anticipated Deliverables
- Advantages
- Conclusion

# Presentation Objectives

- Provide an overview of industry plan to provide an assessment of clad performance margins in response to NUREG/CR-6967 research findings.
- Present the project scope, process, schedule and deliverables.
- Receive feedback on project plan.

# Background

- NRC LOCA research program identified previously unknown embrittlement mechanisms.
- NRC determined current 50.46(b) criteria are not consistent with new high-burnup research findings.
- NRC requested plant-specific information to support initial safety assessment (ML090340073) of sufficient clad performance margin.

# Industry Response Activities

Post - NRC April 28-29 2010 Workshop:

- NEI followed up with NRC on information requests and options for an industry response.
- Requests for clad performance margin assessments conveyed to PWROG/BWROG (project authorizations initiated).
- Industry leadership met to determine clad performance margin assessment scope, resource requirements, implementation and coordination logistics.
- PWROG/BWROG developed plan for clad performance margin assessments as the first piece of industry plan to support 50.46(b) rulemaking and implementation.

# Industry Participation

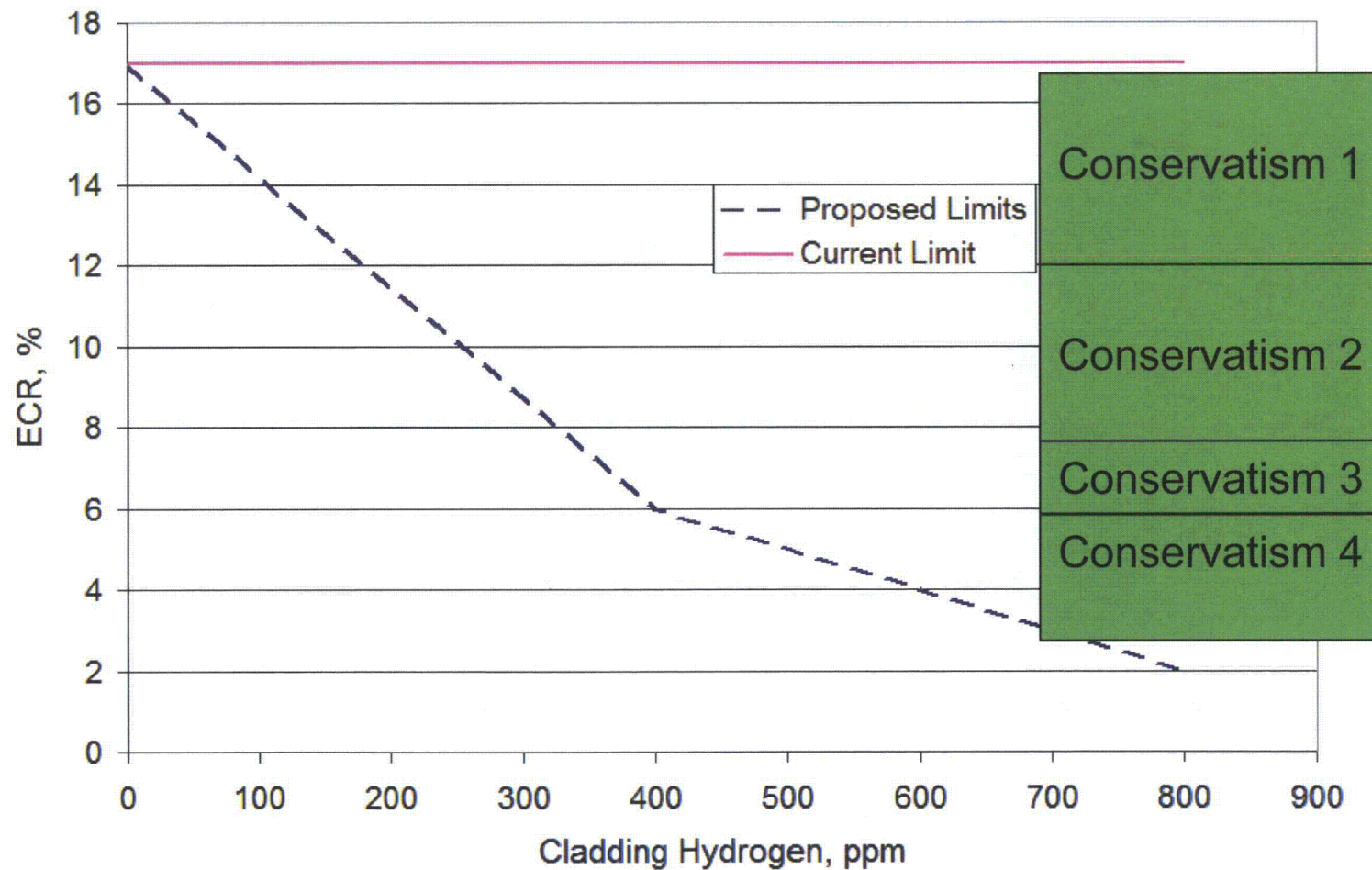
- **NEI** – Policy, NRC Interface, Consensus
- **RegTAC (EPRI-FRP)** – Performance-based rule language, fuel performance research, collaboration with vendor test programs.
- **PWR Owners Group** – Joint clad performance assessment project, 69 reactors.
- **BWR Owners Group** – Joint clad performance assessment project, 35 reactors.
- **Fuel Vendors: AREVA, GEH/GNF, Westinghouse** – Project management, clad performance assessments.

