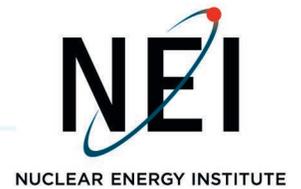


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April 2, 2021

Ms. Anna Bradford  
Director, Division of Advanced Reactors and Non-Power Production and Utilization Facilities  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**Subject:** NEI Comments on draft NRC Staff White Paper: Safety Review of Power Reactor Construction Permit Applications

**Project Number: 689**

Dear Ms. Bradford,

On February 12, 2021 the Nuclear Regulatory Commission made the subject white paper publicly available to support ongoing public discussions. On February 25, 2021 the staff conducted a public meeting to discuss its content and receive comments from stakeholders. During that meeting Nuclear Energy Institute (NEI)<sup>1</sup> and its members presented initial observations concerning the contents of the draft NRC Staff White Paper. The purpose of this letter is to provide more detailed comments on the paper. NEI understands that the staff is continuing to develop and revise its white paper with the objective of eventually developing a related Interim Staff Guidance document.

NEI appreciates the staff's efforts to provide updated guidance for the content of a construction permit application (CPA) and offers the following suggestions concerning the staff's plans to issue guidance for CPAs.

- The draft ISG guidance should be focused on identifying the information that is necessary and sufficient for a CP application. In reviewing the draft white paper there are many examples where NRC specifies providing information beyond what should be considered necessary and sufficient for a CPA, including requesting information that may not be available for a preliminary design. In fact, in some sections the white paper would require a design to be completed to the level necessary for

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

a COLA. The ISG should be written with an understanding that a CPA does not require the same level of design completion as a Part 52 COLA. If the NRC requires the same level of design completion for a CPA as a COLA, then there would be no purpose in having a Part 50 licensing pathway, as a COLA would avoid the need for a future operating license application (OLA) that is associated with a CPA. The NRC requests for information that is beyond that which is developed for a preliminary design is also inconsistent with the level of design completion of past CPAs that the NRC has approved.

- The use of preliminary design information in a PSAR should be acceptable for any of the CP licensing pathways. As written, some sections of the draft ISG recognize that preliminary design information and analyses are acceptable for a CP application. Other sections of the guidance require much more complete design information and analyses that would seem more appropriate for an Operating License (OL) or Combined Operating License (COL) application.
- There are numerous instances in Appendix C of the guidance where it appears that the NRC would require that an applicant using the NEI 18-04/TICAP approach submit more detailed information than necessary for other licensing approaches. The guidance should be revised to specify the necessary and sufficient information required for a CP submittal and there should not be significant differences in the level of detail and completeness of analyses information for a construction permit for the different licensing approaches. This requires a clear distinction between what was found acceptable for previous "preliminary" safety analyses and what has been required for Part 52 "final" safety analyses.
- In Appendix C the guidance would require a peer reviewed PRA for a CPA and has stipulated equivalent requirements for a PRA developed in support of a CPA with that of a PRA developed for a COL. This goes well beyond what should be required and in many cases is not even feasible at the CPA stage. Consistent with our earlier comment, the NRC should not be requiring that the design and analysis for a CPA be at the same level of completion as for a COLA.
- The draft guidance includes a section on the Lessons Learned from Recently Issued CPs. These indicate the acceptability of providing preliminary or limited descriptions of the facility's programs, structures, systems, or components, with regulatory commitments from the applicant to provide complete information in its OL application. Many of the parts of Appendix C of the document appear to conflict with the Lessons Learned in that they require much more information than would seem necessary and sufficient to satisfy the criteria noted in the Lessons Learned.
- To improve the clarity, it would be beneficial for the planned ISG to explain how it supplements the NRC's guidance for CPAs in RG 1.70. This could be accomplished by having each of the appendices include a table showing the applicable NRC guidance document(s) for specific application topics. For example, the table would identify the topic areas where the guidance in Regulatory Guide (RG) 1.70

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remains applicable as well as where other NRC guidance or the ISG was applicable. In addition, the planned ISG should describe any information in SRP-0800 that provides clarifications for CPAs and describe its applicability (for example some guidance in SRP-0800 may not be applicable to non-LWRs). This would greatly simplify the process of determining the applicable guidance for both the applicant and the NRC.

