# American Nuclear Society

## administrative practices for nuclear criticality safety

## an American National Standard

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# American National Standard Administrative Practices for Nuclear Criticality Safety

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**American Nuclear Society**

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**American National Standard**

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## Foreword

(This Foreword is not a part of American National Standard "Administrative Practices for Nuclear Criticality Safety," ANSI/ANS-8.19-2014.)

Administrative practices for nuclear criticality safety evolved in the various organizations processing fissionable materials in ways appropriate to these organizations. In response to interest expressed by the U.S. Nuclear Regulatory Commission, Subcommittee ANS-8 of the Standards Committee of the American Nuclear Society initially established this standard in 1984 to codify the best of those administrative practices. Typical of the differences among organizations is the nature of the nuclear criticality safety staff. While the functions assigned to the staff by this standard are being carried out by all these organizations, the administrative arrangements are so diverse that a concise definition of the term "nuclear criticality safety staff" has not been developed. In essence, the staff comprises those elements of the organization that, in concert, carry out the functions described.

During the 2005 revision of this standard, there was much discussion regarding the use of the term "fissile." Some think the broader term "fissionable" should be used in place of "fissile," while others held to the opinion that the standard does not apply to all fissionable materials. The term "fissile" is the most commonly used term and is appropriate in the majority of applications, although it does not include every nuclide that could present a nuclear criticality safety concern. Facilities that have nuclear criticality safety concerns with nuclides that are fissionable, but not fissile, can also apply this standard to those situations. For the purposes of this standard, the term "fissile" is intended to apply to any nuclide that presents a nuclear criticality safety concern.

This revision provides additional clarification, while retaining well-established safety principles consistent with the evolution of this standard and industry practices. This revision also recognizes that some sites and facilities face changing missions, or in some cases decommissioning. As a result, this revision recommends continued application of these safety principles with an acceptable and practical balance of risk and benefit. Some sections of the standard were reordered to improve overall cohesiveness.

This standard might reference documents and other standards that have been superseded or withdrawn at the time the standard is applied. A statement has been included in the references section that provides guidance on the use of references.

This standard does not incorporate the concepts of generating risk-informed insights, performance-based requirements, or a graded approach to quality assurance. The user is advised that one or more of these techniques could enhance the application of this standard.

This revision was developed under the direction of Subcommittee ANS-8, Fissionable Materials Outside Reactors. The working group would like to acknowledge the significant contributions of Leslie C. Davenport, who died prior to this revision's gaining approval. The membership of the working group at the time of the revision was as follows:

R. W. Carson, Jr. (Chair), *Enercon Federal Services, Inc.*

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J. S. Baker, *Savannah River Nuclear Solutions, LLC*
L. C. Davenport, *Individual*
B. A. Purnell, *U.S. Nuclear Regulatory Commission*

The membership of the ANS-8 Subcommittee at the time of its approval of this standard was as follows:

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B. O. Kidd (Vice Chair), *Babcock & Wilcox Nuclear Operations Group*
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The Nuclear Criticality Safety Consensus Committee had the following membership at the time of its approval of this standard:

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## Contents

# Administrative Practices for Nuclear Criticality Safety

## 1 Introduction

An effective nuclear criticality safety program fosters an acceptable balance of risk and benefit. This includes cooperation among management, supervision, nuclear criticality safety staff, and workers. Criticality safety relies on evaluations, implementation and maintenance of controls, and each employee's conformance with operating procedures. Although the extent and complexity of safety-related activities can vary greatly with the size and type of operation with fissile material, certain safety elements are common. This standard represents a codification of such elements related to nuclear criticality safety.

General guidance for nuclear criticality safety can be found in ANSI/ANS-8.1-2014 [1][1]. Guidance for special isotopes that are fissionable can be found in ANSI/ANS-8.15-1981 (R2005) [2].

## 2 Scope

This standard provides criteria for the administration of a nuclear criticality safety program for operations with fissile materials outside of nuclear reactors in which there exists a potential for nuclear criticality accidents.

This standard addresses the responsibilities of management, supervision, and nuclear criticality safety staff. It also addresses operating procedures, nuclear criticality safety evaluations, and materials control.

## 3 Definitions

### 3.1 Shall, should, and may

The word "shall" is used to denote a requirement; the word "should" is used to denote a recommendation; and the word "may" is used to denote permission, neither a requirement nor a recommendation.

## 4 Management responsibilities

**4.1**

Management shall accept overall responsibility for safety of operations. Continuing commitment to safety should be evident.

**4.2**

Management shall formulate nuclear criticality safety policy and make it known to all personnel involved in operations with fissile material.

**4.3**

Management shall assign responsibility and delegate commensurate authority to implement established policy. Responsibility for nuclear criticality safety should be assigned in a manner consistent with that for other safety disciplines. Each individual, regardless of position, shall be made aware that nuclear criticality safety in his or her work area is his or her responsibility.

**4.4**

Management shall provide personnel familiar with the physics of nuclear criticality and with associated safety practices to furnish technical guidance appropriate to the scope of operations. This function should, to the extent practicable, be administratively independent of operations.

**4.5**

Management shall establish a training and qualification program for nuclear criticality safety staff. Guidance for establishing that program may be obtained from ANSI/ANS-8.26-2007 (R2012) [3].

**4.6**

Management shall establish a method to monitor the nuclear criticality safety program.

[1] Numbers in brackets refer to corresponding numbers in Sec. 9, "References."