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UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

U.S. NRC PRA Research Activities

March 24-26, 2010

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Major Activities

- PRA Methods, Models, and Tools
- PRA Standards Activities
- Human Reliability Analysis
- Fire Research

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PRA Methods, Models, and Tools

- Standardized Plant Analysis Risk (SPAR) Model Development and Maintenance
  - Operating Reactors (77 models)
  - New Reactors (AP1000, ABWR)
- SAPHIRE 8
  - User-friendly features to support NRC wider use
- Digital I&C PRA
  - Increased focus on Quantitative Software Reliability Methods

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PRA Methods, Models, and Tools (con't)

- PRA Model Improvements
  - Core damage surrogate and success criteria evaluation
  - Support system initiators, LOOP, and BWR recirculation post-containment failure (in conjunction with EPRI)
  - Common Cause Failure modeling improvements
  - Improved Level 2 PRA (dynamic approach)
- Enhanced data collection and analysis

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PRA Standards

- PRA Standards
  - Level 1/LERF – Revision to address new reactors and LPSD
  - Level 2
  - Level 3
  - Non-LWR

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Human Reliability Analysis

- HRA Method Development
  - SRM M061020: Evaluate HRA Models
  - Improved LPSD HRA Methods
  - Fuel Handling
  - Medical and Isotope Use
- Benchmarking Activities
  - International Empirical Study (Halden)
  - US Crew Study

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Fire Research

- Fire PRA and HRA
  - NFPA-805 Support
  - NUREG-1921, “Fire HRA”
- Fire Modeling
  - NUREG-1934, “Nuclear Power Plant Fire Modeling Application Guide”
- Fire and Electrical Systems Circuit Analysis
  - NUREG-1924, “Electrical Raceway Fire Barrier Systems in U.S. Nuclear Power Plants”
  - DC Electrical Shorting in Response to Exposure Fire (DESIREE-FIRE)
  - Electrical Circuit Phenomena PIRT
- Fire Testing
  - Spent fuel shipping cask testing (NIST)
  - Cable Heat Release, Ignition, and Spread in Cable Tray Installations of Fires (CHRISTI-FIRE)

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Overall Goals

- Support the reactor oversight and operating experience programs
- Improving the effectiveness and efficiency of risk-informed regulation
- Support continuous advancement in PRA state-of-the-art and state-of-practice
- Expand PRA infrastructure to encompass new reactor concepts and designs