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**fire protection program criteria
for research reactors**

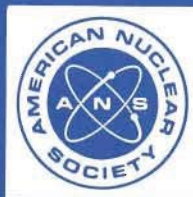
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**American National Standard
Fire Protection Program Criteria
for Research Reactors**

**Secretariat
American Nuclear Society**

**Prepared by the
American Nuclear Society
Standards Committee
Working Group ANS-15.17**

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Foreword

(This Foreword is not a part of American National Standard Fire Protection Program Requirements for Research Reactors, ANSI/ANS-15.17-1981.)

The American Nuclear Society Standards Committee established Subcommittee ANS-15, Operation of Research Reactors, in the fall of 1970 with the task of preparing a standard for the operation of research reactors. In January 1972, this charter was expanded to the multiple tasks of preparing all standards for research reactors. To implement this enlarged responsibility, a number of subcommittee work groups were established to develop standards for consideration and complementary action by Subcommittee ANS-15. ANS-15.17 is one of these groups.

Working Group ANS-15.17 was assigned the task of developing a draft standard for fire protection requirements in June 1978. The membership of Working Group ANS-15.17 is as follows:

A. C. Ellingson, Chairman, *Sandia National Laboratories*
W. J. Brynda, *Brookhaven National Laboratory*
R. E. Carter, *U.S. Nuclear Regulatory Commission*
D. B. Davidson, Jr., *Los Alamos National Laboratory*

V. L. Duke, *Sandia National Laboratories*
H. K. Hasegawa, *Lawrence Livermore Laboratory*
F. Krause, *Sandia National Laboratories*
A. J. Pryor, *U. S. Department of Energy*
R. Sanacore, *American Nuclear Insurers*

Research reactors vary in size from a small, self-contained package operating at a very low power level to much larger reactors of the "swimming pool" type. In many cases, the amount of combustible material on the research reactor site may be fairly modest. On the other hand, on some research reactor sites, space is so limited that the experimental area could become quite congested with auxiliary instrumentation and apparatus, and related combustibles not usually associated with power reactor operation. Also, research reactors are frequently installed in buildings of multiple use occupancy.

Because of frequent changes in experimental goals and the periodic additions of new procedures or equipment, the configuration of a research reactor may change markedly from the original concepts of the designer. Such changes will often defeat the capability of initially-installed fire protection features, such as automatic sprinklers and fire barriers, to achieve the fire protection objective. For this reason, a fire protection program is needed which will continuously evaluate fire protection adequacy and make necessary changes.

This standard is based upon achieving fire protection objectives through the provision of a flexible program to meet these objectives rather than compliance with a list of fixed requirements. This philosophy allows maximum freedom in the selection of program elements and specific fire protection systems to meet the loss criteria. Loss criteria are established by the responsible research reactor management in accordance with rules and regulations established by higher management, by the licensing or chartering authority, by the insurance carrier, or any combination of these bodies.

The adequacy of a fire protection program developed in accordance with this standard must, of course, be evaluated by these other bodies—on the basis of programmatic effects, radiological effects, and property loss effects. When the program is approved by these agencies (after any necessary negotiation and modification), there must still be a continuing assessment of the program by the responsible operating management. Such assessment, using suitable guidance from professional fire protection consultants if necessary, assures the continuing adequacy of fire protection under changing experimental conditions.

The key to continuing program assessment and program updating, under this standard, is found in 4.7(a) which requires that controls shall be included which determine and evaluate the effect of changes in the facility and institute the necessary compensatory changes in the program. Each change that occurs must trigger an identification, evaluation, and program correction process which must take place before operations can continue. The evaluation and correction portion of this process includes a reconsideration of the pertinent elements in Section 5, "Program Components," of the standard. And, of course, this self-correction process must always be documented (see 4.7(c), so that program status information is always available to the approval agencies.

It must be noted that there may be research reactors for which no unacceptable consequences would result under any conceivable fire situation. In such cases, it is logical to assume that no fire protection program is needed. However, reactor management must have some basis for making this decision and such a basis can be provided through documentation of the portion of the program given in 4.3, 4.4, and 4.5 of this standard. These subsections include the identification of safety-related systems, the establishment of loss criteria, the identification of potential fire situations, and an assessment of the risk associated with each situation. If this documentation demonstrates that no fire protection is needed (particularly by demonstrating that no unacceptable radiological consequences can occur), management can stop the program development at this point and still have the documented decision basis. When such a decision is made, periodic reviews should be performed on this documentation to assure that the decision has not been invalidated by change.

Finally, it should be mentioned that some research reactors are under parent institutions which already have fire protection programs. In this case, the research reactor fire protection program, as developed under this standard, might consist largely of reference to the existing institutional program. However, all of the program elements specified in the standard must exist, even if many of them are actually implemented by an external group.

The membership of Subcommittee ANS-15, Operation of Research Reactors, at the time of its approval of the standard was:

W. J. Richards, Chairman, *Argonne National Laboratory-West*
F. T. Binford, *Oak Ridge National Laboratory*
L. C. Brinkerhoff, *U. S. Department of Energy*
W. J. Brynda, *Brookhaven National Laboratory*
A. C. Ellingson, *Sandia National Laboratories*
J. P. Farrar, *University of Virginia*

J. R. Miller, *U. S. Nuclear Regulatory Commission*
R. D. Neff, *Texas A&M University*
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T. R. Schmidt, *Sandia National Laboratories*
R. R. Walston, *U.S. Department of Energy*
W. L. Whittemore, *General Atomic Company*

The American National Standards Committee N17, Research Reactors, Reactor Physics, and Radiation Shielding, had the following membership at the time it reviewed and approved this Standard:

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R. S. Carter, Secretary

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