



U.S. NUCLEAR REGULATORY COMMISSION

Revision 3\*  
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# REGULATORY GUIDE

OFFICE OF NUCLEAR REGULATORY RESEARCH

REGULATORY GUIDE 1.63  
(Task EE 405-4)

## ELECTRIC PENETRATION ASSEMBLIES IN CONTAINMENT STRUCTURES FOR NUCLEAR POWER PLANTS

### A. INTRODUCTION

General Design Criterion 50, "Containment Design Basis," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," requires, in part, that the reactor containment structure, including penetrations, be designed so that the containment structure can, without exceeding the design leakage rate, accommodate the calculated pressure, temperature, and other environmental conditions resulting from any loss-of-coolant accident. Section 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants," of 10 CFR Part 50 specifies the qualification requirements. Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50 establishes quality assurance requirements for design, construction, and operation of nuclear power plant structures, systems, and components. This guide describes a method acceptable to the NRC staff for complying with the Commission's regulations for the design, construction, testing, qualification, installation, and external circuit protection of electric penetration assemblies in containment structures of nuclear power plants.

The Advisory Committee on Reactor Safeguards has been consulted concerning this guide and has concurred in the regulatory position.

Any information collection activities mentioned in this regulatory guide are contained as requirements in 10 CFR Part 50, which provides the regulatory basis for this guide. The information collection requirements in 10 CFR Part 50 have been cleared under OMB Clearance No. 3150-0011.

\*The substantial number of changes in this revision has made it impractical to indicate the changes with lines in the margin.

### B. DISCUSSION

IEEE Std 317-1983, "IEEE Standard for Electric Penetration Assemblies in Containment Structures for Nuclear Power Generating Stations,"\*\* was prepared by a working group of Subcommittee 1, General Plant Criteria, of the Nuclear Power Engineering Committee of the Institute of Electrical and Electronics Engineers (IEEE) and was subsequently approved by the IEEE Standards Board on September 23, 1982. This standard prescribes requirements for the design, construction, testing, qualification, and installation of electric penetration assemblies in containment structures for stationary nuclear power generating stations.

Section 6.2.8(5) of IEEE Std 317-1983 requires that the duration of maximum short circuit current flow in test specimens of electric penetration assemblies be no less than 0.033 second. This duration is representative of the operating time of molded-case circuit breakers. System design may include use of other circuit breakers, which will result in durations longer than 0.033 second. Consideration should be given to modifying the test program to represent the duration of maximum short circuit current expected based on system design.

The external circuit protection of electric penetration assemblies is beyond the scope of IEEE Std 317-1983. This subject is covered by IEEE Std 741-1986, "Criteria for the Protection of Class 1E Power Systems and Equipment in Nuclear Power Generating Stations."\*\*\*

IEEE Std 317-1983 references other standards that contain valuable information. Those referenced standards not endorsed by a regulatory guide or incorporated into the

\*\*Copies may be obtained from the Institute of Electrical and Electronics Engineers, 345 East 47th Street, New York, NY 10017.

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Regulatory Guides are issued to describe and make available to the public methods acceptable to the NRC staff of implementing specific parts of the Commission's regulations, to delineate techniques used by the staff in evaluating specific problems or postulated accidents, or to provide guidance to applicants. Regulatory Guides are not substitutes for regulations, and compliance with them is not required. Methods and solutions different from those set out in the guides will be acceptable if they provide a basis for the findings requisite to the issuance or continuance of a permit or license by the Commission.

This guide was issued after consideration of comments received from the public. Comments and suggestions for improvements in these guides are encouraged at all times, and guides will be revised, as appropriate, to accommodate comments and to reflect new information or experience.

Written comments may be submitted to the Rules and Procedures Branch, DRR, ADM, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

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regulations, if used, are to be used in a manner consistent with current regulations.

### **C. REGULATORY POSITION**

Conformance with the requirements of IEEE Std 317-1983, "IEEE Standard for Electric Penetration Assemblies in Containment Structures for Nuclear Power Generating Stations," provides a method acceptable to the NRC staff for satisfying the Commission's regulations with respect to the design, construction, testing, qualification, and installation of electric penetration assemblies in containment structures for nuclear power plants, subject to the following:

The external circuit protection of electric penetration assemblies should meet the provisions of Section 5.4 of IEEE Std 741-1986, "Criteria for the Protection of Class 1E Power Systems and Equipment in Nuclear Power Generating Stations."

### **D. IMPLEMENTATION**

The purpose of this section is to provide information to applicants and licensees regarding the NRC staff's plans for using this regulatory guide.

Except in those cases in which the applicant or licensee proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the methods described herein will be used in the evaluation of the design, construction, testing, qualification, installation, and external circuit protection of electric penetration assemblies for nuclear power plants as follows:

1. Plants for which the construction permit is issued after February 28, 1987,
2. Plants for which the operating license application is docketed after August 28, 1987,
3. Plants for which the applicant or licensee voluntarily commits to the provisions of this guide.

## VALUE/IMPACT STATEMENT

### BACKGROUND

IEEE Std 317-1976, "IEEE Standard for Electric Penetration Assemblies in Containment Structures for Nuclear Power Generating Stations," was approved by IEEE in September 1975. In July 1978, the NRC staff issued Revision 2 to Regulatory Guide 1.63, which endorsed IEEE Std 317-1976, subject to seven exceptions. Since then the staff has worked with IEEE in developing IEEE Std 317-1983. As a result of these efforts, the exceptions to IEEE Std 317-1976 have been satisfactorily resolved.

Issuance of this Revision 3 is consistent with the NRC policy of evaluating the latest versions of national nuclear standards in terms of their suitability for endorsement by regulatory guides.

### SUBSTANTIVE CHANGES AND THEIR VALUE/IMPACT

Regulatory Position C.1 in Revision 2 was modified in this Revision 3 to include the appropriate requirements of IEEE Std 741-1986, which apply to external circuit protection of electric penetration assemblies.

Regulatory Positions C.2 to C.6 in Revision 2 were not included in this Revision 3 because they were incorporated in IEEE Std 317-1983 as follows:

Regulatory Position Number (Rev. 2 of this guide)	Section Number (IEEE Std 317-1983)
2	6.2.8(3)(a)
3	6.2.8(5)
4	6.2.3(2)
5	D.1.2.5(2)
6	2

Regulatory Position C.7 in Revision 2 was deleted because the applicability of referenced IEEE standards has been included under "Discussion" in this Revision 3.

### VALUE

This guide endorses the latest version of a national standard. The guide also should enhance the licensing process.

### IMPACT

This regulatory guide does not impose any new requirements or costs on licensees or applicants. Thus, no impact will result from issuance of this guide.

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