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May 20, 2020

Mr. Kenneth T. Erwin  
Environmental Review New Reactors Branch  
Division of Rulemaking, Environmental, and Financial Support  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**Subject:** NEI Comments on Draft Micro-Reactor Applications COL-ISG-029, "*Environmental Considerations Associated with Micro-Reactors*"

**Project Number: 689**

Dear Mr. Kenneth T. Erwin:

The Nuclear Energy Institute (NEI)<sup>1</sup> appreciates the opportunity to comment on Draft Micro-Reactor Applications COL-ISG-029, "*Environmental Considerations Associated with Micro-Reactors*." Streamlining the NRC's environmental reviews is important to ensure the efficient and effective licensing of advanced reactors. The NRC's draft guidance provides useful clarification of the staff's expectations and is part of a broader set of actions that are needed in order to streamline NRC's environmental reviews, as discussed in our March 2020 white paper, "*Recommendations for Streamlining Environmental Reviews for Advanced Reactors*."

While the draft guidance is written to be specific to micro-reactors, we note that many of the technical and other considerations informing the guidance are also applicable to other advanced reactors. In developing performance-based guidance for environmental consideration, the NRC should expand the scope to include other advanced reactor technologies that also have comparatively lower risk profile. We further note that this guidance establishes a scope of environmental considerations that would be appropriate for inclusion in the NRC's effort to develop a technology-inclusive advanced nuclear reactor generic environmental impact statement (ANR GEIS).

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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.

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COL-ISG-29 provides a high-level discussion of the conditions that warrant alternative approaches to addressing environmental topics; however, it lacks the level of detail needed to clarify how an applicant can demonstrate that the reactor design meets these conditions and what alternative approaches would be acceptable. We request that the NRC provide additional detail to clarify the staff's expectations similar to COL/ESP-ISG-026, "*Interim Staff Guidance on Environmental Issues Associated with New Reactors*." Clarity and benefit of the guidance can be enhanced by incorporating the following key principles:

- NRC environmental reviews should recognize the potential environmental benefits that advanced reactors would have on mitigating global climate change.
- NRC environmental reviews should credit compliance with the NRC license and other federal, state, and local environmental permits to eliminate duplicative reviews, and should be based on the presumption that such compliance is known to result in small or positive environmental impacts.
- NRC environmental reviews of advanced reactors should consider that the fuel cycle impacts may be very limited and could be bounded by current analyses for LWRs.
- The alternative site analyses should consider only those sites that are realistic and within the NRC's jurisdiction.

More detailed comments are included in the Attachment. We look forward to engaging with the NRC in your continuing work to streamline environmental reviews. If you have any questions concerning the industry's comments, please contact me or Kati Austgen (202.739.8068; kra@nei.org).

Sincerely,



Marcus Nichol

Attachment

c: Mr. John D. Monninger, NRR/DANU, NRC  
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**Nuclear Energy Institute Comments on Draft Micro-Reactor Application COL-ISG-029,  
“Environmental Considerations Associated with Micro-Reactors”**

Note: Some comments include the use of underline/strikethrough to show recommended changes to text in COL-ISG-029.

Affected Section	Comment/Basis	Recommendation
1. General	The draft guidance is specific to micro-reactors. However, many of the technical issues and other considerations included in the guidance are not unique to micro-reactors. Other advanced reactors also have comparatively lower risk profiles. They rely more on passive systems and inherent characteristics used to control power and prevent radioactive releases. The draft guidance also mentions the low power levels and small site footprints for micro-reactors as basis for the guidance. Some other advanced reactors also have low power levels compared to current light water reactors (LWRs) and may often be sited at locations already in industrial use, minimizing new environmental impacts.	The draft guidance should be expanded to include other advanced reactors. Alternatively, the NRC should develop similar guidance for other advanced reactors that similarly accounts for their unique technical considerations and comparatively lower potential impacts relative to the current fleet of LWRs.
2. General	As written, the lack of specificity and broad statements do not provide clarity on the level of detail needed to demonstrate whether a micro-reactor applicant would include specific information or not.	Clarify the ISG similar to COL/ESP-ISG-026, <i>“Interim Staff Guidance on Environmental Issues Associated with New Reactors,”</i> with more detail on what specific types of information the NRC expects a micro-reactor applicant to include and what would not be needed. It could be helpful to establish a “crosswalk” between the guidance provided and the pertinent sections of an applicant’s Environmental Report and/or the staff’s Environmental Impact Statement.
3. General	The draft guidance acknowledges in the “Purpose” section, Page 2, Line 11, that a unique characteristic of micro-reactors is the ability to “[use] mitigation to reduce impacts.” However, this mitigation concept is not further discussed in the draft ISG. New technologies and design	The NRC staff should add a section to the ISG instructing the NRC staff to consider proposed mitigation efforts for environmental impacts discussed in the Environmental Report, and the conditions upon which applicants’ proposed