- The organization of the CP application guidance is confusing and should be revised to include a main body containing the pertinent information that applies to all envisioned construction permit licensing pathways. We understand the NRC is planning to issue an interim staff guidance (ISG) in the near-term. We believe that most of the CPA guidance is cross-cutting and applicable to all technologies (i.e., advanced LWR applicant and advanced NLWR applicants) and to all types of licensing approaches (e.g., traditional safety analyses and NEI 18-04/TICAP/ARCAP). At present the draft guidance does not address the content of application for an advanced NLWR that is using a CP licensing pathway other than use of NEI 18-04/TICAP approach. It is worthy of mention to note that it is possible that an applicant for a CP may not be at the point to commit to using the NEI 18-04/TICAP approach at the time of submittal of their CP application. To address this issue a separate appendix to the draft white paper should be developed for an ANLWR CPA that has not committed to using NEI 18-04/TICAP. The revised draft white paper as envisioned would consist of the main document and 3 separate appendices for the different CP pathways.

Additional detailed comments on the text are included in the attachment.

If you have questions concerning our comments, please contact me or Mike Tschiltz (202.471.0277 or mdt@nei.org).

Sincerely,



Marcus Nichol

Attachment

c: Mr. Mo Shams, NRR/DANU, NRC  
Mr. John P. Segala, NRR/DANU/UARP, NRC  
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Document Control Desk

**Attachment - Comments on draft NRC Staff White Paper: Safety Review of Power Reactor Construction Permit Applications**

Affected Section	Comment/Basis	Recommendation
<p>1. Page 3, Requirements for a Power Reactor Construction Permit Application</p>	<ul style="list-style-type: none"> <li>• 10 CFR 50.55a, "Codes and standards"</li> </ul> <p>The non-LWR community would suggest 50.55a is not necessarily directly applicable. This comes from a plain reading of two clauses:</p> <p style="padding-left: 40px;">50.55a(a) Documents approved for incorporation by reference - approved doesn't mean required. For those applicants who are using these C&amp;S, the applicability and approval may be relied upon.</p> <p>and</p> <p style="padding-left: 40px;">50.55a((b) Use and conditions on the use of standards. Systems and components of boiling and pressurized water-cooled nuclear power reactors must meet the requirements of the ASME BPV Code and the ASME OM Code as specified in this paragraph (b)</p> <p>For this wording an exemption required for a LW-SMR, but not for a non-LWR. Non-LWRs would need to identify and justify any C&amp;S used.</p>	<p>Clarify the applicability of 10 CFR 50.55a for ANLWRs.</p>
<p>2. Page 10, Radiological Consequence Analyses</p>	<p>It should be acceptable for a CPA to qualitatively demonstrate that the radiological consequences to the public during a design basis accident (DBA) are very low (e.g., bounding calculations). If the analyses demonstrate that all of the barriers are not damaged in any DBA, then it should not be necessary to provide detailed dose results.</p> <p>This section would benefit by specifying whether this is for the DBA or the beyond design basis events (BDBE). Also, an applicant should be allowed the option of qualitatively demonstrating that the radiological consequences to the public during a dba is very low. For example, if one or more of the</p>	<p>Clarify to allow use of bounding calculations that demonstrate that all of the barriers are not damaged in any DBA.</p> <p>Clarify whether this applies to both DBEs and BDBEs. Also provide the option of a qualitative analysis where one or more barriers to release remain intact.</p>

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	<p>barriers to release remain intact for all dbas, why is it necessary to provide detailed dose results?</p>	
<p>3. Page 11, Transient and Accident Analyses</p>	<p>In general, the detail and specified completion of safety analysis in this section goes beyond what the industry believes should be required for a CP application.</p> <p>Specifically, the draft guidance notes that “the review of transients and accident analyses requires an evaluation of analytical methods, inputs, and results of analyses.” There should be an option for qualitative arguments that provide justification of why certain transients or accidents are bounding. The draft guidance notes that “all credible accidents are considered and evaluated”, but there should be an explanation that provides a description of the acceptability of the use of a “bounding events” approach.</p> <p>The guidance presents the notion that <i>“selected events are limiting”</i> but then it says <i>“the reviewer verifies that the applicant systematically analyzed and evaluated the limiting events in each category using a detailed quantitative analysis.”</i> This seems to imply that all events are required to be fully analyzed for the CP application. This conflicts with the bullets on page 12 that says <i>“examples of items that could be reasonably left for later include: ...evaluation of assumed non-limiting transients and accidents.”</i></p> <p>The following statement implies that limiting conditions for operation are identified at the CP stage: <i>“determination of the margins of safety during normal operations and transient conditions anticipated during the life of the facility.”</i></p> <p>This seems to go beyond the specified level of completion of analysis that should be required at the CP application stage.</p>	<p>This section of the guidance should be revised to:</p> <ul style="list-style-type: none"> <li>• Allow the option of providing a qualitative analysis of bounding events;</li> <li>• Clarify what is necessary for the evaluation of assumed non-limiting transients and accidents;</li> <li>• Clarify what is meant by the statement: <i>“determination of the margins of safety during normal operations and transient conditions anticipated during the life of the facility.”</i></li> </ul>

