

December 18, 2020

Mr. Robert M. Taylor
Deputy Director, Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: NEI Input on Regulatory Priorities for New and Advanced Reactors

Project Number: 689

Dear Mr. Taylor:

The Nuclear Energy Institute (NEI)¹ and its members appreciate the Nuclear Regulatory Commission's (NRC) efforts to establish a modern and efficient regulatory framework for new and advanced reactors consistent with the 2019 Nuclear Energy Innovation and Modernization Act (NEIMA). We also appreciate that the NRC has been informing the prioritization of its work through solicitation of stakeholder input, including the industry's plans to develop advanced technologies and license new power reactors.

The purpose of this letter is to inform the NRC's prioritization of regulatory improvements that will lead to a more modern and efficient regulatory framework for new and advanced reactors. We recommend establishing the following key regulatory objectives to help guide the NRC's regulatory improvements:

1. Streamlining of regulatory processes needed to support the timely and efficient review and oversight of new and advanced reactors.
2. Resolution of key generic technical or policy topics needed to support the review and approval of new and advanced reactor applications.
3. Changes to the regulations that are needed to achieve a more modern and efficient regulatory framework.

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, including the regulatory aspects of generic operational and technical issues. NEI's members include entities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect and engineering firms, fuel cycle facilities, nuclear materials licensees, and other organizations involved in the nuclear energy industry.

The attachment to this letter provides the industry's list of high priority regulatory topics based upon the above three regulatory objectives to improve the regulatory framework for new and advanced reactors. Please also note that these priorities are a snap shot in time and may evolve as new issues emerge. While many of our priorities are reflected in the NRC's list of advanced reactor regulatory activities and a summary of key policy and technical issues, summarized on the NRC website, there are some areas where our priorities differ.

It is important to recognize that the NRC's licensing process and regulation of new and advanced reactors has a direct impact on the ability of these technologies to benefit society and help the nation meet its energy, environmental, economic and national security goals. Therefore, in pursuit of the above three objectives to improve the regulatory framework for new and advanced reactors, we recommend that the NRC's identification and prioritization of its work also reflect the industry's needs for the regulatory framework for new and advanced reactors:

The NRC Regulatory Framework Supports Industry's Near-Term Plans to Deploy New Reactors

– A growing number of utilities are making commitments to reduce carbon emissions, and are coming to the realization that these commitments cannot be achieved without the use of nuclear energy, and in fact in many cases they will require more nuclear energy. Thus, more and more utilities are considering how to add new nuclear reactors to their generation portfolio. Some of these utilities see a need for new nuclear before 2030, and many utilities see the need for even more new nuclear reactors beyond 2030. Near term plans to deploy new reactors are becoming more publicly known, and we expect at least a half-dozen new reactor applications to be submitted to the NRC by 2025. We further expect the volume of new reactor applications to increase steadily beyond 2025, especially if policies and markets recognize the value of nuclear energy. It is, therefore, important that the NRC establish metrics to achieve a modern and efficient regulatory framework in time to support the industry's plans to license and deploy nearer-term new and advanced reactors.

The NRC Regulatory Framework Supports the Need for Timely and Cost-Effective Reviews –

Although the NRC has made improvements to the efficiency of the regulatory framework, its processes still impose unnecessarily long review timelines, high costs and risks. These long timelines and high costs of the NRC's licensing and oversight of new reactors unnecessarily creates investment risks, disincentives to innovation and a barrier to the commercial viability of new and advanced reactors. Numerous opportunities to be more timely and efficient have been identified through previous new reactor licensing experience, and the inherent safety features of advanced reactors create even more opportunities for the regulatory framework to be more timely and efficient. The ability of the NRC to improve the time, cost and predictability for licensing new and advanced power reactors is one of the most important success factors for nuclear energy to meet the nation's energy, environmental, economic and national security goals. As an example, the Department of Energy's Advanced Reactor Demonstration Program's requirement that the demonstration projects be operational in five to seven years depends on an NRC review process that is more efficient and timely than it is today. Thus, the success of the regulatory framework depends on the

NRC establishing goals and metrics to achieve more reasonable licensing schedules and cost goals (e.g., less than two years and \$10M), and regulatory oversight goals (e.g., less than 0.5% of the operations and maintenance costs of the plant) that are compatible with the needs of the industry to make pragmatic, informed decisions.

The NRC Regulatory Framework Is Technology-Inclusive – The NRC's efforts to develop a more modern and efficient regulatory framework for advanced reactor designs began in the early 2010s to address the needs of light-water small modular reactors (SMRs), and has grown in recent years to address the needs of non-LWRs. An outgrowth of the initial separation of light-water SMRs and non-LWRs is that the NRC identified some regulatory topics as related to light-water SMRs, and other topics related to non-LWRs. However, both light-water SMRs and non-LWRs include inherent safety features and innovative technologies that merit similar consideration in the development of a modern risk-informed regulatory framework. Although the NRC has made progress to equally consider light-water SMRs and non-LWRs for some regulatory topics (e.g., the Emergency Preparedness Rulemaking for SMRs and Other Nuclear Technologies) there are other topics for which the NRC pursues separate pathways for light-water SMRs and non-LWRs (e.g., application content for construction permits). Technology-inclusive treatment in the development of a modern and efficient regulatory framework is important not only for an efficient use of resources, but also to ensure that the NRC does not inadvertently disadvantage the progress of one technology over another.

