

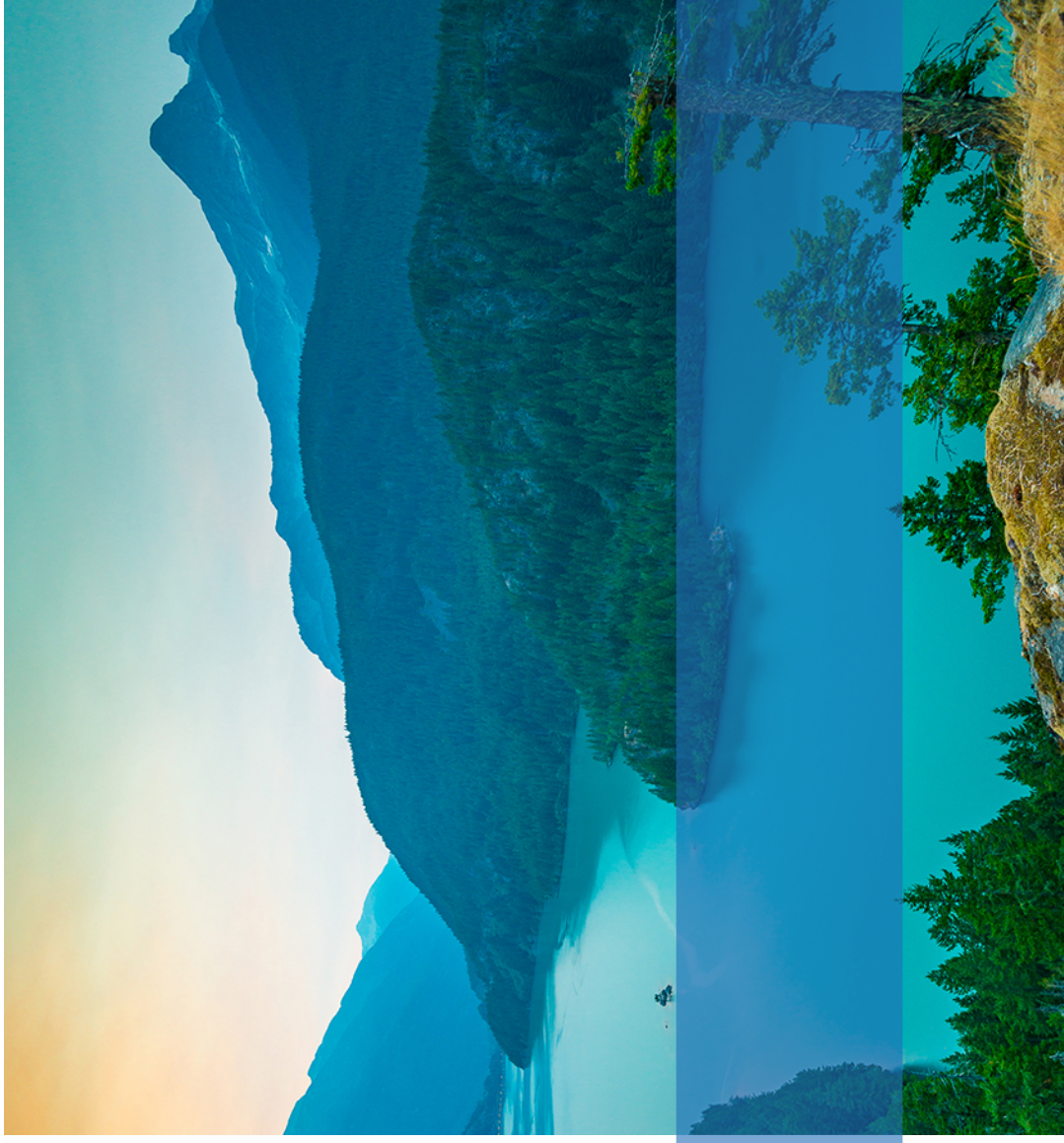
Industry's Vision for Efficient Licensing: Policy, Regulation, and Innovation

March 11th, 2025

Spencer Klein
Senior Project Manager, New Nuclear



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Enabling High-Volume Reactor Deployment

Goals for NEI's Generic Regulatory Work

- Enable new business models, specifically focusing on applications with technological characteristics, and concepts of deployment and operation to support high-volume deployment of nuclear reactors, and
- Maximize the applicability of proposed approaches to other advanced reactors and business models.