# Industry Approach to Clad Performance Margin Assessment

- Compile essential information for LOCA Analyses of Record: PCT; Max. Local Oxidation; Times above transition temperature; Evaluation Models.
- Group plants by key design basis features (e.g., NSSS type, fuel design, methodology).
- Identify plant and fuel cladding information that allows conservatisms to be quantified/justified (e.g., App. K to best-estimate LOCA methods; credits for LBLOCA Redefinition where applicable).
- Perform additional sensitivity studies to evaluate other conservatisms, if necessary.
- Complete report and provide to NRC.

# General Approach for Clad Performance Margin Assessment

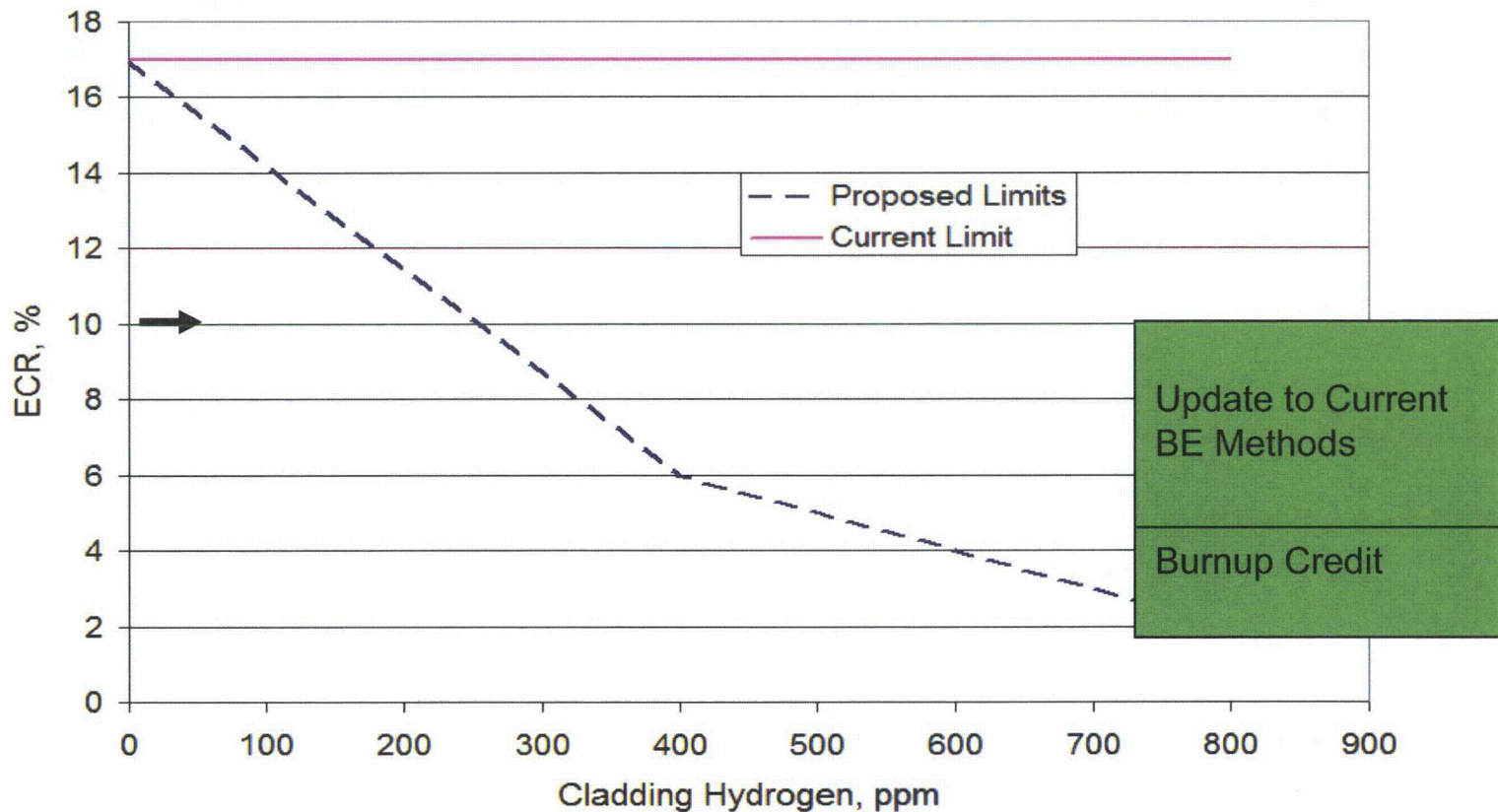
LOCA Criteria, ECR vs Hydrogen





# Illustration of Approach – Group A (Max. ECR = 10%, Older BE Method)

LOCA Criteria, ECR vs Hydrogen



# Milestones/Targets

- Develop project scope, resource requirements, and funding requests - Complete
- PWROG/BWROG authorize projects – T= 0 (Target September 2010)
- Vendors compile plant data – T+2 months
- Vendors group plant data, perform sensitivity studies, assess conservatisms – T+3 months
- Vendors issue draft clad performance margin assessment report to PWROG/BWROG for review – T+4 months (January 2011)
- Vendors/OGs resolve comments – T+5 months (February 2011)
- NEI provides Clad Performance Margin Assessment to NRC – T+6 months (March 2011)

# Anticipated Deliverables

For Each Plant Grouping:

- Define group populations
- Estimated PCT value(s) w/ credits
- Estimated %ECR margin(s) w/ credits
- Time above 800 °C (breakaway oxidation)
- Basis for acceptability of credits
- Inputs/assumptions needed to define clad performance margins, if required

# Advantages to Project Approach

- Efficient use of vendor, industry resources.
- Consistent approach for plants with similar methods, systems, fuel designs, licensing bases.
- Supports implementation planning and resource management.

# Conclusion

Industry project will provide a timely assessment of clad performance margins in response to NUREG/CR-6967 research findings.