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January 11, 2017

Ms. Vonna L. Ordaz  
Director  
Office of New Reactors  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**Subject:** NEI Activities in Support of Advanced Non-Light Water Reactors

**Project Number: 689**

Dear Ms. Ordaz:

The Nuclear Energy Institute (NEI)<sup>1</sup> appreciates the NRC staff efforts in 2016 to address the licensing challenges faced by advanced non-light water reactors, including working with NEI and interested stakeholders to establish an efficient and predictable regulatory process for advanced reactors. As discussed in our April 13, 2016, letter to Dr. Jennifer Uhle, NEI continues to coordinate industry efforts to develop and commercialize advanced reactors.<sup>2</sup> The purpose of this letter is to provide an update on specific activities NEI is pursuing.

NEI co-hosted three technology-specific workshops in July with the Gateway for Accelerated Innovation in Nuclear (GAIN) and the Electric Power Research Institute (EPRI). A key outcome of these workshops was the formation of three technology-specific working groups (TWGs): molten salt reactor, fast reactor and high-temperature gas reactor. NEI has facilitated the formation of these TWGs to help them achieve their objective to inform the conduct of research and development at the U.S. Department of Energy (DOE).

In September, we provided comments on the NRC's Vision and Strategy document, and we have participated in two public meetings on the near-term implementation action plans (IAPs) on October 25 and December 15. As discussed in those public meetings, we have a number of activities underway within the scope of the NRC

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<sup>1</sup> The Nuclear Energy Institute (NEI) is the organization responsible for establishing unified industry policy on matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI's members include all entities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel cycle facilities, nuclear materials licensees, and other organizations and entities involved in the nuclear energy industry.

<sup>2</sup> Letter, A. Pietrangelo to J. Uhle, NEI Activities in Support of Advanced Non-Light Water Reactors, (April 13, 2016), ADAMS Accession No. ML16158A051.

IAPs and look forward to further interactions with the staff in those areas. These activities are summarized below.

### **Establishing a Staged Regulatory Approach Conducive To Advanced Reactor Development**

We appreciate the NRC consideration of a staged regulatory approach and that the NRC has issued a draft Regulatory Review Roadmap for Non-Light Water Reactors. We look forward to continuing interaction with the NRC staff as this roadmap is developed. In connection with those discussions, we are considering development of regulatory engagement planning guidance as a complement to the NRC roadmap. This guidance would provide prospective reactor technology developers a user's guide for effective NRC engagement. This may include guidance from existing NRC documents, precedents and/or examples based on past experience and a template for developing applicant-specific regulatory engagement plans.

### **Establishing a Technology-Inclusive Regulatory Structure for Advanced Reactors That Is Risk-Informed and Performance-Based**

NEI provided industry comments on the NRC draft Advanced Non-Light Water Reactor Design Criteria (ARDC) in June, and we appreciate the consideration of many of those comments as discussed by the staff in an October 10 public meeting. We look forward to additional public meetings to discuss the specific intent of some of the ARDC that are more challenging to craft in a generic manner and to commenting on the final draft ARDC to be published in the *Federal Register*.

In addition, a Licensing Technical Requirements Modernization Project (the Project) led by Southern Company and industry partners will advance prior work by the DOE and industry-sponsored advanced reactor licensing initiatives with the intent to broaden applicability to additional reactor technologies. This project is being coordinated with NEI through our Advanced Reactor Working Group. White papers in the following areas are under development for submittal and discussion with the NRC:

1. Licensing Basis Event Selection (LBE) Process White Paper (2Q17)
2. Probabilistic Risk Assessment (PRA) Technical Adequacy for LBE and Road Map (3Q17)
3. PRA Technical Adequacy for Risk-Informed Performance-Based (RIPB) Decision Making (4Q17)

More information on the Project is provided in an attachment. As discussed in the December 15 public meeting, we agree that a public meeting with NRC technical staff early next year would be very beneficial to the development of the LBE white paper. Additionally, we agree with the staff that regularly scheduled public meetings (e.g., every six to eight weeks) to discuss technical details of the work in progress will be beneficial to the staff's ultimate review of the planned white papers.

Also, NEI has coordinated industry interactions with NRC and standards development organizations (SDOs) to gain alignment on the needs and priorities for advanced reactor standards development. We participated in the NRC's standards forum, held in September, during which NEI, EPRI and NRC agreed on the importance of developing advanced reactor standards and having them endorsed by the NRC. Subsequently, we have

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embarked on an effort to prioritize these SDO activities and assure that industry resources are assigned to the appropriate standards committees.

### **Clarifying and Readying the Licensing Process for Potential Non-Commercial Advanced Reactor Demonstration Projects**

Designers of molten salt technologies are rapidly approaching the point in their development cycles where they may wish to demonstrate the technology with a non-power reactor that would be licensed as either a research or test reactor. Such license applications would be prepared according to NUREG-1537, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors."

NUREG-1537, as currently written, largely applies to pool- and tank-type research and test reactors containing solid fuel, and thus all Molten Salt Reactor (MSR) developers require clarifying guidance in order to thoroughly and efficiently complete their applications. We note that the NRC staff prepared Interim Staff Guidance (ISG) augmenting NUREG-1537 in order to facilitate the review of applications for Aqueous Homogenous Reactors (AHRs) and sub-critical, accelerator-driven facilities for the production of medical radioisotopes. MSRs provide a number of parallels with AHRs, particularly with regard to fuel safeguards and the use of liquid fuel generally, and we are drafting language as input for a similar ISG, or other appropriate guidance document, to include MSR and possibly other advanced reactor technologies.

In connection with developing additional review guidance for non-LWR research and test reactors, we also plan to engage the NRC staff on the basis for the thermal power limits for testing facilities provided in 10 CFR 50.2, including the differing limits provided for solid versus liquid fueled facilities.

We look forward to working with the staff on these issues in the coming months and to the opportunity to periodically discuss progress and alignment at public meetings such as the one on December 15. If you have any questions concerning the industry's advanced reactor activities, please contact me or Russ Bell (202.739.8087; rjb@nei.org).

Sincerely,



Pamela B. Cowan

c: Mr. Michael E. Mayfield, NRO/DEIA, NRC  
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