

Industry Perspectives on PRA

NRC RIC
Session W16
Risk Applications: Emerging
Challenges and Opportunities

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March 13, 2013



Industry Perspectives

- There are multiple views represented in the industry – from practitioners to executives
- What follows are general observations based on 15 years experience with PRA and risk-informed approaches
- Paper being vetted with industry leadership
- A formal perspective will be developed and communicated



Goal

- The industry's desired end state for PRA as a nuclear safety tool involves two components:
 - Confidence that any unknown plant-specific vulnerabilities to beyond design basis conditions have been identified, and
 - A predictable and timely regulatory process for using realistic risk information in optimizing decision-making for regulatory issues



Perspectives

Industry continues to support the use of PRA as outlined in the NRC PRA policy statement (1995 – paraphrased below):

1. Increase use of PRA in regulatory matters
2. Use PRA to reduce unnecessary conservatism in regulation as well as backfit analysis
3. PRAs should be as realistic as practicable, supporting data should be available for review
4. Use safety goal subsidiaries in regulatory decision-making

Safety

- The accident in Japan has emphasized that it is not sufficient to rely on the deterministic design basis to ensure safe plant operations
- PRA, properly utilized, can be a powerful nuclear safety tool for both identifying vulnerabilities and in (cost-) effectively managing plant design and operations to avoid low probability-high consequence events

Successes (1)

- As a tool, PRA has been instrumental in enhancing safety practices, e.g., online maintenance, and in improving the reactor oversight process
- PRA insights have been effective in identifying plant-specific safety enhancements across the industry and were fundamental to the development of severe accident management guidance

Successes (2)

- Use of PRA in the design process has directly supported the enhanced level of safety in new plant designs
- Risk informed inservice inspection and technical specifications are successful and widely implemented

Challenges (1)

- We have moved towards more complex applications with greater reliance on PRA technical adequacy, and larger uncertainties
- Hence, risk-informed licensing applications have become increasingly complex, unpredictable, and prolonged, casting doubts on the continuing benefits
 - Applications such as NFPA 805 have led to safety improvements, but have been far more challenging than expected

Challenges (2)

- Achieving recognition that PRA results are only one input in the risk-informed decision-making process and are intended to be realistic estimates of risk
 - PRA is ultimately dependent on our state of knowledge, which has limitations
 - Defense-in-depth, safety margin assessments and expert panels are correctly included in the process so as to benefit from PRA insights, as well as to complement the insights with these other considerations

Challenges (3)

- PRA methods need to be mature and tested (benchmarked where feasible)
- The role and value of PRA insights have been diluted by immersion in minutiae of PRA details, methodologies, models and requirements
- Purely quantitative decisionmaking can lead to bounding models, not as envisioned by the NRC PRA policy statement
- Strict numerical decisionmaking can lead to less than optimal use of finite resources

Opportunities

- Vogtle Units 1 and 2 piloting of 10 CFR 50.69 (risk informed scope for regulatory treatment) and risk-informed technical specifications
- NRC NTF Recommendation 1
- NRC task force (NUREG 2150)
- Cumulative impacts – sequencing and prioritizing of activities

Keys to Future Success

- Objective evaluation of lessons learned – NRC and stakeholders
- Follow established regulatory process for technical adequacy and integrated decisionmaking
- Consider limitations of tool, address uncertainties and defense in depth more predictably
- Maintain industry support by implementing strategies to achieve improved efficiency, predictability and timeliness
- Incentivize development of broader scope models
