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Auxiliary Feedwater System for Pressurized Water Reactors

ANSI/ANS-51.10-2020



An American National Standard

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American National Standard Auxiliary Feedwater System for Pressurized Water Reactors

Secretariat American Nuclear Society

Prepared by the American Nuclear Society Standards Committee Working Group ANS-51.10

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

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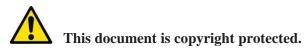
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Foreword (This foreword does not contain any requirements of American National Standard "Auxiliary Feedwater System for Pressurized Water Reactors," ANSI/ANS-51.10-2020, but is included for informational purposes.)

This standard is applicable to pressurized light water reactor nuclear power plants using auxiliary feedwater for emergency applications. Plants that rely on passive safety systems independent of the alternating-current (ac) power system are not considered in the scope of this standard.

ANS-51.10 was originally issued in 1979 and has been extensively updated to reflect current regulatory directives, industry practice and experience, and available design guidance.

Among the major changes incorporated in the 1991 revision of ANS-51.10 was station blackout (i.e., the loss of all ac power sources). A requirement was included that the system be capable of operating for a plant-specific duration with the loss of all ac power sources. The rationale for this requirement and the method of determining the plant-specific duration are identified in Title 10, *Code of Federal Regulations*, Part 50, Sec. 50.63, "Loss of All Alternating Current Power." In the 1979 edition of this standard, a generic duration of 2 hours was identified, and no rationale was included.

Major revision for ANSI/ANS-51.10-2020 includes additional clarification on defense-indepth and diversity of power sources as well as updated references and probabilistic risk assessment language where appropriate.

This standard might reference documents and other standards that have been superseded or withdrawn at the time the standard is applied. A statement has been included in the references section that provides guidance on the use of references.

This standard does not incorporate the concepts of generating risk-informed insights, performance-based requirements, or a graded approach to quality assurance. The user is advised that one or more of these techniques could enhance the application of this standard.

The membership of the ANS-51.10 Working Group of the American Nuclear Society during the revision of this standard was as follows:

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American National Standard ANSI/ANS-51.10-2020

Auxiliary Feedwater System for Pressurized Water Reactors

1 Scope, purpose, and application

1.1 Scope

This standard¹⁾ sets forth the safety-related functional requirements, performance requirements, design criteria, design requirements for testing and maintenance, and interfaces for the safety-related portion of the auxiliary feedwater system (AFS) of pressurized water reactor (PWR) plants.

This standard is written for new facilities that rely on an auxiliary (emergency) feedwater system for a safety-related function.

1.2 Purpose

This standard is written for new facilities. This standard reflects existing regulations, design guidance, and operational experience.

The applicability of this standard to a specific operating plant must be determined on a case-by-case basis to be in compliance with the plant's licensing bases. The criteria and guidance provided in this standard may be different from and inconsistent with the licensed design bases of an operating plant.

1.3 Limits of application

This standard applies to the safety-related AFS. This standard also discusses relevant requirements associated with the AFS instrumentation and controls, source of power, water supply, and support system interfaces.

2 Acronyms and definitions

2.1 Acronyms

- ac:alternating-currentAFS:auxiliary feedwater system
- ANS: American Nuclear Society
- ANSI: American National Standards Institute
- ASME: American Society of Mechanical Engineers
- **CFR:** *Code of Federal Regulations*
- dc: direct-current
- **ESF:** engineered safety feature

¹⁾ The current standard, ANSI/ANS-51.10-2020, is hereinafter referred to as "this standard."