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Licensing Perspectives on Probabilistic Risk Assessment and Its Applications

Small Modular Reactors and Advanced Non-Light Water Reactors

American Nuclear Society International Topical Meeting on
Probabilistic Safety Assessment and Analysis (PSA 2019)

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NRC is committed to risk-inform

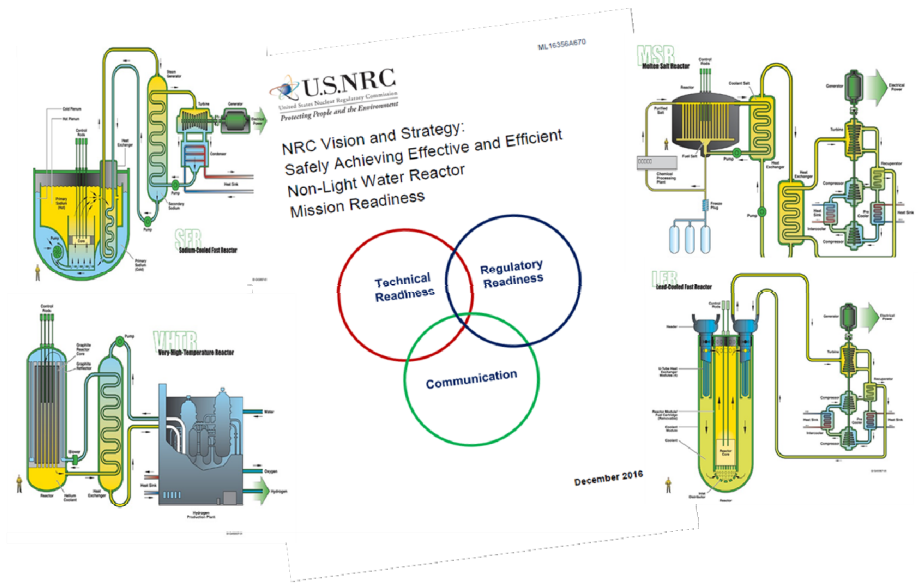
Further risk-inform the current regulatory framework in response to advances in science and technology, policy decisions, and other factors, including prioritizing efforts to focus on the most safety-significant issues.

NRC Strategic Plan (NUREG-1614, Volume 7) - Safety Strategy 2

Advanced non-LWRs present opportunities

NRC Vision and Strategy

Implementation Action Plans



Licensing Modernization Project (NEI 18-04)

…to develop technology-inclusive, risk-informed, and performance based…

Draft Regulatory Guide 1353

PRA acceptability plays a key role in risk-informed applications

…the ability of a PRA to support risk-informed regulatory decisionmaking

…is measured in terms of its appropriateness with respect to scope, conformance with the technical elements of a PRA, level of detail, and plant representation

Source: ADAMS Accession No. ML18024A766

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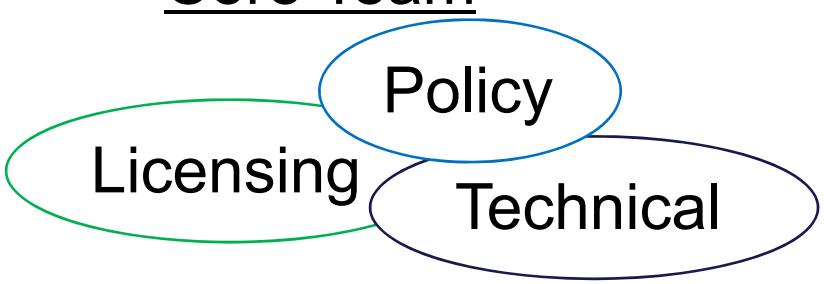
The following topics need increased attention

- Passive and inherent features
- Novel designs
- Key assumptions
- Non-traditional PRA methods
- Peer reviews
- Iterative process
- Level 3

NRC is modernizing licensing of advanced non-LWRs

- Nuclear Energy Innovation and Modernization Act (NEIMA)
- Division of Advanced Reactors formed
- Draft Regulatory Guide 1353

"Core Team"



- Technical readiness
- Regulatory readiness
- Communication

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The staff is working on PRA-related activities

- Pre-application interactions with multiple designers
- Non-LWR PRA standard
- Lessons learned from NuScale small modular reactor review
- Review of the existing regulatory infrastructure
  - Guidance development as necessary
  - Policy matters to be identified early
- Training
- Staff guidance development
  - Acceptance criteria/decision criteria

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Summary

- The staff is working to establish a risk-informed and performance-based approach to regulatory advanced non-LWRs
- PRA is expected to play a key role in a risk-informed manner
- The staff and industry are working closely to modernize advanced non-LWR licensing

Acronym

LWR	light water reactor
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
PRA	probabilistic risk assessment