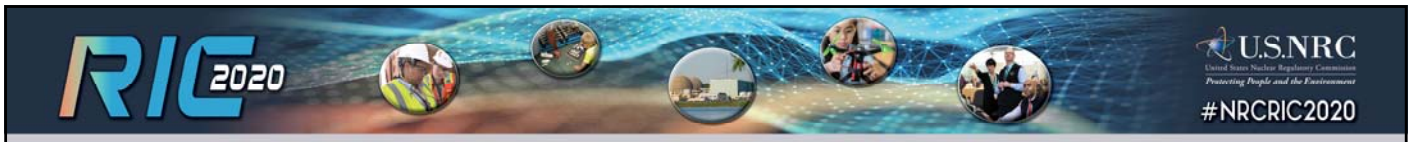

Technology-Inclusive Regulatory Framework for Advanced Nuclear Reactors

Bill Reckley, Senior Project Manager
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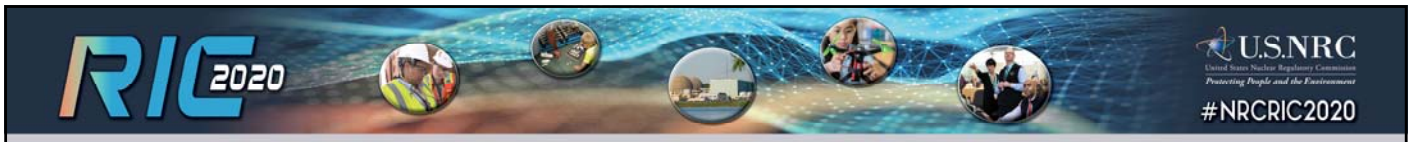


Nuclear Energy Innovation and Modernization Act (NEIMA)

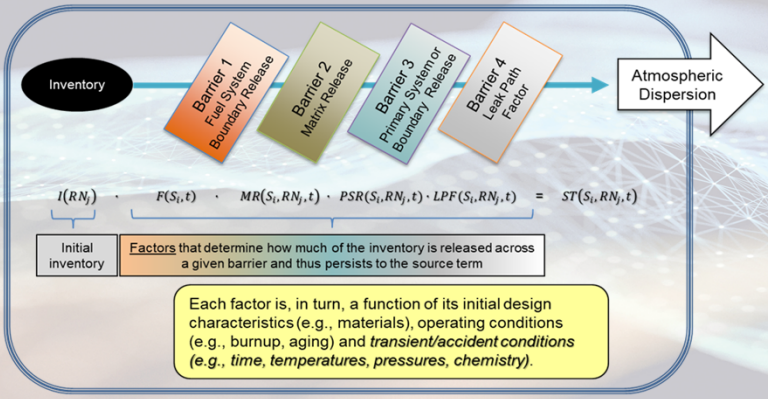
NEIMA defines "advanced nuclear reactor" as "a nuclear fission or fusion reactor, including a prototype plant . . . with significant improvements compared to commercial nuclear reactors under construction" as of January 14, 2019, including improvements such as additional inherent safety features; significantly lower levelized cost of electricity; lower waste yields; greater fuel utilization; enhanced reliability; increased proliferation resistance; increased thermal efficiency; or ability to integrate into electric and nonelectric applications.

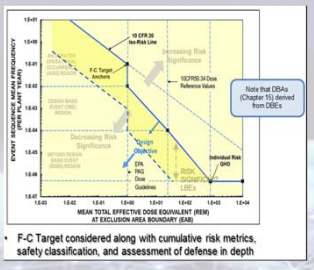
§ 103(a)(2)—"Not later than 2 years after enactment, the Commission shall develop and implement, where appropriate, strategies for the increased use of risk-informed, performance-based licensing evaluation techniques and guidance for commercial advanced nuclear reactors within the existing regulatory framework…."

§ 103(a)(4)—"Not later than December 31, 2027, the Commission shall complete a rulemaking to establish a technology-inclusive, regulatory framework for optional use by commercial advanced nuclear reactor applicants for new reactor license applications."

