

From: Seth Hoedl <shoedl@gmail.com>
Sent: Saturday, January 25, 2020 2:29 AM
To: AdvancedReactorsGEIS.resource@nrc.gov
Cc: Sutton, Mallecia; Cushing, Jack
Subject: [External_Sender] Comment on Exploratory Process for the Development of an Advanced Nuclear Reactor; Generic Environmental Impact Statement; Docket ID NRC-2019-0226
Attachments: Hoedl_Advanced_Nuclear_GEIS_Comment.pdf
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Ms. Sutton and Mr. Cushing,

Please find attached my comment on the Exploratory Process for the Development of an Advanced Nuclear Reactor; Generic Environmental Impact Statement; Docket ID NRC-2019-0226 in pdf format.

Thank you for your time and consideration.

Best Regards,

Seth Hoedl, Ph.D., J.D.

Federal Register Notice: 82FR62559
Comment Number: 5

Mail Envelope Properties (5b93f0f6-d02e-b22b-d9bc-6759c44a7f2b)

Subject: [External_Sender] Comment on Exploratory Process for the Development of an Advanced Nuclear Reactor; Generic Environmental Impact Statement; Docket ID NRC-2019-0226

Sent Date: 1/25/2020 2:29:08 AM

Received Date: 1/25/2020 2:29:31 AM

From: Seth Hoedl

Created By: shoedl@gmail.com

Recipients:

Post Office: gmail.com

Files	Size	Date & Time
MESSAGE	316	1/25/2020 2:29:31 AM
Hoedl_Advanced_Nuclear_GEIS_Comment.pdf		92206

Options

Priority: Standard

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Sensitivity: Normal

Expiration Date:

Recipients Received: Follow up

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January 24, 2020

Acting Chief Joseph P. Doub
Environmental Review, New Reactors Branch
Division of Rulemaking, Environmental, and Financial Support
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

RE: Exploratory Process for the Development of an Advanced Nuclear Reactor; Generic
Environmental Impact Statement; Docket ID NRC-2019-0226

Dear Acting Chief Joseph P. Doub and NRC Commissioners,

This comment pertains to the NRC's exploration of whether to proceed with the development of a generic environmental impact statement ("GEIS") for advanced nuclear reactors.

I have a unique perspective to add to your consideration of this issue. I am an experimental nuclear physicist, an environmental and energy law attorney, and a non-profit co-founder and executive focused on studying and developing new financing structures for sustainable infrastructure.¹ I have devoted my professional career to developing and deploying technologies that advance sustainability and minimize greenhouse gas emissions while protecting and respecting the environment. Much of my recent peer-reviewed academic writing uses social science research to understand how advanced nuclear technologies, whether fission- or fusion-based, can overcome social and legal barriers in order to be relevant to meet the climate challenge. In particular, I have explored how such technologies can acquire a "social license," a critical element for the wide use of any energy technology.

On the basis of my research, I urge the NRC to undertake a public-comment and expert-based exploration of potential environmental impacts of advanced nuclear reactors, but to not use such an exploration to finalize a GEIS for advanced nuclear reactor licensing at this time.

¹ Note that I submit this comment in my personal capacity and not as a representative of the Post Road Foundation.

The NRC should undertake a public-comment and expert-based exploration of potential environmental impacts of advanced nuclear reactors

The social science literature is clear that any energy technology cannot become widespread unless and until it achieves a “social license,” a nebulous concept that can be summarized as society’s consent to a particular activity or technology.² Critically, a “social license” is independent of regulatory approvals, cost-benefit analysis, or environmental benefits. Thus, a technology or particular project can lose or never acquire a “social license” despite the fact that it meets all regulatory requirements and is economically and environmentally beneficial. Without a “social license,” technologies or projects will fail, i.e., they will not be deployed or built, due to public protest, litigation, or other forms of public pressure, even if they have regulatory approval. Although most commonly analyzed in the context of mining and other large extractive projects, the concept of a “social license” can explain why some countries, such as Germany, have chosen to abandon conventional nuclear power, despite the fact that such abandonment has arguably raised the price of electricity, increased both greenhouse gas emissions and conventional pollutants, and led to increased use of coal.

In order to preserve advanced nuclear reactor technology as a mitigation option for climate change, the technology must acquire a “social license” earlier rather than later. Given the controversy surrounding conventional nuclear power, one should not assume that advanced nuclear reactors can in fact acquire a “social license” and remain relevant, even if their costs and environmental impacts are lower than conventional plants, and even if their safety characteristics are better than conventional plants. In fact, I would argue, a “social license” is the biggest barrier that any nuclear-based technology faces to help meet the climate challenge.

Unlike a regulatory license, there is not a single established path for achieving a “social license.” Acquisition depends on the circumstance of the technology, the project, and the society in which the technology is deployed. However, a well-established and essential element of acquisition is a process of open and transparent public engagement that is a two-way conversation between project sponsors and the society in which the technology is deployed. An exploration of potential environmental impacts of advanced reactors that includes public comment would be an excellent beginning for such a conversation. The exploration would also help vendors develop their technology. The vendors would learn what environmental concerns are most pressing to the public, and it would give the vendors an opportunity to respond to such concerns through design and operational modifications before they embark on Design Certification, commercialization and regulatory approval. The exploration could also support the development of an Environmental Impact Statement (“EIS”) for licensing of the first commercial advanced nuclear reactors and could perhaps be framed for such purpose.

