NUCLEAR ENERGY INSTITUTE
1201 F Street NW • Suite 1100
Washington, DC 20004
nei.org

Marcus Nichol
Executive Director, New Nuclear

Phone: 202.316.4412
Email: mrn@nei.org

February 12, 2024

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

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 provide an update to the industry's regulatory priorities, the implementation of which will lead to a more modern and efficient regulatory framework for new and advanced reactors. We consider advanced reactors to be light-water small modular reactors (LWR SMRs), non-light water reactors (non-LWRs) and micro-reactors.

Urgency and Importance of Regulatory Efficiency to U.S. National Goals

As we described in the industry's last update on regulatory priorities in June 2022,[2] there continues to be significant volume and urgency of anticipated near-term advanced reactor deployments in the U.S. This trend is being driven by the widespread recognition that the U.S. needs more nuclear energy to achieve our climate, energy, environmental, economic, and national security goals. In the recent DOE Liftoff report for Advanced Nuclear,[3] the Department emphasized that, (1) "All capital providers agree that the

[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.

[2] ML22158A363

[3] https://liftoff.energy.gov/wp-content/uploads/2023/05/20230320-Liftoff-Advanced-Nuclear-vPUB-0329-Update.pdf

government would need to play a significant role for nuclear to take off in the next ten years, including … acceleration of regulatory/permitting processes," (2) "This group considers nuclear to be outside of their risk appetite due to perceived technology and regulatory risk…," and (3) "To consider a more active investment stance in nuclear, these capital providers are waiting to see more projects nearing deployment (e.g., final regulatory approval and site selection work)…" Furthermore, the DOE Liftoff report identified the following challenge, "The NRC would need to scale its license-application capacity from 0.5 GW per year to 13 GW per year to meet projected demand," and the following potential solution, "The NRC's capacity is determined both by actions taken by the NRC to improve efficiency and increase resources and by activities from applicants to improve and expedite applications interactions."

The industry's recent Advanced Reactor Roadmap[4] reached similar conclusions and recommendations, stating that, "The market need for advanced reactors to enable the United States … to meet their decarbonization goals will result in … a volume of licensing applications that far exceeds the NRC's … current capacity." The Roadmap also identified the following key enabler to regulatory efficiency "Regulatory reform … would establish regulatory frameworks to facilitate the efficient and timely approval and licensing of innovative and safe designs, … support deployment of the first advanced reactors and fast followers and set the foundation for large-scale deployment in the early 2030s." The Roadmap identified the following top-level goals to achieve the needed regulatory efficiency for advanced reactors:

1. Efficient and timely licensing of advanced reactor licenses in less than 12 months from docketing of the application to issuance of the license in the U.S. (Note that additional time will be necessary for the first regulatory review of a design.)

2. Resolving key policy and technical issues (for example, emergency preparedness, environmental reviews, security) prior to the submittal of applications to minimize the need for subsequent design changes that prevent the streamlining of fast followers.

3. Updating the regulatory framework to align requirements with advanced reactor technologies.

4. Collaboration between the NRC and CNSC [Canadian Nuclear Safety Commission] to minimize the duplication of regulatory reviews of designs that are commercialized in both countries and also enable standard designs between the two countries."[5]

The attachment to this letter provides the industry's updated list of high priority regulatory topics based upon these regulatory objectives to streamline the regulatory framework for new and advanced reactors. Please note that these priorities are a snapshot in time and likely will evolve as new issues emerge. While many of our priorities are reflected in the NRC's list of advanced reactor regulatory activities and summary

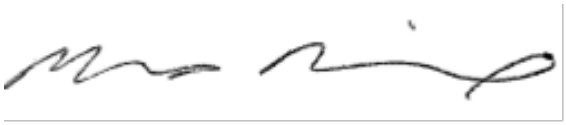
[4] https://publicdownload.epri.com/PublicAttachmentDownload.svc/AttachmentId=83812

[5] A recent report from the Canadian Nuclear Association [CNA] and Nuclear Energy Institute provides further recommendations on how international regulatory efficiency can support U.S. deployment of advanced reactors. https://www.nei.org/resources/reports-briefs/canadian-and-us-reg-cooperation-new-nuclear

of key policy and technical issues, contained on the NRC website, there are some areas where our priorities differ. We think that the NRC may need to take more aggressive steps to modernize the regulatory framework to meet the varied carbon-free energy needs of the nation. Some current business plans envision widespread deployment of approved micro-reactors within a matter of six months.