Return to First Principles

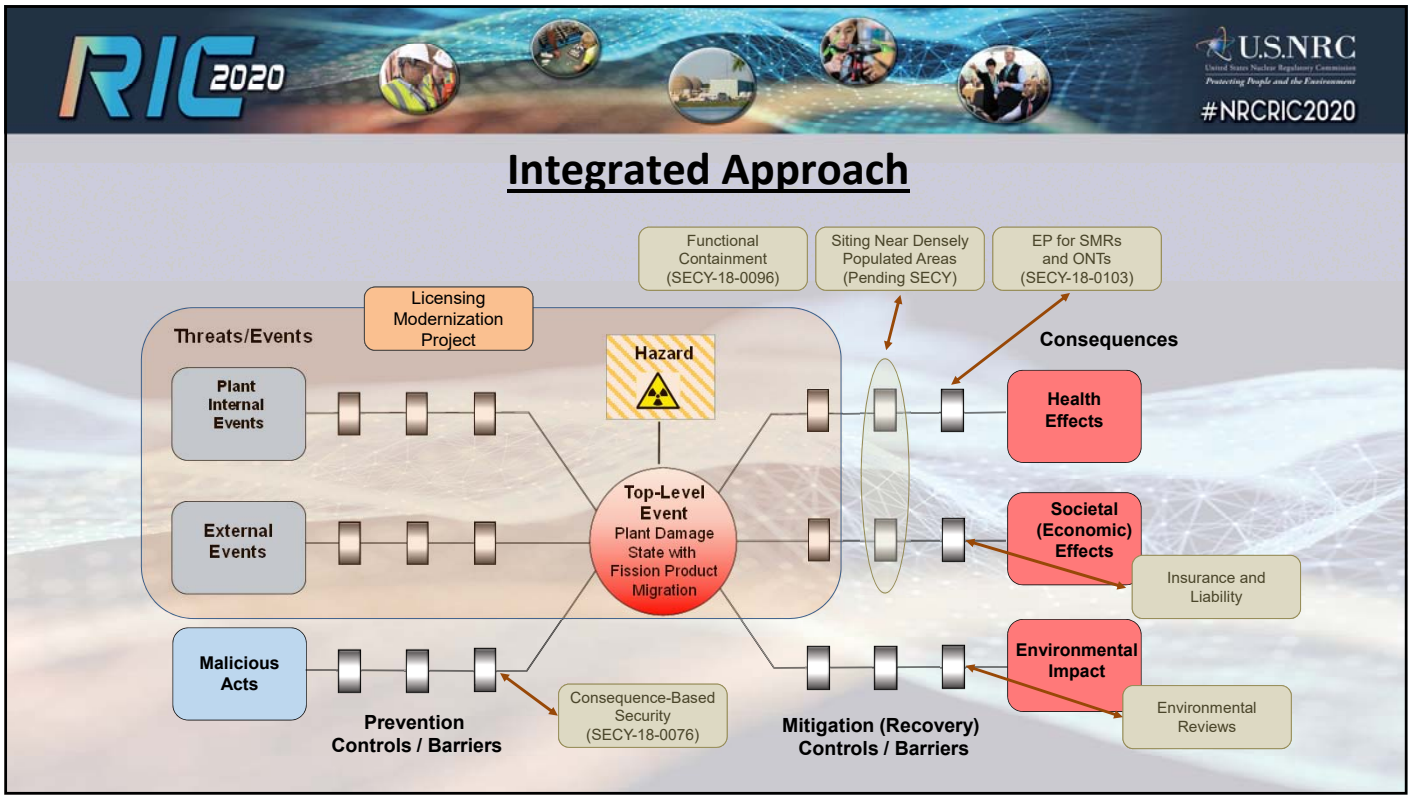
Recent NRC activities related to advanced reactors (e.g., functional containment performance criteria, possible changes to emergency planning & security, and DG-1353) recognize the limitations of existing LWR-related guidance, which requires a return to first principles such as fundamental safety functions supporting the retention of radionuclides





- F-C Target considered along with cumulative risk metrics, safety classification, and assessment of defense in depth

See SECY-18-0096, "Functional Containment Performance Criteria"


RIC 2020
U.S.NRC
#NRCRIC2020
Integrated Approach
Functional Containment (SECY-18-0096)
Siting Near Densely Populated Areas (Pending SECY)
EP for SMRs and ONTs (SECY-18-0103)
Licensing Modernization Project
Threats/Events
Plant Internal Events
External Events
Malicious Acts
Hazard
Top-Level Event
Plant Damage State with Fission Product Migration
Consequences
Health Effects
Societal (Economic) Effects
Insurance and Liability
Environmental Impact
Environmental Reviews
Consequence-Based Security (SECY-18-0076)
Prevention Controls / Barriers
Mitigation (Recovery) Controls / Barriers

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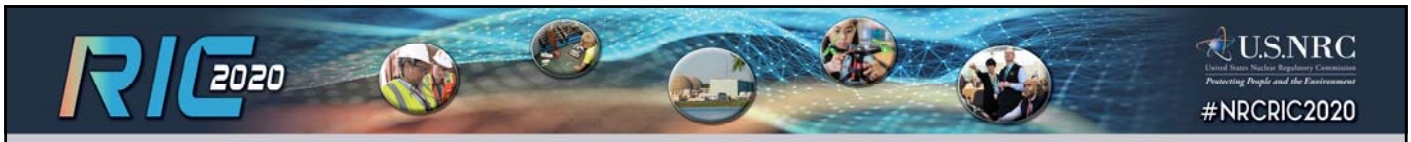

Path Forward

- Issue Regulatory Guide 1.233, “Guidance for a Technology-Inclusive, Risk-Informed, and Performance-Based Methodology to Inform the Licensing Basis and Content of Applications for Licenses, Certifications, and Approvals for Non-Light-Water Reactors.”
- Develop technology-inclusive guidance for content of applications.
- Continue identification and resolution of policy and key technical issues.
- Develop 10 CFR Part 53, “Licensing and Regulation of Advanced Nuclear Reactors.”