

**NRC Staff Comments and Observations  
on NEI 10-01, Rev 2 *Industry Guideline  
for Developing a Plant Parameter  
Envelope in Support of an Early Site  
Permit***

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# Agenda

- Introductions
- Purpose of meeting
- Presentation of NRC staff comments and observations on NEI 10-01, Rev 2
- NEI feedback on NRC staff comments and observations
- Public comments and questions

# Meeting Purpose

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- NEI is seeking NRC endorsement of NEI 10-01, Rev 2 *Industry Guideline for Developing a Plant Parameter Envelope in Support of an Early Site Permit* (ML21222A220) to provide future ESP applicants guidance on an acceptable means for a plant parameter envelope (PPE) development.
- Establishing common expectations and consistent approach on how to develop a PPE for an ESP application can help improve regulatory predictability and efficiency
- The purpose of this meeting to discuss NRC's feedback on NEI 10-01, Rev. 2

# Background

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- NEI originally submitted NEI 10-01, Rev 0, *Industry Guideline for Developing a Plant Parameter Envelope in Support of an Early Site Permit*, Revision 0 to NRC endorsement on March 26, 2010
- NRC staff provided comments and requested additional information (ML103010115) for NEI 10-01, Rev 0 on February 3, 2011
- NEI made additional changes and updates to NEI 10-01 to address NRC staff RAIs and incorporated experience from ESPs issued after May 2012 to develop NEI 10-01, Rev 2
- NEI requested NRC endorsement of NEI 10-01, Rev 2 through public comment (ML21222A220) on the draft version of NRC Regulatory Guide (RG) 4.27, *Use of Plant Parameter Envelope In Early Site Permit Applications for Nuclear Power Plants*
- The NRC effort to potentially endorse NEI 10-01, Rev 2 was deferred, and the agency issued RG 4.27 in July 2023

# Status

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- NRC staff have prepared feedback on NEI 10-01, Rev 2 for NEI consideration at this meeting
- NRC requests NEI revise NEI 10-01 to incorporate the feedback presented today which captures new information, corrects factual errors and identifies areas of staff concerns
- NRC requests NEI consider editorial comments provided in “Supporting Slides”

# NRC Feedback

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## Section 3.1.2, Certainty of Foundation for COL or CP

The list of examples of areas where the applicant has the flexibility to provide additional detail to gain finality includes long-term low level radioactive (LLRW) storage. It should also mention long-term storage of spent nuclear fuel and any applicable high-level waste (such as the potential need for an ISFSI once the spent fuel pool is full) since it is mentioned in Appendix B, Table B-1, PPE Section 12 and this topic has high public interest

## Section 3.3.3, Supplemental Information for Environmental Permitting

Add consideration of the importance of early engagement with other federal, state and local government entities, and Tribes regarding potential plans for a site, and note that this is especially important for site preparation and “pre-construction” activities that do not require NRC authorization.

# NRC Feedback (cont'd)

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## Section 4.1, Normal Releases

Clarify the analysis process and include the 50-mile population dose cost-benefit criteria: For example, a sentence could be added prior to the last sentence: “Effluent concentrations and doses to the public from all applicable exposure pathways (e.g., meat and vegetable ingestion pathways) are compared against applicable regulatory requirements. The 50-mile population dose may be calculated and may be used for application of the cost-benefit analysis criteria in 10 CFR Part 50, Appendix I, Section II, paragraph D.”

# NRC Feedback (cont'd)

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## Section 4.2, Accident Releases

- Clarify that evaluation of offsite doses at the EAB and LBZ should demonstrate compliance with “Part 100 siting criteria and the offsite dose criteria for the site safety assessment in 10 CFR 52.17(a)(1)(ix).” For clarity, consider adding a footnote to “siting criteria” stating “10 CFR 100.20(c)(3) sets requirements for hydrological radionuclide transport and 10 CFR 20.1406 sets requirements for minimization of contamination. For postulated radioactive releases due to failures of tanks containing liquid, additional information is provided in NRC BTP 11-6.”
- For clarity and completeness, consider adding the highlighted text to the last sentence of the last paragraph: The vendor specific radionuclide emissions and **offsite dose estimates**, and vendor specific  $\chi/Q$ 's should be presented in the **Site** Safety Analysis Report.



