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General Comment

See attached file(s)

Attachments

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BEFORE THE
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGAURDS
NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555

In the Matter of:	)	
Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors	)	Docket ID NRC-2019-0062

COMMENTS OF BENJAMIN SKILLIN, J.D. CANDIDATE
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This comment is submitted in response to the Nuclear Regulatory Commission's proposed rulemaking regarding risk-informed, technology-inclusive regulatory framework for advanced reactors. I am a first-year law student at Boston College Law School impassioned about protecting our environment through advancements in the energy sector. I wholly agree with the proposed rulemaking and write to comment on how it will further the NRC's mission of protecting public health and safety, promoting the common defense and security, and protecting the environment. I appreciate your consideration of my comments regarding this notice of proposed rulemaking.

INTRODUCTION

The Nuclear Regulatory Commission (NRC) issued a Notice of Proposed Rulemaking (NPRM), dated November 6, 2020, regarding the incorporation of 10 CFR Part 53, "Licensing and Regulation of Advanced Nuclear Reactors" into the Nuclear Energy Innovation and Modernization Act (NEIMA). This NPRM would set out a risk-informed, technology-inclusive framework for the licensing and regulation of advanced nuclear reactors. The term "advanced

nuclear reactor," for purposes of this rulemaking, means a nuclear fission or fusion reactor with significant improvements compared to commercial nuclear reactors under construction as of January 2019.[1] "Technology-inclusive regulatory framework" means a regulatory framework developed using methods of evaluation that are flexible and practicable for application to a variety of reactor technologies, including, where appropriate, the use of risk-informed and performance-based techniques and other tools and methods.[2] Currently, NEIMA directs the NRC to develop regulatory infrastructure to support the development and commercialization of advanced nuclear reactors, but the current application and licensing requirements, developed for large light-water and non-power reactors, do not fully consider the variety of designs for advanced nuclear reactors and may require extensive use of the exemption process for regulations that include prescriptive requirements specific to light-water reactors.[3]

I strongly agree with the purpose of this NPRM and comment to provide further justifications through a public policy lens. Specifically, 10 CFR Part 53 achieves a crucial dual purpose in:

I. Aiding in the promotion and implementation of advanced nuclear reactors, a necessary step towards achieving a globalized reduction in greenhouse gases and a U.S. carbon-free energy budget; and

II. Quelling public health concerns and distrust of nuclear energy through specifically tailored requirements.

[1] *NRC Staff White Paper*, NUCLEAR REGULATORY COMM'N (July 2020), https://adamswebsearch2.nrc.gov/webSearch2/view?AccessionNumber=ML20195A270.pdf.
[2] *Ibid.*
[3] 10 C.F.R. §§ 50, 52.

I. PROTECTING THE ENVIRONMENT REQUIRES A CONTINUED BUILD-OUT OF NUCLEAR POWER GENERATION WITH PROPER REGULATORY PROCESSES FOR ADVANCED NUCLEAR REACTORS

A risk-informed, technology-inclusive framework for the licensing and regulation of advanced nuclear reactors is critical to combat global climate change and environmental degradation. Anthropogenic forces have substantially increased atmospheric greenhouse gases (GHG), with the energy, electricity, and heat production sector accounting for 25% of global GHGs through historical reliance on burning coal, natural gas, and oil.[4] This in turn has led to a rise in global temperatures and more prevalent catastrophic climate events throughout the world. Together, the United States (15%), China (28%), EU-28 (9%), India (7%), Russia (5%), and Japan (3%) account for more than half of the world's CO_2 emissions.[5] In order to curtail the escalating effects of global warming, these countries must rapidly employ alternative energies to become carbon neutral. Nuclear energy is a proven means of combatting greenhouse gas emissions, and advanced reactors can do so at a more efficient level. Proper licensing and regulatory oversight are critical in determining whether these reactors can be scaled up to provide sufficient energy generation. Further, a working regulatory system in the United States can provide vital guidance for other countries nearing the technological capabilities of advanced reactors.

