POLICY ISSUE
(Notation Vote)

August 5, 2015 SECY-15-0098

FOR: The Commissioners

FROM: Mark A. Satorius
Executive Director for Operations

SUBJECT: DENIAL OF PETITION FOR RULEMAKING RELATED TO ENVIRONMENTAL QUALIFICATION OF ELECTRICAL EQUIPMENT (PRM-50-106)

PURPOSE:

To obtain Commission approval to deny the petition for rulemaking (PRM) submitted by the Natural Resources Defense Council, Inc. (NRDC), and Mr. Paul M. Blanch (collectively, the petitioners).

BACKGROUND:

On June 18, 2012, the U. S. Nuclear Regulatory Commission (NRC) received a petition for rulemaking submitted jointly by the NRDC and Mr. Paul M. Blanch (the NRC's Agencywide Documents Access and Management System (ADAMS) Accession No. ML12177A377). The petitioners requested that the NRC amend its regulations by changing the following parts of Title 10 of the *Code of Federal Regulations* (10 CFR):

- 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities"
- 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants"
- 10 CFR Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants"
- 10 CFR Part 100, "Reactor Site Criteria"

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Specifically, the petitioners asked the NRC "to clearly and unequivocally require the environmental qualification of all safety-related cables, wires, splices, connections and other ancillary electrical equipment that may be subjected to submergence and/or moisture intrusion during normal operating conditions, severe weather, seasonal flooding, and seismic events, and post-accident conditions, both inside and outside of [a reactor's] containment [building]" (Petition at 10).

On September 27, 2012 (77 FR 59345), the NRC published a notice of receipt in the *Federal Register* and docketed the petition for rulemaking as PRM-50-106. The NRC did not request public comment on PRM-50-106 because sufficient information was available for the NRC staff to form a technical opinion regarding the merits of the petition.

DISCUSSION:

The petitioners raised three issues in support of their request that the NRC amend the regulations related to environmental qualification of electrical equipment at nuclear power plants.

Petitioners' Requests

1. The petitioners requested that the NRC amend 10 CFR 50.49 to clarify that it applies to all electrical equipment that may be subjected to submergence or moisture intrusion, both inside and outside of a reactor's containment building.

The petitioners contended that this clarifying rulemaking is necessary because, through the issuance of Generic Letter (GL) 82-09, "Environmental Qualification of Safety-Related Electrical Equipment," dated April 20, 1982 (ADAMS Accession No. ML031080281), the NRC staff limited the scope of this rule based on the location of the electrical equipment. The petitioners stated that as a result of the accident at Three Mile Island, the NRC strengthened the regulatory requirements for electrical equipment by, among other things, revising 10 CFR 50.49(e) to add paragraph (6) to address the possibility of electrical equipment submergence. The petitioners argued that 10 CFR 50.49(e)(6), as written, did not limit or restrict its applicability based upon the location of the equipment, but that the NRC staff limited this applicability through a question and answer (Q&A) set in GL 82-09:

Q. For equipment qualification purposes, what are the staff requirements concerning submergence of equipment outside containment?

A. The staff requires that the licensee submit documentation on the qualification of safety-related equipment that could be submerged due to a high energy line break outside containment.

The petitioners asserted that the problem with this excerpt from GL 82-09 is that safety-related cables and wires outside containment are routinely submerged in water not only during high energy line breaks, but also during a reactor's normal operation. The petitioners argued that the Three Mile Island accident and laboratory testing have shown that moisture intrusion and submergence of electrical cables and wires "significantly increase the probability of failure," which also causes the failure of connected components such as emergency core cooling system motors and pumps, valves, controls, and instrumentation (Petition at 6). The petition

asserted that the safety implications from the failure of a safety-related cable inside containment submerged by an accident, outside containment submerged by a high energy line break, or outside containment submerged by nature, are identical—the safety function is lost.

2. The petitioners also requested that the NRC amend 10 CFR 50.49 such that safety-related cable subject to submergence, condensation, or moisture intrusion located in a "mild environment" should not be exempted from the environmental qualification requirements of 10 CFR 50.49.

The petitioners argued that rulemaking is necessary to ensure that electrical cables and wires will be properly qualified for environmental conditions they may experience during normal operation (i.e., a mild environment) as well as during an accident. The petitioners claimed the need for rulemaking and clarification of 10 CFR 50.49 to address "cables that may be exposed to [non-mild] environments during normal, abnormal, and accident conditions" (Petition at 9). The petitioners noted that "[e]lectrical cables and wires are prone to accelerated failure rates when submerged in water or exposed to high humidity unless designed and qualified for these environmental conditions" (*Id.*). The petitioners stated that the NRC prioritized the inspection of cable penetrations after the 1979 Three Mile Island accident based on the probability of their impairment, mostly due to submergence and moisture. The petitioners argued that "[i]f these conditions cause a high probability of impairment following an accident, then it is logical to assume that these conditions produce a similar outcome in the absence of or prior to an accident as well" (Petition at 4). In support of their case for a rulemaking to address this impairment, the petitioners also referenced a 1996 study by the U.S. Department of Energy (DOE) and studies by the Electric Power Research Institute (EPRI) (*see* Petition at 4 and 6).

