

Use of Risk Insights to Enhance Safety, Flexibility & Efficiency

NRC RIC – Session W10

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March 12, 2025



Determinism & Risk: Solid as a Rock



- Deterministic requirements are the foundation of safety
- Residual risk remains even when all requirements are met
- PRA helps identify the cracks
- NRC rulemakings helped fill the cracks: ATWS, SBO, post-Fukushima (FLEX), etc...

Applying risk insights reduces residual risk & improves safety

Determinism & Risk Enable Flexibility



- PRA can evaluate the residual risk increase when considering flexibility
- Flexibility is permitted when residual risk remains acceptably low
- Key NRC risk-informed programs
 - Risk-informed In-service Inspection
 - Risk-informed Surveillance Frequency
 - Risk-informed Completion Time
 - Risk-informed Special Treatment (50.69)
 - Risk-informed LOCA?

Applying risk insights enhances flexibility

Flexibility Also Enhances Safety

- RI completion time & surveillance frequency -> avoid plant transients from unnecessary shutdowns
- RI special treatment -> safety-related SSC of low risk significance procured in days vs. months & puts plant in a safer state
- RI special treatment -> increases treatment on non-safety related SSC of high significance
- RI in-service inspection -> reduces worker dose & puts plant in safer state
- RI special treatment -> allows operational & design efficiency, which can enable more clean power

Use of risk insights enables safety, flexibility & efficiency

Key Take-aways & Caveats

- Risk insights complement deterministic requirements & make a more solid foundation of safety
 - Focus time & attention on what matters most to safety*
- Risk-informing enhances safety, flexibility & efficiency
 - All are necessary for the expansion of nuclear power in today's environment
- Prerequisites
 - Quality PRA
 - Operating experience to inform availability & reliability
 - Common cause failure treatment
 - Treatment of human reliability
 - Consideration of uncertainty
 - Should be risk-informed - evaluate risk, defense-in-depth & safety margins collectively

The use of risk insights is needed to meet the moment

* NEI 20 – 04, “The Nexus Between Safety and Operational Performance in the U.S. Nuclear Industry