The Biden Administration has recently rejoined the Paris Agreement and set a domestic goal of achieving a 100% clean energy economy and net-zero emissions no later than 2050.[6] This

[4] GLOBAL GREENHOUSE GAS EMISSIONS, https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data (last visited May 3, 2021).
[5] *Ibid.*
[6] THE BIDEN PLAN FOR A CLEAN ENERGY REVOLUTION AND ENVIRONMENTAL JUSTICE, https://joebiden.com/climate-plan/ (last visited May 3, 2021).

is only feasible by increasing the availability of clean and carbon free energies in the U.S. energy grid. Currently, the energy mix is made up of 20% nuclear, 40% natural gas, 19% coal, 20% renewables (wind, solar, hydro, etc.), and 1% petroleum and other.[7] Additionally, 2019 figures show that nuclear energy generates nearly 55% of America's emission-free energy.[8]

While assisting with the procurement and development of grid-scale solar projects prior to law school, I witnessed first-hand the implications of permitting processes that were improperly tailored to emerging technologies. At national, state, and municipal levels, processes for licensing solar projects lacked attention and uniformity. This resulted in substantial delays throughout the project timeline while partners waited for procedures to develop, costing them crucial time and money, and delaying the environmental benefits of going green.

Tailored licensing and application requirements for advanced reactors will provide companies wishing to deploy such technologies clarity as to the feasibility of their designs and more predictable project timelines. This, in turn, will promote the efficient rollout of these reactors, strengthening the mix of carbon-free energy in our energy grid.

Nuclear reactors, however, are not without their drawbacks. Although being a 100% carbon-free energy source, nuclear power—through fission technology—creates substantial nuclear waste. These materials must be disposed of in environmentally sound manners pursuant to the NRC's procedures. By streamlining the regulatory process and increasing the availability of advanced nuclear reactors, this rulemaking addresses the issue of nuclear waste in a more than incidental fashion. Advanced nuclear reactors produce lower waste yields with greater fuel utilization and reliability. Increased deployment of these technologies spurred by proper

[7] ELECTRICITY EXPLAINED, https://www.eia.gov/energyexplained/electricity/electricity-in-the-us-generation-capacity-and-sales.php (last visited May 3, 2021).
[8] CLIMATE, https://www.nei.org/advantages/climate (last visited May 3, 2021).

regulatory oversight will help developers of advanced reactors and replace older generation reactor models that do not share these newly developed characteristics. A great many of these traditional longstanding reactors are reaching their retirement dates, leaving a hole in our zero-emission energy portfolio. Unless we permit lifetime extensions of all existing plants, there could be major consequences to carbon emissions and electricity supply security.[9] Advanced reactors can reduce these potential consequences by filling the hole in our energy budget left by retirement of current reactors.

II. RECLAIMING PUBLIC TRUST IN NUCLEAR ENERGY REQUIRES SPECIFICALLY TAILORED REQUIREMENTS FOR NEW REACTORS

Flexible and practical standards for licensing advanced reactors can mend the friction between nuclear power generation and the public's perception of its safety. Unfortunately, nuclear power is on the demise in the United States. This is a result of numerous factors, but in large part due to the disdain for the energy source as a result of the small number of catastrophic nuclear disasters that have occurred in the past. Namely, critics of nuclear power look to the events of Chernobyl and Fukushima as dispositive reasons to ditch this form of carbon-free energy. This attitude has severely hampered nuclear expansion and the NRC has addressed the public's concerns by promulgating strict licensing and application requirements. 10 CFR Part 53 further quells public fear by creating specific requirements for new reactors, rather than simply exempting them from current permitting processes. Exemptions work counter to the public interest by skirting the rigorous review adapted to address public unease. The rulemaking will reduce the number of exemptions that the NRC provides, furthering its goal of providing

[9] IAEA DATA ANIMATION: NUCLEAR POWER PLANT LIFE EXTENSIONS ENABLE CLEAN ENERGY TRANSITION, https://www.iaea.org/newscenter/news/iaea-data-animation-nuclear-power-plant-life-extensions-enable-clean-energy-transition (last visited May 3, 2021).

reasonable assurance of adequate protection of public health and safety and to promote the common defense and security.