Regulations of Rapid High-Volume Deployable Reactors in Remote Applications and Other Advanced Reactors

- Interest in Business Model for Oil & Gas Upstream operations
- Less than 180 days from specific site identification to operations
- Regulatory costs are less than 1% of capital and O&M

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Douglas Tene
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July 31, 2024

Mirela Gavrilas
Executive Director for Operations
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: NEI Proposal Paper "Regulations of Rapid High-Volume Deployable Reactors in Remote Applications (RHORA) and Other Advanced Reactors"

Project Number: 689

Dear Dr. Gavrilas:

With nuclear power on the advent of an unprecedented opportunity, the NRC, industry, and even Congress have identified the need for modernization of regulatory processes. Advanced reactors bring with them very different manufacturing, construction, and operational models, coupled with vastly different business models that will enable and require adaptation of the regulatory processes that have developed to date. The Nuclear Energy Institute (NEI)¹ and its members are providing the attached proposal paper outlining proposed changes to the Nuclear Regulatory Commission's (NRC) processes, guidance and regulations that would achieve a more modern regulatory framework that will maintain safety and provide a more effective and efficient approach to address the unique considerations of rapid high-volume deployable reactors in remote applications (RHORA). These proposals are focused on attaining the regulatory efficiency and agility required for large-scale microreactor deployment, but many could be applicable to larger advanced (light-water and non-light water) reactors. These proposals align with and expand upon the NRC's valuable efforts to establish a modern and efficient regulatory framework for new advanced reactors consistent with the 2019 Nuclear Energy Innovation and Modernization Act (NEIMA). The proposed changes stem from the NRC's ongoing efforts to update its regulatory framework and guidance to issue and regulate more advanced reactors that meet the requirements in Section 208 of the ADVANCE Act of 2024. Furthermore, these proposals could safety, in part, other requirements in the ADVANCE Act that are contained in Sections 205, 505, 506 and 507. Input specific to those and other sections of the ADVANCE Act will be provided separately.

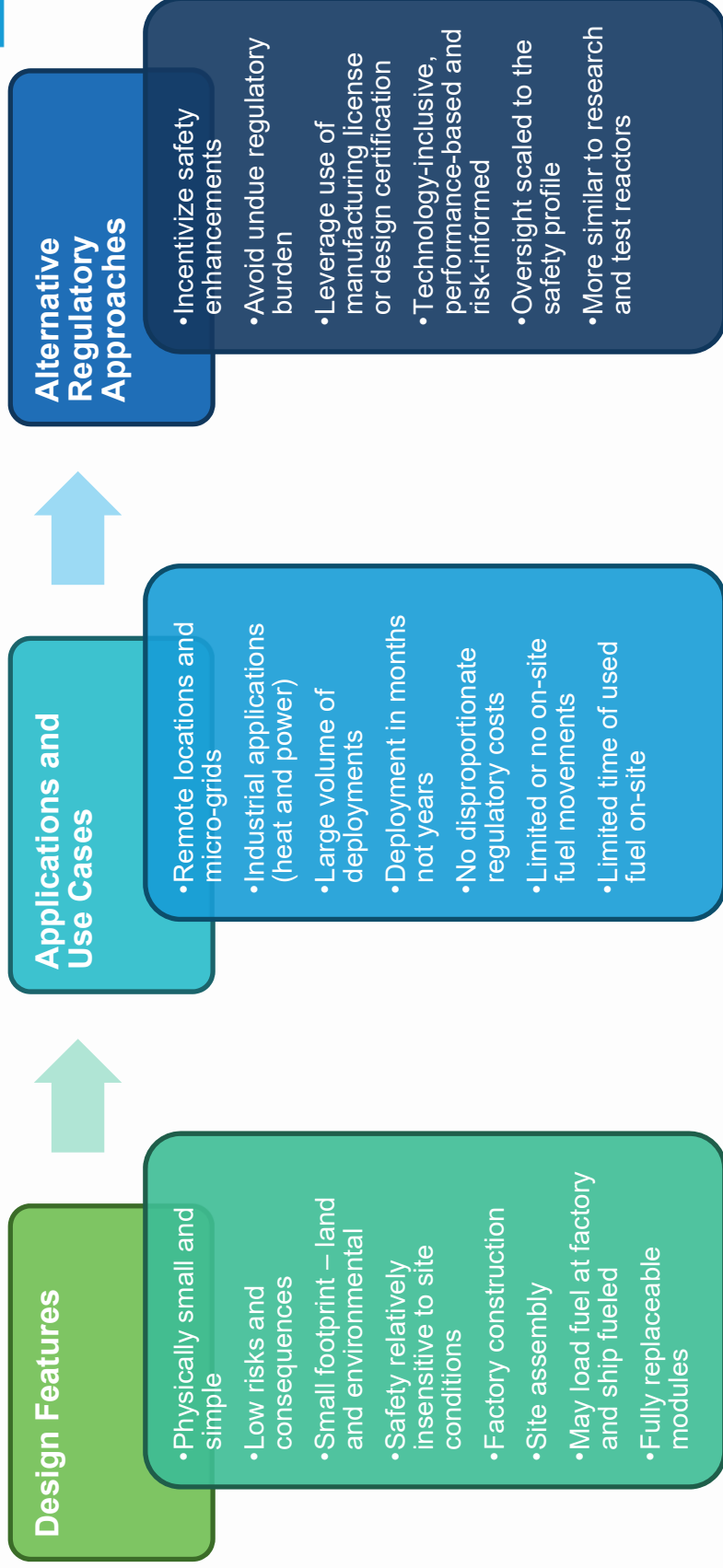
¹ The Nuclear Energy Institute (NEI) is responsible for establishing unified policy on behalf of its members relating to matters affecting the nuclear energy industry. NEI is a non-profit organization that represents the interests of its members, which include commercial nuclear power plants in the United States, nuclear plant designers, major architect and engineering firms, fuel cycle facilities, nuclear materials businesses, and other organizations involved in the nuclear energy industry.

