



RIC 2009 Risk Metrics for New Reactors

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Purpose

To discuss the issues regarding the implementation of risk metrics for new light-water reactor risk-informed applications, and to identify the potential paths forward.

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Risk-Informed Initiatives for New Reactors

- In the near term, risk-informed applications have been proposed:
 - Risk-managed Technical Specifications
 - Risk-informed completion times
 - Surveillance frequency control program
- Longer term initiatives (post-COL) may include:
 - EPRI research program on risk-informed in-service inspection of piping
 - Special treatment requirements (10CFR50.69)

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Risk Metrics for Operating Reactors

- Core Damage Frequency (CDF) <math>< 10^{-4}</math> /yr
 - > Surrogate for latent cancer fatalities in the Commission's quantitative health objective (QHO)
- Large Early Release Frequency (LERF) <math>< 10^{-5}</math> /yr
 - > Surrogate for prompt fatalities in QHO

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From RG 1.174

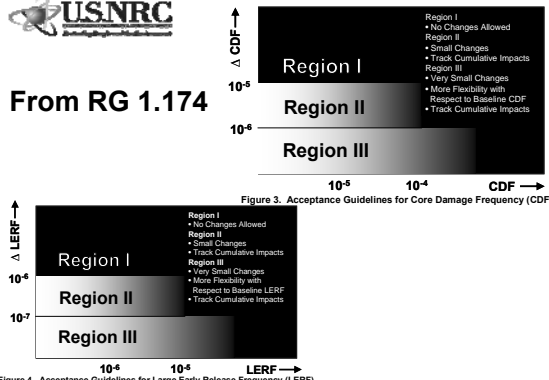


Figure 4. Acceptance Guidelines for Large Early Release Frequency (LERF)

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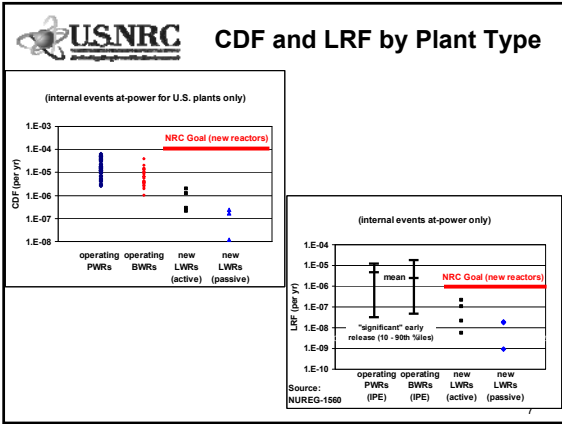


Risk Goals for New Reactors

- Core Damage Frequency (CDF) <math>< 10^{-4}</math> /yr
- Large Release Frequency (LRF) <math>< 10^{-6}</math> /yr
- A deterministic goal that containment integrity be maintained for approximately 24 hours following the onset of core damage for the more likely severe accident challenges
- Conditional containment failure probability (CCFP) less than approximately 0.1

SRM on SECY-90-016, 6/26/90

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New Reactor Implementation Issues

- Review of these applications has raised fundamental questions about risk metric acceptance guidelines for implementation of risk-informed initiatives
 - LERF versus Commission's goal on LRF
 - LRF was not previously defined in NRC documents.
- Use of current numerical risk metric goals (e.g., LERF) would result in risk-informed applications/amendments being evaluated against less restrictive criteria than those used for the licensing basis of new reactors.
- Should the principle of "small increase" be based on *relative* or *absolute* Δ CDF and Δ LERF / Δ LRF?

Path Forward

- White paper issued (Adams # ML090430220)
- Public meeting held February 18, 2009
- Continued engagement of stakeholders