	<p>approaches will allow micro-reactor applicants to significantly mitigate potential environmental impacts, and credit should be given for such efforts.</p> <p>Following the issuance of Council on Environmental Quality (CEQ) Guidance in 2011, "Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact," the US government has generally embraced reliance on mitigation measures to lessen environmental impacts and the resultant scale of NEPA reviews.</p> <p>Other NRC guidance documents also include more detailed discussion of mitigation and its use by applicants to reduce potential environmental impacts. See, e.g., COL/ESP-ISG-026; NRC, Office of Nuclear Reactor Regulation, Office Instruction LIC-203, Rev. 3, "Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues" (June 24, 2013); Regulatory Guide 4.2, Rev. 3, "Preparation of Environmental Reports for Nuclear Power Stations" (Sept. 2018).</p>	<p>mitigation measures can be relied upon to reduce the scope of an environmental analysis (e.g., if an applicant proposes methods to offset impacts on wetlands, then analysis of impacts on wetlands may be commensurately reduced in scope).</p>
4. Purpose, page A-1, first paragraph	<p>Consistent with Comment No. 1, above, the description provided in this paragraph would also largely apply to other advanced reactors.</p>	<p>Add the following, "Although this ISG solely applies to micro-reactors, some of the unique enhanced safety characteristics of micro-reactors are also available in other advanced reactors. Therefore, this ISG, in whole or in part, may be applicable for other advanced reactor environmental licensing considerations."</p>
5. Purpose, page A-1, first paragraph, line 9	<p>The reference to "power levels" may be misleading insofar as it suggests that larger power levels necessarily equate to larger environmental impacts. In fact, the power level has very little correlation to the environmental impacts, and is an inappropriate parameter for establishing the applicability of this guidance.</p>	<p>Eliminate language "operating power levels on the order of tens of megawatts-thermal or less" as one of the qualifying characteristics.</p>

6. Purpose, page A-1, line 23	The reference to NUREG-1537 for non-power reactors which may have equal, or greater, core power levels than micro-reactors, highlights an opportunity to compare and contrast the two to identify similarities that can be used by applicants in assessing micro-reactor environmental impacts.	Expand discussion of how consideration of environmental impacts for non-power reactors in NUREG-1537 (and the final ISG augmenting NUREG-1537) can be used by micro-reactor designs.
7. Purpose, page A-1, line 25	The reference Final ISG augmenting NUREG-1537, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors," Chapter 19, "Environmental Review" does not appear to be readily available to the public.	Ensure this ISG appears on the NRC website with other Interim Staff Guidance Associated with Research and Test Reactors. <a href="https://www.nrc.gov/reading-rm/doc-collections/isg/research-test-reactors.html">https://www.nrc.gov/reading-rm/doc-collections/isg/research-test-reactors.html</a> Accessed April 28, 2020
8. Purpose, page A-1, footnote 1	Some advanced reactors will be used for purposes other than electric generation, such as the generation of hydrogen or the use of heat by a co-located industrial facility instead of, or in addition to, the generation of electric power. The NRC may not be obligated by regulation to prepare an environmental impact statement (EIS) for all micro-reactors; micro-reactors are more analogous to research reactors than to large utility scale nuclear power plants.	Add clarifying language that micro-reactors to be utilized in the generation of electric power are subject to the requirements of 10 CFR 51.20 and therefore an EIS will be required. Add language that indicates non-power reactors may be subject to a different level of NEPA analysis and will be handled on a case-by-case basis (unless and until the relevant NRC regulation(s) are revised to allow the use of categorical exclusions and/or Environmental Assessments for micro-reactors).  Note that as recommended in NEI's White Paper, "Recommendations for Streamlining Reviews for Advanced Reactors," for all advanced reactors, NRC should revise 10 CFR 51.20 to eliminate the list of NRC licensing actions that require an EIS and allow for the flexibility to use environmental assessments (EAs) and categorical exclusions for those licensing actions.
9. Purpose, page 2, lines 22-38	Many of the resources listed as environmental review considerations are regulated by other agencies. NEPA is intended to ensure that agencies consider the significant environmental consequences of proposed actions and inform the public about agency decision making.	NRC should insert language that acknowledges applicant compliance with the NRC license and other federal, state, and local environmental permits is known to result in small or positive environmental impacts. NRC could request that

