

# Scenario Based Testing

Exelon Nuclear Fleet incorporation of

NEI 09-09 guidance

Reg Guide 1.149 R4

ANSI/ANS 3.5-2009

# Exelon Fleet Simulators

- Ten sites – six different designs
  - PWR Westinghouse 4-loop (Byron, Braidwood)
  - PWR Babcock & Wilcox (TMI U-1)
  - GE BWR1 (Oyster Creek)
  - GE BWR4 Mk 1 Containment (Limerick, Peach Bottom, Quad Cities, Dresden)
  - GE BWR5 Mk 2 Containment (LaSalle)
  - GE BWR6 Mk 3 Containment (Clinton)

# Exelon Fleet Simulators

- Three different standards
- ANSI/ANS-1985  
Regulatory Guide 1.149 – Rev 1
- ANSI-3.5-1993  
Regulatory Guide 1.149 – Rev 2 (Clinton only)

# Simulator Procedures

- Multiple procedures
  - Simulator Configuration Management
  - Simulator Testing and Documentation
  - Controlling Simulator Core Updates
  - Simulator Modification and Projects Plan

# Simulator Procedures

- Even more ‘support documents’
  - Service Level Agreements (H/W & S/W)
  - Training Load Control
  - Simulator Work Request Prioritization
  - BWR Core Performance Testing
  - PWR Coefficients (Rod Worth, Boron, Temperature, Fuel, Doppler, Xenon)
  - PWR X

# Issues

- Testing issues identified fleet wide by internal (Training and NOS) and external (71111.11) reviews and inspections
- Lack of common governance: Analysis determined that lack of clear procedural guidance made individual site simulator coordinators to determine and implement testing requirements

# A Better Way

- February 2007 – Scenario Based Testing (SBT) Workshop – Benchmarking identified opportunity to simplify and standardize testing
- December 2007 – SBT pilot proposal approved
  - Oyster Creek selected as pilot site

# Pilot

- April 2008 – Oyster Creek
  - Transitions to ANSI/ANS 3.5-1998
  - Begins use of Scenario Based Testing using draft NEI 09-09 guidance
- June 2008 – Oyster Creek
  - Effectiveness Assessment performed
  - Lessons learned used to finalize NEI 09-09 Rev. 0



# Fleet Incorporation

- Line-by-line comparisons of ANSI/ANS-3.5 versions performed
- Change management plan and action plan developed - driven through CAP
  - each site's work load taken into account
- Re-wrote fleet common governance to consolidate and incorporate lessons learned
- Trained entire fleet on process in 2010 – 2011

# Industry/ Regulatory Guidance Timeline

- April 2009 – NEI 09-09, ‘Nuclear Power Plant-referenced Simulator Scenario Based Testing Methodology’ issued
- September 2009 – ANSI/ANS-3.5 2009 issued
- May 2010 – NRC issues draft Regulatory Guide 1.149 Rev 4
- April 2011 – NRC issues Regulatory Guide 1.149 Rev 4

# Implementation

- Revised fleet procedure to:
  - Reflect the one standard
  - Clearly defined testing requirements
- Issued procedure after Reg Guide 1.149 Rev 4 issued 6/30/11 and began implementation
- Clinton was first - LaSalle was last
- Entire fleet on common standard on 12/1/11

# Results

- No issues with any site's simulator scenario based testing during recent IP-71111.11 inspections.

