



Selection, Qualification, and Training of Personnel for Nuclear Power Plants

An American National Standard



American National Standard Selection, Qualification, and Training of Personnel for Nuclear Power Plants

Secretariat American Nuclear Society

Prepared by the American Nuclear Society Standards Committee Working Group ANS-3.1

Published by the American Nuclear Society 555 North Kensington Avenue La Grange Park, Illinois 60525 USA

Approved November 20, 2014 by the American National Standards Institute, Inc.

American National Standard

Designation of this document as an American National Standard attests that the principles of openness and due process have been followed in the approval procedure and that a consensus of those directly and materially affected by the standard has been achieved.

This standard was developed under the 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.

An American National Standard is intended to aid industry, consumers, governmental agencies, and general interest groups. Its use is entirely voluntary. The existence of an American National Standard, in and of itself, does not preclude anyone from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standard.

By publication of this standard, the American Nuclear Society does not insure anyone utilizing the standard against liability allegedly arising from or after its use. The content of this standard reflects acceptable practice at the time of its approval and publication. Changes, if any, occurring through developments in the state of the art, may be considered at the time that the standard is subjected to periodic review. It may be reaffirmed, revised, or withdrawn at any time in accordance with established procedures. Users of this standard are cautioned to determine the validity of copies in their possession and to establish that they are of the latest issue.

The American Nuclear Society accepts no responsibility for interpretations of this standard made by any individual or by any ad hoc group of individuals. Responses to inquiries about requirements, recommendations, and/or permissive statements (i.e., "shall," "should," and "may," respectively) 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.

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

Published by American Nuclear Society 555 North Kensington Avenue La Grange Park, Illinois 60526 USA



This document is copyright protected.

Copyright © 2014 by American Nuclear Society. All rights reserved.

Any part of this standard may be quoted. Credit lines should read "Extracted from American National Standard ANSI/ANS-3.1-2014 with permission of the publisher, the American Nuclear Society." Reproduction prohibited under copyright convention unless written permission is granted by the American Nuclear Society.

Printed in the United States of America

Inquiry Requests

The American Nuclear Society (ANS) Standards Committee will provide responses to inquiries about requirements, recommendations, and/or permissive statements (i.e., "shall," "should," and "may," respectively) in American National Standards that are developed and approved by ANS. Responses to inquiries will be provided according to the Policy Manual for the ANS Standards Committee. Nonrelevant inquiries or those concerning unrelated subjects will be returned with appropriate explanation. ANS does not develop case interpretations of requirements in a standard that are applicable to a specific design, operation, facility, or other unique situation only, and therefore is not intended for generic application.

Responses to inquiries on standards are published in ANS's magazine, *Nuclear News*, and are available publicly on the ANS Web site or by contacting the ANS Standards Administrator.

Inquiry requests shall include the following:

Inquiry Format

- (1) the name, company name if applicable, mailing address, and telephone number of the inquirer;
- (2) reference to the applicable standard edition, section, paragraph, figure, and/or table;
- (3) the purpose(s) of the inquiry;
- (4) the inquiry stated in a clear, concise manner;
- (5) a proposed reply, if the inquirer is in a position to offer one.

Inquiries should be addressed to

American Nuclear Society ATTN: Standards Administrator 555 N. Kensington Avenue La Grange Park, IL 60526

or standards@ans.org

Foreword

(This foreword is not a part of American National Standard "Selection, Qualification, and Training of Personnel for Nuclear Power Plants", ANSI/ANS-3.1-2014.)

Proper selection, qualification, and training of personnel are significant factors in ensuring the safe, reliable, and efficient operation of nuclear power plants. It is through these processes that personnel responsible for the various aspects of nuclear power plant operation can understand the complexities of the power plant and the impacts that their individual activities have on safe plant operation.

This standard contains criteria for the selection, qualification, and training of personnel for the operating organization of stationary nuclear power plants.

The criteria in the standard are organized by functional levels of responsibility that generally occur in nuclear power plant organizations. Specific education and experience criteria are presented based on a consensus of job requirements. Training requirements reflect the industry practice of training based on a systematic analysis of the training needs and on performance-based training. Each owner organization defines the power plant organization that meets its specific situation, and adapts training and other criteria to meet the specific situation.

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, 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 standard specifies minimum qualification for levels of management and individuals. For an organization to be effective, the collective qualifications of the plant staff should exceed the sum of the individual qualifications specified in the standard.

The purpose of the 2014 revision is to update the standard in the following areas:

- align the American Nuclear Society, the U.S. Nuclear Regulatory Commission, and the Institute of Nuclear Power Operations with industry training and standards:
- provide a common language across the industry;
- incorporate the past 20 years of learning and experience with nuclear power plant training program implementation and performance;
- better address supplemental training and qualification;
- update positions in light of new nuclear power plant construction, current position terminology, and evolving technology.

This standard was prepared by Working Group ANS-3.1 of the Standards Committee of the American Nuclear Society, whose membership was as follows:

- J. A. Sickle (Chair), Exelon Nuclear
- T. E. Amundson, Southern Nuclear Operating Company
- S. Bauer, Nuclear Energy Institute
- T. J. Green, Arizona Public Service Company
- K. Hamlin, Institute of Nuclear Power Operations
- J. W. Hiatt, BHI Energy
- R. Hons, Southern Nuclear Operating Company

