**From:** Michael Rice <risprin@gmail.com>
**Sent:** Thursday, June 11, 2020 9:37 AM
**To:** AdvancedReactors-GEIS Resource
**Subject:** [External_Sender] Docket IDNRC-2020-0101: No Generic Review for Unknown, Untested Nuclear Reactors

Nuclear Regulatory Commission

RE: Docket IDNRC-2020-0101: No Generic Review for Unknown, Untested Nuclear Reactors

Dear ,

Dear Kenneth T. Erwin:

I am writing in opposition to the U.S. Nuclear Regulatory Commission's proposal to produce a "generic" environmental impact statement (GEIS) for "small-scale advanced nuclear reactors." The stated purpose of this proposal is to "streamline" the environmental review process for unknown, untested types of nuclear reactors. This would contradict NRC's primary mission to protect the public health and safety, not to promote the commercial nuclear energy industry, for the following reasons:

1) NRC has no experience regulating "advanced" nuclear reactors (ANRs). There have been no commercial "non-light-water reactors" in operation in the US since the 1980s. In fact, only three were ever built, and all were licensed before the NRC was created in 1975. The NRC's lack of experience in regulating such a wide variety of possible reactor designs requires rigorous study and experience. NRC has only issued GEIS's for other issues (such as decommissioning and license renewal) after years of real-world industry and regulatory experience. NRC has no such basis for generically evaluating small-scale ANRs.

2) Creating a generic environmental review is an exercise in speculative fiction. There is no such thing as a "generic" ANR. In fact, the whole category of "advanced reactors" covers a far wider variety of potential reactor designs than exist today. There are potentially dozens of different combinations of fuel sources, fuel designs, moderators, and coolants. Each type of ANR would have different possible safety issues and possible ways to release radiation. They would also rely on wholly different fuel cycles, with a variety of environmental impacts.

3) There is no basis for assuming accidents with "small-scale" ANRs would not be able to cause significant offsite radiation releases. History shows there is no such thing as an accident-proof nuclear reactor. For instance, in the 1950s, US nuclear experts believed that light-water reactors (LWRs) had significant safety advantages over non-LWRs (or ANRs). Some concluded that LWRs were well-nigh accident-proof, and didn't require robust backup cooling systems. But by the 1960s, further studies showed that meltdowns and large releases of radiation were, in fact, possible, requiring major design changes and resulting in significantly increased costs for licensing, construction, regulation, emergency planning, security, etc.

4) There is no basis for determining that the "microreactors" contemplated in the GEIS would have a "small environmental footprint" or that there would be no offsite radiation releases in the case of an accident. Even "small-scale" reactors would contain large amounts of radioactive material, and generate power at very high density. Such a conclusion could only be drawn based on a detailed review of each individual reactor design, including its fuel, moderator, coolant, and engineered safety and containment systems, as well as the site size, location, and seismic, and climatic conditions.

5) Non-light water reactors have been known to have significant safety risks for decades. For instance, sodium-cooled reactors have had fires and partial meltdowns (e.g., Fermi unit 1 in 1966), and carry the risk of catastrophic sodium-water explosions. Molten salt reactors generally have only one major barrier to releasing radiation, because the fuel within the reactor vessel is already in liquid form. Graphite-moderated reactors become extremely radioactive due to carbon-14 production, and they can catch fire in a loss of coolant accident.

6) Advanced reactors would generate many different kinds and forms of radioactive waste that would be even more difficult to manage than produced by the current light-water reactors. Some ANR designs could require on-site reprocessing of irradiated nuclear fuel, which entails enormous environmental impacts, releases of gaseous radioisotopes, and liquid radioactive waste streams that are extremely polluting and difficult to manage.

7) All of the environmental impacts of small-scale ANRs will have significant environmental justice impacts, from siting and construction, to reactor operations, leaks, and accidents; from fuel extraction and processing, to decommissioning, waste storage, and disposal. At every stage of the nuclear fuel cycle, polluting facilities and activities have been located disproportionately on indigenous peoples' lands and in African-American, Latinx, and other communities of color. There is no reason to expect that to change with ANRs, although new vectors of environmental injustice may result. For instance, the potential siting of ANRs in remote Arctic locations would potentially occur on the lands of indigenous peoples, compounding colonialist resource extraction impacts with the introduction of long-lasting radiological contamination and indefinite periods of radioactive waste storage.

In addition, NRC must consider the futility of streamlining the environmental review and licensing process for ANRs due to the realities of climate change and the evolution of energy alternatives.

"Advanced" nuclear reactors cannot be safely licensed and built quickly enough to address climate change, if any of them prove commercially viable at all. The international scientific consensus is that the world must be well on the way to phasing out fossil fuels by 2030: 40-60% reductions in greenhouse gas emissions (from 1990 levels) by 2030; and industrial nations like the US would need to achieve reductions at the high end of that range. By every reasonable assessment ANR designs (small-scale or large-) would not be ready for widespread commercial deployment until the 2030s or 2040s. By the time that happens, water temperatures, sea-level rise, weather patterns, and other siting conditions will already be changing dramatically. For instance, some small-scale ANRs are envisioned for deployment in remote locations, such as arctic drilling operations. Not only is such an application (drilling for oil and fossil gas) inconsistent with the demands of climate action (so that such a market may not actually exist), but such sites could be subject to extreme instability, with the melting of permafrost and the destabilization of the potential reactor sites.

In addition, in any environmental impact statement, NRC must consider the need for the action and consider alternatives. Historically, NRC's evaluation of the need for nuclear reactors has failed to include

a realistic assessment of their actual costs, and it has used unrealistically unfavorable assessments of other energy options. There is no excuse for that now. Renewable energy, energy efficiency, battery storage, smart grids, and other sustainable, carbon-free energy resources are rapidly falling in price and making technological leaps and bounds far faster than the nuclear industry can possibly keep up. Wind, utility-scale solar, and energy efficiency are now the lowest cost energy resources available, and battery storage, distributed solar, and offshore wind on the same trajectory.

NRC must include a realistic, balanced, evidence-based assessment of climate change, energy alternatives, and the trajectory of the energy industry in all of its environmental reviews going forward.

For these reasons, I believe NRC must abandon the proposal for a streamlined environmental review and licensing process for small-scale advanced nuclear reactors (and ANRs of any size). Pursuit of the GEIS proposal is a waste of NRC's resources, and would compromise NRC's public health and safety mission.

Sincerely,
Michael Rice

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