

FUKUSHIMA SAFETY ENHANCEMENTS

Industry Perspective

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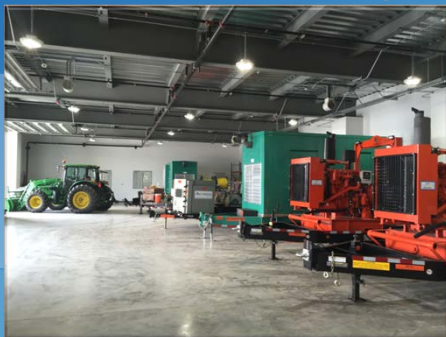
Senior Vice President
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Limerick FLEX Building



Peach Bottom FLEX Building



Quad Cities N+1 Building



Exelon Generation

National Response Center



Exelon Generation

National Response Center



Exelon Generation

Safety Improvements As A Result of FLEX

CDF/LERF		
Category	Reduction Ranges	Primary Influence
BWR CDF (IE)	2 - 40%	HCVS and FLEX portable generators
PWR CDF (IE)	1 - 44%	Low leakage seals and FLEX generators
BWR CDF (Fire)	40% (at 1 pilot site)	Diverse injection free from fire damage
BWR CDF (Seismic)	17% (at 1 pilot site)	Additional diverse injection
PWR LERF	2 - 12%	Low leakage seals and FLEX generators
BWR LERF	1 - 35%	FLEX generators and heat removal system cross-tie

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Key Takeaways

- Solid safety gains
- Calculated risks vary based on site specific plant design and existing mitigation capabilities
- HRA estimates are conservative
- Model updates are pending final considerations of HRA methodology and dependent operator actions

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Lessons Learned from Implementation

Significant Change & Short Timeline

1. Obtained early alignment with stakeholders on an aggressive approach
2. Identified actions that provided the most improvement in capabilities and moved forward without all potentially supporting issues fully resolved
3. Accepted risk of adjustments, course corrections, rework that may be required as supporting issues were resolved
4. Established processes that facilitated accelerated progress

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Lessons Learned from Implementation

Beyond Design Basis - Approach Challenging

1. Tendency to revert to design basis thinking
2. Difficulty in establishing an acceptance threshold when any event is theoretically possible
3. Can result in excluding non-compliant design basis approaches that are reasonable for beyond design basis

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Lessons Learned from Implementation

External Event Assessments

1. Deterministic approach conservative since probabilistic assessments of event frequencies are not mature
2. Establishing appropriate screening criteria is a key
3. Site specific hazards, topography, capabilities limit broader application
4. Limited licensee and industry expertise have necessitated adjustments to methods and schedules
5. Industry method for evaluating future impacts to assessments involves EPRI

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NRC/Licensee Interactions

Audit Process

1. Mutually beneficial
2. Significant information sharing
3. In-process review allowing course corrections instead of significant changes at the end
4. Some risk associated with licensee closure of open items without formal NRC acceptance

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NRC/Licensee Interactions

Collegial Approach

1. Industry consistency facilitated by NEI, EPRI and the Owners Groups has been strong – convergence on standard approaches, use of templates
2. NRC interactions with the industry have generally been timely and feedback has been specific and actionable
3. Challenges between stakeholders have generally resulted in better outcomes

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