UNITED STATES
NUCLEAR REGULATORY COMMISSION
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September 21, 2020

MEMORANDUM TO: Benjamin Beasley, Chief
Advanced Reactor Licensing Branch
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

FROM: Donna Williams, Project Manager ***/RA/***
Advanced Reactor Licensing Branch
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Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF JULY 22, 2020, PUBLIC MEETING TO DISCUSS THE ADVANCED NON-LIGHT-WATER REACTOR PROBABILISTIC RISK ASSESSMENT STANDARD

On July 22, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20183A073), the U.S. Nuclear Regulatory Commission (NRC) held a Category 2 public meeting with stakeholders, including the Nuclear Energy Institute (NEI), to discuss the staff's review of draft standard, ASME/ANS (American Society of Mechanical Engineers/ American Nuclear Society) RA-S-1.4 and NEI 20-09, Rev. 0, "Performance of PRA [Probabilistic Risk Assessment] Peer Reviews Using the ASME/ANS Advanced Non-LWR PRA Standard". The presentation slides can be found at ADAMS Accession No. ML20203M336. Enclosure 1 lists the meeting attendees.

The purpose of the meeting was to:

- Provide an update on the advanced non-LWR (light-water reactor) PRA standard review and endorsement;
- discuss plans for review and endorsement of NEI's guidance on peer review (NEI-20-09) and discuss observations from initial review of NEI-20-09; and
- discuss the scope of the Regulatory Guide and seek feedback from the public.

Prior to the meeting, the staff had provided the meeting slides to NEI that included a list of preliminary observations that the staff wanted to discuss regarding NEI 20-09. The NEI provided responses to the observations to support the meeting discussions; these responses are included as Enclosure 2.

The meeting began with NRC updates on the status of its endorsement of the standard including the planned schedule. The staff then discussed the preliminary observations identified from its initial review of NEI 20-09.

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The NEI stated that they plan to revise NEI 20-09 to address some of the staff's observations and will resend it to the staff in August 2020. Following receipt of the revised document, the staff and NEI will hold another public meeting to discuss the changes and any additional observations that the staff has identified. For the last agenda item, Scope of the Staff's Efforts to Endorse the advanced non-LWR PRA Standard, the staff discussed the applicability of the standard to various licensing applications, related rulemakings that are ongoing and may impact the use of the standard, and observations on the scope of the regulatory guide to be developed.

Enclosures:
1. List of Attendees
2. NEI responses to staff observations on NEI 20-09

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NAME	DWilliams	SLent	BBeasley	DWilliams
DATE	7/ 31 /2020	7/31/2020	8/14/2020	9/21/2020

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List of Attendees (via Skype or conference call)	
Name	**Organization**
Michelle Gonzales	U.S. Nuclear Regulatory Commission (NRC)
Marty Stutzke	NRC
Hanh Phan	NRC
Anders Gilbertson	NRC
Matthew Humberstone	NRC
Donna Williams	NRC
Ismael Garcia	NRC
Mike Cheok	NRC
John Nakoski	NRC
Dale Yielding	NRC
Alyssa Beasley	NRC
Tania Martizez Navedo	NRC
Michelle Hayes	NRC
Ian Jung	NRC
Julie Ezell	NRC
John Lane	NRC
Derek Widmayer	NRC
Mehdi Reisi Fard	NRC
Sunil Weekerody	NRC
Kati Austgen	Nuclear Energy Institute (NEI)
Victoria Andersen	NEI
Alexandra Renner	Oklo
Madeline Feltus	Department of Energy
Mirmiran Sorouche	Fennovoima
Irina Popova	self
Jason Redd	Southern Nuclear
Drew Peebles	Kairos
Jerry Pemberton	self
Jana Bergman	Scientech
Amir Afzali	Southern Company
Mihai Diaconeasa	North Carolina State University
Jodine Vehec	Holtec
Jordan Hagman	Kairos
Raymond Dremel	Enercon
Farshid Shahrokhi	Framatome
Richard Paese	self
Archie Manoha	self
Cindy Williams	BWXT Nuclear Energy Canada
George Flanagan	Oakridge National Laboratory
Brian Johnson	TerraPower
Leanne Galanek	self
Bridget Hawn	Kairos
Tammy Morin	INPO
Andrea Maidi	self
Paul Cochran	self
Jessica Gee	Engineering Planning and Management (EPM), Inc.