	<p>Agencies must use reliable existing data and resources, but are not required to undertake new scientific and technical research to inform their analysis. NEPA reviews should presume that the applicant will apply for, comply with, and meet conditions associated with all applicable federal and state licenses and permits.</p> <p>The ISG should be based on the presumption that applicant compliance with the NRC license and other federal, state, and local environmental permits is known to result in small or positive environmental impacts. See, e.g., NUREG-1437, Rev. 1 at 3-138 ("Nuclear power plants are required by the NRC to operate in compliance with all applicable environmental laws, regulations, and permits, therefore minimizing the impact on the environment, workers, and the public."); <i>Progress Energy Fla., Inc.</i> (Levy County Nuclear Power Plant, Units 1 and 2), LBP-13-4, 77 NRC 107, 217-18 (2013) (noting that "NRC may properly assume that an applicant or licensee will comply with concrete and enforceable conditions and requirements imposed by statutes, regulations, licenses, or permits issued by competent federal, state, or local governmental entities").</p>	<p>applicants demonstrate the compliance with other federal, state, and local regulatory and permit requirements as a part of their review.</p>
<p>10. Purpose, page 2, line 32</p> <p>Severe Accident Mitigation Alternatives, page 7, line 22</p>	<p>The NRC historically has defined an LWR severe accident as an accident involving multiple failures of equipment or function, whose likelihood is generally lower than design-basis accidents but where consequences may be higher. See NUREG-1437, Vol. 1 at 5-1 (1996); NUREG-1437, Rev. 1 at 1-27 (2013). Thus, by definition, severe accidents are postulated events whose probability of occurrence is so low that they are excluded from the spectrum of design-basis accidents postulated by NRC regulations. Moreover, they involve multiple failures that may result in changes to the reactor core configuration and significant radionuclide releases from the damaged core. See <i>id.</i> For LWRs licensed under Part 52, Section</p>	<p>The NRC should modify the ISG to reflect the reasonable expectations that: (1) micro-reactor designs will not involve credible severe accident progression sequences; (2) deterministic (e.g., maximum hypothetical/credible accident) analyses may suffice; and (3) SAMDA/SAMA analyses of the type conventionally conducted for large LWRs (typically using full-scope PRA methods) are not expected to be necessary for micro-reactors. If the NRC decides to retain SAMDA-related guidance in the ISG for micro-reactors, then it should make clear that any decision to conduct a SAMDA analysis will be made on a case-by-case basis, and</p>