Although necessary, strict regulatory constraints have reduced the implementation of nuclear energy. Over 85% of the world's nuclear electricity is generated by reactors derived from designs originally developed for naval use, such as light water reactors governed under NEIMA.[10] These traditional nuclear power plants require numerous safety precautions, including a 10-mile emergency planning zone, a special water supply, and redundant transmission interconnections.[11] Such constraints have been put in place out of concern for public health and safety in the event of disasters. Currently, there are only a small number of feasible sites in the U.S. that fit such parameters, and many of them already have existing nuclear plants, presenting a difficult obstacle for nuclear energy expansion.[12]

Advanced nuclear reactors provide an answer for the worrying decrease in new nuclear energy plants, but novel aspects of these technologies make the identification of new requirements necessary. Traditional nuclear power units are now being superseded by fusion reactors and Generation IV fission reactors, both of which are included under 10 CFR Part 53.[13] Nuclear fission power plants have the disadvantage of generating unstable nuclei; some of which are radioactive for millions of years.[14] Fusion does not create any long-lived radioactive nuclear waste and is inherently safe because the cooling of plasma or loss of containment would

[10] ADVANCED NUCLEAR POWER REACTORS, https://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/advanced-nuclear-power-reactors.aspx (last visited May 3, 2021).
[11] FORMER NRC CHAIR QUESTIONS ECONOMIC FEASIBILITY OF NEW NUCLEAR IN US, https://www.utilitydive.com/news/former-nrc-chair-questions-economic-feasibility-of-new-nuclear-in-us/598188/ (last visited May 3, 2021).
[12] *Ibid.*
[13] ADVANCED NUCLEAR POWER REACTORS, https://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/advanced-nuclear-power-reactors.aspx (last visited May 3, 2021); GENERATION IV NUCLEAR REACTORS, https://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/generation-iv-nuclear-reactors.aspx (last visited May 3, 2021).
[14] FUSION FAQS, https://www.iaea.org/topics/energy/fusion/faqs (last visited May 3, 2021).

automatically arrest the process of energy production, with no effects taking place outside the containment field.[15] Even though fusion reactors are not inherently dangerous, they still employ chemical reactions, high heat, plasma, and magnetic energy. Such elements pose substantial risks to those working with the reactors and possible risks to the public. Therefore, it is essential that the NRC constructs a regulatory system that encompasses these novel designs.

Specific tailoring of licensing requirements may shed some of the precautions that constrained traditional nuclear power plants, thereby overcoming the hurdle posed to nuclear energy expansion. Although increased regulatory oversight of the NRC through 10 CFR Part 53 could delay initial deployment of new nuclear sites as companies conform their designs to appropriate standards, such tailored requirements may also provide adequate replacements for older, stricter regulations. For instance, if an advanced fusion reactor created no reasonable risk of disaster, the 10-mile emergency planning zone instituted for nuclear meltdowns could likely be phased out. This would free up new areas for nuclear site selection, thereby substantially increasing deployment. Moreover, traditional restrictions are inherently alarming and provoke images of hysterical exoduses from sites of nuclear disaster. If these restrictions need not apply to safer advanced nuclear reactors, reducing them may recuperate some of the public's trust in this form of energy.

By specifically tailoring regulations to advanced reactors, rather than generalizing all nuclear energy generation under the processes and exemptions pursuant to NEIMA, the public's faith in the various forms of nuclear energy can be rebuilt. Further, the efficient permitting of new nuclear technologies will allow for older reactors nearing the end of their life cycle to be safely shut down, alleviating any public concern with those outdated plants.

[15] *Ibid.*

CONCLUSION

I, like the NRC, believe that NEIMA needs to be expanded to properly incorporate a flexible and technology-inclusive framework for advanced nuclear reactors. NRC achieves this significant goal through the addition of 10 CFR Part 53. Nuclear is still the energy of the future and will be crucial if we are to have a future at all due to the continuous escalation of climate change. Nuclear will not work without the public's support behind it. This rulemaking is a step toward regaining that trust, though many more will need to be taken.

Ultimately, this rule can succeed in its current form, but my comment in no way attempts to foreclose the possibility of adding further important criterion to its language.

Respectfully submitted,

__/s/___*Benjamin Skillin*___

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