If you have any questions concerning our input, please contact me, or Kati Austgen at kra@nei.org.

Sincerely,



Marcus Nichol
Executive Director, New Nuclear

Attachment

C: Ray Furstenau, Acting EDO, NRC
Ms. Andrea Veil, NRR, NRC
Mr. Brian Smith, NRR/DNRL, NRC
Mr. Mohamed K. Shams, NRR/DANU, NRC
NRC Document Control Desk

NEI Input on Regulatory Priorities for New and Advanced Reactors
Attachment – List of Priority Topics

The following list of industry priorities (generally, though not exclusively, in order of priority) for new and advanced reactors is a snapshot in time and is expected to evolve. These priority topics are 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., aircraft impact assessment, fuel qualification, advanced manufacturing, risk-informed external hazards analysis, and codes and standards).

	Topic	Desired Outcome[1]
1	**NRC Review Efficiency and Timeliness** 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. The NRC should ensure that reviews for designs that have previously been licensed or approved are not duplicated unnecessarily.	**NRC establishes and implements a "Strategy and Action Plan for Achieving Efficient and Timely Licensing of SMR and Advanced Reactor Licenses, Permits and Approvals."** The strategy and action plan would include the following actions (based in part on NEI prior input ML21160A246): 1. Establish more reasonable generic targets for both the cost and duration of new reactor application reviews in less than 12 months from docketing of the application to issuance of the license in the U.S. (Note that additional time will likely be necessary for the first regulatory review of a design.) The generic targets would include the entire licensing process (e.g., from submitting the application to issuing the license or permit; rather than only focusing on the safety review activity). Actual review schedules for a particular application could be shorter or longer than the target based upon factors such as the simplicity/complexity of the design, the safety/risk profile and margin to the safety limits, and the scope of potential policy and technical issues related to novel features of the design. 2. Issue guidance to the NRC staff that achieves regulatory stability and efficiency by leveraging prior NRC safety and environmental findings on designs that have previously been approved by the NRC. These protocols would avoid duplicative NRC review of portions of the design that have not changed and for which there is no new

[1] Bold text identifies the desired outcome(s) for each topic area. For some topics, the desired outcome includes further details for clarity, and for other topics there are multiple desired outcomes, linked by a common theme.

	Topic	Desired Outcome[1]
		information that would substantially change the basis for the prior NRC decisions. 3. Identify lessons learned from recent licensing reviews and implement strategies for replicating more efficient and timely review schedules, e.g., the Kairos Hermes review in 18 months, for future licensing reviews, with the goals of continuously improving the overall efficiency of NRC reviews.
2	**Environmental Reviews** Over time, agency implementation of the National Environmental Protection Act (NEPA) has become unnecessarily complex and time-intensive, with reviews frequently spanning several years or more and requiring substantial resource expenditures. Thus, maintaining the status quo likely will hinder the timely licensing of advanced reactors.	The NRC streamlines its NEPA review process to achieve efficient and timely environmental reviews (e.g., on the order of 12-18 months), consistent with the Fiscal Responsibility Act of 2023 amendments to the National Environmental Policy Act and the recommendations in the NEI 2020 white paper *Recommendations for Streamlining Environmental Reviews for Advanced Reactors* (ML20065N155), and the 2024 NEI paper *Summary of Recommendations - NEI White Paper: Assessment of the NRC Environmental Requirements for Siting*(ML24016A232) to achieve the following: **1. Finalize the NRC generic environmental impact statement (GEIS) and associated Part 51 rulemaking (see ML21222A044) that minimizes the scope of and time required for site-specific environmental reviews** **2. Enable the broader use of environmental assessments (EAs) and categorical exclusions (including "mitigated FONSIs" and "mitigated categorical exclusions") for new reactors via rulemaking (e.g. modifying 10 CFR 51.20), interim exemptions, and updated guidance, as necessary (see NEI letter dated July 21, 2021, ML21203A225).** **3. Allow existing environmental analyses (including those prepared by NRC and other federal, state, and local agencies) to be adopted or incorporated by reference into a project's EA or EIS to the maximum extent practicable.**

