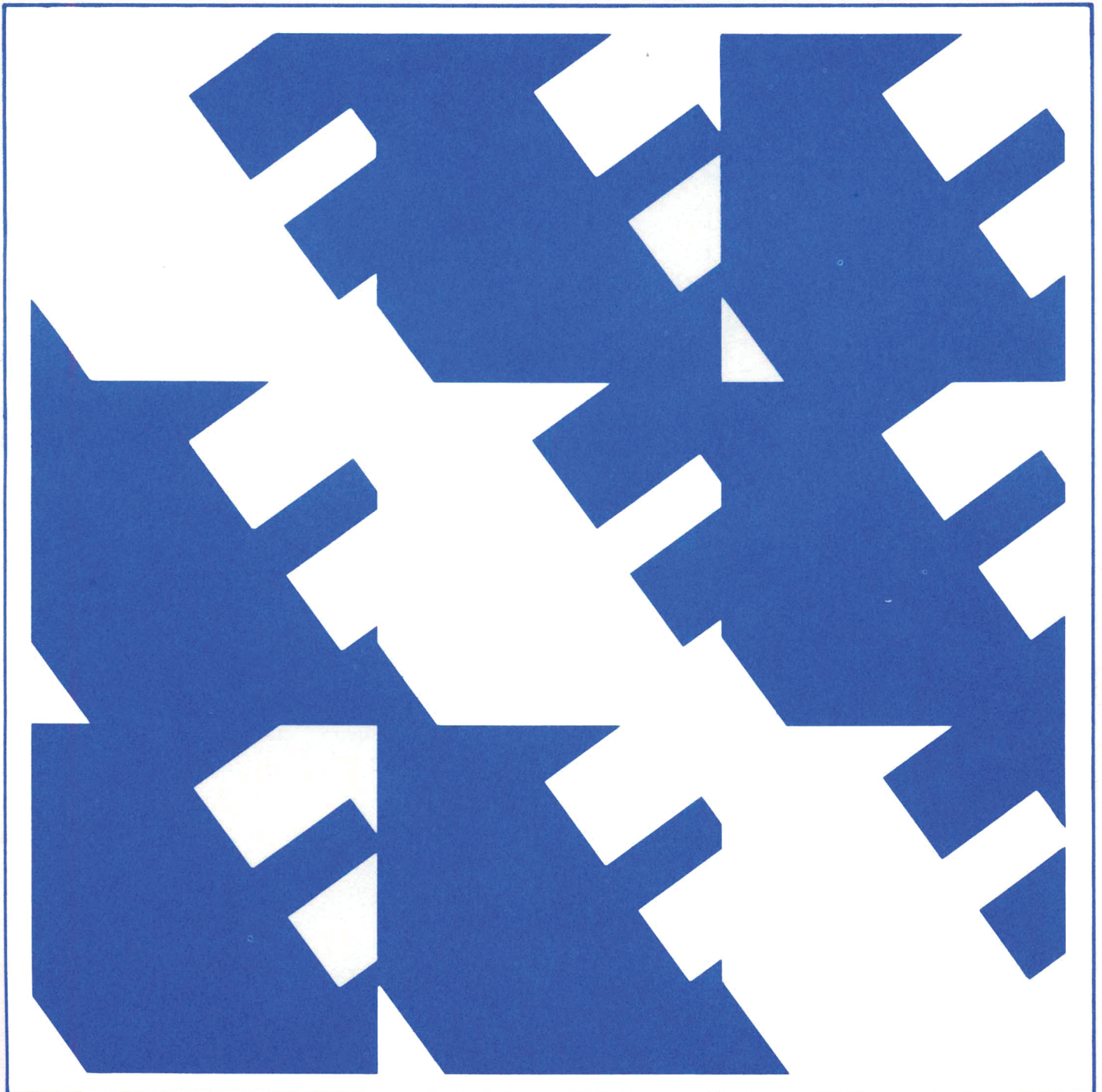


IEEE Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations

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IEEE
Std 308-1978
(Revision of
IEEE Std 308-1974)

IEEE Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations

Sponsor
**Nuclear Power Engineering Committee of the
IEEE Power Engineering Society**

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Foreword

(This Foreword is not a part of IEEE Std 308-1978, Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations.)

