



POLICY ISSUE **(Notation Vote)**

March 27, 2025

SECY-25-0021

FOR: The Commissioners

FROM: Mirela Gavrilas, PhD
Executive Director for Operations

SUBJECT: DENIAL OF PETITION FOR RULEMAKING AND DISCONTINUATION
OF RULEMAKING ACTIVITY—LONG-TERM COOLING AND
UNATTENDED WATER MAKEUP OF SPENT FUEL POOLS
(NRC-2011-0069)

PURPOSE:

To request Commission approval to deny the aspects of a petition for rulemaking (PRM) that have not been previously addressed by the U.S. Nuclear Regulatory Commission (NRC), discontinue the associated "Long-Term Cooling and Unattended Water Makeup of Spent Fuel Pools" rulemaking activity, and publish the enclosed *Federal Register* notice.

BACKGROUND:

On December 18, 2012, the NRC published a notice to consider in the rulemaking process the issues raised in PRM-50-96 (77 FR 74788). The PRM, submitted by Thomas Popik (petitioner) on behalf of the Foundation for Resilient Societies (Agencywide Documents Access and Management System (ADAMS) Accession No. ML110750145), requested that the NRC amend its regulations to require that facilities licensed by the NRC ensure long-term cooling and unattended water makeup of spent fuel pools (SFPs) in the event of geomagnetic disturbances (GMDs) caused by solar storms resulting in long-term loss of power. The final rule on Mitigation of Beyond-Design-Basis Events (MBDBE) (84 FR 39684; August 9, 2019) partially addressed the issues in the petition. That rulemaking established generic requirements in Part 50,

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"Domestic Licensing of Production and Utilization Facilities," of Title 10 of the *Code of Federal Regulations* (10 CFR), under which licensees must establish strategies and guidelines to acquire and use offsite assistance to support maintenance or restoration of core cooling, containment, and SFP cooling following an extended loss of alternating current power, which has been postulated as a potential consequence of extreme GMDs. The issues raised in PRM-50-96 that were not resolved by the MBDBE final rule remained under NRC consideration. There is no other rulemaking plan associated with PRM-50-96.

For the reasons described below, the staff has determined that the application of additional resources on this rulemaking activity would not enhance the protection of public health and safety. Should the Commission approve the staff's recommendation to discontinue this rulemaking, work on this activity would be terminated. Enclosure 1 is a draft *Federal Register* notice that would inform the public of the Commission's decision, and Enclosure 2 is the associated letter to the petitioner.

DISCUSSION:

The December 2012 notice stated that the NRC planned to consider in the rulemaking process the issues raised in the petition and that, as part of this consideration, the NRC would monitor the progress of several ongoing potential regulatory activities to determine whether any potentially new requirements, established as part of these activities, would address the issues raised in PRM-50-96. The regulatory activities referenced in the 2012 notice ultimately culminated in the MBDBE final rule.

The MBDBE final rule addressed the issues in the petition, with two exceptions. The first issue not resolved by the MBDBE final rule was that current NRC regulations do not require power reactor licensees to undertake mitigating efforts for prolonged grid failure scenarios that could be caused by GMDs resulting from an extreme solar storm. The second issue was the petitioner's request that licensees be required to have emergency systems to ensure long-term cooling and water makeup of SFPs capable of operating for a period of 2 years without human intervention and without offsite fuel resupply. As described below, the staff concludes that the petitioner's concerns not resolved by the MBDBE final rule have been addressed by other industry and government action. For this reason, the staff recommends that the NRC deny PRM-50-96 and discontinue the associated rulemaking.¹

Consideration of Public Input

The NRC received 97 comment submissions on PRM-50-96. Fifty-eight of these were from letter submissions that did not provide additional technical information. One comment came from an industry group and the remainder were either anonymous submissions or comments from individuals. The only comment submission recommending denial of the petition came from the Nuclear Energy Institute. The common concerns raised included long-term grid failure, loss of operators, inadequate or unreliable emergency generator fuel supply, SFP fires, solar flares, electromagnetic pulse attack, and cyberattack. The MBDBE final rule addressed a significant portion of the concerns raised in the comment submissions for PRM-50-96.

