

**From:** [Boyd, Dallas](#)  
**To:** [RulemakingComments Resource](#)  
**Cc:** [NRCExecSec Resource](#); [Bookless, William](#); [Park, Brent](#); [Baranwal, Rita](#); [Van Dyke, Henry](#); [Schrader, Eric](#); [Beall, Bob](#); [Heinrich, Ann](#); [Smith, Christopher L](#); [Crocker, Jackson](#); [Tilden, Jay](#); [Hoagland, David](#); [Christensen, Rick](#); [Knapp, David](#); [Bravo, Normita \(CONTR\)](#); [Bauer, Amy \(LAB\)](#); [Scheuer, Mark](#); [Reyes, Bryan \(CONTR\)](#); [Black, Thomas](#)  
**Subject:** [External\_Sender] NNSA Response to NRC Rulemaking on Emergency Preparedness for SMR / ONT  
**Date:** Wednesday, July 22, 2020 8:17:33 AM  
**Attachments:** [NNSA Response to NRC Rulemaking July 22, 2020 Final.pdf](#)  
**Importance:** High

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Colleagues,

On behalf of Deputy Under Secretary Jay A. Tilden, please see the attached memo containing the National Nuclear Security Administration's (NNSA) comments on the Nuclear Regulatory Commission's proposed rulemaking on 10 CFR Parts 50 and 52, *Emergency Preparedness for Small Modular Reactors and Other New Technologies*, dated May 12, 2020.

Please direct any questions concerning this memo to myself, Rick Christensen, Deputy Director of the NNSA Office of Nuclear Incident Response (NA-84), at [rick.christensen@nnsa.doe.gov](mailto:rick.christensen@nnsa.doe.gov) / (202) 586-0997, or Col. David Knapp, Program Manager, NA-84, at [david.knapp@nnsa.doe.gov](mailto:david.knapp@nnsa.doe.gov) / (202) 586-6619.

Best,  
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July 22, 2020

TO: ANNETTE VIETTI-COOK  
SECRETARY OF THE NUCLEAR REGULATORY COMMISSION  
ATTN: RULEMAKINGS AND ADJUDICATIONS STAFF

A handwritten signature in blue ink that reads "Jay A. Tilden".

FROM: JAY A. TILDEN  
DEPUTY UNDER SECRETARY FOR  
COUNTERTERRORISM AND COUNTERPROLIFERATION  
DEPARTMENT OF ENERGY

SUBJECT: Response to NRC Rulemaking on Emergency Preparedness for Small Modular Reactors (SMR) and Other New Technologies (ONT)

The purpose of this memorandum is to provide Department of Energy / National Nuclear Security Administration (DOE/NNSA) comments on the Nuclear Regulatory Commission's (NRC) proposed rulemaking on 10 CFR Parts 50 and 52, *Emergency Preparedness for Small Modular Reactors and Other New Technologies*, dated May 12, 2020. This rulemaking provides an alternative to existing emergency preparedness requirements for nuclear facilities as promulgated in 10 CFR Part 50 Appendix E recognizing improvements in SMR and ONT design and other safety advances.

In addition to the letter to NRC Chairman Svinicki from DOE Assistant Secretary for Nuclear Energy Dr. Rita Baranwal in support of this rulemaking, NNSA offers comments below to clarify and strengthen emergency preparedness requirements for SMRs and ONTs. NNSA is committed to emergency preparedness and will continue to support this important aspect of public health and safety through its supporting role codified in 44 CFR 351.24.

### [Response to NRC Topic 7 Question #2: Emergency Planning Zone Size](#)

The new NRC approach to emergency preparedness for SMRs and ONTs represents a significant departure from the successful 42-year-old practice of using a 10-mile plume exposure emergency planning zone (EPZ) and 50-mile ingestion pathway EPZ. This traditional approach is documented in NUREG-0396, "Planning Basis for the Development of State and Local Emergency Plans in Support of Light Water Nuclear Power Plants."

The current EPZ and emergency planning framework provides the last layer of a defense-in-depth for low-probability, high-consequence accidents. It is both cost effective and beneficial to communities around nuclear power plants and to the nuclear utilities. However, the proposed EPZ strategy may not provide the same defense-in-depth against the full spectrum of nuclear accident scenarios. Specifically, the proposal could greatly reduce the plume EPZ from 10 miles to a much smaller footprint, possibly down to the site boundary. NNSA recommends that NRC consider alternatives to the proposed approach in 10 CFR 50 Appendix E. One option is to develop smaller plume and ingestion pathway EPZs applicable to all SMR and ONT facilities to

help validate NRC's approach. A reduced EPZ would acknowledge the safety improvements in SMRs yet provide a reasonable safety margin should unforeseen engineering issues arise or the new SMR and ONT designs do not operate as expected. Given the lack of operational history for SMR technologies, the source term determination and evaluation of credible accident scenarios are purely theoretical. This circumstance should lead the NRC, nuclear utilities, and emergency planners to be more conservative with emergency preparedness rules and determinations of EPZ size.