	<p>52.79(a)(38) makes this clear, insofar as it refers to severe accidents as involving “challenges to containment integrity caused by core-concrete interaction, steam explosion, high-pressure core melt ejection, hydrogen combustion, and containment bypass.”</p> <p>NEI recognizes that the requirement to consider severe accident mitigation design alternatives (SAMDAs) (the term “SAMAs” is typically used for existing LWRs seeking license renewal) is a NEPA-based requirement derived from a judicial decision (see <i>Limerick Ecology Action v. NRC</i>, 869 F.2d 719 (3rd Cir. 1989)) and implemented through certain regulations in 10 CFR Part 51. However, the NRC’s concept of credible severe accident progression sequences (and related SAMDAs) does not appear to apply to micro-reactors, which, as the draft ISG notes, involve “simpler designs than those for large LWRs” and “operating power levels on the order of tens of megawatts-thermal or less.” These unique micro-reactor considerations are discussed further in BNL-212380-2019-INRE, “Regulatory Review of Micro-Reactors – Initial Considerations,” Brookhaven National Laboratory (Feb. 20, 2020). That document notes that “the accident source term may be similar for micro-reactors and existing <i>non-power</i> reactors”; “[t]he expected number of events and accident sequences to be analyzed are small in a micro-reactor design and the process can be made simple... without the burden of conducting a full-scope PRA;” and that “a maximum hypothetical accident [as considered in NUREG-1537] rather than a probabilistic approach to consequence analysis” may be appropriate for a micro-reactor. Thus, a thorough deterministic or risk-informed analysis (e.g., transient and accident analysis) as opposed to a severe accident analysis is expected to be sufficient for micro-reactors.</p>	<p>that any such analysis (if deemed necessary) is appropriately tailored to the much simpler design and accident phenomenology of a micro-reactor. In addition, the NRC should retain the discretion to exclude consideration of SAMDAs on the basis that postulated severe accidents are remote and speculative for a given design. See Nuclear Energy Institute; Denial of Petition for Rulemaking, 66 Fed. Reg. 10834, 10839 (Feb. 20, 2001) (“In reviewing licensing actions outside of the license renewal context, it may be possible for the NRC to conclude that certain severe accident scenarios are remote and speculative and do not warrant detailed consideration for the purposes of the NEPA review for that particular NRC action.”).</p>
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<p>11. Purpose, page 3, lines 2-4</p>	<p>The draft guidance states: “The NRC staff will continue to look for other opportunities to effectively streamline environmental reviews and work with prospective applicants to identify opportunities to streamline ERs and still meet the NRC’s regulations.”</p>	<p>One option in micro-reactor siting could include a “permit by rule” approach for units without a credible severe accident scenario. This permitting option is used extensively in EPA-regulated air emissions in order to reduce administrative burdens associated with routine emission sources. The concept, along with the use of a plant parameter envelope and a site parameter envelope, is discussed in INL/EXT-19-55257, “Key Regulatory Issues in Nuclear Microreactor Transport and Siting,” Idaho National Laboratory, September 2019.</p>
<p>12. Preapplication Interactions, page 3, lines 22-24</p> <p>Purpose and Need for the Proposed Project, page 4, lines 7-15</p> <p>Need for Power and Alternatives, page 6, lines 9-24</p>	<p>There are two would-be project proponents for advanced reactors: governmental authorities and private corporations, both of whom, as a practical matter, are unlikely to change their business plan based on the NRC’s alternative analysis. Consider that: (1) if the impetus to increase or generate power reflects a governmental decision (for sites in which energy facilities are regulated by a public utilities commission or co-located on government property), the need for power analysis has already been performed by the government applicant; or (2) if the impetus to provide power, either electric or non-electric, is a private party decision, the project proponent would have already performed the analysis and will bear the risk of the need for power associated with the project. Further, for many new reactor projects the selected site will be the only site available, for example it may be co-located with an existing generation source, providing heat to an industrial facility, or providing secure power to a Federal facility.</p> <p>Similarly, for non-electric applications such as process heat and desalination, the market would make the decision regarding whether to use nuclear technology and, if so, what type should be used.</p>	<p>As recommended in NEI’s White Paper, “Recommendations for Streamlining Reviews for Advanced Reactors,” for all advanced reactors, NRC should reduce burdensome alternative site analyses by limiting the scope of the analyses to those that are realistic and within the NRC’s jurisdiction.</p> <p>NRC should clarify in this ISG that the “reasonable” alternatives analyzed must meet the purpose and need of the proposed project and should be analyzed with the lens of what is actually feasible, based on the purpose and need of the applicant’s goals and the agency’s statutory authority.</p> <p>Per CEQ’s proposed rulemaking and federal/NRC case law, the alternative(s) considered should be limited to those that are technically and economically feasible, and which meet the purpose and need for the proposed action, as defined by the applicant. That is, the NRC staff should give substantial weight to the preferences of the applicant and/or sponsor in the siting and design of the project.</p>