² Hoedl S. (2019) A Social License for Nuclear Technologies. In: Black-Branch J., Fleck D. (eds) Nuclear Non-Proliferation in International Law - Volume IV. T.M.C. Asser Press, https://doi.org/10.1007/978-94-6265-267-5_2.

The NRC should not use a public-comment and expert-based exploration of potential environmental impacts of advanced nuclear reactors to finalize a GEIS for advanced nuclear reactor licensing at this time

Although an exploration of potential environmental impacts would help advanced nuclear reactors achieve a “social license,” undertaking such an exploration with the intent of preparing and finalizing a GEIS would be premature, and possibly, counter-productive to preserving advanced nuclear reactors as a climate mitigation option.

A GEIS for advanced nuclear reactors at this time would be premature because it is unlikely to facilitate the benefits of a GEIS process, i.e., expeditious review and approval. A properly structured environmental review process that separates generic from site-specific review has the potential to speed review by reducing duplicative analysis of common, well understood, i.e., generic, impacts in subsequent license applications. However, in order to protect the environment with the same rigor as a conventional EIS process, the site-specific review must also consider any new information that pertains to generic impacts and that requires a new generic impact analysis.³ Thus, the benefits of a GEIS process can only be realized if new information will not frequently arise between GEIS finalization and subsequent license applications. In the case of advanced nuclear reactors, however, new information that necessitates a new analysis may arise frequently for many types of impacts because there is no commercial track-record of operation, there is no operational data on which to base the environmental review of generic impacts, and prototypes of the reactors themselves have yet to be tested. In contrast, the GEIS for nuclear power plant license renewal, NUREG-1437, is based on over sixty years of experience and the 400 reactors operating worldwide.

Any impact analysis of advanced nuclear reactors conducted in the near term would necessarily be based on simulation, projected construction and operational characteristics and analogies to similar industrial projects, rather than observation and measurement. Although an analysis based on simulation may be the same as an analysis based on commercial performance for some generic impacts, for other types of generic impact the analysis could change as knowledge regarding the impacts accumulates and as the technology matures, in response to the result of prototype testing, NRC Design Certification, and commercial operation. Thus, if a GEIS is finalized at the present time, many generic impacts will need to be re-analyzed as advanced nuclear reactors are prototyped, tested and commercially deployed, undercutting the purpose of separating generic from site-specific review and requiring more staff time than an EIS-only process.

³ This comment makes no assessment of whether other NRC GEIS's, such as the GEIS for License Renewal of Nuclear Plants, NUREG-1437, achieves the same level of environmental protection that would be achieved with an EIS-only approach.

A premature GEIS may also be counterproductive to preserving advanced nuclear reactors as a climate mitigation option for at least three reasons. *First*, embarking on a GEIS before a track record of operation is developed may inhibit a “social license.” A GEIS presumes that generic impacts are knowable and well understood. Embarking on a process of preparing a GEIS now signals to the public that regulators understand the operation and design of advanced nuclear reactors sufficiently from simulation and analogy to evaluate generic impacts. A GEIS also signals an expectation that many advanced nuclear reactors will be licensed in the near future. It has the potential to be interpreted as an arrogant attempt to lay the regulatory groundwork for new nuclear technology before the risks of such technology are fully understood and evaluated. Such an interpretation would inhibit the essential two-way conversation needed for a “social license,” which requires humility on the part of vendors, regulators and project sponsors.

Second, a premature GEIS may overestimate the environmental impacts of commercial advanced nuclear reactors. By overestimating the impact, the GEIS may compel vendors to deploy mitigation measures that unnecessarily increase capital cost and impair long-term economic competitiveness. Overestimation may also unnecessarily prevent the development of projects because of the overestimated impact itself.

Third, a premature GEIS may hinder needed innovation and product improvement by “locking” vendors into the design analyzed for the GEIS. A vendor may be reticent to improve or modify plant design, operation or construction method if such modification would trigger a revision to the GEIS. This locking may occur even if the reactor design has yet to be issued a Design Certification. The locking may be especially powerful for early-stage companies that need their reactors to be in commercial operation as soon as possible. Yet, modifications are likely to be especially needed in the early years of prototype test and commercialization. In the long-term, such early lock-in would impede the commercial viability of advanced nuclear reactors by inhibiting product improvement and increasing long term capital cost.

Summary

The NRC should undertake a public-comment and expert-based exploration of the environmental impacts of advanced nuclear reactors. Such an exploration will improve the technology, facilitate a “social license,” and help preserve advanced nuclear reactors as a climate change mitigation option. However, the NRC should not use the exploration to prepare and finalize a GEIS for advanced nuclear reactors at this time. Such a GEIS is unlikely to save NRC staff time or expedite environmental review and could be counter-productive to the acquisition of a “social license.” Instead, the NRC should undertake environmental review of advanced nuclear reactors on a case-by-case basis, learning from each prior review so that such reviews become more efficient. After a particular technology becomes widely commercialized, the NRC could re-evaluate the need for a GEIS for that specific reactor technology.

Thank you for your time and consideration.

Sincerely,

A handwritten signature in black ink, appearing to read 'Seth Hoedl', written in a cursive style.

Seth Hoedl, Ph.D., J.D.