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<p>4. Page 12, Structures, Systems, and Components</p>	<p>This section identifies specific regulatory guides that an applicant must commit to as opposed to requiring the applicant to identify which regulatory guides are applicable and identifying and making a commitment to follow them. For example, the commitment to <i>"RG 1.142 for the design and qualification of the safety-related concrete structures other than containment, which includes ACI-349"</i> may not be applicable to a CP applicant whose design does not utilize a concrete containment.</p>	<p>Revise the draft guidance to allow the applicant to specify the applicable regulatory guides for their CP application.</p>
<p>5. General Section of Guidance applicable to all CP applications</p> <p>Programs required to be in place prior to the issuance of a CP</p>	<p>It would be helpful if the NRC communicated what programs that an applicant needs to have established and accepted by the NRC prior to approval of a CPA.</p>	<p>Revise the draft guidance to include a section on construction permit programs.</p>
<p>6. Appendix C, page 1 Advanced Reactor Construction Permit Guidance</p>	<p>Appendix C of the draft NRC guidance is written with the expectation that the CP application use concepts developed for NEI 18-04/TICAP, such as Fundamental Safety Functions and Complimentary Design Criteria, that have not been needed in other licensing approaches.</p>	<p>The NRC should revise the draft guidance to include a separate appendix for ANLWR CP applicants who choose not to utilize the approach specified in NEI 18-04.</p>
<p>7. Appendix C page 2 Specific Topic Guidance 1.b General plant and site characteristics</p>	<p>Paragraph 1.b.ii specifies in part that the general description of the important plant design and operational features include, <i>"the plant structures, systems, and components (SSCs) modelled in the probabilistic risk assessment (PRA)."</i></p> <p>This is a very long list and complicated to describe. For example, SSCs that lead to specific trip are indirectly modeled in some cases under initiating event basic events or undeveloped events. Other SSCs are modeled directly to a specific set of PRA basic events. Under LMP, most SSCs are assessed as non-safety with no special treatment. Providing a full list of SSCs mapped to the PRA is not really helpful.</p>	<p>Revise the draft guidance to clarify that an application should describe the SSCs credited for safely shutting down the plant, and described in other portions of the document.</p>

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	<p>The application should describe the SSCs credited for safely shutting down the plant, and described in other portions of the document. For LMP applications, this includes the SSCs determined to be Safety Related as well as NSRST.</p>	
<p>8. Appendix C page 4, General Analysis b. PRA</p>	<p>a. The Policy Statement on "Severe Reactor Accidents Regarding Future Designs and Existing Plants" does not specify when a PRA needs to be complete and what level of completion is required for a CPA. It notes that a PRA should be done as "a useful design tool", but the PRA is not a prerequisite for issuance of a PDA.</p> <p>The Policy Statement does note that the Commission would expect some PRA with the CPA if not done in the PDA, but it still doesn't say complete PRA at this stage. And further it stipulates, "If the scope of the FDA [Final Design Approval] reference design is limited to an extent that would preclude the completion of a meaningful, comprehensive PRA, the requirement for a complete PRA may be waived."</p>	<p>Revise the draft guidance to provide additional flexibility concerning what is necessary and sufficient for the development of the PRA for a CPA.</p>
	<p>b. The draft guidance requires that "the staff should review how the applicant's PRA is or will be used to support the analysis in the application. The application should summarize the scope, methodology, and pedigree of the PRA, to include what SSCs and human actions are modeled, and the scope and capability category to which the PRA was completed for the purposes of a CP."</p> <p>The description of the PRA methodology in the CPA is not needed as it is reviewed for acceptability by the peer review team. The methodology is complicated and would take hundreds of pages to describe in detail for a full scope PRA. The methodology documents for the PRA are available for NRC audit.</p>	<p>Revise the draft guidance to delete the requirement for the applicant to summarize the methodology of the PRA in the CPA.</p>