### Response to NRC Topic 7 Question #3: Ingestion Pathway EPZ Size

Under the proposed rulemaking, current 50-mile ingestion pathway EPZ (IPZ) requirements would be dramatically weakened or eliminated altogether. NRC Draft Regulatory Guide DG-1350 Page 7, Paragraph 3, removes the requirement for an IPZ not because of limited potential impact but because of the availability of food contamination tracing and the capabilities of the Federal Radiological Monitoring and Assessment Center and the Interagency Advisory Team for Environment, Food, and Health. DG-1350 Page 9, Section 3, sets a requirement for federal, state, local, and tribal authorities to maintain capabilities and deploy them to keep doses under Protective Action Guide requirements. The rulemaking also suggests that merely describing these existing federal, state, local, and tribal capabilities for contamination interdiction is sufficient for a licensee to adequately address emergency preparedness in the event environmental contamination occurs. On-site and off-site environmental contamination concerns are within the spectrum of credible consequences that will need to be managed within the first four (4) days of a response. Furthermore, nuclear utilities and counties cannot be prepared to properly message contamination within an IPZ if they do not plan for such a contingency. The proposed rulemaking should require off-site emergency response coordination in the on-site emergency plan regardless of the EPZ boundary.

### Response to NRC Topic 7 Questions #2, 3: Hazard Analysis for EPZ Determination

Historically, reactor accidents have been the result of or complicated by unforeseen risks or hazards and/or the inability to respond accordingly. Similar phenomena should be expected from SMR and ONT technologies, and as such a suitable safety margin should be imposed. NRC should advocate for approaches that take into account unknowns and uncertainties with SMRs that exist only as designs, have not been built or tested, and have no operational history. Hazard analyses should include low-probability events, security considerations, combined emergency scenarios, and other beyond-design-basis events.

### Response to NRC Topic 6 Questions #2, 3: Mixed Mode or Multi-module SMRs

As the Fukushima disaster demonstrated, a natural disaster can cause accidents at more than one reactor on a site. The proposed rulemaking should require hazard analysis and emergency planning for multi-unit SMR sites or mixed facilities consisting of any combination of SMRs, light water reactors, decommissioned reactors, and interim spent nuclear fuel storage sites. The NRC design and safety justifications regarding individual modules are not technically compelling arguments for ignoring the need for multi-module planning.

### Response to NRC Topic 6 Question #3: Transparent EPZ Determination Process

The rulemaking does not offer a clear description of the process for making the EPZ determination. The rulemaking relies on the licensee to provide an estimate of the source term, the full spectrum of credible accidents, and the hazard analysis. Further, the Federal Emergency Management Agency would have no role in assessing the adequacy of off-site emergency plans and capabilities for reactors with a site boundary EPZ. The NRC should reassure the public and interagency partners by publishing a description of the process that is in place for the review of source term determination and hazard analysis that includes technical experts outside NRC to evaluate the technical basis (e.g., source term, spectrum of credible accidents, and beyond-design-basis scenarios) for EPZ determination. Coupled with the fact that no operational history exists for SMRs and ONTs, stringent review practices for EPZ determination by the NRC should be promulgated.

### Response to NRC Topic 4 Questions #1, 2: Off-site Radiological Emergency Preparedness Planning Activities; Topic 5 Question #1: Drills and Exercises

To maintain a reliable emergency preparedness plan and emergency response skill set, the proposed rulemaking should require a drill and exercise cadence for SMR and ONT operators that reflects the expected turnover of key personnel involved in emergency response both at the utility site and at state, local, and tribal authorities. Once an operational history is established with online SMRs and ONTs, lessons learned can be incorporated for these technologies at a suitable rate. NNSA supports explicit language in the NRC rulemaking that maintains the existing requirements for conducting an off-site emergency preparedness drill every two (2) years and the full suite of emergency preparedness exercises over an eight (8) year cycle. In addition, drills must exercise the interactions at the interface between on-site operating staff and off-site authorities, including notification, emergency response coordination, evacuation orders, and public affairs coordination. This coordination is even more critical if an EPZ is determined to be at the site boundary.

Please contact Rick Christensen, Deputy Director of the NNSA Office of Nuclear Incident Response (NA-84), at [rick.christensen@nnsa.doe.gov](mailto:rick.christensen@nnsa.doe.gov) / (202) 586-0997 or Col. David Knapp, Program Manager, NA-84, at [david.knapp@nnsa.doe.gov](mailto:david.knapp@nnsa.doe.gov) / (202) 586-6619 with any questions.

Cc:

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