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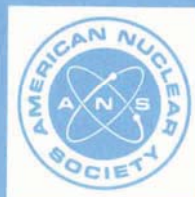
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**safety guide for
the performance of
critical experiments**

an American National Standard

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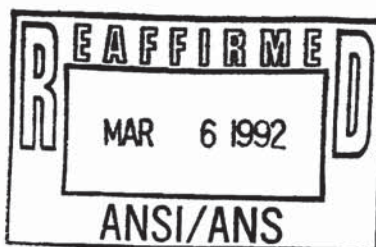
**American National Standard
Safety Guide for the Performance
of Critical Experiments**

Secretariat
American Nuclear Society

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

Published by the
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American National Standard

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Foreword

(This Foreword is not a part of American National Safety Guide for the Performance of Critical Experiments, ANS/ANS-1-1987.)

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 perturbation extraneous to the equipment necessary to the objective of the experiment. Accordingly, assemblies for this purpose 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 requirements 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 simple operating rules.

This Guide contains nuclear safety criteria and practices that have evolved and have been tested during more than four decades 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 the then 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:

Dixon 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*
Eldon I. Nowstrup, *U.S. Energy Research and Development Administration*
H. C. Paxton, *Los Alamos Scientific Laboratory*
Glenn A. Price, *Brookhaven National Laboratory*
W. C. Redman, *Argonne National Laboratory*
Norman 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 is:

E. D. Clayton, *Battelle Pacific Northwest Laboratories*
E. B. Johnson, *Oak Ridge National Laboratory*
D. W. Magnuson, *Union Carbide Corporation, Nuclear Division (retired)*
H. C. Paxton, *Los Alamos National Laboratory (retired)*
Dixon Callihan, *Union Carbide Corporation, Nuclear Division (retired)*

This most recent version includes textual modifications solely for the purpose of updating references and of recounting procedural matters necessary to the action. The technical content has in no way been altered.

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

R. S. Carter, Chairman
T. M. Raby, Secretary

J. D. Buchanan	Health Physics Society
A. D. Callihan (Subcommittee ANS-1)	Individual
R. E. Carter	U.S. Nuclear Regulatory Commission
R. S. Carter	American Nuclear Society
A. De La Paz (Subcommittee ANS-14)	Department of U.S. Army
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