



# REGULATORY GUIDE

OFFICE OF NUCLEAR REGULATORY RESEARCH

## REGULATORY GUIDE 1.8

(Drafts were issued as DG-1084 and DG-1012)

### QUALIFICATION AND TRAINING OF PERSONNEL FOR NUCLEAR POWER PLANTS

#### A. INTRODUCTION

This regulatory guide is being issued to provide current guidance that is acceptable to the NRC staff regarding qualifications and training for nuclear power plant personnel. This regulatory guide endorses ANSI/ANS-3.1-1993, "Selection, Qualification, and Training of Personnel for Nuclear Power Plants,"<sup>1</sup> with certain clarifications, additions, and exceptions. Personnel of test, training, research, and mobile reactors are not covered by this regulatory guide.

In 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," Section 50.120, "Training and Qualification of Nuclear Power Plant Personnel," requires that each nuclear power plant licensee or applicant for an operating license implement training and qualification programs that are derived from a systems approach to training. Paragraph 50.34(b)(6)(i) requires that an application for a license to operate a nuclear power plant include information concerning organizational structure, personnel qualifications, and related matters. Subpart D, "Applications," of 10 CFR Part 55, "Operators' Licenses," requires that operator license applications include information concerning an individual's education and experience and other related matters.

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<sup>1</sup>Copies may be obtained from the American Nuclear Society, 555 North Kensington Ave., La Grange Park, IL 60525, telephone (708)352-6611.

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This guide was issued after consideration of comments received from the public. Comments and suggestions for improvements in these guides are encouraged at all times, and guides will be revised, as appropriate, to accommodate comments and to reflect new information or experience. Written comments may be submitted to the Rules and Directives Branch, ADM, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

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## **B. DISCUSSION**

This regulatory guide endorses ANSI/ANS-3.1-1993, "Selection, Qualification, and Training of Personnel for Nuclear Power Plants," with certain additions and exceptions that are listed in the Regulatory Position of this guide. Some of the exceptions are endorsements of certain sections of two other standards, ANSI N18.7-1976 (ANS-3.2), "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants,"<sup>1</sup> and ANSI/ASME NQA-1-1983, "Quality Assurance Program Requirements for Nuclear Power Plants."<sup>2</sup>

The first proposed Revision 3 of Regulatory Guide 1.8, Draft Regulatory Guide DG-1012, was published for public comment in September 1996. Draft Regulatory Guide DG-1084 reflected modifications made to DG-1012 following the first public comment period. Some regulatory positions remained unchanged from DG-1012, some have been modified, and some were developed following the publication of DG-1012 for public comment. DG-1084 was published for public comment in March 1999. This final regulatory guide includes changes from DG-1084 based on the staff's resolution of some of the public comments. The complete history of the development of this guide is in an appendix to this guide.

Certain regulatory positions in this regulatory guide reflect the previous endorsement of ANSI/ANS-3.1-1981 by Revision 2 of Regulatory Guide 1.8 (April 1987). In addition, certain regulatory positions regarding quality control, quality assurance, and independent review are consistent with Regulatory Positions in Revision 3 of Regulatory Guide 1.28, "Quality Assurance Program Requirements (Design and Construction)" (August 1985), and Revision 2 of Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)" (February 1978).

## **C. REGULATORY POSITION**

ANSI/ANS-3.1-1993, "Selection, Qualification, and Training of Personnel for Nuclear Power Plants,"<sup>1</sup> provides criteria for the selection, qualification, and training of personnel for nuclear power plants. These criteria, with the following additions, exceptions, and clarifications, are acceptable to the NRC staff for complying with the qualifications and training requirements of 10 CFR Parts 50 and 55 and with the guidance regarding the shift technical advisor (STA) function provided in the Commission's "Policy Statement on Engineering Expertise on Shift."<sup>3</sup>

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<sup>2</sup>Copies are available from Global Engineering Documents, 7730 Carondelet Avenue, Suite 407, Clayton, MO 63105, telephone (800)854-7179.

<sup>3</sup>Copies are available for inspection or copying for a fee from the NRC Public Document Room at 2120 L Street NW., Washington, DC; the PDR's mailing address is Mail Stop LL-6, Washington, DC 20555; telephone (202)634-3273; fax (202)634-3343.

