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remote shutdown for light water reactors

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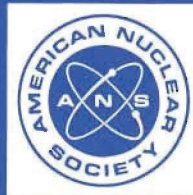
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Criteria for Remote Shutdown for
Light Water Reactors**

**Secretariat
American Nuclear Society**

**Prepared by the
American Nuclear Society
Standards Committee
Working Group ANS-58.6**

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Foreword (This Foreword is not a part of American National Standard Criteria for Remote Shutdown for Light Water Reactors ANSI/ANS-58.6-1983.)

Criterion 19 of the General Design Criteria for Nuclear Power Plants contained in Title 10, "Energy," Code of Federal Regulations, Part 50, "Licensing of Production and Utilization Facilities," Appendix A, stipulates that a Control Room be provided for safe unit operation, and also that controls external to this Control Room be provided with a capability to achieve hot shutdown and a potential capability to achieve cold shutdown. This Standard addresses the criteria necessary for controls external to the Control Room in response to the latter part of Criterion 19, "Control Room."

A mechanism for control room evacuation is not postulated, in this standard or Criterion 19, although the work group did consider addressing this issue during development of the standard. It was decided that mechanistic events occurring within the control room are beyond the scope of this standard but should be addressed in other standards, particularly one dealing with control room design and philosophy. It was also recognized that other standards will provide interfacing criteria and design requirements, including fire protection, single failure, pipe break, missiles, and electrical and control system criteria. Thus, this standard should be regarded as only one of a group of standards which collectively address plant safety and control.

The criteria are divided into two parts: Assumptions for Design, and Criteria for Remote Shutdown. Although the second part gives the criteria specifically needed to define remote shutdown operation, the designer cannot implement these criteria without proper consideration of surrounding effects and conditions throughout the plant. Consequently, the first part gives guidance in the form of assumptions about plant operating conditions. A combination of the two parts is then used by the designer to allow an integrated approach to implement the remote shutdown requirements.

In general, the criteria require a design which allows the operator to place the plant in "tripped" condition, leave the Control Room and continue shutdown operation at a remote station. An Auxiliary Shutdown Station is the location for central administration and communication in the event of a Control Room Evacuation Occurrence. Local Shutdown Stations throughout the plant may be utilized in coordination with the Auxiliary Shutdown Station. The Auxiliary Shutdown Station and the Local Shutdown Station are separate from the Control Room and cable-spreading areas. From these locations, the safety functions of reactivity control, core coolant inventory maintenance, pressure control, and core residual heat removal, can be administered and monitored as needed to maintain a safe shutdown. The systems and controls needed are required to be capable of operation from normal and emergency power supplies and must have other attributes normally associated with safety related systems. In order to limit the possibility of simultaneous unintended operation of the plant from the Control Room and the remote shutdown location, the criteria require Control Transfer Devices to be installed or administrative procedures to be used to permit operations to be from only one location at any time. In order to initiate remote shutdown operation, the Control Transfer Devices must be in the appropriate mode.

This standard was originally developed under ANS-51 and balloted affirmatively by that committee. Subsequently, the N18 Committee, Nuclear Design Criteria, balloted on the standard in April 1978.

Further review and comments were received from the American Nuclear Society's Nuclear Power Plant Standards Committee (NUPPSCO) in October 1979. Subsequently, the standard was balloted by NUPPSCO in March 1980 and further reviewed

at a July 1980 NUPPSCO meeting. The present version of the standard is based on resolution of ballot comments and further review at the November 1981 NUPPSCO meeting.

This standard was prepared under the direction of Subcommittee 51, Pressurized Water Reactor Criteria, of the Standards Committee of the American Nuclear Society (ANS). The membership of this Subcommittee at the time of preparation was:

*C. J. Gill, Chairman, <i>Bechtel Power Corporation</i>	D. Lewis, <i>Bechtel Power Corporation</i>
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*C. J. Gill served as director for the effort to develop this standard.

The American Nuclear Society's Nuclear Power Plant Standards Committee (NUPPSCO) had the following membership at the time of its approval of this standard.

J. F. Mallay, Chairman
M. D. Weber, Secretary

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