We are not requesting a written response to this letter, but would appreciate NRC's response in a future public meeting on advanced reactors. If you have questions concerning our input, please contact me at 202-739-8131 or mrn@nei.org.

Sincerely,



Marcus Nichol

c: Mr. Ho Nieh, NRR, NRC
Ms. Anna Bradford, NRR/DNRL, NRC
Mr. Mohamed K. Shams, NRR/DANU, NRC
NRC Document Control Desk

Attachment – Industry Regulatory Priorities for New and Advanced Reactors

The following list of industry priorities for new and advanced reactors is a snap shot in time and is expected to evolve. These priority topics are both highly important to the industry to resolve, have an urgent need for resolution, and require NRC action to complete. Although not included in our high priority topics, we recognize that there are additional regulatory topics that should continue toward resolution (e.g., volcanic hazards, risk-informed seismic analysis). There are also regulatory topics that are important but do not have an urgent need for resolution, or do not need a near-term action from the NRC (e.g., on-site property insurance, codes and standards, standardized ITAAC).

	Topic	Desired Outcome	Desired Completion
Highest Priorities (In order of Completion Date)			
1	Emergency Preparedness (EPZ and Planning Standards) - The existing regulatory framework for Emergency Preparedness (EP) does not take into consideration the innovative design features, smaller source terms, and safety characteristics of small modular reactors (SMRs) and advanced reactors (ARs). These designs are disadvantaged, because they are not able to scale their emergency planning zone (EPZ) and emergency response based on their safety profile.	The EP regulatory framework for SMRs/ARs is technology-neutral, dose-based, and consequence-oriented, maintains effective defense-in-depth, and facilitates appropriate allocation of EP resources commensurate with the safety profile.	2Q2021 <ul style="list-style-type: none"> NRC Final Rule - EP for SMRs and Other New Technologies
2	Content of Applications – Current NRC guidance and expectations lead to applications that contain information that is not necessary to make a safety determination and increases the cost and time for the NRC review.	The NRC guidance and expectations for application content that right-sizes the level of detail in new reactor applications.	2Q2021 <ul style="list-style-type: none"> NRC implementation of recommendations from NEI’s 2018 white paper on “Enhancing the Safety Focus of New Reactor Regulatory Reviews” NRC interim guidance for construction permit applications
3	Timeliness of NRC Reviews - NRC review schedules for new reactor reviews are unduly long, and create a significant impediment for the deployment of new and advanced reactors that are critical to achieving the nation’s environmental, economic and national security goals.	NRC implements efficiency improvements to their review processes that can achieve review schedules that better align with the needs of the regulated industry (e.g., 24 months or less), while continuing to ensure the same high level of nuclear safety, and the same high levels of review quality and predictability.	3Q2021 <ul style="list-style-type: none"> NRC implementation of changes to achieve more timely and predictable new reactor reviews

	Topic	Desired Outcome	Desired Completion
4	Physical Security - The existing regulatory framework for physical security does not take into consideration the safety and security characteristics of SMRs and ARs. These designs are disadvantaged, because they are not able to scale their security organization and response based on their ability to protect against radiological sabotage without the need to interdict and neutralize the threat.	10 CFR Part 73 is revised to include alternative security requirements appropriate for SMRs/ARs that provide “security-by-design,” i.e., for which engineered features alone are capable of protecting against acts of radiological sabotage. These facilities would be required to detect, assess and communicate unauthorized access (or such attempts) to offsite responders.	2Q2022 <ul style="list-style-type: none"> • NRC Final Rule - Alternative Physical Security Requirements for Advanced Reactors • NRC endorsement of NEI Guidance to meet NRC Alternative Security Requirements for Advanced Reactors rulemaking
5	Environmental Reviews – Over time, agency implementation of the National Environmental Protection Act (NEPA) has become unjustifiably complex and time-intensive, with reviews frequently spanning several years or more and requiring massive resource expenditures. Thus, maintaining the status quo likely will hinder the timely licensing of the advanced reactors.	Streamline the NRC’s implementation of NEPA to achieve efficient and timely environmental reviews, consistent with the recommendations in the NEI 2020 white paper <i>Recommendations for Streamlining Environmental Reviews for Advanced Reactors</i> .	2Q2022 <ul style="list-style-type: none"> • NRC generic environmental impact statements (GEISs) that minimizes the scope of site-specific environmental reviews • NRC guidance on the broader use of environmental assessments (EAs) and categorical exclusions • NRC allows existing environmental analyses to be incorporated into a project’s EA or EIS • NRC clarity on an approach to use the applicant’s environmental report (ER) as the draft EA or EIS • NRC elimination of unnecessary burden in alternative site analysis • NRC implementation of changes to that increases efficiency of environmental reviews