## 1. SECTION 2, DEFINITIONS

**1.1** The definition of “**related experience**” should be replaced by “Experience in performing job duties in the discipline for which the individual seeks qualification; such experience may or may not be at a nuclear power plant.”

**1.2** Add a definition for “**designated nuclear control room operator**”: “An individual assigned to a licensed control room operator position identified in either Technical Specification Table 6.2.1 or the table “Minimum Requirements Per Shift for On-Site Staffing of Nuclear Power Units by Operators and Senior Operators Licensed Under 10 CFR Part 55” in 10 CFR 50.54(m)(2)(i).”

**1.3** Add a definition for “**responsible nuclear power plant experience**”: “Responsible nuclear power plant experience for a Senior Operator (SO) is having actively performed as a designated nuclear control room operator or as a power plant staff engineer involved in the day-to-day activities of the facility.”

**1.4** Add definition for “**staff engineer**”: “An individual in a technical support position (i.e., personnel covered in Sections 4.4.10 and 4.6) who is responsible for the coordination and implementation of any of the following: plant equipment control, integrated operation procedures, operations, maintenance, and radiological support, or review of modification and maintenance plans for plant systems.”

## 2. QUALIFICATION CRITERIA

The qualification criteria described in Section 4 of ANSI/ANS-3.1-1993 are acceptable to the NRC staff with the following exceptions.

### 2.1 Sections 4.1.1.1, Alternatives to Degree Requirements; 4.1.1.2, Experience Substitution for Education; 4.1.2.1, Alternatives to Experience

The equivalents in these sections do not apply to individuals assigned to positions in Quality Assurance (Section 4.3.7), Quality Control (Section 4.5.5), and Quality Assurance (Section 4.5.6). The following equivalents for education and experience apply:

#### 2.1.1 Section 4.3.7, Quality Assurance

Individuals who do not possess the formal educational and experience requirements specified in this section for this position will not be eliminated automatically when other factors provide sufficient demonstration of their abilities. These other factors are to be evaluated on a case-by-case basis and approved and documented by the plant manager. However, the individual assigned to this position is to meet the Special Requirements in Section 4.3.7.

#### 2.1.2 Section 4.5.5, Quality Control

This regulatory guide endorses ANSI/ASME NQA-1-1983, “Quality Assurance Program Requirements for Nuclear Power Plants,” for the equivalents for education and experience for individuals assigned to this position (see Regulatory Position 2.12 of this guide).

### **2.1.3 Section 4.5.6, Quality Assurance**

Individuals who do not possess the formal education and experience specified in this section for this position will not be eliminated automatically when other factors provide sufficient demonstration of their abilities. These other factors are to be evaluated on a case-by-case basis and approved and documented by the plant manager.

### **2.2 Section 4.1.2.4, Related Experience**

The educational alternative to experience should apply only to those position qualifications in Sections 4.2 through 4.6 that specifically include a related experience clause.

### **2.3 Section 4.1.4, Training**

For positions not identified in this section, the training development process identified in Section 6.2.2 is acceptable to the NRC staff except for quality control personnel (as defined in Section 4.5.5) and quality assurance personnel (as defined in Section 4.5.6). For the training for quality control and quality assurance personnel, this Regulatory Guide 1.8 endorses ANSI/ASME NQA-1-1983 (see Sections 2.12 and 2.13 below).

### **2.4 Section 4.1.4, Training**

The individuals responsible for managing the training programs listed in Section 4.1.4 of the standard should have education, experience, or training in educational methods and should have knowledge consistent with the technical content and requirements of the initial and continuing training programs for which they are responsible. These individuals should be responsible to the facility Training Manager.

### **2.5 Section 4.2.2, Operations Manager**

Under Special Requirements, Subsection (1)(d), "Have plant operational knowledge consistent with the requirements of the operations manager's job," is not an acceptable alternative.

### **2.6 Section 4.3.1, Training**

The required Baccalaureate education should include courses in education and technical subjects. If educational techniques are not covered in the Baccalaureate course material, training should be provided in educational techniques.

### **2.7 Section 4.3.3, Radiation Protection**

For the radiation protection manager, the three years of nuclear power plant experience should be at a level requiring policy planning and decision making related to the programmatic aspects of the radiation protection program as a whole.

