

August 18, 2020

Ms. Malia Zaman  
Senior Program Manager, Technical Program Operations  
Institute of Electrical and Electronics Engineers  
445 Hoes Lane  
Piscataway, NJ 08854

Dear Ms. Zaman:

Subject: Lessons Learned and Recommended Actions from NEI/ANS June 23, 2020 Advanced Reactor Codes and Standards Workshop

The Nuclear Energy Institute (NEI) and the American Nuclear Society (ANS) hosted a joint workshop on Advanced Reactor Codes and Standards on June 23, 2020. There were 445 people from 22 countries, including advanced reactor researchers, developers, and regulators that participated in the workshop. We very much appreciate the encouraging response to and support of the workshop, and the overall enthusiasm and support for the development of codes and standards beneficial to advanced reactor developers.

The purpose of the workshop was to facilitate discussions concerning needs for advanced reactor codes and standards. The discussions included advanced reactor developer perspectives, codes and standards organization perspectives as well as DOE and NRC perspectives. The objective was to start the process of alignment of developer needs and codes and standard organization priorities. In addition, the discussion included the need for DOE to fund these activities and the actions necessary to link DOE funding to high priority activities. It was also noted in the planning for the workshop that following the workshop, NEI/ANS should identify the recommended next steps for accelerating advanced reactor codes and standards development.

The attachment includes the recommended actions, by organization, identified from the presentations and panel discussions during the workshop. The recommended actions thought to be most beneficial in the near-term are to move forward with the development, issuance and endorsement of standards that were identified as high priority and to conduct a gap analysis to identify areas where the current state of practice does not support development of advanced reactor standards and where additional research is needed.

We encourage all the stakeholders to move proactively to implement the recommended action and we stand ready to support their efforts to do so. We welcome feedback on these recommended actions and expect that many of these issues will be topics for discussion during future workshops hosted by the same or other organizations.

If you have any questions concerning this letter and the recommended actions please contact Mark Richter, NEI Senior Project Manager, at [mar@nei.org](mailto:mar@nei.org) and Pat Schroeder, ANS Standards Manager, at [pschroeder@ans.org](mailto:pschroeder@ans.org).

Thanks in advance for your support of this very important initiative.

Sincerely,



Marc Nichol  
Senior Director New Plants  
Nuclear Energy Institute



Steven A. Arndt, Ph.D., P.E., Past Chair  
ANS Standards Board

Attachment

Cc: Donald R. Eggett, ANS Standards Board Chair  
Carl A. Mazzola, ANS Standards Board Vice Chair  
Mike Tschiltz, NEI  
Mark Richter, NEI Senior Project Manager  
Daryl Harmon, IEEE Nuclear Power Engineering Committee  
Craig Piercy, ANS Executive Director / CEO  
Paula Cappelletti, CMP, ANS Director of Meetings and Programs / COO  
John Starkey, ANS Director of Government Relations  
Patricia Schroeder, ANS Standards Manager

**Recommended Actions by Organization****1. DOE**

- a. DOE should identify the actions needed to develop a strategy for engaging in codes and standards development in a meaningful way to support advanced reactor deployment. DOE should proactively implement the developed strategy as soon as practicable. A gap analysis should be performed by engaging advanced reactor developers to identify areas where current state of practice<sup>1</sup> does not support development of near-term advanced reactor standard needs and where additional research is needed.
- b. DOE and GAIN should communicate the necessary actions and pathways for obtaining funding to support advanced reactor related codes and standards development.
- c. DOE should provide support for the development of the “state of practice” for codes and standards that were identified through performance of a gap analysis. The following areas were identified during the ANS/NEI workshop as being likely candidates for needed development:
  - i. There appears to be a need for additional ASME codes and standards development work for steel-concrete structures. This could be an area where DOE could fund additional research and development.
  - ii. DOE should review ASTM Strategic Roadmap for Research and Development and identify areas to support. Experiences gained from advanced manufacturing techniques used for the Transformational Challenge Reactor should be utilized as a part of this effort.
  - iii. DOE should consider funding development of the state of practice for the use of fiber reinforced concrete and self-consolidating concrete. These were highlighted as promising technologies for reducing the cost of construction of advanced reactors.
  - iv. DOE should prioritize advanced manufacturing methods and identify pathways and timelines for use in advanced reactor development including the development of codes and standards. This would require DOE to work in close collaboration with ASTM.
- d. Since DOE is building the VTR utilizing the GE-H Prism advanced reactor design, the codes and standards needed to support construction and operation of the VTR should be among the priority areas.

