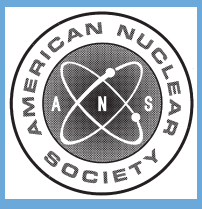
American Nuclear Society

safety guide for the performance of critical experiments

an American National Standard



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SAFETY GUIDE FOR THE PERFORMANCE OF CRITICAL EXPERIMENTS

AMERICAN NUCLEAR SOCIETY
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FOREWORD

(This Foreword is not a part of the Proposed American National Standard Safety Guide for the Performance of Critical Experiments.)

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 been tested during more than two decades of critical experimentation. It was 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 approved by the Board of Directors of the Society as ANS-STD.1-1967. The membership of the Subcommittee on November 1, 1966, was

Dixon Callihan, Chairman, Oak Ridge National Laboratory
James R. Brown, General Dynamics Corporation, General Atomic Division
E. D. Clayton, Battelle Memorial Institute, Pacific Northwest Laboratory
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R. G. Luce, General Electric Company, Knolls Atomic Power Laboratory
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This revision of the Society Standard ANS-STD.1-1967 has been prepared by the present Subcommittee ANS-1, the membership of which has changed slightly since 1966. The membership at the time of approval of this revision, on July 6, 1971, was

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