American Nuclear Society

WITHDRAWN

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design criteria for safe shutdown following selected design basis events in light water reactors

an American National Standard

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American National Standard Design Criteria for Safe Shutdown Following Selected Design Basis Events in Light Water Reactors

Secretariat
American Nuclear Society

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Working Group ANS-58.11

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American National Standard

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Comments on this standard are encouraged and should be sent to Society Headquarters.

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Addendum to Foreword

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Design Criteria for Safe Shutdown Following Selected Design Basis Events in Light Water Reactors

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This standard has been reviewed and reaffirmed by the ANS Nuclear Facilities Standards Committee (NFSC) with the recognition that it may reference other standards and documents that may have been superseded or withdrawn. The requirements of this document are met by using the version of the standards and documents referenced herein. It is the responsibility of the user to review each of the references cited and to determine whether the use of the original references or more recent versions is appropriate for the facility. Variations from the standards and documents referenced in this standard should be evaluated and documented.

The standard does not necessarily reflect recent industry initiatives for risk informed decision-making or a graded approach to quality assurance. Users should consider the use of these industry initiatives in the application of this standard.

Foreword

(This Foreword is not a part of American National Standard Design Criteria for Safe Shutdown Following Selected Design Basis Events in Light Water Reactors, ANSI/ANS-58.11-1995.)

Background

This standard provides guidance to the plant designer regarding the means to shut down a reactor and maintain it in a safe shutdown condition, including plant cooldown to a cold shutdown condition. The standard also recognizes that it might not be prudent to deliberately impose reactivity, temperature, and pressure transients on the plant, by proceeding to the cold shutdown condition, following every transient which requires a shutdown of the reactor.

Development

The original version of this standard was issued in 1983. This standard was subsequently re-affirmed in 1988. The re-affirmation process identified 28 comments, which have been addressed in this revision. In addition to the re-affirmation comments, this standard has undergone a general revision to make it consistent with other newer ANS Standards, and to address industry work on evolutionary and advanced light water reactors, including designs with passive engineered safety features. The previous versions of this standard provided design criteria for plant cooldown from hot to cold shutdown conditions. This revision expands the scope of the standard to provide design criteria for plant safe shutdown. The safe shutdown design criteria include criteria to shut down the reactor and maintain it in a long term safe shutdown condition, which is defined to include plant cooldown from hot conditions to cold shutdown conditions within 36 hours following initiation of a design basis event. Alternative design criteria are included to permit the designer to select an alternative, higher end point cooldown temperature for maintenance of a long-term safe shutdown condition.

From an historical perspective, there was significant guidance provided during the early development of nuclear plant designs with respect to design basis accidents. This guidance is contained in numerous NRC regulations and other ANS standards. However, until the latter part of the 1970s, there was little guidance available regarding the need to shut down a plant safely after an incident that was not one of the "classical" Final Safety Analysis Report (FSAR) type accidents. From this need, ANS-58.11 was developed. Therefore, this standard excludes explicit consideration of these classical accidents, as stated in Section 1 of the standard.

The existence of unique plant or site characteristics might require the consideration of alternate design concepts. This standard has been developed along functional lines to permit this flexibility. This standard references other standards that provide design criteria applicable to safe shutdown systems.

A designer is not restricted by this standard from proposing or using alternate criteria to ensure nuclear safety. Frequently, a desirable overall result can be obtained by any of several design concepts. The designer can choose from several alternatives in satisfying the specifics of this standard by the proper consideration of the interrelationship of components and systems within the plant.

This standard was prepared by Working Group ANS-58.11 with assistance of the LWR Criteria Management Committee MC-1. This standard was approved by NUPPSCO in 1995.

This standard is intended for prospective use only.

Continuing efforts will be required to augment or modify the criteria in this standard to implement changing licensing requirements, to achieve standardization among the various industry criteria and standards currently being developed, and to provide additional clarification or interpretation as appropriate. The LWR Criteria Management Committee MC-1 meets periodically to consider revisions or modifications to this standard.

Working Group ANS-58.11, of the Standards Committee of the American Nuclear Society, had the following membership at the time it developed this standard:

E. C. Arnold, Chairman, *Westinghouse Electric Corporation*
L. F. Pabst, *Florida Power & Light Company*

At the time of its approval of this standard, Committee MC-1 had the following membership:

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