- P. Knoetgen, Institute of Nuclear Power Operations
- T. C. Kolb, U.S. Nuclear Regulatory Commission
- A. Lindsay, Duke Energy
- M. D. Llewellyn, Institute of Nuclear Power Operations
- G. W. Ludlam, Exelon Nuclear
- E. McAndrew-Benavides, Nuclear Energy Institute
- J. H. Murray, PSEG Nuclear
- R. M. Pelton, U.S. Nuclear Regulatory Commission
- J. Phelps, STP Nuclear Operating Company
- C. R. Sizemore, NextEra Energy
- G. W. Steele, SCANA
- R. Smith, Wolf Creek Nuclear Operating Corporation
- G. Sparks, Entergy
- S. A. Wender, First Energy Nuclear Operating Company

Subcommittee ANS-21, Maintenance, Operations Testing & Training, had the following membership at the time of its approval of this standard:

- S. Lott (Chair), Los Alamos National Laboratory
- A. Hull (Vice Chair), U.S. Nuclear Regulatory Commission
- T. Bellinger, U.S. Department of Energy
- C. Brooks, Institute for Nuclear Power Operations
- J. Call, Tennessee Valley Authority
- G. Carpenter, U.S. Nuclear Regulatory Commission
- R. Carpenter, U.S. Nuclear Regulatory Commission
- D. Eggett, Automated Engineering Services Corporation
- J. Glover, Graftel, Inc.
- R. Kassawara, Electric Power Research Institute
- E. M. Lloyd, Exitech Corporation
- C. Mazzola, Shaw Environmental & Infrastructure, Inc.
- P. Milligan, U.S. Nuclear Regulatory Commission
- C. H. Moseley, Individual
- J. W. Roe, Nuclear Energy Institute
- W. J. Rudolph II, First Energy Corporation
- J. Sickle, Exelon Nuclear
- M. Smith, STP Nuclear Operating Company
- B. Stevens, Exelon Corporation

The Nuclear Facilities Standards Committee had the following membership at the time it reviewed and approved this standard:

- C. A. Mazzola (Chair), CB & I Federal Services
- W. B. Reuland (Vice Chair), Individual
- J. K. August, CORE, Inc.
- W. H. Bell, South Carolina Electric & Gas Company
- B. B. Bevard, Oak Ridge National Laboratory
- J. R. Brault, Individual
- C. K. Brown, Southern Nuclear Operating Company
- K. R. Bryson, Individual
- D. R. Eggett, Automated Engineering Services Corporation
- P. Guha, U.S. Department of Energy
- P. S. Hastings, Babcock & Wilcox
- A. B. Hull, U.S. Nuclear Regulatory Commission
 - (Alt. C. E. Carpenter, U.S. Nuclear Regulatory Commission)

- N. P. Kadambi, Individual
- M. A. Linn, Oak Ridge National Laboratory
- E. M. Lloyd, Exitech Corporation
- E. P. Loewen, GE Hitachi Nuclear Energy
- S. A. Lott, Los Alamos National Laboratory
- H. W. Massie, Jr., Defense Nuclear Facilities Safety Board
- R. H. McFetridge, Westinghouse Electric Company, LLC
- T. K. Meneely, Westinghouse Electric Company, LLC
- C. H. Moseley, Jr., ASME NQA Liaison
- D. G. Newton, AREVA Inc.
- M. W. Peres, Fluor Enterprises Inc.
- R. M. Ruby, Individual
- J. C. Saldarini, Bechtel Power Corporation
- D. J. Spellman, Individual
- S. L. Stamm, Individual
- J. D. Stevenson, Individual
- J. A. Wehrenberg, *Individual*

Nuclear Facilities Standards Committee Liaison:

- G. Hutcherson, Institute of Nuclear Power Operations
- J. Riley, Nuclear Energy Institute
 - (Alt. J. Butler, Nuclear Energy Institute)

Contents	Section	age
1	Scope and purpose	1
	1.1 Scope	
	1.2 Purpose	
2	Acronyms and definitions	
	2.1 Acronyms	
	2.2 Shall, should, and may	1
	2.3 Definitions	1
3	Functional levels and assignment of responsibility	3
	3.1 Operating organization	
	3.2 Supplemental personnel	
4	Qualification	4
	4.1 General	4
	4.1.1 Education	
	4.1.2 Experience	
	4.1.3 Special requirements	
	4.1.4 Training	
	4.2 Senior manager level	
	4.2.1 Frant manager 4.2.2 Operations	
	4.2.3 Maintenance	
	4.2.4 Engineering	
	4.2.5 Training	
	4.2.6 Quality assurance	11
	4.3 Middle manager level	. 11
	4.3.1 Training	
	4.3.2 Chemistry	
	4.3.3 Radiation protection	
	4.3.4 Maintenance	
	4.3.5 Quality assurance	
	4.3.7 Shift manager	
	4.3.8 Engineering	
	4.4 First line supervisor level	
	4.4.1 Senior operator	
	4.4.2 Senior operator limited to fuel handling	
	4.4.3 Training	
	4.4.4 Chemistry	
	4.4.5 Radiochemistry	
	4.4.6 Radiation protection	
	4.4.7 Maintenance 4.4.8 Engineering	
	4.4.9 Preoperational testing engineer	
	4.4.10 Startup testing engineer	
	4.4.11 Quality assurance or quality control	
	4.5 Operators, technicians, and maintenance personnel	
	4.5.1 Reactor operator	
	4.5.2 Operator	19
	4.5.3 Technician	
	4.5.4 Instructor	
	4.5.5 Quality control	
	4.5.6 Quality assurance	
	4.5.7 Maintenance personnel	∠⊥

	4.6 Engineering personnel			21
		4.6.1	neering personnel Engineer	21
		4.6.2	Shift technical advisor	22
	4.7	22		
		$4.7.1^{-}$	Supervisor or chairman of standing committee responsible for	
			independent review	22
		4.7.2		23
			f personnel	
-	6.1	Gene	ral	23
	6.2 Training development process			
			Systematic approach to training	
			Alternate process	
7	Refe	rences		24