



Overview of New Topics in PRA Research

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PRA Research Strategic Goals

- Supporting the Reactor Oversight Process
- Improving the Efficiency and Effectiveness of Risk-Informed Regulation
- Extending PRA Technology to New Technologies
- Improving the PRA State-of-the-Art

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Supporting the Reactor Oversight Process

- SAPHIRE 8
- Risk Assessment Standardization Project (RASP) Handbook
- Standardized Plant Analysis Risk (SPAR) Models

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SPAR – Focus Areas in the Coming Year

- Other hazard and NFPA-805 fire models
- Support system initiating events
- Integrated capabilities model
 - 1 SPAR model with all modes/hazards/levels that SPAR currently covers
- Confirmatory success criteria analysis
 - 4-loop Westinghouse plant
- Resolution of ASME Peer Review Findings and Observations

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Common-Cause in Event Assessment

- Draft NUREG-XXXX, “*Common-Cause Failure Analysis in Event and Condition Assessment: Guidance and Research*,” issued for comment
- Topics treated in the NUREG include:
 - Treatment of CCF potential conditioned upon an observed component failure
 - Limitations of current CCF modeling and issues with alpha-factor estimates
 - Future research needed for data collection, parameter estimation and casual models

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Improving the Efficiency and Effectiveness of Risk-Informed Regulation

- Improved Methods
 - Consequential SGTR
- Regulatory Guides
 - RG 1.174, 1.200
 - RG 1.221 (Hurricane Missiles)
- PRA Standards

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PRA Standards

- PRA standards under development
 - Level 1 (CDF) and LERF for low power and shutdown conditions addressing both internal and external hazards for operating LWRs
 - Level 1 (CDF) and LERF for at-power conditions addressing both internal and external hazards for LWRs in design stage (pre-operational)
 - Level 2 for at-power conditions addressing both internal and external hazards for operating and advanced LWRs
 - Level 3 for all operating modes, all hazards, and both light water and non-light water reactors
 - Level 1 and Level 2 for all operating modes addressing both internal and external hazards for non-light water reactors

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PRA Standards (cont'd)

- NEI has develop/developing peer review guidance
 - NEI 00-02/NEI 05-04 addresses Level 1/LERF for at-power conditions for operating LWRs for internal events and internal flood
 - NEI 07-12 address Level 1/LERF for at-power conditions for operating LWRs for internal fires
 - NEI developing guidance for seismic PRA for Level 1/LERF for at-power conditions
- PRA Standards and peer review guidance endorsed in RG 1.200
 - NRC issuing Interim Staff Guidance documents providing interim staff endorsement on updates to the standard until next revision

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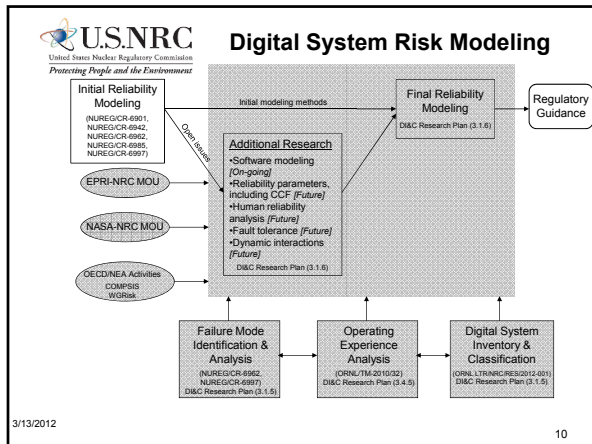
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Extending PRA Technology to New Technologies

- Advanced Reactor PRA Guidance
- Digital I&C
- New Reactor SPAR Models

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- New Reactors SPAR Models**
- AP1000
 - Seismic model incorporated into the SPAR model
 - ABWR
 - ABWR GE SPAR model
 - ABWR Toshiba SPAR model
 - LPSD model for the Toshiba design is being developed
 - US-APWR
 - EPR- in progress
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- Improving the PRA State-of-the-Art**
- Dynamic PRA
 - Long Term Research
 - Advanced PRA Methods
 - Sources of PRA Uncertainty
 - Site Level 3 PRA (SRM SECY 11-0089)
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Site Level 3 PRA – Objectives

- Develop a Level 3 PRA that:
 - reflects technical advances since the last NRC-sponsored Level 3 PRAs were completed over 20 years ago, and
 - addresses scope considerations that were not previously considered
- Enhance PRA capability, expertise, and documentation
- Demonstrate technical feasibility and evaluate the realistic cost of developing new Level 3 PRAs

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Site Level 3 PRA – Approach

- Scope includes all internal and external initiating event hazards, all modes of operation, and site radiological sources (all reactor cores, spent fuel pools, and dry storage casks on site),
- In general, the Level 3 PRA study will be based on current “state of practice”
- The study will be for a single site; therefore, it will not necessarily provide insights applicable to all sites and all technical issues.

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Acronyms

- ACRS - Advisory Committee on Reactor Safeguards
- CCF - Common Cause Failure
- CDF - Core Damage Frequency
- COL - Combined License
- DC - Design Certification
- I&C - Instrumentation and Control
- LERF - Large Early Release Frequency
- LPSD - Low Power Shut Down
- NTTF - Near Term Task Force
- SMR - Small Modular Reactor
- SPAR - Standardized Plant Analysis Risk

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