13. Applicability, page 4, lines 2-5	The draft guidance states: "Elements of this ISG may also apply to some larger advanced reactor projects with limited environmental interface. However, the applicability to non-micro-reactors would need to be discussed during the preapplication phase." The guidance does not state what aspects of the guidance would not apply to advanced reactor projects. For example, one aspect that might be different would be the number of construction workers.	The guidance could be clarified by changing the two quoted sentences, to state, "Elements of this ISG may also <u>be applicable</u> <del>apply to other some larger</del> advanced reactor projects <del>with limited environmental interface. However, the applicability to non-micro-reactors would need</del> Applicants are encouraged to <del>be discussed</del> <u>this applicability</u> during the preapplication phase."
14. Size of the Proposed Project and Resources Used, page 4, lines 18-20	The statement, "If the micro-reactor site encompasses no more than a few acres, then the amount of information and level of data collection needed to describe the site and the impacts resulting from the footprint of disturbance may be limited," is misleading. The relevant metric is the site area that is disturbed, not necessarily the entire site that may be owned or leased by the applicant.	Revise as follows, "If the micro-reactor site <u>disturbs</u> <del>encompasses</del> no more than a few acres, then the amount of information and level of data collection needed to describe the site and the impacts resulting from the footprint of disturbance may be limited."
15. Land Use, page 4, line 25	The term, "few acres," should be quantified.	NRC should provide a defined basis for a quantitative value, such as "less than or equal to 10 acres" in lieu of "few acres."
16. Land Use, page 4	The draft guidance includes guidance relative to land use. The guidance discusses the small footprint expected at a micro-reactor site. However, the guidance does not discuss the situation where a micro-reactor (or advanced reactor project) may select a site already in industrial use. Selecting a site that is already in industrial use would likely obviate new environmental disturbances, which should be a basis for limiting the scope of the environmental review. The same logic applies to Historic and Cultural Resources.	The draft guidance should include a discussion of efficiencies that can be gained in the environmental review process when an applicant selects a site that is already in industrial use, such that "greenfield" environmental impacts related to land use and other resources are unlikely.
17. Land Use, page 4, lines 33-36	The draft ISG states that "If the applicant proposes to locate a micro-reactor on a site containing, or adjacent to, sensitive land resources, such as wetlands or prime or unique farmland, then the applicant should follow existing	The NRC staff should Revise as follows, "If the applicant proposes to locate a micro-reactor on a site containing sensitive land resources, such as wetlands or prime or unique farmland, then the applicant should <u>perform the appropriate analyses,</u>

	<p>guidance for considering possible impacts to those resources.”</p> <p>This is potentially too broad a statement. Micro-reactors are not anticipated to have many (or any) material off-site impacts. However, the statement above indicates that if there are sensitive resources simply “adjacent to” the plant site, the NRC staff should turn back to “existing guidance” for the analysis. The existing guidance does not adequately consider the negligible off-site impacts associated with next-generation reactor designs, even if such reactors are located in proximity to “sensitive” land or aquatic resources.</p> <p>As noted by the NRC staff, microreactors are small industrial facilities, often composed of just one building, that have minimal impacts on the environment. In some cases, micro-reactors could be used to provide resources (e.g., electricity) to unique farmlands. The placement of micro-reactors adjacent to sensitive land resources does not have the same ripple effect as has been of concern with large industrial sites or large-scale construction projects. Additionally, previous guidance associated with environmental analyses of this nature was written with large LWRs in mind and is likely overly burdensome for small projects.</p>	<p><u>commensurate with the potential impacts of the micro-reactor, follow-existing-guidance</u> for considering possible impacts to those resources. <u>Analysis of impacts to sensitive land resources adjacent to the micro-reactor site should continue to consider the limited off-site impacts anticipated for most micro-reactor designs, and scale the methodologies used in the existing guidance accordingly.”</u></p>
<p>18. Water Resources, page 4, lines 38-39</p> <p>Aquatic Ecology, page 5, lines 18-19</p>	<p>In the following statement, “Micro-reactors might not use cooling water and might not require building or operating intake or discharge structures or pipelines,” the latter portion may be misleading. Although this statement might be true for some subset of micro-reactors, other micro-reactors may use building or operating intake and discharge structures or piping.</p> <p>Micro-reactors will generally be composed of one building onsite, which will be relatively small when compared to a</p>	<p>Revise the statement under Water Resources as follows, “Micro-reactors might not use cooling water <u>for operation of the reactor and might not require building or operating intake or discharge structures or pipelines.”</u></p> <p>Similar adjustment should be made under Aquatic Ecology.</p>

