

## **Boiling Water Reactor Vessel & Internals Project (BWRVIP)**

**David Czufin, Exelon**  
BWRVIP Executive Chairman

**Industry/NRC Executive Meeting on  
Materials Program**

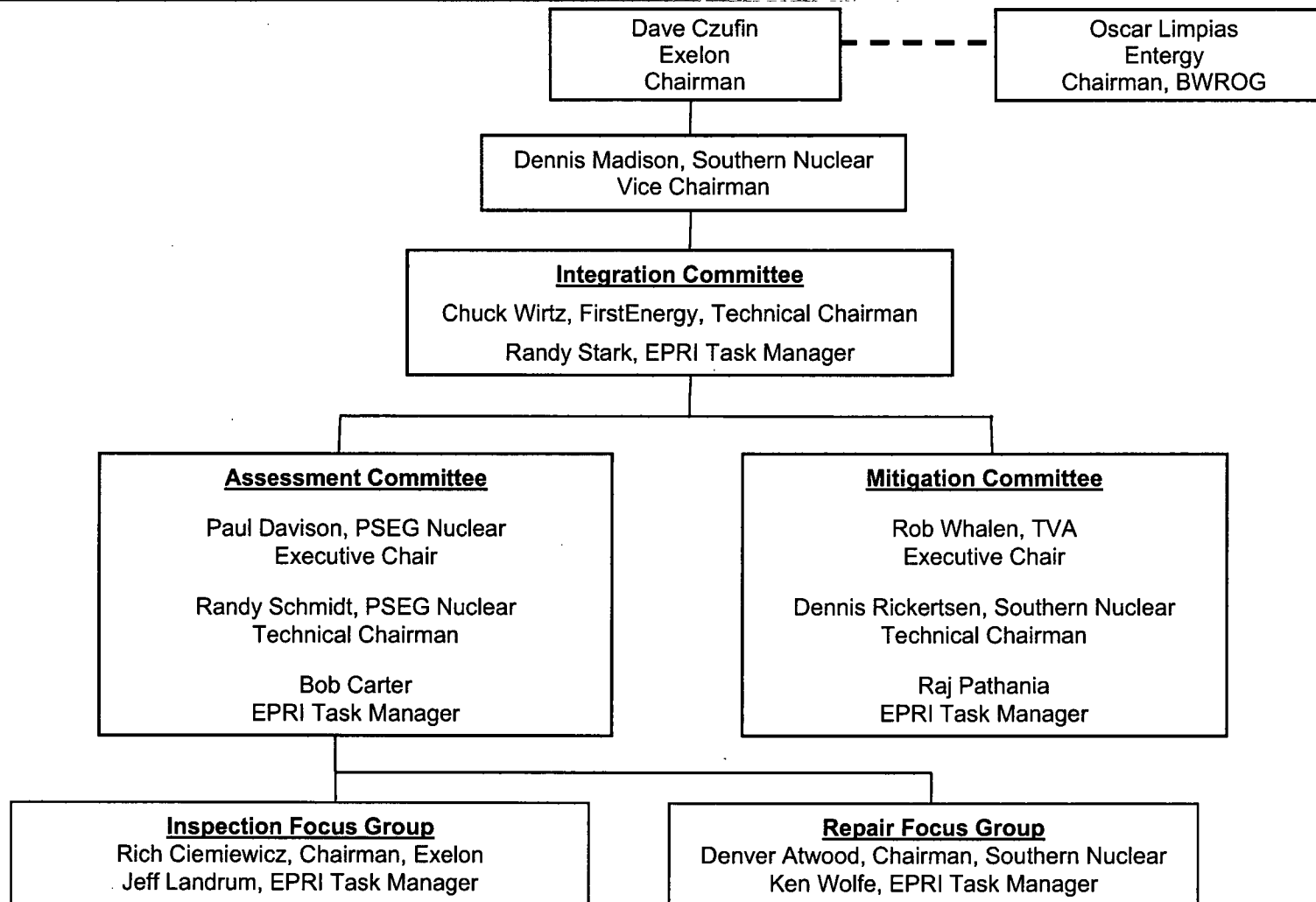
June 21, 2011

# Presentation Outline

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- BWRVIP Organization
- Technical Committee Responsibilities
- 2011 Major Tasks
  - Full Scale Jet Pump Testing Facility
  - Optimization of Inspection Frequencies
  - BWRVIP-62, Revision 1
- Planned Report Submittals for 2011