POWERING OUR CLEAN ENERGY FUTURE

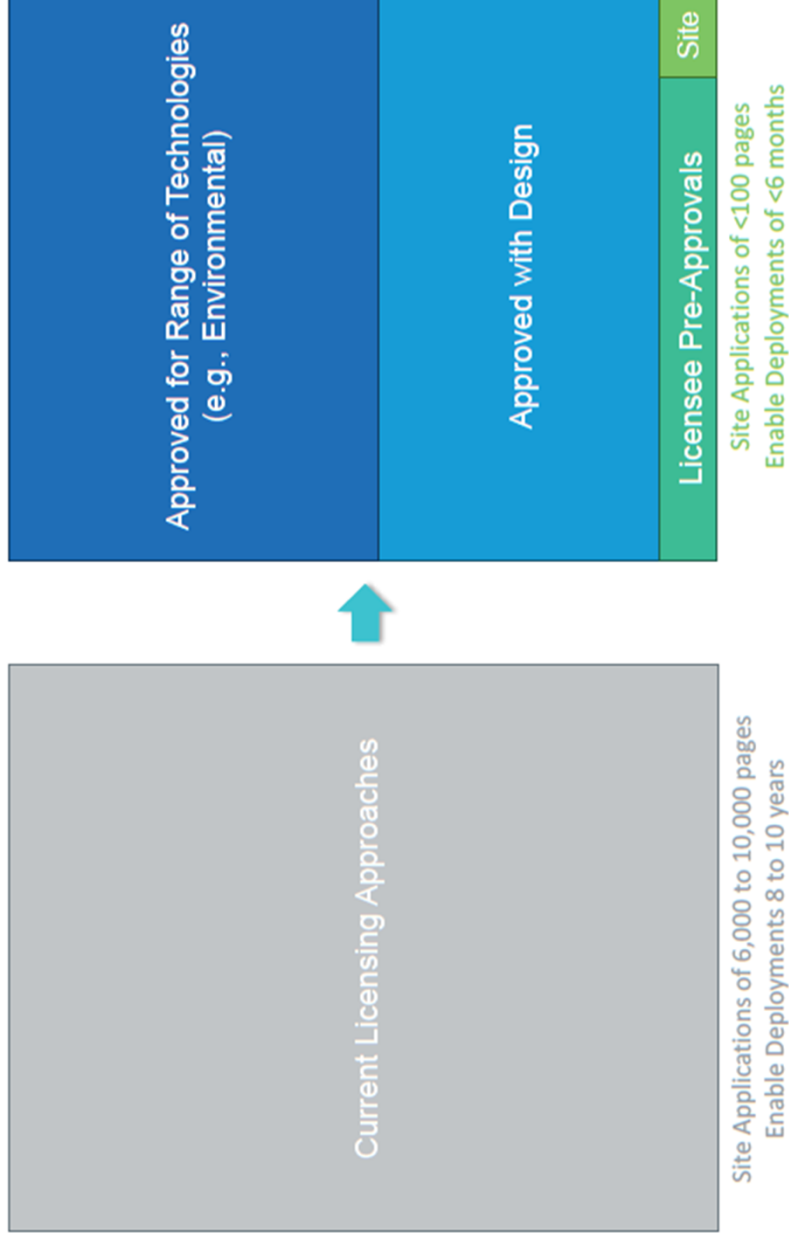
Prioritization of Resolving Issue Topics