	standard commercial building (e.g., pharmacy, fast food restaurant), and immensely small when compared to a conventional power plant (e.g., nuclear, coal). Thus, there may be some “building or operating intake or discharge structures or pipelines.” Requiring such micro-reactors to have anything more than an environmental review of building water piping similar to a standard construction building (on par with what is constructed in the U.S. daily) would not be commensurate with the scale of the potential environmental impact.	
19. Water Resources, page 5, lines 2-4	The draft guidance states, “It may also be necessary to briefly document the use of best management practices in accordance with State or local guidelines to minimize potential erosion and sedimentation.” It is not clear which regulatory requirement drives this statement.	Please reference the regulatory requirement that necessitates the inclusion of this information in an environmental report. Alternatively, delete the statement.
20. Terrestrial Ecology and Aquatic Ecology, page 5, line 15 and line 30	Draft guide states: “it may be possible to resolve potential concerns from a micro-reactor project affecting little or no ... habitat through informal consultation.”	Wherever appropriate, issues pertaining to unaffected environments should be dispositioned through informal discussions rather than formal review processes. Extend this allowance to socioeconomic, environmental justice, and cultural resource topics when circumstances permit such consideration.
21. Socioeconomics and Environmental Justice, page 5	The typically-included category of “Socioeconomics and Environmental Justice” is unnecessary for most micro-reactors. As noted by the NRC staff, large construction projects, not just nuclear power plants, have the ability to potentially affect the local and nearby communities they are sited within. However, micro-reactors are not large construction projects and have small construction and operational footprints by the nature of the design. These projects may take as little a month to construct and install in place and no people, or only a few people, onsite to operate. This limited construction and operational staff will not have a noticeable impact on the local communities in terms of demographics and employment.	Revise the first sentence as follows, “Micro-reactors may have limited numbers of construction workers and operational staff, and therefore may not require <u>extensive any</u> demographic and employment analyses; <u>other micro-reactor applications might require limited demographic and employment analyses.</u> ”

22. Socioeconomics and Environmental Justice, page 5, line 35	Provide more detail on “scaled as appropriate to reflect employment levels and demand for regional services...”	Identify a method for scaling the evaluation and/or a basis for a specific percentage (compared to large LWRs) of employment and regional services that will not require any detailed evaluation.
23. Historic and Cultural Resources, page 5	Consistent with Comment No. 16, above, siting a reactor at a location already in industrial use would minimize effects on Historic and Cultural resources, and should be reflected in a more efficient environmental review.	The draft guidance should include a discussion of efficiencies that can be gained in the environmental review process when an applicant selects a site that is already in industrial use.
24. Need for Power and Alternatives, page 6	Site selection alternatives are not addressed – clarity should be added to indicate this may not be necessary depending on specific site circumstances.	Clarify that site selection alternatives may not need to be analyzed for micro-reactors depending on the specific circumstances of a site and the purpose and need for the proposed action, as defined by the applicant. Examples are: remote isolated communities, mines, or military bases.
25. Meteorology and Air Quality, page 6	The guidance recognizes that construction of a micro-reactor may have minimal deleterious effect on global climate change. However, the section does not discuss the potential benefit the micro-reactor (and any advanced reactor) would have on mitigating global climate change. In many cases, micro-reactors are expected to replace diesel generators, which emit high amounts of carbon.	Any new guidance must address the carbon avoidance inherent in this technology or point to where that guidance exists. The document should include guidance about addressing in the environmental review the potential benefits of micro-reactors and advanced reactors on global climate change.
26. Meteorology and Air Quality, page 6, lines 26-27	The statement, “Micro-reactors may have limited potential air emissions and limited potential contribution to global climate change,” could be misleading for a reader from the public. Although all projects (nuclear and non-nuclear) may contribute to global climate change, nuclear projects have a net positive impact on global climate change because of the energy sources they are replacing (e.g., micro-reactor in lieu of diesel generator).	Revise as follows, “Micro-reactors may have limited potential air emissions and <u>are expected to have a net positive limited</u> -potential contribution to <u>mitigating</u> global climate change.”
27. Meteorology and Air Quality, page 6, lines 27-29	The draft ISG states, “For specific data requirements, the environmental review of potential meteorology and air quality impacts from micro-reactors will likely rely on the same information provided for the safety review and not require additional monitoring data or dispersion	Clarify the language to incorporate reactors that have no associated radiological release outside of the reactor building. For example, “For specific data requirements, the environmental review of potential meteorology and air quality impacts from

