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criteria for the reactor safety systems of research reactors

an American National Standard

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American National Standard Criteria for the Reactor Safety Systems of Research Reactors

Secretariat
American Nuclear Society

Prepared by the
American Nuclear Society
Standards Committee
Working Group ANS-15.15

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American National Standard

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Foreword

(This Foreword is not a part of American National Standard Criteria for the Reactor Safety Systems of Research Reactors, ANSI/ANS-15.15-1978)

The American Nuclear Society Standards Secretariat established Subcommittee ANS-15 in the fall of 1970 with the task of preparing a standard on 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 have been established to develop standards for consideration and complementary action by Subcommittee ANS-15.

In January 1975, Work Group ANS-15.15 was chartered to develop the Criteria for the Reactor Safety Systems of Research Reactors. The combination of the Reactor Safety System and engineered safety features constitutes the overall "safety system" of the facility (or the "plant protection system," as it is sometimes called). The following membership was established:

M. A. Bell, Chairman,* *U.S. Department of Energy*
J. T. Beard, *U.S. Department of Energy*
G. Beck, *University of Illinois*
O. Frizzell, *Westinghouse Hanford Corp.*

The development of the standard proceeded as follows: The Work Group decided to review existing standards such as IEEE 279, "Criteria for Protection Systems for Nuclear Power Generating Stations," and RDT Standard C 16-IT, "Supplementary Criteria and Requirements for RDT Reactor Plant Protection Systems," in order to generate an exhaustive list of possible topics. Informal discussions with the staff of the U.S. Nuclear Regulatory Commission were also held. The need to document definitions of frequently used terms such as "bypass" was also recognized. The Work Group then decided which topics would be covered in the standard. The fundamental concept of describing a systematic approach to establishing requirements for the Reactor Safety System (RSS) of a new research reactor which are commensurate with the risks involved was agreed upon. It is intended that, while important items such as safety interlocks are given proper attention, the greatest degree of latitude be given the designer that safety permits.

Drafts No. 1 and No. 2 were given conceptual reviews by Subcommittee ANS-15. The concepts of the negligible-risk facility and safety interlocks were refined in the finalization of Draft No. 3. Draft No. 3 was reviewed in detail by ANS-15 with comments reflected in Draft No. 4. The Subcommittee gave preliminary approval to this version of the proposed standard and authorized its distribution for peer-group review. Request for review and comment was sent to every licensed research reactor and every DOE-owned reactor. Comments received were incorporated into Draft No. 5 which received a final review by ANS-15. Minor changes in response to this review produced Draft No. 6, achieving final approval of the Subcommittee.

Draft No. 6 was released for N17 review and ballot concurrent with formal public review procedures. Consensus for approval was unanimous by N17 with four members offering comments. Minor changes as a result of these comments were reflected in the final draft submitted for approval as an American National Standard.

The body of the standard includes the scope statement, definitions, requirements ("shall" statements) and provisions ("may" statements). Conformance with this standard is achieved by satisfying all of its requirements. Supporting information, such as explanations of need/intent and suggested/recommended practices ("should" statements), is included as an appendix. This appendix, like the Foreword, is not officially part of the standard but is provided so this information will be readily available as optional guidance for the designers and other users.

In the process of creating standards against the background of established and varied practices in many operating facilities, it is important to consider:

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*Now retired

a. It is not intended that the standard be used as a demand model for backfitting purposes.
b. It should be vital for the new owner-agency.
c. It should be helpful for the facility undergoing change/modification.
d. Its thoughtful use by the community should ease the burden of regulatory agencies.

We affirm that the use of any standard of performance, conduct or excellence is volitional. The decision to use a standard is a management matter, presumably on technical advisement. The institutionalizing of a standard can and almost must be conditional; i.e., high probability exists that some exception or addition will compromise the absolute, unconditional application of a document which was composed to cross lines of functional and material discipline.

It is a management function to ameliorate or mitigate conditional matter. It is not the function of a standard to attempt to accommodate the many different management systems. Neither is its function to preempt management prerogatives.

This standard is promulgated in the context of these considerations, and in the context of a family of related research reactor standards, a Work Group and an actively participating Subcommittee in an atmosphere of direct exchange of ideas across multi-discipline and multi-system boundaries.

The family of standards and task assignments include:
ANS-15.1 (N378): Development of Technical Specifications (N378-1974)
ANS-15.2 (N398): Quality Verification for Plate-type U-AL Fuel Elements (N398-1974)
ANS-15.3 (N399): Records and Reports (N399-1974)
ANS-15.4 (N380): Selection and Training of Personnel (ANSI/ANS-15.4-1977)
ANS-15.6 (N401): Review of Experiments (N401-1974)
ANS-15.7 (N379): Site Evaluation (N379/ANS-15.7-1977)
ANS-15.8 (N402): Quality Assurance Program Requirements (N402-1976)
ANS-15.10 (N440): Decommissioning
ANS-15.11 (N628): Radiological Control (N628/ANS-15.11-1977)
ANS-15.12 (N647): Design Criteria — Effluents — (N647/ANS-15.12-1977)
ANS-15.14 (N700): Physical Security
ANS-15.15: Reactor Safety Systems
ANS-15.17: Fire Protection
ANS-15.18: Administrative Controls

The membership of ANS-15 at the time of its approval of this standard was:

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F. T. Binford, *Oak Ridge National Laboratory*
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W. L. Whittemore, *General Atomic Company*

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Washington, D.C. 20555

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:

W. L. Whittemore, Chairman
R. S. Carter, Secretary

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American Institute of Chemical Engineers	Richard Duffy
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American Physical Society	W. W. Havens, Jr.
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