

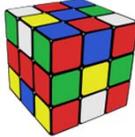




Technical Session T9
**Status of the Level 3 PRA Project for Vogtle,
 Units 1 and 2**
 Overview of Project Status and Key Technical Issues
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 U.S. NRC, Office of Nuclear Regulatory Research
 March 10, 2015


Outline of Presentation

- Reactor, at-power, Level 1
 - Internal events and floods
 - Internal fires
 - Seismic events
 - High winds, external flooding, other hazards
- Reactor, at-power, Level 2
- Reactor, at-power, Level 3
- Reactor, low power and shutdown
- Spent fuel pool (SFP)
- Dry cask storage (DCS)
- Integrated site risk



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**Internal Events and Floods
 (Reactor, At-Power, Level 1)**

- Completed internal event and flood models
- Completed American Society of Mechanical Engineers (ASME)/American Nuclear Society (ANS) probabilistic risk assessment (PRA) standard-based peer review
- Revising model and documentation to address comments
- Piloting expert elicitation guidance for interfacing systems loss-of-coolant accident (LOCA)

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Internal Fires (Reactor, At-Power, Level 1)

- Completed initial fire PRA model
- Updating model based on internal review and additional plant walkdowns and fire analysis
- Anticipate ASME/ANS PRA standard-based peer review in latter half of 2015

CHALLENGE

Review and acceptance of key fire PRA inputs

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Seismic Events (Reactor, At-Power, Level 1)

- Completed initial seismic PRA model without benefit of licensee seismic PRA model
- Current seismic PRA model based on 2012 hazard curves and preliminary plant-specific fragilities provided by Southern Nuclear Operating Company (SNC)
- Reviewing revised fragilities provided by SNC in December 2014
- Anticipating completion of revised model shortly

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High Winds, External Flooding, and Other Hazards (Reactor, At-Power, Level 1)

- Completed and documented Level 1, at-power, high wind PRA model
- Completed and documented "other hazards" evaluation
- Completed ASME/ANS PRA standard-based peer review
- Revising model and documentation to address comments

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Reactor, At-Power, Level 2

- Completed reactor, at-power, Level 2 PRA model for internal events and internal floods
- Completed ASME/ANS PRA standard-based peer review, using trial standard
- Revising model and documentation to address comments

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Reactor, At-Power, Level 3

- Completed accident consequence analysis code (MACCS*) development work necessary to support Level 3 PRA reactor, at-power source terms
- Developed new evacuation models based on the NRC's State-of-the-Art Reactor Consequence Analyses (SOARCA) study experience and site visits
- Developed initial draft of technical basis for MACCS input parameters and datasets and initial draft of MACCS input files
- Near completion of initial model

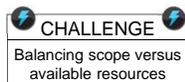
* MELCOR Accident Consequence Code System (MACCS)

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Reactor, Low Power and Shutdown

- Developing new PRA model in NRC PRA software code SAPHIRE
- Observed Unit 2 refueling outage (September 2014)
- Currently performing accident sequence development for internal events and floods
- Anticipating completion of initial model in mid-2015



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Spent Fuel Pool PRA

- Approach informed by recent RES SFP work
- Developed site operating phases to encompass major SFP configurations
- Identified initial list of hazards
- Performed numerous pre-fuel damage sequence timing calculations to prioritize probabilistic model build-out
- Developing initial Level 1 accident sequences

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Dry Cask Storage PRA

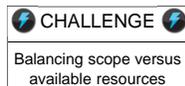
- Extensive interactions with SNC staff regarding dry cask storage design and operation
 - Observed cask loading campaign in November 2013
- PRA model based on NUREG-1864, "A Pilot Probabilistic Risk Assessment of a Dry Cask Storage System at a Nuclear Power Plant"
 - Performed additional structural analysis on fuel and multi-purpose canister
 - Completing accident sequence development
- Anticipating completion of model in the near-term

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Integrated Site Risk

- Developing new approaches for risk integration
- Will be based on risk insights from single-source models
- Assessing quantification tools for consequential loss-of-offsite power and cross-unit common cause failure
- Focusing on dependencies between radiological sources



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Significant Accomplishments

- Enhanced staff's PRA capability
- Directly integrated Level 1 and Level 2 PRA models
- Developed and implemented human reliability analysis approach for post-core-damage response
- Building off lessons-learned from the State-of-the-Art Reactor Consequence Analysis (SOARCA) project
- Completed several ASME/ANS PRA standard-based peer reviews

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Path Forward

- Continue work in all technical areas of the study
- Continue with Pressurized Water Reactor (PWR) Owners Group-led, PRA standard-based peer reviews
- Public review and comment and external stakeholder peer reviews on publicly available reports
- Schedule challenges
- Acknowledgements
 - SNC
 - PWR Owners Group
 - Westinghouse and EPRI

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