



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

February 21, 2020

Mr. Eliot Dye, Contracting Officer  
Office of Nuclear Energy  
Department of Energy  
[advancedreactordemonstration@id.doe.gov](mailto:advancedreactordemonstration@id.doe.gov)

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION RESPONSE TO THE U.S.  
DEPARTMENT OF ENERGY, INFORMATION REQUEST ON THE ADVANCED  
REACTOR DEMONSTRATION PROGRAM (DE-FOA RFI-0002271)

Dear Mr. Dye:

On February 5, 2020, the Department of Energy (DOE) issued a Request for Information (RFI)/Notice of Intent (NOI) DE-FOA RFI-0002271, "Information Request on the Advanced Reactor Demonstration Program," to notify interested parties of DOE's intent to solicit applications for two advanced reactor demonstration awards. The RFI/NOI sought information from interested parties, including government organizations, on a series of questions and, as discussed in the RFI/NOI, DOE anticipates that the potential demonstration reactors would be licensed by the U.S. Nuclear Regulatory Commission (NRC). On behalf of the NRC staff, we are responding to the RFI/NOI to assist DOE in considering responses from other interested parties and highlight the diverse and flexible approaches to licensing currently available within the NRC's licensing framework.

As an independent safety and security regulatory agency, the NRC's mission is to ensure the safe and secure use of radioactive materials for beneficial civilian purposes while protecting people and the environment. Consistent with our role as an independent regulatory agency, we would like to express our willingness to continue our cooperation with DOE on advanced reactor issues. This early engagement with DOE is consistent with the NRC's Policy Statement on the Regulation of Advanced Reactors, 73 Fed. Reg. 60612 (Tuesday, October 14, 2008). One of the Commission's primary objectives in issuing this policy statement is "to maintain the earliest possible interaction of applicants, vendors, and government agencies with the NRC." The Commission further stated that "interaction and guidance early in the design process will contribute towards minimizing complexity and adding stability and predictability in the licensing and regulation of advanced reactors." It is with these goals in mind, that we provide the following comments in response to the RFI/NOI.

The NRC continually improves its processes, procedures, and programs to be more efficient and effective in carrying out its safety and security mission and the staff is ready to review applications for advanced reactors. On page 3 of the RFI/NOI, DOE specifies that: "Advanced reactors are defined as any light water or non-light water fission reactor with significant improvements compared to the current generation of operational reactors." The NRC has modernized its approach to reviewing, certifying, and licensing advanced light-water reactor technologies, including large light-water reactors such as the two new Westinghouse AP1000

units nearing the completion of construction at the Vogtle Electric Generating Station in Georgia, and the KHNP APR1400, which was certified on schedule in 2019. The NRC applied lessons learned from its review, certification, and licensing of large light-water reactors to modernize its approach to reviewing new technologies and small modular reactors (SMR) such as NuScale, which is currently under review, and the Tennessee Valley Authority Early Site Permit for two or more SMRs at the Clinch River Nuclear Site. The staff completed the safety and environmental reviews of the Clinch River application, which included novel features, ahead of schedule and the ESP was issued in December 2019.

Regarding long-lead items in the regulatory arena, the NRC developed a vision and strategy, as well as implementation action plans to ensure the agency's readiness to conduct its mission to review and regulate a new generation of non-light-water reactors (non-LWRs). The NRC has engaged with DOE and other interested stakeholders during the development and execution of these plans and will continue to engage with DOE and reactor developers to identify and resolve long lead regulatory or policy issues that need to be addressed to support commercial deployment of advanced reactors and potential NRC review of proposed demonstration reactors.

The staff has made significant progress over the past several years on its ongoing activities to support licensing non-LWRs. In July 2013, DOE and NRC established a joint initiative to address a key portion of the licensing framework essential to advanced reactor technologies that culminated with the NRC's publication of Regulatory Guide 1.232, Guidance for Developing Principal Design Criteria for Non-Light-Water Reactors, in April 2018. As required by Section 103 of the Nuclear Energy Innovation and Modernization Act (NEIMA), the NRC prepared two reports on (1) expediting and establishing stages in the licensing process for commercial advanced nuclear reactors, and (2) increasing, where appropriate, the use of risk-informed and performance-based evaluation techniques and regulatory guidance in licensing commercial advanced nuclear reactors within the existing regulatory framework. The NRC sent these reports to Congress on July 12, 2019. The staff has enhanced its advanced reactor technical readiness in accordance with Section 103(a)(5) of NEIMA, which requires the NRC to provide for staff training or hiring of experts to support activities required under Section 103(a)(1 through 4) of NEIMA and support preparations for preapplication interactions and reviews of commercial advanced reactor license applications. Finally, consistent with Section 103 of NEIMA, the staff has begun efforts to establish a "technology-inclusive regulatory framework" for optional use by applicants for new commercial advanced nuclear reactor licenses.