	Topic	Desired Outcome	Desired Completion
			<ul style="list-style-type: none"> NRC elimination of duplicative adjudicatory hearings for NRC environmental reviews
6	Near Term Risk-informed, Technology Inclusive Regulatory Guidance – Current NRC format-and-content and standard review guidance for new reactors does not provide a risk-informed, technology-inclusive approach that is appropriate for advanced reactor technologies.	Establishes guidelines for advanced reactors that are technology-inclusive, risk-informed and performance-based, and builds upon the methodology in NEI 18-04 that was endorsed by the NRC in RG 1.233.	4Q2022 <ul style="list-style-type: none"> NRC guidance that: 1) endorses an NEI document on “Technology Inclusive Content of Applications”, and 2) addresses additional “Advanced Reactor Content of Application” topics
7	Part 50/52 Lessons Learned Rulemaking – Address lessons learned with the experience of the first applicants and licensees to use 10 CFR Part 52 and update 10 CFR Part 50 for technical consistency with Part 52.	The Part 50 and 52 regulatory processes does not impose undue risks and delays in licensing and construction of new reactors.	2Q2024 <ul style="list-style-type: none"> NRC Final Rule incorporating Part 50/52 lessons learned
8	10 CFR Part 53: Risk-informed, Technology Inclusive Regulatory Framework for Advanced Reactors Rulemaking – The current regulatory framework for technical requirements is prescriptive and is inefficient for the regulation of advanced reactor technologies.	A technology-inclusive, risk-informed and performance-based regulatory framework that is so efficient and adaptable that it is the preferred option for applicants to meet their needs for schedule, cost and predictability.	4Q2024 <ul style="list-style-type: none"> NRC Final Rule for Part 53 and associated guidance
Additional High Priorities (In order of Completion Date)			
9	Applicability of Requirements to Advanced Reactors –The existing regulations are based on large LWR technologies, and many of these requirements do not apply to non-LWR designs or light-water SMRs. The use of the exemption process is inefficient for regulations that are generally not-applicable to a broad scope of designs.	NRC process to efficiently disposition non-applicable regulations that: 1) identifies the Part 50 and Part 52 requirements that generally do not apply to advanced reactors, and 2) clarifies the method for dispositioning these requirements without the need for exemptions.	2Q2021 <ul style="list-style-type: none"> NRC implementation of a process to disposition non-applicable regulations

	Topic	Desired Outcome	Desired Completion
10	Siting - The existing population related siting guidance is prescriptive and based upon large LWR technology.	NRC guidance and expectations for population related siting of advanced reactors appropriately consider their smaller source terms and safety characteristics through the use of technology-inclusive, risk-informed, and performance-based criteria.	3Q2021 <ul style="list-style-type: none"> NRC updated population related siting guidance
12	Advanced Manufacturing Technologies – A lack of clarity on the NRC licensing and technical expectations for the use of advanced manufacturing components, particularly for pressure boundary parts, is a barrier to the adoption of these advanced manufacturing technologies.	Regulatory guidance and expectations that support timely and cost-effective implementation of advanced manufactured components with by the nuclear industry.	Q42021 <ul style="list-style-type: none"> NRC risk-informed guidance on licensing and technical considerations for advanced manufacturing technologies
13	Annual Fees for Non-LWRs – The NRC annual fee rule 10 CFR 171 does not explicitly address non-LWRs and would impose a disproportionate impact on very small reactors (e.g., micro-reactors).	Revision of 10 CFR 171 to assess reasonable annual fees for non-LWRs, and that avoid disproportionate impacts on very small reactors.	Q42021 <ul style="list-style-type: none"> Rulemaking that revises 10 CFR 171 to include non-LWRs
14	Fuel qualification – Many advanced reactors are planning to use new fuel types that have not previously been used in commercial reactors in the U.S. Furthermore, the NRC’s timeline for approving new fuels for large LWRs is not compatible with the industry’s timelines for licensing advanced reactors.	NRC guidance on qualification of fuel for advanced reactors that allows for timely and efficient approvals.	Q42021 <ul style="list-style-type: none"> NRC fuel qualification guidance
15	Non-LWR PRA Standard – The ASME/ANS trial use advanced non-light-water reactor (non-LWR) PRA standard, developed by the ASME/ANS Joint Committee on Nuclear Risk Management (JCNRM), requires revision to address issues before NRC endorsement.	NRC endorse a revised non-LWR PRA standard.	3Q2022 <ul style="list-style-type: none"> NRC endorsement of revised non-LWR PRA standard