American Nuclear Society

REAFFIRMED
September 16, 2005
ANSI/ANS-8.20-1991
(R2005)

nuclear criticality safety training

an American National Standard

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American National Standard for Nuclear Criticality Safety Training

Secretariat
American Nuclear Society

Prepared by the
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Standards Committee
Working Group ANS-8.20

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American National Standard

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Foreword

(This Foreword is not a part of American National Standard for Nuclear Criticality Safety Training, ANSI/ANS-8.20-1991.)

This standard presents the training outline, procedures, and responsibilities for providing appropriate nuclear criticality safety training for employees associated with fissile material operations outside reactors. The usefulness of this standard lies in its provisions for the establishment of training objectives, the designation of personnel requiring training, the skeletal framework of training program content, and criteria for program documentation and evaluation. The two appendixes include relevant references and resources and various methods for conducting training. Heretofore, no generally accepted guidance for nuclear criticality safety training has been available.

This standard was initiated by the Training Work Group of the U.S. Department of Energy Nuclear Criticality Technology and Safety (U.S. DOE NCT&S) Project in recognition of the need for and the feasibility of a standard for the establishment of consistent, appropriate nuclear criticality safety training in fissile material operations outside nuclear reactors.

A group, ANS-8.20, under Subcommittee 8 of the Standards Committee of the American Nuclear Society, was established to formulate the proposed standard. Several drafts were prepared for review by the members of the NCT&S Project Training Work Group. The membership of the Training Work Group was expanded to include representatives from not only the U.S. DOE, its field offices, and its contractors, but also from the U.S. Nuclear Regulatory Commission (U.S. NRC), private nuclear industry companies, and universities.

This standard was developed by ANS-8.20, which had the following membership:

M. R. Crowell, Chairman, *Oak Ridge Associated Universities*
F. M. Alcorn, *Babcock & Wilcox Company*
L. C. Dolan, *Martin Marietta Energy Systems, Inc.*
M. C. Evans, *British Nuclear Fuels plc*
C. M. Hopper, *Oak Ridge National Laboratory*
N. Ketzlach, *The Ralph M. Parsons Company*
L. L. Lowry, *Lawrence Livermore National Laboratory*
T. P. McLaughlin, *Los Alamos National Laboratory*

Invaluable assistance was given in the review process of this standard by R. A. Knief of *GPU Nuclear Corporation,* G. A. Price of *Brookhaven National Laboratory,* and other members of the Training Work Group of the NCT&S Project.

This standard was prepared under the direction of ANS-8, Fissionable Materials Outside Reactors. The membership of ANS-8 at the time of its approval of this standard was as follows:

J. T. Thomas, Chairman, *Martin Marietta Energy Systems, Inc.*
E. B. Johnson, Secretary, *Oak Ridge National Laboratory*
F. M. Alcorn, *Babcock & Wilcox Company*
R. D. Carter, *Westinghouse Hanford Company*
H. K. Clark, *Savannah River Laboratory* (retired)
E. D. Clayton, *Battelle Pacific Northwest Laboratories* (retired)
D. M. Dawson, *Science Applications International Corporation*
M. C. Evans, *British Nuclear Fuels plc*
C. M. Hopper, *Oak Ridge National Laboratory*
N. Ketzlach, *The Ralph M. Parsons Company*
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T. P. McLaughlin, *Los Alamos National Laboratory*
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D. A. Reed, *Martin Marietta Energy Systems, Inc.*
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Consensus Committee N16, Nuclear Criticality Safety, had the following membership at the time of its approval of this standard:

Dixon Callihan, Chairman
David R. Smith, Vice Chairman
Elizabeth B. Johnson, Secretary

Organization	*Representative*
Advanced Nuclear Fuels Corporation	L. D. Gerrald
American Institute of Chemical Engineers	L. Robert LaRiviere
American Nuclear Society	Dixon Callihan
American Society for Testing and Materials (Liaison only)	Ricardo Artigas
Health Physics Society	John W. Cure III
	Milton E. McLain, Jr. (Alternate)
Institute of Nuclear Materials Management	C. Leslie Brown
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Contents

Nuclear Criticality Safety Training

1. Introduction

This standard provides a framework for the training of employees associated with fissionable material operations outside reactors where potential exists for criticality accidents. An effective nuclear criticality safety training program requires the cooperative involvement of management, supervision, and the criticality safety staff.

General guidance for nuclear criticality safety is found in American National Standard for Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors, ANSI/ANS-8.1-1983 (R1988) [1].[1] Criteria for the administration of a nuclear criticality safety program for operations outside reactors in which there exists a potential for criticality accidents are found in American National Standard Administrative Practices for Nuclear Criticality Safety, ANSI/ANS-8.19-1984 (R1989) [2].

2. Scope

This standard provides criteria for nuclear criticality safety training for personnel associated with operations outside reactors where a potential exists for criticality accidents. It is not sufficient for the training of nuclear criticality safety staff.

3. Objective

The objective of this standard is to identify the basic characteristics of an effective nuclear criticality safety training program. The program is directed toward those who manage, work in, or work near facilities where the potential exists for a criticality accident. These personnel include, but are not limited to, the following:

(1) those who work with fissionable material and their supervisors
(2) operations support personnel
(3) design personnel
(4) maintenance personnel
(5) emergency response personnel
(6) managers and other administrative personnel
(7) others who enter areas where fissionable material is processed, stored or handled.

4. Definitions

4.1 Limitations. The definitions given below are of a restricted nature for the purposes of this standard.

4.2 Shall, Should, May. The word "shall" is used to denote a requirement, the word "should" to denote a recommendation, and the word "may" to denote permission, neither a requirement nor a recommendation. In order to conform with this standard, all operations shall be performed in accordance with its requirements but not necessarily with its recommendations.

4.3 Glossary of Terms

criticality accident. The release of energy as a result of accidentally producing a self-sustaining or divergent neutron chain reaction.

criticality safety staff. Specialists skilled in the techniques of nuclear criticality safety assessment and familiar with plant operations while, to the extent practicable, administratively independent of process supervision.

nuclear criticality safety. Protection against the consequences of an inadvertent nuclear chain reaction, preferably by the prevention of the reaction.

training. Instruction that imparts knowledge and skills necessary for safe and efficient on-the-job performance.

5. Program Responsibilities

5.1 Management shall establish a nuclear criticality safety training program that provides confidence in the continuing proficiency of personnel.

5.2 Supervisors shall ensure that their staffs are suitably trained.

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