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ADJUDICATIONS STAFFAnnette L. Vietti-Cook  
Secretary of the Commission  
U.S. Nuclear Regulatory Commission  
December 28, 2001  
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ON EQUIPMENT QUALIFICATION12<sup>th</sup> FLOOR  
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December 28, 2001

Annette L. Vietti-Cook  
Secretary of the Commission  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

**ATTENTION:** Rulemakings and Adjudications Staff

**SUBJECT:** Nuclear Utility Group on Equipment Qualification - Comments Concerning Draft Rule Language for 10 C.F.R. § 50.69, "Risk-Informed Treatment of Structures, Systems, and Components," (66 Fed. Reg. 59,546 (Nov. 29, 2001))

Dear Ms. Vietti-Cook:

We appreciate the opportunity to comment on the subject draft rule language concerning risk-informing the treatment of structures, systems, and components in nuclear power plants, including the environmental qualification requirements for certain equipment (10 C.F.R. § 50.49). On behalf of the Nuclear Utility Group on Equipment Qualification ("NUGEQ" or "Group"),<sup>1</sup> we submit the enclosed comments in response to the referenced request for comments. Though the draft rule is broader in scope, our comments focus on the treatment of electrical equipment environmental qualification.

<sup>241142.1</sup> In addition, the NUGEQ endorses and supports the comments submitted by the Nuclear Energy Institute ("NEI") on December 13, 2001, including the specific comment that 10

<sup>1</sup> The NUGEQ is comprised of member electric utilities in the United States and Canada, including NRC licensees authorized to operate over 90 nuclear power reactors in the United States. The NUGEQ was formed in 1981 to address and monitor topics and issues related to equipment qualification, particularly with respect to the environmental qualification of electrical equipment pursuant to 10 C.F.R. § 50.49.

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SECY-02

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C.F.R. § 50.49 should not apply to the low-risk significant equipment.

We commend the NRC for developing a draft optional rule that would provide licensees with an opportunity to use the optional rule to relax or eliminate certain special treatment requirements through the categorization of structures, systems, and components into levels of risk significance. In addition, we support the NRC's efforts to reduce the regulatory burden of certain requirements through the use of risk-informed insights. Further, we believe that the rule's provisions should be less prescriptive, thus permitting advances in processes and technology to be more readily integrated into the methodologies for assuring that low-risk significant equipment is capable of performing its design function.

Regarding environmental qualification, we believe the proposed exception to apply 10 C.F.R. §§ 50.49(e)(1) through (e)(7) for certain RISC-3 and RISC-4 equipment is unnecessary and confusing. To improve the clarity of the rule and ensure that the NRC's intent for burden reduction is met, we suggest alternative language and provide the rationale for the suggested language.

Again, we appreciate the opportunity to comment and look forward to continued participation in this rulemaking process. Please contact us if you have any questions regarding our comments.

Sincerely,



William A. Horin  
Patricia L. Campbell

Counsel to the Nuclear Utility Group on Equipment  
Qualification

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**10 C.F.R. § 50.69, "Risk-Informed Draft Rule Language for Structures, Systems, and**  
**10 C.F.R. § 50.69, "Risk-Informed Treatment of Structures, Systems, and**  
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Our comments focus on the special treatment provisions related to electrical equipment environmental qualification. We support the intent of the draft rule to reduce regulatory burden using risk-informed insights. Our suggestions below support burden reduction while maintaining safety. In addition, we recommend that the final rule be less prescriptive, with industry guidelines (as endorsed by the NRC in regulatory guidance) providing one or more acceptable means for implementing specific provisions of the rule. In this manner, advances in processes and technology may be more readily integrated into the methodologies for assuring that the equipment is capable of performing its design function. Our detailed comments concerning the portion of the draft rule dealing with the application of 10 C.F.R. § 50.49 to low-risk significant structures, systems, and components ("SSC") are provided below.<sup>1</sup>

**Environmental Qualification - 50.69(d)(3)(iii)**

The NUGEQ agrees that the design of low-risk significant ("RISC-3," if safety-related, and "RISC-4," if non-safety related) equipment must continue to consider the environmental conditions under which such equipment must perform. However, the NUGEQ maintains that none of the provisions of 10 C.F.R. § 50.49 need apply to RISC-3 and RISC-4 equipment, and disagrees with citing 10 C.F.R. §§ 50.49 (e)(1) through (7) as the basis for these conditions. In fact, 10 C.F.R. § 50.49 and its qualification requirements are designed to focus on electrical equipment considered to be most important to safety, and not electrical equipment considered to be of low safety significance.<sup>2</sup> Thus, 10 C.F.R. § 50.49 was intended to focus on what is essentially risk important equipment, and not on non-risk important equipment. We propose the following revised language, which will accomplish the NRC's intent for the draft rule:

<sup>1</sup> We recommend that the language of the final rule, the Statement of Considerations, and the associated regulatory guidance, be clear that no new requirements are imposed upon RISC-2 and RISC-4 (*i.e.*, non-safety related) equipment if a licensee elects to voluntarily implement the alternative treatment requirements.