# BWRVIP Organization



# Technical Committee Responsibilities

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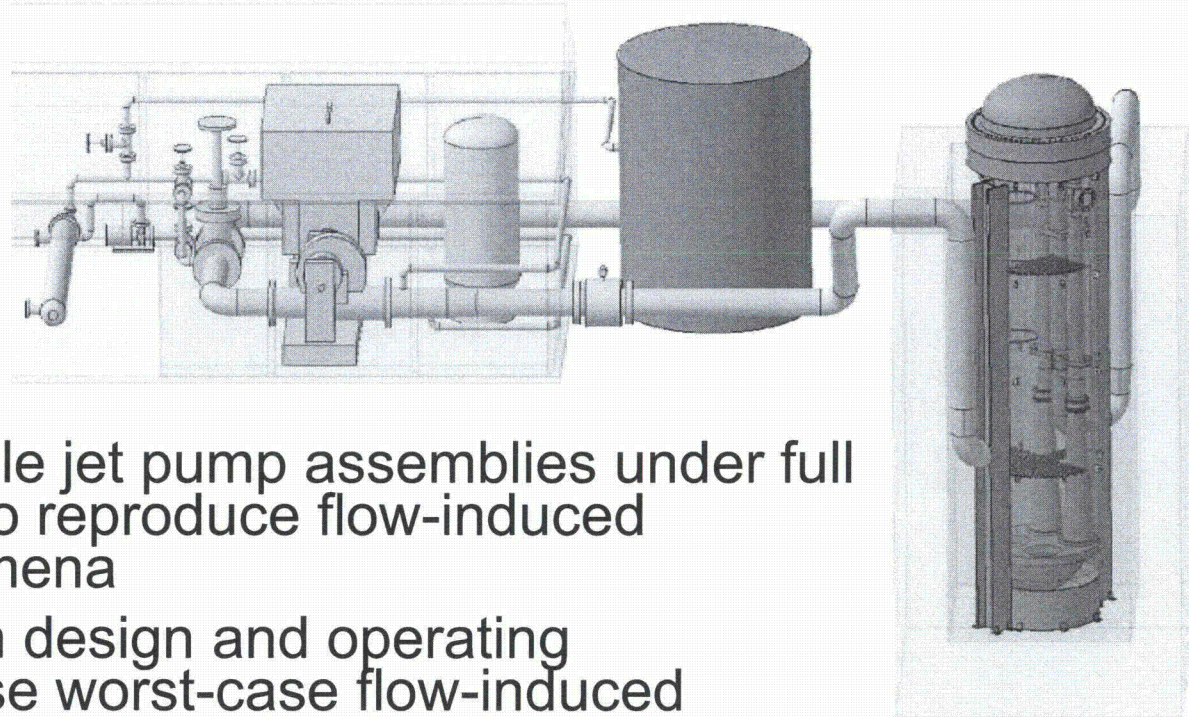
- Assessment -- What needs to be inspected, when it needs to be inspected, inspection options, how to disposition observed degradation
- Inspection -- How to inspect, what equipment and techniques are available, what are the associated uncertainties
- Repair/replace -- What repair/replacement techniques are available and what are the associated requirements that must be met
- Mitigation -- How can SCC degradation be prevented or reduced

# 2011 BWRVIP Major Tasks

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- Crack Growth and Fracture Toughness Evaluation of Highly Irradiated Stainless Steel
- Full Scale Jet Pump Testing
- Testing of X-750 Materials
- Welding of Highly Irradiated Materials
- Core Spray Inspection Optimization
- Online NobleChem Effectiveness Studies
- BWRVIP-62, Revision 1 (Lower Plenum Credit and OLNC)
- BWRVIA Revision 3.1
- RAI Responses to BWRVIP-194, Steam Dryer Loads Methodology

# Full-Scale Jet Pump Testing



## Objectives

- Evaluate full-scale jet pump assemblies under full flow conditions to reproduce flow-induced vibration phenomena
- Determine which design and operating parameters cause worst-case flow-induced vibration conditions
- Assess potential mitigation solutions against worst-case flow-induced vibration conditions
- Construction and testing planned to be completed in 2011

# Optimization of Inspection Frequencies

- BWRVIP intends to re-visit the I&E Guidelines and to optimize the inspection programs based on:
  - Latest field inspection data and fleet operating experience
  - SCC mitigation associated with HWC / NMCA
  - Current NDE capabilities
  - Component repairs
  - In-situ crack growth rate studies
  - Structural analyses
- Core Spray Optimization Technical Basis and BWRVIP-18 Rev 2 to be submitted to NRC by December 2011
- Jet Pump and Shroud Optimization technical bases documents currently being evaluated by the BWRVIP

# BWRVIP-62, Revision 1

- Will be submitted to the NRC by December 2011
- Primary and secondary parameters for On-Line NobleChem (OLNC)
- Summary of core shroud re-inspection results to show that moderate hydrogen water chemistry (MHWC), Noble Metal Chemical Application (NMCA) and OLNC plants are showing a decrease in crack growth rates compared to NWC
- Inspection data showing mitigation of stub tube cracking in the lower plenum in MHWC and NMCA plants
- Published Japanese Owners Group (JOG) ECP data from lower plenum for NMCA plants to showing that ECP drops to low values when the molar ratio is  $>2:1$ 
  - This data suggests that if the molar ratio is  $>2:1$  then lower plenum ECP measurements are not necessary in plants to demonstrate mitigation effectiveness with NMCA (or OLNC)
- Updated Tables showing degree of IGSCC mitigation for BWR internals with MHWC, NMCA and OLNC



# Expected Near Term Submittals

- BWRVIP-62, Revision 1 (technical basis for inspection relief for internal components with hydrogen injection)
- BWRVIP-76, Revision 1 (core shroud I&E guidelines)
- BWRVIP-84, Revision 1 (guidelines for selection and use of materials for repairs to BWR internal components)
- BWRVIP-100, Revision 1 (updated assessment of the fracture toughness of irradiated stainless steel for BWR core shrouds)
- BWRVIP-158-A (flaw proximity rules for assessment of BWR internals)
- BWRVIP-173-A (evaluation of chemistry data for BWR nozzle forging materials)
- BWRVIP-XXX (technical basis for revision of the BWRVIP-18 core spray inspection program)

# BWRVIP Key Contact Information

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