Also in support of their request for rulemaking to extend 10 CFR 50.49 requirements to electrical equipment in mild environments, the petitioners contended that the "NRC's requirements state only that safety systems should remain functional and do not provide conditions or acceptance criteria for degraded cables" (Petition at 6).

3. The petitioners also requested that the NRC amend the General Design Criteria (GDC) in Appendix A of 10 CFR Part 50 to apply to plants with construction permits issued before May 21, 1971.

Although GDC 2 and 4 require that cables be able to perform their design function when subjected to anticipated environmental conditions, the petitioners contended that the NRC does not apply these and other GDC to the 57 plants with construction permits issued before May 21, 1971, the effective date of the GDC rule (36 FR 3256; February 20, 1971). Citing the NRC staff regulatory issue resolution protocol, "Cable Performance Issues at Nuclear Power Plants," dated August 25, 2009 (ADAMS Accession No. ML092220419), the petitioners asserted that this statement defined the NRC's governing regulations on submerged cable performance as explicitly including GDC 2 and GDC 4. The GDC 2 requires that important-to-safety reactor structures, systems, and components (SSCs) be designed to withstand the effects of natural phenomena without loss of capability to perform their safety functions. The GDC 4 requires that these SSCs be designed to "accommodate the effects of" and "be compatible with" the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents.

The petitioners stated that although these GDC "may very well contain appropriate regulatory requirements for the qualification of electrical cables and wires, the Commission has determined that these requirements are NOT to be applied to the majority of reactors" (Petition at 8, emphasis in original). The petitioners noted that, at the time the petition was submitted, at least 57 of the nation's 104 operating reactors were issued construction permits prior to May 21, 1971, the effective date of the GDC rule, and that the NRC, through direction to the NRC staff on SECY-92-223, "Resolution of Deviations Identified During the Systematic Evaluation Program" (ADAMS Accession No. ML12256B290), has determined that GDC do not need to be applied to these 57 reactors.

Summary of the NRC's Analysis

Section 50.49 imposes additional requirements beyond those of § 50.65; 10 CFR Part 50, Appendix A; and 10 CFR Part 50, Appendix B, for important-to-safety equipment subject to design basis accident conditions. In particular, 10 CFR 50.49 establishes environmental qualification requirements for electrical equipment in non-mild environments during accident conditions. Section 50.49 (c) explicitly excludes important to safety electrical equipment subject only to mild environments. The petitioners have not provided significant and new information sufficient to justify a rulemaking to change this position.

A rulemaking to require the environmental qualification of all electrical equipment exposed only to mild environments is unnecessary because existing NRC regulations require sufficient protection of important to safety electrical equipment against expected or potential environmental conditions it experiences during its period of service. The petitioners have not provided new information or previously unconsidered reasons that § 50.49 should be amended to extend environmental qualification requirements to important–to–safety cables and electrical equipment exposed to submergence, condensation, or moisture intrusion in the mild environments. Generic Letter 82-09, which the petitioners referenced, does not limit the applicability of 10 CFR 50.49 based on the location of the equipment. In addition, the NRC has other regulations in place to address environmental qualifications of electrical equipment subject to mild environments that address the maintenance of electrical equipment. The maintenance rule (§ 50.65); 10 CFR Part 50, Appendix A General Design Criteria; and applicable 10 CFR Part 50, Appendix B quality assurance regulations provide functional requirements through maintenance, design, and quality assurance for important–to–safety equipment in mild environments. For these reasons, it is not necessary to conduct a rulemaking to apply the requirements of § 50.49 to equipment both inside and outside containment.

Finally, with regard to the reactors that received construction permits prior to May 21, 1971, the Commission determined in response to SECY-92-223 that these plants are operating safely with appropriately qualified important-to-safety equipment and that no specific backfits of the GDC to these plants were required (ADAMS Accession No. ML003763736). The petitioners have not provided any significant, new, or previously unconsidered information to justify a rulemaking that would backfit the GDC.

RECOMMENDATION:

After reviewing the PRM, the staff recommends denying the petition for rulemaking. The NRC staff disagrees that issuance of GL 82-09 limited the scope of 10 CFR 50.49 based on the location of electrical equipment. The NRC staff also disagrees that inadequate environmental

qualification requirements are in place to address electrical equipment that may be exposed to non-mild environments in accident conditions or that there are insufficient regulations and inspection procedures in place to monitor electrical equipment important to safety. A more detailed discussion of the reasons for denial of the PRM is contained in the attached *Federal Register* notice (FRN) of denial.

The staff recommends that the Commission deny the PRM, approve publication of the FRN (Enclosure 1), and approve the letter to the petitioner (Enclosure 2).

COORDINATION:

The staff coordinated this SECY paper with the Office of General Counsel. The Office of the General Counsel has no legal obligation to this paper.

/RA Michael R. Johnson Acting for/

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Enclosures:
1. *Federal Register* notice
2. Letter to Petitioner

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ADAMS Accession No: ML14071A276 (Pkg.); ML14071A279 (SECY Paper) *via e-mail

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