This standard presents criteria and requirements for the electrical systems of nuclear generating stations specifically related to providing protection to the health and safety of the public. These are based on the following:

- (1) Redundant systems that require electric power are provided to cope with the design basis events
- (2) The conditions and the availability of the various portions of the systems following a design basis event cannot be predicted exactly
- (3) The access to certain equipment following a design basis event may be limited for several months

The Institute of Electrical and Electronics Engineers has developed these criteria to provide guidance in the determination of the design features, minimum conditions of operation, and the surveillance requirements related to the electric power systems of the nuclear facility. Each applicant for a construction permit or an operating license for a nuclear facility in the United States is required to develop these items to comply with the Title 10 Code of Federal Regulations, Part 50.

Adherence to these criteria may not suffice for assuring the public health and safety because it is the integrated performance of the structures, the fluid systems, the instrumentation, and the electric systems of the station that establishes the consequences of accidents. Failure to meet these requirements may be an indication of system inadequacy. Each applicant has the responsibility to assure himself and others that this integrated performance is adequate.

IEEE Std 308-1970 was approved in September, 1969, and published August, 1970. It was the work of Subcommittee 4, Auxiliary Power Systems of JCNPS (Joint Committee on Nuclear Power Standards) of the IEEE Nuclear Science Group and the IEEE Power Engineering Society. As the result of experience with IEEE 308-1970 and comments received, a number of minor revisions were made to the standard and IEEE Std 308-1971 was approved in September, 1971. This revision also added the section on multiunit station considerations. Subsequently, a second revision, IEEE Std 308-1974, was initiated to improve definitions and bring the standard up to date with the latest consensus of the industry. The revised standard was prepared by Working Group 4.1 of Subcommittee 4 of JCNPS. Effective January 1, 1973, the JCNPS became the Nuclear Power Engineering Committee (NPEC) of the IEEE Power Engineering Society. The second revision was approved in December, 1973, and published February 28, 1974.

This revision, the third, was undertaken to clarify the interface between the functional requirements of the Class 1E Auxiliary Power System and the functional requirements of the Safety System for elements of the Protective Action System that are in the Class 1E Power System. In addition, this revision was undertaken to address a number of areas where additional guidance was needed. These areas were:

- (1) Design bases for Class 1E power systems
- (2) Application of the single failure criterion to Class 1E power systems
- (3) Connection of non-Class 1E loads to Class 1E buses
- (4) Independence of Class 1E power systems
- (5) Requirements for circuits which penetrate containment
- (6) Preoperational testing of Class 1E power systems
- (7) Multi-unit station considerations
- (8) Surveillance requirements for Class 1E systems

The major role of the Class 1E power systems is to provide electric power to the reactor trip system, engineered safety features, and auxiliary supporting features; and therefore, the Class 1E power system is an auxiliary supporting feature.

The Class 1E power system is unique in that it extends throughout the plant having far more complex interfaces than other auxiliary supporting features. Most other auxiliary supporting features are limited to one area or a single process in the plant and are basically mechanical systems. Char-

acteristic of the complex interfaces of the Class 1E power system is the fact that it is an auxiliary supporting feature; other auxiliary supporting features are auxiliary supporting features for it; and it may provide support for nonsafety system equipment, as well as providing the means for the execution of the safety system protective actions.

In its role in the protective action system, some Class 1E power system equipment, switchgear, circuit breakers, power cabling, and loads (primarily motors) are not only part of the Class 1E power system, but are integral parts of the engineered safety features as well.

The committee recognizes that certain areas of the standard need more extensive treatment. This includes criteria for interfacing the Class 1E power system with the protection system, the preferred (offsite) power supplies and criteria for the Class 1E power system protection. These topics are under active consideration in the subcommittee and will be the subject of a new standard or subsequent revision. The next revision to this standard will include an explanation of the relationship between the Class 1E power system and the safety system and how to apply safety system requirements to the Class 1E power system. This revision will be done concurrently with the next revision to the safety system standard.

The IEEE will maintain this standard current with the state of the technology. Comments are invited on this standard as well as suggestions for additional material that should be included. These should be addressed to:

Secretary
IEEE Standards Committee
The Institute of Electrical and Electronics Engineers, Inc.
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Subcommittee 4 of NPEC had the following membership at the time that its various working groups prepared Revision 3.

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The subcommittee wishes to acknowledge the contribution of K. J. Brockwell for his past chairmanship of the working group.

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