	modeling." This is confusing as it suggests that there is some monitoring and dispersion modeling required. In the case of no radiological release outside of the reactor building, there is nothing to be gained from a dispersion model.	micro-reactors will likely rely on the same information provided for the safety review <del>and not require additional monitoring data or dispersion modeling."</del>
28. Nonradiological Health, page 6, line 35	It is not clear why non-radiological health is included in this ISG. This type of analysis is not required for other industrial facilities of this size. The inclusion of this category for micro-reactors especially is overly burdensome and unnecessary for the reasons already mentioned by the NRC staff in lines 36-42 on page 6 and lines 1-2 on page 7. Microreactor licensees would already need to follow the appropriate local, State, and Federal policies on occupational health, as dictated by other agencies, laws, and regulations.	Revise to indicate that this topic area does not need to be addressed for micro-reactors or provide a clear regulatory requirement with the appropriate legal authority for why this topic must be included in an environmental report.
29. Radiological Health, page 7, line 3	It is not clear why radiological health is included in this ISG. Most nuclear facilities already have to meet the requirements of 10 CFR Part 20, which included consultation from the Environmental Protection Agency. Therefore, all onsite and co-located lifeforms are protected already by these regulations. It is duplicative and unnecessary to repeat this analysis in the same license application.	Revise to indicate that this topic area does not need to be addressed for micro-reactors (i.e., will rely on the same information provided for the safety review) or provide a clear regulatory requirement with the appropriate legal authority for why this topic must be included in an environmental report.
30. Postulated Accidents, page 7  Severe Accident Mitigation Alternatives, pages 7-8	Micro-reactors may have no radiological impacts outside of the site boundary. This should be generally referenced in the ISG.  Other agency documents and initiatives consider that smaller and advanced reactors may have limited off-site radiological consequences. For example, see NUREG-0849, "Standard Review Plan for the Review and Evaluation of Emergency Plans for Research and Test Reactors," and the rulemaking on Emergency Preparedness Requirements for Small Modular Reactors and Other New Technologies.	Include discussion that micro-reactors may not have radiological consequences beyond the site boundary.

	The staff should also consider referencing any potential changes to population siting requirements, such as discussed in the draft SECY paper, "Population-Related Siting Considerations for Advanced Reactors" (ML19203A219).	
31. Severe Accident Mitigation Alternatives, page 7	Per Comment No. 10, this section should be significantly modified. If retained, A "credible severe accident" is not defined in reference NUREG/BR-0058 or NEI 05-01 documents. Footnote 3 does not clarify or provide any specific acceptance criteria or screening limits.	Per Comment No. 10, this section should be significantly modified. If NRC does not delete this, NRC should quantify the screening limit for "credible severe accidents."
32. Severe Accident Mitigation Alternatives, page 7, line 29	Per Comment No. 10, this section should be significantly modified. If retained, the term "safety accident analysis" appears to be in error.	Per Comment No. 10, this section should be significantly modified. If NRC does not delete this, revise with the correct term.
33. Acts of Terrorism, page 8, lines 16-20	The section about Acts of Terrorism discusses the case law related to the Ninth Circuit. It is unclear which applicants would need to reach a finding related to terrorism and sabotage in the environmental review.	The guidance should clarify the circumstances under which NRC is required to address acts of terrorism. The Acts of Terrorism section implies that only applicants for sites located within the territorial jurisdiction of the Ninth Circuit Court of Appeals would need to address acts of terrorism. The guidance should clarify that point. Consider revising the current draft ISG language as follows: "In circumstances under which the NRC is required to address acts of terrorism and sabotage ( <u>i.e., for proposed facilities located within the territorial jurisdiction of the Ninth Circuit</u> ), the staff evaluation will apply a process for reaching an environmental finding for this impact unless the micro-reactor applicant can demonstrate that the design features that provide physical protection of the reactor make acts of terrorism remote and speculative. <u>Applicants for proposed facilities located outside of the territorial jurisdiction of the Ninth Circuit are not required to assess acts of terrorism, consistent with Commission policy and related case law. See AmerGen Energy Company, LLC (Oyster Creek</u>