	Topic	Desired Outcome[1]
		4. Provide clarity on an approach to use the applicant's environmental report (ER) as the draft EA or EIS (consistent with NEPA § 107) or otherwise optimize use of an applicant's ER as the basis for the NRC's draft EIS or EA. **5. Limit the scope of NRC analysis of alternatives, including alternative sites, to those that are realistic, consistent with current law and guidance that "reasonable alternatives include those that are practicable or feasible from the technical and economic standpoint using common sense," and which clearly meet the purpose and need of the proposed action.** **6. Ensure that lessons learned and process improvements from recent NRC environmental reviews (e.g., Clinch River ESP, Kairos Hermes CP, SLR) are applied in all new reactor and fuel cycle facility licensing actions to ensure adherence to the EIS/EA time and page limits in NEPA §107 are met.** **7. Expedite a lessons-learned review of NRC environmental consultations with other federal and state agencies and apply those lessons moving forward to expedite the consultation processes.** **8. Identify and implement possible measures to expedite contested adjudicatory hearings on environmental issues, including, for example, use of strictly informal hearing procedures (i.e., hearings based on written submissions only), more narrowly-tailored mandatory disclosures, and the initiation of hearings based on the NRC's Draft EIS or EA.** **9. Fully utilize "online and digital technologies" identified by Congress in Section 110 (E-NEPA) to enhance the exchange of information between applicants and NRC as well as NRC coordination with other agencies.** **10. Ensure that NEPA reviews of advanced reactor demonstration projects supported by DOE are performed in a timely and efficient manner, consistent with Addendum No. 7**

	Topic	Desired Outcome[1]
		(ML23213A147) to NRC's and DOE's October 2019 MOU on Nuclear Energy Innovation (ML19263C976).
3	**Physical Security** The existing regulatory framework for physical security does not take into consideration the safety and security characteristics of small modular reactors (SMRs) and advanced reactors (ARs).	**NRC issues a Final Rule on Alternative Physical Security Requirements for Advanced Reactors** 10 CFR Part 73 is revised to include alternative physical security requirements that promote "security-by-design," i.e., facility design and engineered security features, including the formulation of mitigation measures, that result in reduced reliance on human actions. This will enable advanced reactors to scale their security organization based on the ability of the facility to protect against radiological sabotage. In cases where the security-by-design is sufficiently robust, a facility would be required to detect, assess, and communicate unauthorized access (or such attempts) to offsite responders (e.g., local law enforcement).
4	**Siting** NRC guidance for the population and safety (e.g., seismic, hydrology, meteorology) aspects of siting LWR SMRs and non-LWRs is not optimized for application to these new technologies.	Establishment of guidance documents for the population and safety aspects of siting LWR SMRs and non-LWRs: **1. NRC revision of the acceptance criteria for population density distance in DG-4034 to provide a similar level of protection to the current 20-mile distance prescribed for large LWRs, consistent with the conclusions in the NEI technical evaluation paper (see NEI letter and attachments thereto dated November 17, 2023, ML23326A031).** **2. NRC review of other population siting criteria (e.g., population center distance) to determine if alternative approaches are necessary to incorporate considerations of the SMR and non-LWR technologies.** **3. NRC review and eventual endorsement of NEI's recommendations and proposed alternative approaches for the safety aspects of siting (e.g., seismic, hydrology, meteorology), *NEI paper in development*.**

