American Nuclear Society

REAFFIRMED

June 5, 2024
August 12, 2019
October 5, 2012
ANSI/ANS-1-2000 (R2024)

conduct of critical experiments

an American National Standard

REAFFIRMED

October 11, 2007
ANSI/ANS-1-2000 (R2007)

This standard has been reviewed and reaffirmed with the recognition that it may reference other standards and documents that may have been superseded or withdrawn. The requirements of this document will be 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 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.
This 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.

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555 North Kensington Avenue
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American National Standard for Conduct of Critical Experiments

Secretariat
American Nuclear Society

Prepared by the
American Nuclear Society
Standards Committee
Working Group ANS-1

Published by the
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Approved March 23, 2000
by the
American National Standards Institute, Inc.

American National Standard

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This standard was developed under procedures of the Standards Committee of the American Nuclear Society; these procedures are accredited by the American National Standards Institute, Inc., as meeting the criteria for American National Standards. The consensus committee that approved the standard was balanced to ensure that competent, concerned, and varied interests have had an opportunity to participate.

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The American Nuclear Society accepts no responsibility for interpretations of this standard made by any individual or by any ad hoc group of individuals. Requests for interpretation should be sent to the Standards Department at Society Headquarters. Action will be taken to provide appropriate response in accordance with established procedures that ensure consensus on the interpretation.

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

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Foreword

(This Foreword is not a part of American National Standard for Conduct of Critical Experiments, ANSI/ANS-1-2000.)

Critical experiments are an essential part of nuclear research and development. They yield information valuable for the design of nuclear reactors, for the specification of processes and operations with fissionable materials, and for furthering fundamental scientific knowledge.

Because of this diversity of purpose and the exploratory nature of critical experiments, their conduct differs from routine reactor operation. In many cases, for example, it is not possible to predetermine the exact value of operational controls or of shutdown devices, for to obtain the required information is the purpose of the experiment. Good practice dictates a minimum of perturbations extraneous to the equipment necessary to the objective of the experiment. Accordingly, assemblies for this purpose are operated remotely behind shielding, and are often equipped with control and safety devices quite different from those in reactors designed to produce power. The information demanded from critical experiments requires great latitude in both the equipment and the operational practices, to allow the necessarily frequent and often extensive changes in the assembly configuration.

These characteristics result in a higher probability of an accidental nuclear excursion than could be tolerated for reactors. This greater probability is made acceptable by the absence of the large fission-product inventory and large internal energy that characterize reactors which have produced power; effective radiation protection therefore can be provided in a properly designed facility by adherence to simple operating rules.

This standard contains nuclear safety criteria and practices that have evolved and have been tested during half a century of critical experimentation. It was initially prepared by Subcommittee ANS-1, Performance of Critical Experiments, of the American Nuclear Society Standards Committee, and was approved by the Subcommittee on November 1, 1966. On August 18, 1967, the document was certified by the Board of Directors of the Society as ANS-STD.1-1967.

A revision of ANS-STD. 1-1967 was prepared by Subcommittee ANS-1 on July 6, 1971, and was certified by the Society as ANS-STD.1-1972 on September 19, 1972. The membership of the subcommittee which prepared that revision was:

A. D. Callihan, Chairman, *Union Carbide Corporation, Nuclear Division*
E. B. Johnson, Secretary, *Union Carbide Corporation, Nuclear Division*
E. D. Clayton, *Battelle Pacific Northwest Laboratories*
D. F. Hanlen, *Westinghouse Electric Corporation, Atomic Power Division*
R. G. Luce, *General Electric Company, Knolls Atomic Power Laboratory*
E. I. Nowstrup, *U.S. Atomic Energy Commission*
H. C. Paxton, *Los Alamos Scientific Laboratory*
G. A. Price, *Brookhaven National Laboratory*
W. C. Redman, *Argonne National Laboratory*
N. L. Snidow, *Babcock and Wilcox Company*

The stature of, and the breadth of interest in, this standard were increased on April 29, 1975, when it was approved as an American National Standard by the American National Standards Institute, Inc. The designation then was ANSI N405-1975.

The content of N405-1975 was reaffirmed October 21, 1981, and the standard was revised in 1986, with consensus being achieved on November 7. The membership of the ad hoc group performing those actions was:

E. D. Clayton, *Battelle Pacific Northwest Laboratories*
E. B. Johnson, *Oak Ridge National Laboratory*
D. W. Magnuson, *Individual*
H. C. Paxton, *Individual*
A. D. Callihan, *Individual*

That version included textual modifications solely for the purpose of updating references and of recounting procedural matters necessary to the action. The technical content was in no way altered.

The standard was again revised in 1998 with consensus achieved on August 27, 1999. The membership of the working group responsible for the revision is:

R. L. Seale, Chair, *University of Arizona*
R. D. Busch, *University of New Mexico*
R. A. Knief, *XE Corporation*
T. P. McLaughlin, *Los Alamos National Laboratory*
R. Paternoster, *Los Alamos National Laboratory*
S. S. Payne, *U. S. Department of Energy*
J. S. Philbin, *Sandia National Laboratories*
T. R. Schmidt, *Sandia National Laboratories*

Consensus Committee N17, Research Reactors, Radiation Physics and Radiation Shielding, had the following membership at the time of its approval of this standard:

Tawfik M. Raby, Chair
Shawn Coyne-Nalbach, Secretary

A. D. Callihan . . . . . Individual
R. E. Carter . . . . . E.G. & G.
D. Cokinos . . . . . Brookhaven National Laboratories
B. Dodd . . . . . Health Physics Society
D. Duffey . . . . . American Institute of Chemical Engineers
W. A. Holt . . . . . American Public Health Association
W. C. Hopkins . . . . . Bechtel Corporation
L. B. Marsh . . . . . U.S. Nuclear Regulatory Commission
J. Miller . . . . . Institute of Electrical and Electronics Engineers
J. E. Olhoeft . . . . . Individual
T. M. Raby . . . . . American Nuclear Society
W. J. Richards . . . . . U.S. Department of Defense
R. Seale . . . . . American Nuclear Society
T. Schmidt . . . . . Sandia National Laboratories
A. Smetana . . . . . Savannah River Laboratory
J. F. Torrence . . . . . National Institute of Standards Technology

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