May 15, 2001

MEMORANDUM TO: Jose Calvo, Chief
Electrical and Instrumentation and Controls Branch
Division of Engineering
Office of Nuclear Reactor Regulation

FROM: Sher Bahadur, Chief /RA/
Engineering Research Applications Branch
Division of Engineering Technology
Office of Nuclear Regulatory Research

SUBJECT: TRANSMITTAL OF NUREG/CR-XXXX, "APPLICATION OF MICROPROCESSOR-BASED EQUIPMENT IN NPPS" AND DG-1077 "GUIDELINES FOR ENVIRONMENTAL QUALIFICATION OF MICROPROCESSOR- BASED EQUIPMENT IMPORTANT TO SAFETY ON NPPS"

This memorandum requests your review of Draft NUREG/CR-XXXX, "Application of Microprocessor-Based Equipment in NPPs - Technical Basis for a Qualification Methodology" and Draft Regulatory Guide DG-1077 "Guidelines for Environmental Qualification of Microprocessor- Based Equipment Important to Safety in Nuclear Power Plants (NPPs)." NUREG/CR- XXXX is the final report from Oak Ridge National Laboratory (ORNL) on the proposed qualification methodology of advanced Instrumentation and Control (I&C) based on endorsement of two standards. DG-1077 proposes a method for determining the environmental qualification procedures for microprocessor-based electric equipment important to safety for service in NPPs.

In 1994, the Office of Nuclear Regulatory Research initiated a program at ORNL to prepare comprehensive acceptance criteria and hardware qualification requirements and address all technical issues relevant to the qualification of digital I&C systems in response to a user need request from NRR. The objectives of this confirmatory research are to identify any unique environmental-stress-related failure modes posed by digital technologies and their potential impact on the safety systems and then develop the technical basis for regulatory guidance using these findings. A subsequent user need from the Office of Nuclear Reactor Regulation, dated March 17, 2000, from S. J. Collins to A. C. Thadani, reinforced the goal that the findings of this research project be integrated into the technical basis for comprehensive guidance and acceptance criteria on environmental qualification of digital safety-related I&C systems.

The subject NUREG/CR-XXXX report presents the insights and conclusions drawn from the project findings and also documents a comparative analysis of two environmental standards (IEEE 323-1983 and IEC-60780-1998), and the results and recommendations for enhancing regulatory guidance for environmental qualification of microprocessor-based safety-related systems. Draft RG-1077 is complementary to Regulatory Guide 1.89 "Environmental Qualification of Certain Electrical Equipment Important to Safety for Nuclear Power Plants," which addresses compliance with 10 CFR 50.49 under design basis accidents.

We would appreciate receiving your comments by July 1, 2001.

If you have any questions, please call me (415-6010) or Christina Antonescu (415-6792) of my staff. Christina is the Project Manager for this study in my branch.

Attachments:
1. NUREG/CR-XXXX, "Application of Microprocessor-Based Equipment in Nuclear Power Plants-Technical Basis for a Qualification Methodology"
2. DG-1077, "Guidelines for Environmental Qualification of Microprocessor-Based Equipment Important to Safety in Nuclear Power Plants"

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