	Topic	Desired Outcome[1]
5	**Alternative Business Models** LWR SMR and non-LWR technologies, especially micro-reactors, may include non-traditional safety approaches to enable new business models resulting in the need for alternative licensing approaches, and regulatory considerations of novel activities.	**NRC guidance that addresses new and novel business models** NRC guidance would address novel topics such as expanded use of manufacturing licenses, design-own-operate organization, factory fabrication and fueling of reactors, the transport of fueled reactors, replacement of factory-fabricated reactors at the deployment site, and a duration of less than 6 months from order to operation. This will require NRC changes that include but go far beyond the recent NRC SECY (draft ML23236A598 and ML23236A597, and NEI input ML23286A085, ML21197A103 and ML19319C497).
6	**Near Term Risk-informed, Technology Inclusive Regulatory Guidance** 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. More risk-informed approaches to developing the safety and licensing basis will focus application content and NRC reviews on that which is most safety significant, and avoid distractions from content that is not safety significant.	Establishment of guidance documents that right-size the content of applications based on risk-insights and a focus on the areas of most safety significance: 1. **Issuance of the NRC Advanced Reactor Content of Application (ARCAP) guidance to streamline application content for LWR SMRs and non-LWRs, including clarification on how LWR SMRs could utilize risk-informed approaches approved by the NRC in Regulatory Guide (RG) 1.233.** 2. **Endorsement of NEI 21-07, Technology Inclusive Content of Application (TICAP), guidance for applications that implement LMP in RG 1.233.** 3. **Endorsement of NEI 22-05, "Technology Inclusive Risk Informed Change Evaluation (TIRICE)," guidance for licensees implementing RG 1.233.** 4. **Review and eventual endorsement of industry guidance (in development) for establishing a licensing basis incorporating approaches in the International Atomic Energy Agency (IAEA) safety standards.**

	Topic	Desired Outcome[1]
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.	**NRC Final Rule incorporating Part 50/52 lessons learned** Changes are made to the regulations so that the Part 50 and 52 regulatory processes do not impose undue risks and delays in licensing and construction of new reactors. In addition to the lessons already incorporated into the proposed rule, NRC includes key lessons learned identified by industry such as (based in part on NEI prior input, see comments #3 and #7 on NRC FR DOC #2021-01860): • allowing changes to Tier 1 information during construction without prior staff approval • creation of a regulatory process to avoid delays in the issuance of combined licenses (COLs) due to errors noted in the referenced Design Certification • the requirements that are not applicable to non-light-water reactors (non-LWRs) are clarified • consistency in the treatment of non-applicable requirements in the Part 50 and Part 52 licensing processes is ensured.
8	**10 CFR Part 53: Risk-informed, Technology Inclusive Regulatory Framework for Advanced Reactors Rulemaking** The current regulatory framework is prescriptive, and often imposes regulatory burden without a commensurate increase in safety. A flexible framework is needed to regulate the wide range of advanced reactor technologies, as envisioned by NEIMA.	**NRC Final Rule for Part 53 and associated guidance** A technology-inclusive, risk-informed and performance-based regulatory framework that is efficient and adaptable such that it is the preferred licensing option for applicants to meet their needs for schedule, cost, flexibility, and predictability. NEI has submitted substantive comments and recommendations on Part 53 since 2020 (see letter from August 31, 2022, ML22243A257, for the most recent submittal including recommended mark-ups of the NRC preliminary proposed rule language and guidance). These detailed comments and recommendations address stakeholder concerns, which would result in a rule that is used and useful. Major changes that are needed to the proposed Part 53 rule include: 1. Create a single framework, based upon Framework A, viable for all licensing approaches, rather than continue to pursue dual frameworks.

	Topic	Desired Outcome[1]
		2. Remove QHOs from the rule language and keep as a Policy Statement implemented through guidance. 3. Delete the As Low as Reasonably Achievable (ALARA) requirement in design, or at a minimum, NRC should simply align the language to the existing Part 50 requirements, to avoid this ongoing uncertainty and confusion. 4. Address Beyond Design Basis Events (BDBEs) consistent with Parts 50 and 52 by creating a more technology-inclusive and performance-based *mitigation* requirement. 5. Delete the requirement for the Facility Safety Program, which duplicates other requirements, increases regulatory burden and would circumvent backfit protections. 6. Change the safety standards to be consistent with the Atomic Energy Act, which are also used in Parts 50 and 52, as well as all other NRC Parts. Eliminate the programs that are redundant with programs that are carried over from Parts 50 and 52. Use consistent terminology for regulatory concepts that are also found in Parts 50 and 52.
9	**Operations** NRC guidance for the operational aspects of LWR SMRs and non-LWRs is not optimized for application to these new technologies.	Establishment of guidance documents for the operational aspects of LWR SMRs and non-LWRs. **1. NRC guidance for LWR SMRs and non-LWRs on Operator Staffing, Organization, and Concept of Operations, Human Factors Engineering, and Operator Training programs, including the endorsement of NEI 23-01 guidance on *Cold Operator Training*.** **2. NRC guidance on approaches for operations that incorporate automatic and/or remote operations.** **3. NRC review and endorsement of NEI guidance on alternative acceptance criteria for facilities that accommodate Fire Brigades of less than five people.**