	Near-Term Urgent Resolution	Longer-Term Resolution
High Priority	1 – Environmental Reviews 2 – Standardized Design Approvals 5 – Site License 10 – Meteorology and Weather Data 11 – Geologic and Geotechnical 14 – Operations Staffing 19 – Physical Security	3 – Construction Authorization Upon Docketing 6 – Contested Hearing 7 – Mandatory Hearing 17 – Remote Operations 21 – AA/FFD
Medium to Low Priority	9 – AIA 13 – Fire Brigade 16 – Remote Monitoring 18 – Cyber Security 22 – Radiation Protection 23 – Oversight 25 – Use of Contractors by ML 28 – Features to Preclude Criticality 31 – Used Fuel	4 – ITAAC 8 – Licensing fees 12 – Other External Hazards 15 – Autonomous Operations 20 – Emergency Preparedness 24 – Annual Fees 26 – Loading Fuel at Factory 27 – Testing at the Factory 29 – Transport Modules to Site 30 – Replace Modules at Site

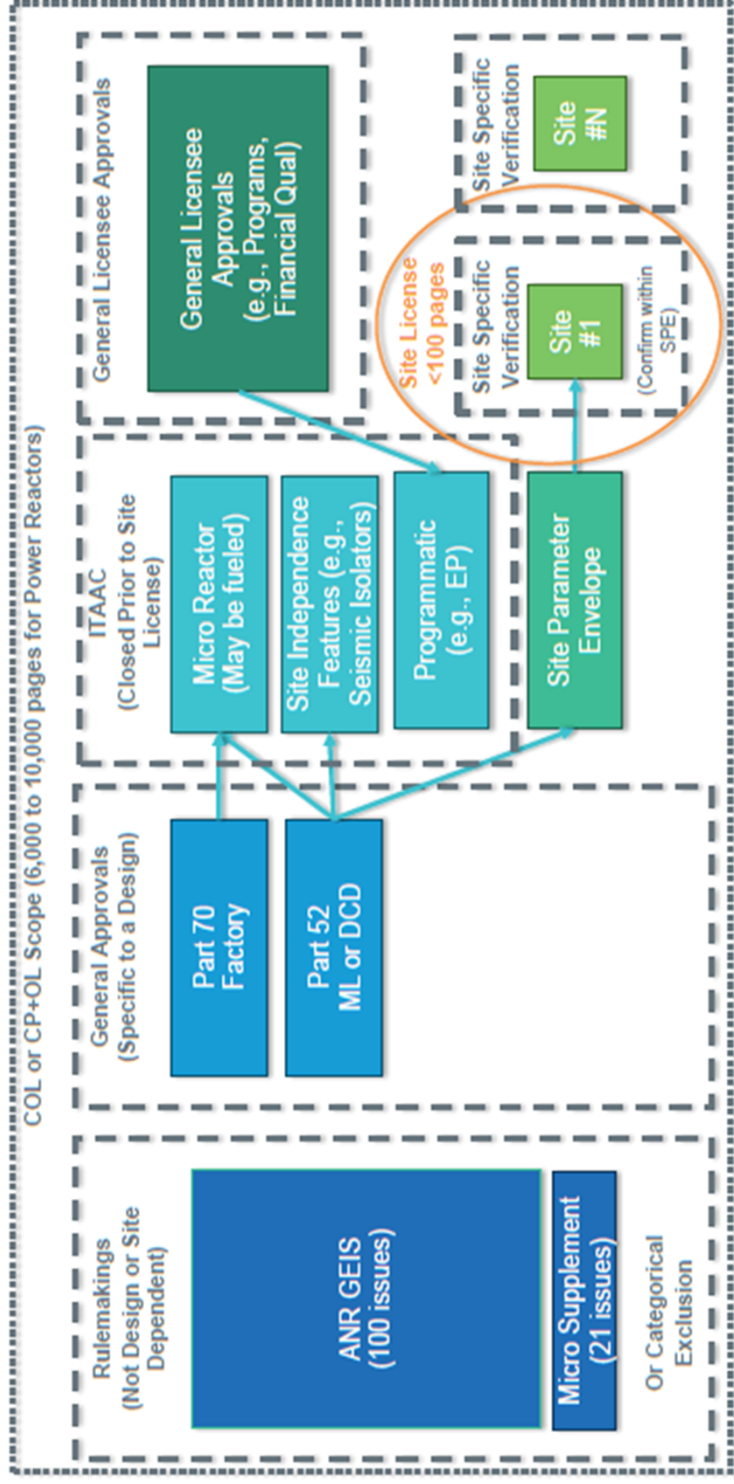
Rationale for An Alternative Regulatory Approach