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	<p>c. The draft guidance requires <i>that "the application should summarize the scope, methodology, and pedigree of the PRA, to include what SSCs and human actions are modeled, and the scope and <u>capability category</u> to which the PRA was completed for the purposes of a CP."</i>(emphasis added)</p> <p>A PRA is not assessed to have a capability category (CC). Each assessed supporting requirement (SR) is assessed for CC, and an F&amp;O is issued when CC-II is not met. Closure of the assigned F&amp;Os for a specific SR results in the SR being met to CC-II. So overall, the assessed CC is not needed, other than the discussion of scope of the peer review and the capability category assessed during the peer review(s).</p>	<p>Revise the draft guidance to delete the requirement for the applicant to include a discussion of capability category.</p>
	<p>d. The draft guidance requires that <i>"the pedigree is intended to be (i) a statement of compliance (with any exceptions) with the non-LWR PRA standard, ASME/ANS RA-S-1.4-2021, and the draft NRC white paper "Demonstrating the Acceptability of Probabilistic Risk Assessment Results Used to Support Advanced Non-Light Water Reactor Plant Licensing" (ML21015A434), the manner in which the standard was used, <u>and the findings of PRA peer review</u> conducted in accordance with NEI 20-09, Revision 1, "Performance of PRA Peer Reviews Using the ASME/ANS Advanced Non-LWR PRA Standard" (ML20302A115), or (ii) an alternative means of demonstrating PRA technical acceptability."</i>(emphasis added)</p> <p>Listing the findings of PRA peer review (F&amp;Os) is not needed. F&amp;Os are addressed through a closure process as described in Appendix C of NEI 20-09. The peer review, including assessments and F&amp;Os, as well as the F&amp;O closure documentation are available for NRC audit. This closure status and documentation changes as ongoing PRA work continues in support of the living PRA (using the PRA Standard required PRA configuration control program). As such, a summary of F&amp;Os or discussion of status in the application would require constant update.</p>	<p>Revise the draft guidance to include a description of base requirements for the PRA.</p> <p>It would be appropriate for the guidance to require a statement that describes the scope of the PRA, the version of the PRA standard that was used or will be used for the peer review, the process for addressing and closing the F&amp;Os (e.g., the process described in the NE 20-09 guidance) and that the PRA changes, including maintenance and upgrades, are addressed through a PRA configuration control program meeting the requirements of the PRA standard.</p>

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<p>9. App C page 5, 3.a, Licensing Basis Events, Discussion of selected DBAs</p>	<p>The draft guidance states that "<i>the staff should ensure that the spectrum of DBAs includes those DBAs that present the greatest challenge with respect to calculated fission product releases.</i>" DBAs are grouped to represent a group of identified LBEs. The DBA selected should represent the greatest challenge for the grouped LBEs with respect to the calculated fission product releases.</p>	<p>Clarify statement to refer to the DBA selected represents the greatest challenge for the grouped LBEs with respect to the calculated fission product releases.</p>
<p>10. App C page 5, 3.d, Discussion of the characteristics of fission product releases</p>	<p>The draft guidance states that "<i>discussion of the characteristics of fission product releases from the proposed site to the environment including the rates of fission product release, the isotopic quantities and the chemical forms of fission products released to the environment. The staff should review the modeling of changes in chemical form as the releases are processed by mitigating systems to the environment from the site during the entire period of the DBA as a function of time.</i>"</p> <p>At the CPA stage some of these characteristics may be at the "approach/methodology identified" phase and bounding calculations used in place of more detailed, final-level-of-detail analyses.</p>	<p>Revise the draft guidance to recognize that at the CPA stage it is acceptable for the applicant to provide a discussion of the approach/methodology identified and bounding calculations used in place of more detailed, final-level-of-detail analyses.</p>
<p>11. App C page 5, 3.f, Discussion of the characteristics of fission product releases</p>	<p>The draft guidance states that the "<i>discussion of the analysis methods, assumptions and results for the total calculated radiological consequence dose at the exclusion area boundary (EAB), low population zone (LPZ) and control room (if operators are relied upon for safety-significant functions) from the DBAs. The uncertainty analyses in the mechanistic source terms and radiological doses should be reviewed as part of the evaluation of conservative assumptions used in this analysis. The plant design features intended to mitigate the radiological consequences of accidents, site atmospheric dispersion characteristics and the distances to the EAB and to the LPZ outer boundary are acceptable if the total calculated radiological consequences for the postulated fission product release.</i>"</p>	<p>Revise guidance to reflect the acceptability of a discussion of commitment to analysis methods and ensuring that results will be verified to be acceptable with the "<i>total calculated radiological consequences for the postulated fission product release.</i>"</p>