# NRC Feedback (cont'd)

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## Section 4.3, Severe Accident Releases

- The second sentence in the first paragraph should be modified for clarity. For example, “If sufficient design information is not available at the ESP stage, then the applicant will need to provide sufficient design information at the COL or CP stage.”
- Based on more recent licensing information, the text of the second bullet after the third paragraph should be changed to be more current and include a footnote. For example, “The greatest risk associated with a new generation reactor design (for which data is available) is well below that of the already low risk associated with the existing fleet that has completed license renewal.” Example footnote: “The NRC staff consideration of severe accidents have now been completed and included in an EIS or SEIS for the vast majority of all operating nuclear power plants (see Table E.3-1 of the 2024 LR GEIS) demonstrating that the probability-weighted consequences of a severe accident for light water reactors are SMALL.”

# NRC Feedback (cont'd)

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## Section 5, Quality Assurance

- Clarify that use of an existing operating plant QA program is limited to those ESP applicants who have one and for completeness, include the following option “Alternatively, 10 CFR Part 50, Appendix B, allows applicants to structure and monitor their Quality Assurance program so that it may be implemented by others, such as contractors, agents, or consultants, but requires that the applicant retain responsibility for the Quality Assurance program.”
- Clarify that the QA program must (rather than should) be included in the SSAR. Sample text for first sentence of last paragraph: “To demonstrate compliance with 10 CFR 52.17(a)(1)(xi), the SSAR, e.g., in Chapter 17 for applicants following NUREG-0800, must describe the quality assurance program applied to the safety-related activities for generating the information in the SSAR.”

# NRC Feedback (cont'd)

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## Section 6.2, Capturing Both Large and Small Reactors in a Single Submittal

Acknowledge that consideration of different radioisotopes is not limited to small reactors. For example, change text to “Similarly, additional specific radioisotopes may need to be considered for some reactors, especially non-LWRs, which could result in adding some radioisotopes to release evaluations as reflected in Tables 3, 7, 8, 9, 10 and 11 of the Sample PPE Table in Appendix C.”

# NRC Feedback (cont'd)

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## Section 6.3, Non-Light Water, Small or Micro-Reactor Source Term and Radiological Impacts

Change listing and description of regulatory documents as shown to correct factual errors (e.g., 50.67 does not apply to new applications) and modify text for clarity. “For example, PPE Table 9 accident time intervals are based on several regulatory documents, specifically 10 CFR Part 100 as well as NRC regulatory guides 1.183, 1.195, and 1.236. 10 CFR 52.17(a)(1)(ix) and 10 CFR 100.21 (which refers to dose criteria in 10 CFR 50.34(a)(1)) require that design basis radiological doses be calculated for any 2-hour period at the EAB and for the entire period of the plume passage at the outer boundary of the LPZ to meet the dose criteria.”

# NRC Feedback (cont'd)

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## Appendix A, Section A.2., Early Site Permit Purpose and Scope

The list of information in an ESP includes “A redress plan, if site preparation activities are planned.” This should be deleted or modified because a site redress plan is not required by NRC for non-safety related site preparation activities (pre-construction activities) by ESP applicants or holders. Only if a limited work authorization (LWA) is part of an ESP application would a site redress plan be required. Note, however, that some entities other than NRC might require redress plans for permitted activities under their purview. This comment applies to all references to site redress plans in the document (e.g., last paragraph in Appendix Section A.2. and paragraph 4 in Appendix Section A.4.)

# NRC Feedback (cont'd)

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## Appendix A, Section A.2., Early Site Permit Purpose and Scope

The Emergency Plan requirements bullet should be augmented to specify the three available options, as follows:

- Option 1. 10 CFR 52.17(b)(1) and (4) Physical characteristics w/ contacts and arrangements
- Option 2. 10 CFR 52.17(b)(1), (2)(i), and (4) (sec. 52.17(b)(3) optional) Major Features w/ contacts and arrangements
- Option 3. 10 CFR 52.17(b)(2)(ii), (3), and (4) Completed and Integrated Emergency Plan

## Appendix A, Section A.4., Regulatory Basis

Add Regulatory Guide 4.27 Rev 0, *Use of Plant Parameter Envelope In Early Site Permit Applications for Nuclear Power Plants*

# NRC Feedback (cont'd)

- Appendix C, Table C-1: Plant Parameter Envelope

The following changes/additions to Section 9 and 10 in the table were recommended by staff to try to more accurately capture the different source terms (and tie with Tables C-8, C-9, and C-11 in the document):