<sup>2</sup> 10 C.F.R. § 50.49 specifies the special treatments to be applied to safety-related, important to safety, or certain post-accident monitoring equipment, as described in 10 C.F.R. § 50.49(b), to establish reasonable assurance of equipment performance during design basis events (*i.e.*, LOCA, HELB, and other pipe breaks).

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(d)(3)(iii) 10 C.F.R. § 50.49; however, the design of electrical equipment must continue to consider the design basis accident environmental conditions (temperature, pressure, humidity, chemical effects, radiation, and submergence) under which the electrical equipment must perform.

There are two principal reasons for our objections to the draft language citing 10 C.F.R. §§ 50.49(e)(1) through (7). First, according to the NRC's process for using risk-informed insights in rulemaking actions, accident environmental conditions and SSC performance are part of the design bases and must be preserved when alternative treatments are applied. Second, the requirements in 10 C.F.R. § 50.49(e)(5), *Aging*, and in 10 C.F.R. § 50.49(e)(7), *Synergistic Effects*, are not environmental conditions.

As noted, one underlying principle associated with the alternative treatments is that the design bases, including accident environmental conditions and performance requirements, will be preserved for the low-risk significant equipment. Paragraphs 50.49(e)(1), (2), (3), (4), and (6) simply list the types of accident environmental conditions that must be considered during "qualification" of the equipment under 10 C.F.R. § 50.49. The assumptions and methods used to define these accident conditions are established by other regulations and guidance outside of 10 C.F.R. § 50.49. (*See, e.g.*, NUREG-0588, Rev. 1, for methods used to define containment atmosphere LOCA temperature and pressure conditions, and TID-14844 for accident radiation source terms.) Consequently, the rule need not reference these sections of 10 C.F.R. § 50.49 for defining the list of environmental conditions to consider. As proposed above, it is clearer and more appropriate to simply list the range of environmental conditions in 10 C.F.R. § 50.69(d)(3)(iii).

While we maintain that it is inappropriate and unnecessary for the rule to reference 10 C.F.R. § 50.49 as defining the environmental conditions, additional bases for not including *aging* and *synergistic effects* are explained as follows:

- *Aging* is integrated into the 10 C.F.R. § 50.49 "qualification" methodology to provide assurance that accident performance can be achieved after the potential degrading effects of in-service aging. *Aging* is not, however, an environmental condition. The qualification methodologies used to consider aging for equipment within the scope of 10 C.F.R. § 50.49 are not appropriate for the low-risk-significant equipment in RISC-3 or RISC-4 categories. For RISC-3 and RISC-4 equipment, the Design Control Process (*e.g.*, suitable materials), the Maintenance Process (*e.g.*, periodic maintenance), and the Procurement Process (*e.g.*, design and

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performance specifications), alone or in combination, adequately address aging effects. Consequently, it is inappropriate for the rule to reference 10 C.F.R. § 50.49(e)(5) for RISC-3 and RISC-4 equipment.

- *Synergistic effects* are integrated into 10 C.F.R. § 50.49 to address potential second-order effects associated with "sequential" qualification test methods. *Synergistic effects* do not represent an environmental condition. Qualification experience and research testing suggest the possibility that, for certain material formulations, the combined effects of sequential application of certain artificial aging conditions (e.g., thermal aging followed by radiation aging) or accident conditions (e.g., radiation exposure followed by steam exposure) might be less degrading than their simultaneous application. Although many environmental qualification practitioners and experts maintain that, if such synergistic effects (a second order consideration) exist, they are adequately addressed by the conservatisms employed in the qualification process. 10 C.F.R. § 50.49(e)(7) was, nonetheless, incorporated into the final environmental qualification rule. Importantly, however, the NRC does not require consideration of synergisms for any equipment, including equipment that would fall within the RISC-1 category, that is qualified to the DOR Guidelines or NUREG-0588, Category II.<sup>3</sup> Consequently, consideration of synergistic effects is also not necessary or appropriate for the low-risk-significant equipment in the RISC-3 or RISC-4 categories. For RISC-3 and RISC-4 equipment, the Design Control Process (e.g., suitable materials), the Maintenance Process (e.g., periodic maintenance), and the Procurement Process (e.g., design and performance specifications), alone or in combination, adequately address possible synergistic aging effects. For RISC-3 and RISC-4 equipment, the conservatisms employed in defining the accident environmental conditions should adequately account for possible synergistic accident effects. It is therefore inappropriate for the rule to reference 10 C.F.R. § 50.49(e)(7) for RISC-3 and RISC-4 equipment.

For the reasons discussed, we recommend that the above-suggested language be substituted for the draft language currently proposed, with respect to the consideration of environmental conditions for RISC-3 and RISC-4 equipment. Listing the specific accident environmental conditions that are required by the design bases adequately reminds licensees that these design bases conditions must continue to apply to RISC-3

<sup>3</sup> See, e.g., NUREG-0588, Rev. 1, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment," Nov. 1980, p. 15.

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and RISC-4 equipment. It is unnecessary and inappropriate for the rule to list specific portions of 10 C.F.R. § 50.49 as defining the accident environmental conditions for RISC-3 and RISC-4 equipment. Further, of those provisions in 10 C.F.R. § 50.49 listed in the draft rule language, *aging* and *synergistic effects* are not environmental conditions.