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	The level of detail and the completion of the safety analysis goes beyond what should be required at the CPA stage.	
12. App C page 7, 4.a Integrated Evaluations, Evaluation of Integrated Plant Risk	It seems unreasonable to expect that the level of analysis details in this section would be available at the CPA stage. For the NEI 18-04 targets, it should be acceptable to provide a discussion of the approach/methodology and initial, preliminary, results and the remaining actions to get to final level of detail/completion.	Revise the draft guidance to recognize that it is acceptable to provide a discussion of the approach/methodology and initial, preliminary, results and the remaining actions to get to final level of detail/completion.
13. App C page 8, 4.b Integrated Evaluations, Defense-in-Depth	The draft guidance states that the <i>"DID is a design approach to account for uncertainties in equipment and human performance. It can result in redundant, diverse and independent measures to accomplish safety functions and ensure that safety is not dependent upon a single SSC or human action."</i>  DID can be used in a given design approach to account for uncertainties but it is not a design approach in and of itself.  DID does not result in diverse systems, but rather is used to identify redundant, diverse and independent measures for each safety function. These systems/features are generally already in the design, as we do not design reactors that rely on a single feature for a safety function.	Revise the draft guidance to indicate DID can be used in a design approach to account for uncertainties but that it is not a design approach in and of itself.  Revise the draft guidance to indicate that an evaluation of DID is used to identify redundant, diverse and independent measures for each safety function.
	The draft guidance states that <i>"the staff should expect the DID information to address the systematic assessment methodology endorsed by RG 1.233 and document preliminary integrated decision-making process panel (IDPP) decisions according to NEI 18-04, Revision 1."</i>  The integrated decision-making process panel is a voluntary/optional part of the IDP.	Revise the draft guidance to remove reference to the integrated decision-making process panel.
14. 12. App C page 10, 6 Safety-Related SSC Criteria and Capabilities	The draft guidance states that "the staff should ensure that commitments are provided to describe SR SSC reliability and capability performance requirements, performance of testing and validation of SSC performance capability, operability/	Revise the draft guidance to recognize that reliability of SSCs will be monitored and maintained by a licensee program over the operational lifetime of a facility.

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	<p>availability requirements, special treatment requirements, and any required support functions at the operating license stage.”</p> <p>It is not envisioned that the specific reliability targets are to be included as a part of an application but that they will be established and maintained by a specific program. The reliability of an SSC is expected to change during the operating life of a plant so maintaining them in the license creates an undue burden.</p>	
15. App C page 11, 13. Quality Assurance	The guidance for Quality Assurance should allow the complexity of a quality assurance program to be reflective of the complexity and inherent safety of a design. The intended outcome of this approach is to allow simpler designs to implement a quality assurance program that are not overly prescriptive for features that are not relied upon to ensure safe operation. It is beneficial for an advanced reactor designer to have a QAPD that covers design activities that is flexible enough to be used for any prospective applicant and NRC licensing pathway, as well as any design-specific activities like Part 52 DC or SDAs.	Revise appropriate guidance for Quality Assurance to allow for simpler designs to implement a quality assurance program that are not overly prescriptive for features that are not relied upon to ensure safe operation.
16. App C page 13, 16. Aircraft Impact	The draft guidance doesn't incorporate the NRC's approach for addressing aircraft impact for micro reactors as described in an NRC paper on the subject.	Revise the draft guidance to provide a reference to NRC's guidance for micro reactors.
17. App C, page 14, 18. Fuel Qualification	<p>The amount of information in this section goes beyond the focus and purpose of the draft guidance to provide information on what would be considered necessary and sufficient information for a CPA.</p> <p>The draft guidance states that <i>"the fuel procurement specification should describe the characteristics the fuel must have to be acceptable. The reviewer should determine how the applicant intends to ensure the as fabricated fuel complies with the procurement specification."</i></p> <p>Requiring procurement specifications goes beyond what is necessary and sufficient information in a CPA</p>	Revise the draft guidance to specify the necessary and sufficient information for fuel qualification for a CPA.