American Nuclear Society

design basis criteria for safety systems in nuclear power generating stations

an American National Standard

published by the
American Nuclear Society
555 North Kensington Avenue
La Grange Park, Illinois 60526 USA

ANSI/ANS-4.1-1978

American National Standard Design Basis Criteria for Safety Systems in Nuclear Power Generating Stations

Secretariat
American Nuclear Society

Prepared by the
American Nuclear Society
Standards Committee
Working Group ANS-4.1

Published by the
American Nuclear Society
555 North Kensington Avenue
La Grange Park, Illinois 60525 USA

Approved November 21, 1978
by the
American National Standards Institute, Inc.

American National Standard

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Published by

American Nuclear Society
555 North Kensington Avenue, La Grange Park, Illinois 60525 USA

Price: $22.00

Printed in the United States of America

Foreword

(This Foreword is not a part of American National Standard Design Basis Criteria for Safety Systems in Nuclear Power Generating Stations, ANSI/ANS-4.1-1978.)

Prior to operation of a nuclear power generating station, the designers, owner/operators, and regulatory agencies are concerned with establishing the design features of the station, the principal design criteria for these features, the limits of process conditions for safe operation, the abnormal conditions at which protective action should be taken to ensure that the station remains within the limits of process conditions for safe operation, the limits of degraded design features that can maintain the station within safe conditions of operation, the surveillance necessary to ensure that safe conditions exist, and the administrative controls necessary to ensure that operation and maintenance are carried out in a safe manner throughout the life of the station.

For several years the technical professional societies and the U.S. Nuclear Regulatory Commission (NRC) have been developing criteria, standards, and codes to aid designers in establishing this information during the design of a station. Because there are many levels and disciplines of design, several levels of criteria have evolved. For example, Federal regulations establish specific limits for the release of radioactive material from a facility (station)*; general design criteria provide guidance for the overall design and operation of the station**; design basis criteria for interdependent systems of the station (such as set forth in this document for protection systems and actuator systems) provide guidance to develop the design basis for such systems; and design criteria provide guidance for the design of specific systems, components, or equipment.***

All these levels of criteria are vital to the integrated and thorough design of technically sound station systems that meet the requirements of Federal regulations related to public safety. Each level of criteria is necessary to provide guidance to the designer at the appropriate level and within the appropriate discipline to aid in the identification, design, implementation, and testing of the safety systems. For example, this document establishes design basis criteria for the integrated performance of safety systems. The IEEE Standard Criteria for Protection Systems for Nuclear Power Generating Stations, IEEE Std. 279-1971, provides guidance for designing a protection system that is compatible with the design bases established herein. The IEEE Standard Criteria for Class IE Electrical Systems for Nuclear Power Generating Stations, IEEE Std. 308-1974, provides guidance for designing safety related electrical systems that are compatible with the design bases established herein. American National Standard Nuclear Safety Criteria for the Design of Stationary Pressurized Water Reactor Plants, N18.2-1973 (ANS-51.1) and similar criteria under development for boiling water reactors, gas cooled reactors, and fast breeder reactors provide amplification of the NRC's general design criteria related to structures, fission-product barriers, fluid systems (mechanical design), safety systems, and safety supporting systems.

Suggestions for the improvement of the provisions of this standard will be welcomed. This standard was prepared by Working Group 4.1 of Subcommittee ANS-4, Reactor Dynamics and Control, of the Standards Committee of the American Nuclear Society through liaison with the Society's Standards Subcommittee ANS-50, Power Reactor

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*Examples are Title 10, Code of Federal Regulations, Part 50, "Licensing of Production and Utilization Facilities," as well as References 5 and 8 listed in Section 6, "References."

**Examples are Title 10, Code of Federal Regulations, Part 50, "Licensing of Production and Utilization Facilities," Appendix A, "General Design Criteria for Nuclear Power Plants," and Appendix B, "Quality Assurance Criteria for Nuclear Power Plants," as well as Reference 4 listed in the text of this standard.

***Examples are Title 10, Code of Federal Regulations, Part 50, Appendices A and B, as well as References 2, 3, 4, and 7 listed in the text of this standard.

Note: Additional standards similar to Reference 4 in the text of this standard are currently under development for boiling water reactors, gas cooled reactors, and fast breeder reactors. A detailed listing appears in footnote 5 of the text.

Systems, and the Institute of Electrical & Electronics Engineers (IEEE) Nuclear Power Engineering Committee. The working group consists of persons from each of the companies in the United States currently designing commercial nuclear power plants, as well as a representative of a utility, and of the U.S. Nuclear Regulatory Commission.

In the course of development of the standard, Subcommittee ANS-4 solicited and received numerous comments from other workers in the field, including members of American National Standards Commitees N18, N42, and N45, and members of the IEEE. Subcommittee ANS-4 approved a draft standard on the third ballot in July 1970. That draft was distributed for public comment by the American Nuclear Society in January 1971. A revised draft was balloted by N18 in June 1972. Comments received from this ballot were considered. Suitable revisions, prepared by an Ad Hoc Committee which represented ANS-4, IEEE/JCNPS, ANS-20, and NRC were incorporated.

The members of the working group which prepared this standard were:

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