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## Risk-Informed Decision-Making at Southern Nuclear

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## Our Journey

To Act: Latin verb agere - "to set in motion"  
To Lead: Anglo-Saxon origin laedre - "people on a journey"

A leader is...  
someone that sets people, organizations or an industry in motion;  
someone that takes people, organizations or an industry on a journey.\*

This journey requires vision and courage.

\* International Dimensions of Organizational Behavior, by Nancy Adler




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## Leadership Takes Vision

**To Achieve and Maintain Excellence in Nuclear Safety through  
Performance-Based/Risk-Informed Decision Making**

- Focus on nuclear safety excellence versus compliance
- Continuous improvement based on performance




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# Our Journey to Excellence

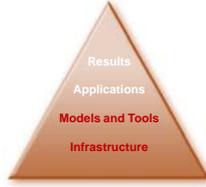
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## Infrastructure

- Form risk-informed engineering department
  - PRA Models and Tools Functional Area
  - Risk-Informed Applications Functional Area
- Establish application-focused mindset in PRA practitioners
- Establish risk-informed mindset in SNC organization
- Include risk-informed applications in SNC Excellence Plans
- Engage NRC and Industry

## State-of-the-Art Models and Tools

- Develop application focused PRA models
  - Internal Events models with highly successful peer review results
  - Developing fire PRA with seismic, and shutdown PRAs to follow
- Develop application focused automated tools
  - At-power risk monitoring model to support 4b implementation
  - Defense-in-depth risk monitoring model for assessing shutdown risk




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# Risk-Informed Applications

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## Risk-informed allowed completion time ("initiative 4b")

- Safety Improvements
  - Reduces operations/engineering distractions following failure of a safety related component
  - Accounts for the risk impact of multiple out-of-service conditions
  - Enhances risk-management tools and processes
- Operational Flexibility Improvements
  - Increased flexibility for scheduling maintenance activities
- Increased regulatory certainty
  - Reduced need for NOEDs/emergency LARs



## Risk-Informed Categorization of Structures, Systems, and Components (SSCs) ("Option 2" or "50.69")

- Safety Improvements
  - Increased focus on non-safety-related but risk significant SSCs
- Operational Flexibility Improvements
  - Decrease in requirements for low risk significant SSCs.
- Increased regulatory certainty
  - Increased owners control over treatment of different categories of SSCs.

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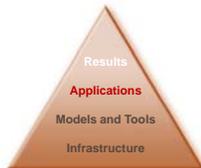
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# Risk-Informed Applications

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## Relocation of surveillance frequency from TS to an owner-controlled Risk-Informed program ("initiative 5B")

- Safety Improvements
  - Performance-based/risk-informed technical basis for establishing test intervals
  - Improved appreciation for the impact of SSC performance on safety
- Operational Flexibility Improvements
  - Increased flexibility in evaluating the appropriateness of test intervals
- Increased regulatory certainty
  - Increased owners control over surveillance frequency control program



## Transition to 10 CFR 50.48(c) [aka NFPA-805], Performance-Based/Risk-Informed alternative to Appendix R

- Safety Improvements (e.g.)
  - Addresses vulnerabilities in non-power operational modes
  - Eliminates pre-emptive Operator Manual Actions
- Operational Flexibility Improvements
  - Increases flexibility in evaluating the appropriateness of fire protection features and shutdown strategy
- Increased regulatory certainty
  - Evaluates and self-approves fire protection changes throughout the life of the plant

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## Leadership Takes Courage

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### Challenges

- Culture change from a prescriptive to a performance-based/risk-informed mindset
- Temptation to overlay improbable ("conservative") assumptions in developing models and processes
- Unavailability of realistic methodologies for meeting requirements in the PRA standards (e.g., Fire or Seismic PRAs)
- Uncertainty in requirement of the NRC inspection guidance for the risk-informed programs



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## Our Destination

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### Results

- Increased Nuclear Safety margin
- Optimized allocation of resources
- Performance improvement
- Increased operational flexibility
- Improved regulatory certainty



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