		<a href="#"><u>Nuclear Generating Station), CLI-07-8, 65 NRC 124 (2007), review denied, N. J. Dep't of Env'tl. Prot. v. NRC, 561 F.3d 132 (3d Cir. 2009) (holding that terrorist attacks are too far removed from the natural or expected consequences of agency action to require environmental analysis in an NRC licensing proceeding, and declining to follow the Ninth Circuit's ruling in <i>San Luis Obispo Mothers for Peace v. NRC</i>, 449 F.3d 1016 (9th Cir. 2006)."</u></a>
34. Acts of Terrorism, page 8	Further, the referenced Ninth Circuit Court of Appeals case, <i>San Luis Obispo Mothers for Peace v. NRC</i> , which stated that the NRC could not categorically refuse to consider NEPA consequences of a terrorist attack pertained to the dry cask storage installation for spent nuclear fuel at the Diablo Canyon Nuclear Power Plant (DCNPP). Over the lifetime of the DCNPP, there are hundreds of times more spent fuel produced than many micro-reactors will contain in their lifetime. For example, one fuel assembly at DCNPP produces more power than some micro-reactors. Due to the small potential impact of a worst-case sabotage event for a micro-reactor, terrorists would have minimal, to no, impact on public health and safety. Thus, a micro-reactor is not an attractive terror target, substantially less so than a spent fuel installation at a 2.2 GWe nuclear power plant, such as DCNPP. Additionally, a single fully-loaded dry cask has more special nuclear material, including more plutonium, than some micro-reactors. Thus, the legal precedent of <i>San Luis Obispo Mothers for Peace v. NRC</i> does not apply to micro-reactors.	Clarify that acts of terrorism do not need to be addressed in the environmental report for a micro-reactor.
35. Fuel Cycle Impacts, Transportation of Fuel and Waste, and Continued Storage of Spent Fuel, pages 8-9	The draft ISG essentially states that fuel cycle impacts for micro-reactor non-LWRs will be evaluated on a case-by-case basis, and that current LWR analyses do not apply. This level of guidance is insufficient to benefit applicants or the NRC staff reviewer.	The NRC staff should add at the end of this section of the ISG: " <a href="#"><u>As part of any case-by-case analysis for front- and back-end fuel cycle impacts, reviewers should consider as a threshold matter whether the proposed fuel cycle impacts are sufficiently limited that they can be bounded by</u></a>



	<p>This guidance should explicitly consider that non-LWR micro-reactors may be small enough such that their fuel cycle impacts are very limited and could be bounded by current analyses for LWRs.</p> <p>This guidance also should explicitly consider that certain micro-reactors may get their first fuel loads from DOE, and/or fuel cycle facilities that will themselves be subject to NRC review. These separate actions will entail their own environmental reviews (either the DOE review for providing the fuel, or the NRC review related to construction and operation of the fuel cycle facility). The ISG should recognize that similar fuel cycle impacts may be evaluated as part of those environmental reviews, and should not be duplicated here.</p>	<p><u>current environmental impact analyses for LWRs. Moreover, reviewers should examine whether fuel cycle impacts will be more accurately addressed in other environmental reviews and need not be duplicated in the current review—such as any reviews by the U.S. Department of Energy (if DOE is providing the fuel), or reviews by the NRC related to the licensing of future fuel cycle facilities.”</u></p>
36. Fuel Cycle Impacts, Transportation of Fuel and Waste, and Continued Storage of Spent Fuel, pages 8-9	The inapplicability of 10 CFR 51.51 Table S-3 and 10 CFR 51.52 Table S-4 as well as NUREG-2157 followed by statements regarding preapplication interactions and “case-by-case basis” does not provide useful generic guidance to NRC reviewers or applicants.	Acceptable comparable technical bases for environmental impacts of fuel and waste transport should be described here so that applicants and NRC reviewers understand how compliance can be achieved for non-LWR micro-reactor designs.
37. Fuel Cycle Impacts, Transportation of Fuel and Waste, and Continued Storage of Spent Fuel, pages 8-9	This section does not address the possibility that the micro-reactor may be transported to the site with fuel in it and may also be transported off-site after end of cycle with irradiated used fuel inside it.	Revise this section to address unique fuel-in-reactor transport aspects of micro-reactors.
38. Consistency with Safety Licensing Documents, page 9, lines 34-35	The draft ISG states, “If a micro-reactor applicant also submits requests for exemption from any safety regulations, the ER and the EIS must assess the environmental impacts of the exemption requests.” This language is misleading in that some exemptions do not have any impact on the environment. The language suggests that all safety regulation exemptions must be addressed in the ER. As the ER and the EIS address environmental impacts, the exemption environmental impact discussion should be limited to those exemption requests that might have an impact on the environment.	Provide clarification that this statement is only applicable to the regulations in 10 CFR Part 51 and include the specific regulatory requirement since the word “must” is used.