PPE Item		Design Parameter	Definition
9.4.1	Gaseous (Normal)	Table C-7. Provided in SSAR, e.g., in Chapter 11 for applicants following NUREG-0800	The expected annual activity, by radionuclide, contained in routine plant airborne effluent streams.
9.4.2	Gaseous (Accident)	Table C-8. Provided in SSAR, e.g., in Chapter 11 for applicants following NUREG-0800	The activity, by radionuclide, contained in post-accident airborne effluents.
9.4.3	LOCA (or other bounding DBA)	Table C-9. Provided in SSAR, e.g., in Chapter 15 for applicants following NUREG-0800	The activity, by radionuclide, contained in post-accident airborne effluents, by post-accident interval.
10.3.2	Liquid (Accident)	Table C-11. Provided in SSAR, e.g., in Chapter 11 for applicants following NUREG-0800	The activity, by radionuclide, contained in post-accident liquid effluents, as a result of an accidental release of liquid radioactivity.

# Next Steps

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- NEI may submit an updated version of NEI 10-01, Rev 2 to address staff comments
- Staff will review the technical report for endorsement with appropriate conditions and limitations, if needed.
- NRC endorsement would initially be provided by letter, followed by endorsement by revision of RG 4.27



**Questions?**

# Supporting Slides

# Editorial Observations and Comments

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- Consider adding following text to the second paragraph of Section 1.1, Background: “Regulatory Guide 4.27, *Use of Plant Parameter Envelope in Early Site Permits for Nuclear Power Plants* provides guidance to applicants on the use of PPEs in ESP applications.” (captures new information)
- Under Section 2, Definitions, NRC does not use the term “combined operating license” and staff recommends using only the term “combined license”. (See NRC definitions under 10 CFR 52.1)
- Under Section 2, Definitions, *Environmental Report*, consider adding “and related environmental statutes and regulations” after (NEPA) as there are other environmental regulations for applicants to consider outside of NEPA (e.g., *Endangered Species Act* and *National Historic Preservation Act*)

# Editorial Observations and Comments (cont'd)

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- Section 2, Definitions, *Small Reactors*, consider changing to *Small Modular Reactors* consistent with the definitions in 10 CFR 50.2 and 10 CFR 171.5
- Section 3.1.1, Consistency with 10 CFR Part 52 Process, add “security” after the word safety in the second paragraph
- Section 3.1.2, Certainty of Foundation for COL or CP, add the following footnote at the end of the third sentence in the first paragraph: “New and significant information would also need to be evaluated at the OL application stage for a new reactor or reactors on a site.”
- Section 3.1.2, Certainty of Foundation for COL or CP, consider adding “Regarding site safety issues, there is also a requirement for NRC consultation with the Department of Homeland Security (see 2011 NRC-DHS MOU, ADAMS Accession Number ML1135505081).” before the last sentence in paragraph three

# Editorial Observations and Comments (Cont'd)

- Inclusion of the highlighted text in the title of Section 4 “Development of Normal and Accident Source Terms **and Dose Estimates** for PPE-Based ESP” seems merited because the section discusses more than just source terms.
- Section 4.2, Accident Releases, for clarity, consider adding the following sentence to the beginning of the third paragraph: “Reactor vendors provide information on the design-specific accident radionuclide releases to the environment. The vendor may also provide accident offsite dose estimates calculated using vendor site parameters and source terms developed for design certification review.”
- Section 4.2, Accident Releases, adding “in the development of site characteristic  $\chi/Q$  values and the use of vendor specific information” right after “should be considered” (second sentence, third paragraph) would be beneficial for providing context

# Editorial Observations and Comments (Cont'd)

- Section 5, Quality Assurance, the text of the second sentence of the second paragraph should be changed for clarity and completeness: For example, “Data collection, analysis, and evaluation and other activities for establishing site characteristics including soil composition, geology, hydrology, meteorology, and seismology must follow a Quality Assurance program that complies with 10 CFR Part 50, Appendix B.”
- Section 6.3, Non-Light Water, Small or Micro-Reactor Source Term and Radiological Impacts, Add highlighted text to the following sentence. “The regulatory guides specify atmospheric dispersion factors (also known as  $\chi/Q$  values) for each of the following time periods: 0-8 hours; 8-24 hours; 1-4 days; and 4-30 days. These regulatory guides also specify different public and control room operator breathing rates for 0-8 hours; 8-24 hours; and greater than 24 hours. The breathing rates, in conjunction with the  $\chi/Q$  values and source terms are used to calculate dose.”
- In Appendix Section A.4, the regulation cited in the second paragraph should be 10 CFR 100.21(g), not 10 CFR 100.2(g)