

December 19, 2003

MEMORANDUM TO: Ledyard (Tad) Marsh, Director
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

FROM: Michael Mayfield, Director /RA/
Division of Engineering Technology
Office of Nuclear Regulatory Research

SUBJECT: TRANSMITTAL OF NUREG/CR-5609 AND NUREG/CR-6782 IN
SUPPORT OF REGULATORY GUIDE 1.180 UPDATE

The Division of Engineering Technology is forwarding NUREG/CR-5609, "Electromagnetic Compatibility Testing for Conducted Susceptibility along Interconnecting Signal Lines" and NUREG/CR-6782, "Comparison of U.S. Military and International Electromagnetic Compatibility Guidance" for information and use in support of implementing Revision 1 of Regulatory Guide 1.180. Regulatory Guide 1.180, Rev. 1, A Guideline for Evaluating EMI/RFI in Safety-Related I&C Systems, describes an acceptable method for establishing electromagnetic compatibility (EMC) for safety-related I&C systems. The practices described in Revision 1 are consistent with previous staff positions [NUREG-0800, Chapter 7; Regulatory Guide 1.180]. Revision 1 relaxes previously specified criteria, where technically justified, and addresses previously unresolved EMC issues. The revised guide endorses the design and installation practices in IEEE Std. 1050-1996, the electromagnetic and radio-frequency interference (EMI/RFI) testing practices in MIL-STD-461E, the power surge testing practices in IEEE C62.41 and C62.45, and the commercial EMI/RFI testing practices in IEC 61000.

NUREG/CR-5609 presents recommendations and the associated technical basis for addressing the effects of conducted EMI/RFI along interconnecting signal lines in safety-related instrumentation and control (I&C) systems. Coverage of signal line susceptibility had been identified as an open issue in the previous research used to establish the practices endorsed by the original Regulatory Guide 1.180. Findings from this NUREG/CR help to form the technical basis for updating the acceptable EMI/RFI test methods and operating envelopes.

NUREG/CR-6782 details an assessment of the commercial EMI/RFI test standards issued by the International Electrotechnical Commission (IEC) and endorsed by the European Union. The assessment results were compared to test practices employed by the U.S. military and the guidance endorsed by the original Regulatory Guide 1.180. The comparisons made between the military and commercial EMI/RFI standards in this NUREG/CR provide additional insights for conducting reviews of EMI/RFI related licensing submittals.

The research approach for the EMC project includes the identification and assessment of EMI/RFI and surge withstand capability (SWC) standards and practices, the collection of ambient EMI/RFI data in nuclear power plants, the testing of an artifact to validate test methodologies, and development of the technical basis for EMI/RFI and SWC guidance. The approach is comprehensive and pulls information from a number of diverse sources in order to forge an acceptable solution for licensees. The end product is intended to be applicable to future nuclear power plants and operating plants that voluntarily initiate a related system modification.

This research supports the agencies performance goal of maintaining safety by developing an enhanced approach for establishing EMC for safety-related I & C systems in nuclear power plants. Also, the goal of reducing unnecessary regulatory burden is achieved because the regulatory guide offers alternate testing suites and the selected test criteria can be relaxed where technically justified. Finally, contribution to the goal of improving regulatory effectiveness is realized because this research offers comprehensive guidance on acceptable practices for EMC that utilize current standards.

Attachment: As stated

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