Rapid Efficient Repeatable Licensing Process



NRC Processes that Could Enable Rapid Efficient Licensing of Sites



Aircraft Impact Assessments

(Methodology Under Development)



NEI

Background:

The 10 CFR Part 50.150 Aircraft Impact Assessment (AIA) Rule requires applicants to perform a design-specific assessment of the effects on the facility of the impact of a large, commercial aircraft.

Schedule:

- **Q2 2025:** Submittal to NRC

Issue Statement:

- NRC-endorsed guidance for meeting 50.150 assumes a large light water reactor and credits primarily concrete and steel containment structures that ensure the reactor and its cooling systems are protected. NEI is proposing additional acceptance criteria for smaller reactors including:
 - **Hitability** – Microreactors may be underground or too small to target.
 - **Source term** – Microreactors may have small enough radionuclide inventories that there is no credible large release.
 - Microreactors may rely on robust fuel like TRISO which may withstand the aircraft impact.

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NEI Lead: Jon Facemire

Meteorology and Weather Data

(Methodology Under Development)



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Background:

NRC last updated guidance (RG 1.23) for Meteorological Monitoring programs in 2007. Data sources have improved with high quality data available from NOAA and state met stations which are used by EPA.

Schedule:

- **Q2 2025:** Submittal to NRC

Issue Statement:

- RG 1.23 is the sole NRC-endorsed methodology for site-specific meteorological data collection and requires installation of a 60m onsite tower. Potential cost and schedule impacts:
 - Potential critical path data collection
 - Eng/proc/install – up to 1 year (long-lead time on equipment)
 - Data collection – 1 to 2 years pre-application
 - Data processing and impact modelling – 6 months
 - Costs: +/- \$1m
- NEI is proposing use of existing data sources shortening timeline to <6 months and eliminating costs of constructing a site-specific tower

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NEI Lead: Jon Facemire

Geologic and Geotechnical

(Methodology Under Development)



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Background:

RG 1.208 has guidance for the steps of performing site geotechnical characterization investigations specific to seismic-related hazards, identifying seismic sources (e.g., faults), developing a probabilistic seismic hazard analysis (PSHA), and accounting for local site effects (e.g., soil amplification).

Schedule:

- **Q4 2025:** Submittal to NRC

Issue Statement:

- Seismic aspects of site characterization for NPPs is resource-intensive in time and cost, and current regulatory guidance was based on gigawatt-scale LWR's.
- New NPPs may come in all shapes and sizes. Industry desires confidence in using alternative approaches that require less resources
- Building on an NRC White Paper, NEI is proposing a methodology for graded seismic site characterization

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NEI Lead: Jon Facemire

Population Siting Criteria

(Basis Under Development)



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Background:

10 CFR Part 100 and RG 4.7 provide population siting criteria (e.g., low population zone (LPZ), population center distance (PCD)) and guidance for siting away from densely populated areas

Schedule:

- **Q1 2025:** Submittal to NRC

Issue Statement:

- The current population siting requirements in 10 CFR Part 100 were established more than 60 years ago during the nascent stages of the commercial nuclear power industry, and about 20 years before the NRC issued its first emergency preparedness (EP) regulations in 1980.
- As a result, those requirements were focused on early large light-water reactor (LWR) technologies and developed using deterministic methods.
- The safety features of those advanced reactors that enable them to establish that no plume exposure pathway (PEP) emergency planning zone (EPZ) is required, or that the PEP EPZ does not extend beyond the site boundary, should also enable LPZ and PCD at the site boundary.

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NEI Lead: Marty O'Neill / Kati Austgen

Process for Implementing the Proposed Approaches





Thank You for Your Time!