Preliminary Responses to NRC Comments on NEI 20-09
July 22, 2020, Public Meeting

NRC Comment	Preliminary Industry Response
1. Non-LWR PRA Life Cycle Stages	
a. Are there any differences on the review process, requirements, materials, finding disposition, etc., among the peer reviews conducted for the PRAs performed during design stage, COL [Combined License] stage, construction stage, initial fuel load, and operation?	The peer review process is the same; the way the standard is applied is different.
b. Is NEI 20-09 applicable to the peer reviews conducted for the mobile reactor PRAs	Yes, as the same standard is also applicable.
c. Should there be any differences between the peer reviews conducted for the existing LWR PRAs (NEI 17-07) and for the non-LWR PRAs on operating plants (e.g., after the first four-year upgrade)?	The PRA Standard and how it is applied are different. The review process is very similar.
d. The non-LWR PRA standard includes requirements for PRAs performed before and after initial fuel loading. The capability category assignment for a same PRA may change significantly from one stage to another. Any specific guidance on this aspect?	No, the PRA is reviewed against the Capability Category requested by the host user.
e. If the PRA being used for a design certification application or risk-informed application does not have a specific site, should a review of the proxy site information be included?	No, there is not a proxy site. The “bounding site” is a hypothetical site based on an assumed set of external hazard scenarios, meteorological conditions and population. The peer review needs to be performed to confirm the PRA meets the assumptions made in the definition of the bounding site.
f. The discussion in Sections 2.1 and 6.4 concerning the potential non-applicability of certain SRs during various plant life cycle stages appears to be inconsistent with the discussion in Section 1.3 of the non-LWR PRA standard, which states: “In addition, some PRA requirements that are appropriate for an operating plant or a plant already constructed may not be achievable or appropriate for a PRA on a plant in various design and	In the PRA Standard the user decides the scope of the PRA and which SRs to apply to which parts of the PRA model. Peer review should be done in that context and NEI 20-09 is structured as such.

licensing stages…" The language used in NEI 20-09 appears to potentially give a false impression that users and peer reviewers may arbitrarily set aside certain SRs due to lack of design or operating details, rather than documenting assumptions and proceeding with the analysis as specified in the non-LWR PRA standard.	
2. Technical Terms Used in the Guidance	
Several terms in NEI 20-09, i.e., self-assessment, independent review, independent assessment, PRA upgrade, etc., are not defined in the same context as they are described in the SRP and some other staff guidance. The staff recognizes that these terms are used consistently between NEI 20-09 and NEI 17-07, Rev. 2, which is endorsed in DG-1362.	We intend to retain consistency between 17-07 and 20-09 to streamline the industry peer review process.
3. Follow-on Peer Review	
a. It is not clear whether a follow-on peer review or a full-scope peer review or a focused-scope peer review will be performed for the plant-specific COL applicant's PRAs that reference a design-specific PRA and COL holder's PRAs that are updated to reflect the site-specific design information and/or design changes/departures.	Each PRA at each stage of design, construction, or operation that the user elects to have a peer review done is a different PRA and a different peer review.
b. Would the follow-on or focused-scope peer review be needed/conducted for a PRA on a certified design, which is subject to the restrictions of 10 CFR 52.63(a)(1) concerning the finality of standard design certification?	It would depend upon whether or not the PRA had substantially changed such that the changes constituted an upgrade. If so, yes. If not, no.
4. Radiological Consequence Peer Review	
a. Is there any specific guidance on the radiological consequence reviews in addition to the sub-bullet on Page 12 (e.g., physical properties of the fuel, negative temperature coefficient of reactivity, inherently safe capacity, computer software/code)?	See PRA standard requirements for qualifications
b. Section 4.4, "Attributes of Review Team," additional expertise for radiological consequence reviews should be considered, such as: • meteorological data	This is generically addressed as "Experienced in phases of the type of PRA being reviewed." We can consider adding this specificity, if desired.