The NRC's regulatory framework for licensing new reactor technologies is flexible and there are many ways a potential applicant can seek NRC approval of either all or portions of a reactor. The different approaches provide options for reactor designers and applicants when determining the best approach for regulatory engagement with the NRC. The NRC describes these many approaches to regulatory engagement in a document entitled "A Regulatory Review Roadmap for Non-Light Water Reactors." This and other guidance documents describing approaches to advanced reactor licensing can be found on the NRC's public advanced reactor website. Potential licensing approaches include early pre-application meetings that do not request an NRC regulatory decision; NRC review of conceptual designs; NRC review of portions of a design (e.g., topical reports, limited work authorizations, or standard design approvals); or NRC reviews of entire designs in either the NRC's traditional two-part licensing process in 10 C.F.R. Part 50 (i.e., construction permits and operating licenses) or the newer licensing processes in

10 C.F.R. Part 52 (i.e., early site permits, design certifications, combined licenses, and manufacturing licenses). Phased or staged review processes are also available. In addition to the many regulatory approaches available, the NRC has also done extensive work reviewing DOE and industry initiatives like the Licensing Modernization Project to better inform advanced reactors applicants on ways to meet the NRC's requirements and the expected contents of applications. A hallmark of each of these approaches is early engagement between potential applicants and the NRC staff to discuss the designer's plans, design, and potential licensing approaches. These interactions help the NRC staff plan its resources and ensure it is technically prepared to review new designs. The NRC encourages all potential applicants to seek this early engagement.

For reactors owned and operated by, or otherwise affiliated with, DOE, an NRC license may or may not be required, depending on the circumstances. An NRC license is required where a DOE-affiliated reactor is operated by a private party on private property, free from DOE oversight and control. An NRC license is also required for demonstration reactors operated as part of the power generation facilities of an electric utility system or otherwise to demonstrate the reactor's suitability or practical value for industrial or commercial application, regardless of whether the reactor is owned by, or otherwise affiliated with, DOE. In general, a demonstration reactor project that is subject to NRC licensing regardless of its relationship to DOE is one that serves to demonstrate an entire reactor for commercial purposes, rather than demonstrating only a portion of the reactor.

On the other hand, DOE has statutory authority to self-regulate construction and operation of reactors on DOE property for the purpose of developing or testing new reactor technologies or concepts, or the safety and workability of systems or components individually or as part of the overall reactor system, where the project does not rise to the level of demonstrating an entire reactor for commercial suitability. Generally, DOE, or a private party under an agreement with and subject to oversight by DOE, may construct and operate a research-oriented, non-power reactor at a U.S. Government-owned facility without obtaining an NRC license. Many of these determinations as to whether NRC licensing is required will be fact-specific, and the NRC is ready to discuss jurisdiction and licensing questions with DOE when needed.

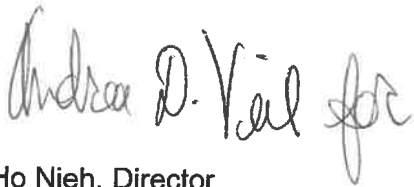
The NRC staff appreciates the current level of cooperation with DOE on advanced reactor issues and the NRC remains ready to assist DOE to the extent possible within the bounds of the NRC's role as an independent safety and security regulator. Even if a reactor may eventually require an NRC license, the NRC and DOE can interact prior to the licensing review through mutual information sharing and learning. The NRC is prepared to answer questions regarding NRC regulatory requirements, and the NRC staff appreciates opportunities to better understand potential designs and how they function. The NRC staff's ability to learn from DOE and understand a design before it is submitted for NRC certification or licensing will facilitate a more effective and efficient review of any future application by the NRC.

E. Dye

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The NRC staff appreciates the opportunity to respond to this RFI and we look forward to engaging with DOE as this process moves forward.

Sincerely,

Handwritten signature of Andrea D. Veil for, in cursive script.

Ho Nieh, Director  
Office of Nuclear Reactor Regulation

Handwritten signature of Raymond Furstenau, in cursive script.

Raymond Furstenau, Director  
Office of Nuclear Regulatory Research