**2. NEI**

- a. NEI should interact with advanced reactor developers through the TWGs to identify and facilitate opportunities for enhancing the effectiveness of interactions between industry, SDOs and DOE.

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<sup>1</sup> Advanced reactor developers emphasized the importance advanced reactor materials research and standards development as opposed to development of process standards. The lack of “state of practice” experience limits interest and inhibits progress in this area.

- b. Interface with the TWGs and SDOs to prioritize the needs for development of codes and standards.
- c. Advocate for government funding of actions to be taken by DOE, SDOs and advanced reactor developers.
- d. Identify needs and opportunities for accelerating acceptance and endorsement of near-term codes and standards' needs.
  - i. Advocate for NRC endorsement of the Non-LWR PRA Standard (ASME/ANS RA-S-1.4) as a near-term priority.

### 3. Codes and Standards Organizations

- a. Codes and Standards organizations should:
  - i. take actions to better understand advanced reactor developer needs and priorities;
  - ii. participate in DOE led gap analysis to identify areas where current state of practice does not support development of advanced reactor standards and where research is needed.
  - iii. focus on activities that are of clear value to the developers.
  - iv. SDO's should partner with advanced reactor developers/TWGS on proposals for funding specific code/standard development.
  - v. build a case for DOE support of specific codes and standards development by identifying activities that further agency and departmental missions, authorities, priorities.
  - vi. Address concerns about the time it takes to develop and endorse codes and standards. Advanced reactor developers view the time it takes to develop and obtain endorsement of a codes/standards as a significant obstacle to their use.
  - vii. SDOs should reach out to advanced reactor developers to increase their involvement in codes and standards activities.
  - viii. ASME/ANS JCNRM should familiarize advanced reactor developers with the RIM process to improve understanding of the potential advantages of the process.
  - ix. During the workshop it was noted that additional ASME codes and standards development work was needed for steel-concrete structures. DOE funding of additional research and development should be considered.

- b. It was noted that Trial Use / Pilot standards provides an opportunity to maximum benefit of codes and standards in areas where the state of practice has not been fully developed. SDO's should use Trial Use / Pilot standards to the greatest extent practicable.
  - c. Issuance and endorsement of the following standards was identified as a near term priority:
    - i. ASME III Division 5, High Temperature Reactors
    - ii. Equivalent QME-1 for Qualification of Passive Equipment
    - iii. ASME BPVC Section XI, Division 2 In-service Inspection of Components
    - iv. ASME/ANS RA-S-1.4-2020 PRA for Non-LWRs
- 4. Advanced Reactor Developers / Technology Working Groups**
- a. Advanced Reactor developers should take actions to become more involved in codes and standards activities to help set priorities for research and development in support of revised or new codes and standards. Although resources may be a challenge for advanced reactor developers the best way to influence SDO activities is to be involved in the activities that are most important to them.
  - b. Advanced Reactor developers should participate in performance of a DOE led gap analysis to identify areas where current state of practice does not support development of advanced reactor standards and where research is needed.
  - c. TWGs should develop priorities for codes/standards. Input is needed from the advanced reactor technology working groups on what codes and standards are needed or identifying areas where research is necessary to support future codes and standards development. Need to identify if there is interest amongst advanced reactor developers to support IEEE standard development.
  - d. TWGs should engage ASTM and DOE to identify high value advanced manufacturing and construction methods that could be beneficial to advanced nuclear developers.