• exposure assessment (e.g., exposure factors, shielding) • modeling of radiation effects to human health • modeling of emergency response measures • economic impact modeling.	
5. Attributes of Review Team	
a. Should the following attributes be included? • knowledge/familiar with the non-LWR designs, configurations, procedures, performance data, in which the plants are not yet built/operated. • knowledge/familiar with the LMP and other risk-informed application(s) for which the PRA is to be used.	See PRA standard requirements for peer review. Scope of peer review includes "training" of the peer reviewers on the reactor's safety design approach. Additionally, the requirements in Section 4 include "Familiar with relevant regulatory guidance" which covers LMP, etc.
b. It is not clear why the experience expectation for the peer review team lead is reduced from 10+ years (NEI 17-07) to 5+ years (NEI 20-09).	This is a recognition that some of these novel designs will need to have review teams led by individuals with knowledge of the design who may have less total experience, but will possess sufficient knowledge to lead the review.
c. It is not clear why the last sentence of the first paragraph in Section 4.1 "avoiding a perception of a conflict of interest remains important," has been removed from NEI 17-07.	This phrase does not add anything, as the expectations are clear in the preceding portion of the sentence.
d. It is not clear why the following sentences in Section 4.4 have been removed from NEI 17-07: • Expert in all phases of the type of PRA being reviewed. • A minimal team size for a full-scope peer review is five members.	• The first is removed in recognition of the potential to bring in an expert who can contribute in one area of the review but not others. • The second is removed in recognition that advanced designs may be simpler and that peer review teams could be smaller in size.
6. Relative Timing of the Reviews	
It is unclear whether all reviews (including follow-on peer review, focused-scope review, in-depth review, and newly developed method review) will be performed and completed prior to the submittal of an application.	This is outside the scope of a peer review process guidance document.
7. Figure 1-1, Peer Review Process	
a. The language in the second box should be modified to fit non-LWR PRAs.	This can be revised

b. It is not clear what needs to be done after the last box.	There should be an arrow back to the beginning, this will be added.
c. It is not clear why the following sub-bullets under Item 7 in Section 5.2 have been removed from NEI 17-07: • Sub-bullet d - Examine results of any sensitivity run(s) performed during the review • Sub-bullet e - Examine the PRA maintenance and upgrade process • Sub-bullet f - Review newly developed method.	These subbullets are still there but have moved onto a new page.
8. Seismic PRA Peer Review	
a. The following statement on Page 12, "Reviewer(s) focusing on the seismic fragility work should have successfully completed the SQUG Walkdown Screening and Seismic Evaluation Training Course or have demonstrated equivalent experience or training in seismic walkdowns," may not be applicable to a PRA performed prior to construction.	This language will be adjusted
b. Should other requirements in EFRI Seismic PRA Implementation Guide, e.g., "The peer review team shall have the combined experience in the areas of systems engineering, seismic hazard, seismic capability engineering, and SPRAs" be included?	This is covered by the language regarding "Experienced in phases of the type of PRA being reviewed" in Section 4.4
c. Seismic margin assessment is not considered for new reactors as listed on Page A-12.	This can be removed if desired.
9. Appendix A: Preparation Material	
Information to be sent by the host user to the peer review team should include: • Procedure(s) used to assess design changes for PRA impact, including documentation that implements the procedure, • List of design changes up until the peer review but not incorporated into the models yet, • List of key sources of uncertainty and key assumptions that drive the PRA models and results, • Etc.	• The first item will be covered by the review of maintenance and upgrade. • The second item would be covered by the guidance on as-to-be-built, as-to-be-operated plants. We can explicitly add this to the preparation material list. • The third item is covered by the guidance in Section 8 to consider uncertainties and assumptions for each SR, and would therefore be in the self assessment. It would be most useful to state that the self assessment should include evaluation of uncertainty and key assumptions.

10. Practical Implementation Aspects	
a. Section 3.1 states that "To start the PRA peer review process, the host user should request and schedule a peer review through the appropriate responsible organizing entity (e.g. Owners Group, independent vendor, industry consortium, etc.)," For certain non-LWR designs, an appropriate responsible organizing entity may not have been established. Will NEI serve as a clearinghouse in this situation?	NEI could serve this function. We can add "such as NEI" to clarify if helpful.
b. For PRAs where a site has not been selected (e.g., PRAs in support of DC, SDA, and ML applications), the non-LWR PRA standard requires the use of bounding sites. These bounding sites will be used to establish appropriate external hazards and the information needed to develop offsite consequence estimates (e.g., meteorology and demographic information). Is there any industry effort to define bounding sites for non-LWRs?	Not at this time; this is beyond the scope of the peer review guidance document.
11. Other Minor Clarifications	
a. If a normal plant walkdown cannot be conducted, should other methods (e.g., tabletop walkdowns, computerized simulations) be necessary?	Other methods may be used, but are not strictly necessary in all cases.
b. There are no CCIII in the non-LWR PRA standard as cited in Section 8.10.	This reference will be removed.
c. Define and add "SQUG - Seismic Qualification Users Group" to the document.	This will be added.
d. For PRAs on plants performed prior to construction, the terms "as-designed, as-to-be-built, and as-to-be operated" should be used.	This can be added.