	Topic	Desired Outcome[1]
10	**Emergency Preparedness** The recently published SMR EP Rule and guidance lacks sufficient detail for selecting the seismic hazard to use in establishing the emergency planning zone.	**NRC endorsement of the NEI paper *Selection of a Seismic Scenario for an EPZ Boundary Determination.*** Regulatory transparency and clarity are provided for applicants to demonstrate the EP requirements are satisfied.
11	**Construction Oversight** Construction for LWR SMRs and non-LWRs is expected to incorporate greater use of factory construction, utilize fewer safety related structures, systems and components, and implement other approaches that enable more efficient NRC construction oversight.	**NRC issues guidance to modernize construction oversight of LWR SMRs and non-LWRs** Updated guidance would reduce unnecessary burden and gain efficiencies while retaining elements necessary to achieve outcomes related to safety and reliability.
12	**Use of ISO-9001 and Other Commercial Grade Quality Assurance (QA) Programs** The large-scale deployment of advanced reactors is expected to utilize suppliers that have commercial QA programs, like ISO-9001, for the supply of safety related structures, systems and components. An approach is needed to efficiently qualify these commercial suppliers.	**NRC review and endorsement of NEI 22-04** NEI 22-04 guidance (in development) provides a process whereby an ISO-9001 certified, or other commercial program certified, supplier can become a supplier of safety related and basic components to the nuclear industry, enabling industry to take advantage of the commercial supply chain.
13	**International Regulatory Cooperation** Strategic regulatory cooperation between the U.S. and other countries will help enable our nations to achieve the large-scale deployment of new nuclear power plants and enable both countries to achieve their national energy, climate, environmental, economic and national security goals.	NRC increased regulatory cooperation with Canada and expansion to other countries consistent with the NEI/CNA paper, *Canadian and United States Regulatory Cooperation for New Nuclear Deployment: Recommendations for Implementation of The International Regulatory Efficiency Framework*. **1. Ensure that the regulatory mission, both nuclear safety and environmental reviews, avoids unnecessary burden in regulating safe nuclear energy.** **2. Establish a plan for increasing NRC and CNSC regulatory cooperation over time in ways that increase the benefits of international regulatory efficiency enabled by "4 Star" and "5-**

	Topic	Desired Outcome[1]
		Star" regulatory cooperation agreements. CNSC and NRC should use their experience in regulatory cooperation to inform, and be informed by, the IAEA Nuclear Harmonization and Standardization Initiative (NHSI). **3. Expand regulatory cooperation by: 1) pursuing cooperation on additional designs that are common to Canada and the U.S., and 2) include other countries in the CNSC/NRC agreement, to bring international regulatory efficiency to more countries.** **4. Establish a mechanism for greater discussion with industry on the long-term regulatory cooperation goals, and opportunities for near term cooperation.** **5. Pursue international regulatory cooperation with, and assistance to, regulators in potential host countries to the maximum extent possible. CNSC and NRC should prioritize this cooperation and assistance to countries that are seeking near-term deployment of designs that are being licensed in Canada and the U.S., but also ensure appropriate support for countries seeking to build regulatory capacity to ensure nuclear safety for current plants or facilities and future potential reactor deployments.** **6. Provide guidance on the similarities and differences between the regulatory requirements of national regulators that are cooperating to streamline their regulatory reviews between their countries.**