Additionally, the NRC received multiple public comment submissions on the MBDBE proposed rule that concerned the effects of geomagnetic disturbances, and the NRC deferred these

¹ Consistent with 10 CFR 2.803(i)(2), the NRC's decision not to proceed with rulemaking after closure of a PRM docket is documented as a denial of the PRM.

comments to the resolution of the outstanding issues in PRM-50-96. The MBDBE final rule requires mitigation strategies that could be initially deployed and used to address the effects of GMDs if such disturbances lead to adverse impacts on the transmission system and an associated loss of offsite power. However, its regulatory scope does not address the issue of GMDs in its entirety. The deferred comments were concerned about the long-term (i.e., months to years) failure of critical grid infrastructure and SFP cooling equipment and the adequate resupply of outside resources to licensees. As described below and in more detail in section II of the enclosed *Federal Register* notice, these concerns have been addressed.

Actions Taken to Fully Address the Petition

As explained above, the two issues raised by PRM-50-96 that were not fully resolved by the MBDBE final rule involved petitioner's concerns about (1) the potential for GMDs to result in prolonged grid failure, and (2) licensees' capability to provide continual power for active cooling and/or water makeup of SFPs after a grid failure.

First, with respect to the potential for GMDs to result in grid failure, since 2012, there have been improvements in electrical grid resilience to GMDs and advances in overall knowledge regarding the potential impacts of GMDs. The current understanding is that GMDs may cause localized grid failures but are unlikely to cause a widespread, long-term grid failure. In addition, improvements in space weather monitoring allow grid operators to take actions that can protect grid equipment. Grid operators are directly engaged with the National Oceanic and Atmospheric Administration's Space Weather Prediction Center and receive timely notification of impending geomagnetic storms, forecasts, and real-time onset, strength, and duration information. This information allows active mitigation of potential space weather impacts. As such, damage to transformers and other vital equipment is less likely to occur. Additionally, the Federal Energy Regulatory Commission has implemented new standards to improve the resiliency of the grid to GMDs. As a result, a widespread, long-term grid failure is unlikely because it is largely driven by the failure of extra high voltage transformers that are now subject to requirements for vulnerability assessments and associated corrective action plans.

Second, multiple efforts in addition to the MBDBE final rule address the petitioner's concern regarding the adequacy of fuel supply to provide sufficient cooling and/or water makeup of SFPs during a grid failure after a GMD event. The NRC's regulations in 10 CFR Part 50 require that onsite electric power supplies, and the onsite electric distribution system, have sufficient independence, redundancy, and testability to perform their safety functions. Regulatory Guide 1.137, Revision 2, "Fuel Oil Systems for Emergency Power Supplies" (ML13134A288), and industry standards from the American National Standards Institute/American Nuclear Society recommend that plants should maintain a minimum of a 7-day fuel supply on site. The Federal Government also provides leadership and planning that supports the response to energy emergencies and disruptions with specific organizational structure and authority to ensure that nuclear power plants receive fuel resupplies. Furthermore, onsite equipment to provide makeup water to the SFP would not be affected by a grid failure because emergency equipment, such as standalone diesel pumps, does not run on electricity. Therefore, the staff has reasonable assurance of an onsite 7-day fuel supply to maintain safe shutdown and that offsite diesel fuel can be obtained after a grid failure following a GMD event.

Conclusion

The staff analyzed the two remaining issues in the PRM that were not fully addressed by the MBDBE rule. Based on the consideration of other government agency and industry efforts to address the concerns of this petition, and the improved understanding of the potential impacts of GMDs, the staff has determined that no further action is required to maintain reasonable assurance of adequate protection of public health and safety in response to GMDs. In addition, the NRC has reasonable assurance of an onsite 7-day fuel supply to maintain safe shutdown and that in the event of a grid failure, offsite diesel fuel can be obtained through existing industry contracts or Federal, State, and local organizations, if needed. Accordingly, the NRC staff recommends denying PRM-50-96 and discontinuing the associated rulemaking.

RECOMMENDATIONS:

The staff recommends that the Commission approve the following:

1. Denial of PRM-50-96, "Long-Term Cooling and Unattended Water Makeup of Spent Fuel Pools," on the bases set forth in this SECY paper.
2. Discontinuation of rulemaking activity, "Long-Term Cooling and Unattended Water Makeup of Spent Fuel Pools."
3. Publication of the enclosed *Federal Register* notice informing the public that the NRC is denying PRM-50-96 and discontinuing the rulemaking activity, for the reasons set forth in this SECY paper.

Upon Commission approval, the staff will inform the appropriate congressional committees of this action and ensure the orderly closure of these rulemaking activities.

RESOURCES:

No additional resources are required to implement these recommendations.

COORDINATION:

The Office of the General Counsel has no legal objection to this action.



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Enclosures:

1. Draft *Federal Register* notice
2. Letter to petitioner

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MAKEUP OF SPENT FUEL POOLS (NRC-2011-0069), DATED: March 27, 2025

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