

June 24, 2005

MEMORANDUM TO: John T. Larkins, Executive Director  
Advisory Committee on Reactor Safeguards (ACRS)

FROM: Richard J. Barrett, Director */RA/*  
Division of Engineering Technology  
Office of Nuclear Regulatory Research

SUBJECT: REQUEST ACRS TO REVIEW FINAL DRAFT GUIDE, DG-1137,  
"GUIDELINES OF LIGHTNING PROTECTION OF NUCLEAR POWER  
PLANTS."

The Division of Engineering Technology of the Office of Nuclear Regulatory Research (RES) has developed the attached final draft regulatory guide, DG-1137, "Guidelines for Lightning Protection of Nuclear Power Plants." It is considered a final draft because it has been reviewed by NRC staff and is awaiting review by ACRS. The guide has been developed in response to NRR User Need Request 2002-017.

This final draft regulatory guide offers guidance to NRC licensees and applicants for their use in developing and implementing practices that the staff finds acceptable for complying with the agency's regulatory requirements in Criterion 2, "Design Bases for Protection Against Natural Phenomena," as it appears in Appendix A, "General Design Criteria for Nuclear Power Plants," to Title 10, Part 50, of the Code of Federal Regulations. Specifically, Criterion 2 requires, in part, that nuclear power plant structures, systems, and components that are important to safety must be designed to withstand the effects of natural phenomena without losing their capability to perform their respective safety functions. While the regulations address lightning protection for safety-related electrical equipment, they do not explicitly provide guidance concerning the design and installation of lightning protection systems (LPSs) to ensure that electrical transients resulting from lightning phenomena do not cause spurious operations in safety-related systems or render them inoperable.

As proposed, DG-1137 will augment the regulations by establishing explicit guidance that is consistent with LPS design and installation practices that are currently applied throughout the commercial power industry. Toward that end, the NRC staff has selected for endorsement four standards issued by the Institute of Electrical and Electronics Engineers (IEEE), which taken together, provide comprehensive lightning protection guidance for nuclear power plants. Specifically, the four standards are IEEE Std. 665-1995 (reaffirmed 2001), *IEEE Guide for Generating Station Grounding*; IEEE Std. 666-1991 (reaffirmed 1996), *IEEE Design Guide for Electrical Power Service Systems for Generating Stations*; IEEE Std. 1050-1996, *IEEE Guide for Instrumentation and Control Equipment Grounding in Generating Stations*; and IEEE Std. C62.23-1995 (reaffirmed 2001), *IEEE Application Guide for Surge Protection of Electric Generating Plants*. The standards are endorsed in their entirety, with one exception taken in IEEE Std. 665-1995 (reaffirmed 2001) due to a misquote. The technical bases for the selection of the standards are provided in the draft NUREG/CR-6866 report, "Technical Basis for Regulatory Guidance on Lightning Protection in Nuclear Power Plants." In addition, the

technical basis for guidance on the design, testing, maintenance practices and implementation of lightning protection systems is provided. The draft NUREG/CR-6866 report is attached.

The draft regulatory guide was made available as DG-1137 for public comment. The comment period ended April 20, 2005. The NRC received comments from two correspondents, that included one utility and one user group. The staff reviewed those comments and incorporated them, as appropriate. The public comments and the staff's resolution of these comments are attached.

Your response is requested by July 17, 2005. If you have any questions, please contact Ms. Christina Antonescu of my staff at (301) 415-6792.

Attachments:

1. DG-1137 - Guidelines for Lightning Protection of Nuclear Power Plants
2. NUREG/CR-6866 - Technical Basis for Regulatory Guidance on Lightning Protection in Nuclear Power Plants
3. Response to Public Comments Submitted on the Draft Regulatory Guide on Guidelines for Lightning Protection of Nuclear Power Plants