### **2.8 Section 4.4.1, Operations Shift Supervisor, and Section 4.4.2, Senior Operator**

A nonlicensed applicant (an instant candidate) for a senior operator (SO) license should have three years of responsible nuclear power plant experience. A maximum of one year of

responsible nuclear power plant experience may be fulfilled by academic or related technical training on a one-for-one basis. At least six months of the responsible nuclear power plant experience should be at the plant for which the instant candidate seeks a license and should not include any of the time spent in the control room as an extra person on shift. The education equivalence and the six months on site may also count toward the three years of responsible nuclear power plant experience. Applicants for an SO position who do not hold a bachelor's degree in engineering or the equivalent should have held an operator's license and should have been actively involved in the performance of licensed duties for at least one year or have at least two years of military experience in a position equivalent to a licensed reactor operator. Eligibility for equipment operators and non-degreed licensed operator instructors to sit for SO examinations will be evaluated on a case-by-case basis.

## **2.9 Section 4.4.6, Radiation Protection**

The two years of nuclear power plant experience should include varied activities in the radiological protection area.

## **2.10 Section 4.5.1, Reactor Operator**

An applicant for a reactor operator (RO) license should have three years of power plant experience. At least one year of this experience should have been at the plant for which an applicant seeks a license and should not include any of the time spent in the control room as an extra person on shift. Six months of the time on site should have been spent performing plant operational duties as a nonlicensed operator.

## **2.11 Section 4.5.5, Quality Control**

The qualifications criteria in ANSI/ASME NQA-1-1989 are not acceptable to the NRC staff. The qualifications criteria in Supplement 2S-1, "Supplementary Requirements for the Qualification of Inspection and Test Personnel," to ANSI/ASME NQA-1-1983 are endorsed by this regulatory guide. The provisions of Appendix 2A-1, "Nonmandatory Guidance on the Qualification of Inspection and Test Personnel," to ANSI/ASME NQA-1-1983 should be met as they are a part of Supplement 2S-1.

## **2.12 Section 4.5.6, Quality Assurance**

The qualifications criteria in ANSI/ASME NQA-1-1989 are not acceptable to the NRC staff. Instead, Supplement 2S-3, "Supplementary Requirements for the Qualification of Quality Assurance Program Audit Personnel," to ANSI/ASME NQA-1-1983 is endorsed by this regulatory guide for "Special Requirements" for individuals assigned to this position.

## **2.13 Section 4.6.2, Shift Technical Advisor**

In addition to the qualifications described in the standard, the STA should assume an active role in shift activities and should reflect the guidance provided in the "Policy Statement on Engineering Expertise on Shift" (see 50 FR 43621, October 28, 1985).<sup>3</sup> "Assume an active role in

shift activities" means performing at least three shifts per quarter as the STA. If an STA has not assumed an active role in shift activities, the STA should receive training sufficient to ensure that the STA is cognizant of changes to the facility and procedures that occurred during the absence.

#### **2.14 Section 4.7.1, Supervisor or Chairman of Standing Committee Responsible for Independent Review.**

Section 4.7.1 states that the minimum experience for this position is "Combined managerial and technical support -- 6 yrs." This experience should provide the individual with the necessary overall nuclear background in the plant areas identified in Section 4.3 of ANSI N18.7-1976 (ANS3.2), "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants" and in all phases of the plant as discussed in Section 4.3.4 of ANSI N18.7-1976, to determine when to call consultants and contractors for dealing with complex problems beyond the expertise of the owner organization.

#### **2.15 Section 4.7.2, Independent Review Organization Members**

Members of the Independent Review Organization should have a minimum of five years of experience in their own area of responsibility, i.e., in one of the twelve areas listed in Section 4.7.

### **D. IMPLEMENTATION**

The purpose of this section is to provide information to applicants and licensees regarding the NRC staff's plans for using this Regulatory Guide. No backfitting is intended or approved in connection with the issuance of this guide.

Except in those cases in which an applicant or licensee proposes an acceptable alternative method for complying with the specified portions of the NRC's regulations, the methods described in this final guide reflecting public comments will be used in the evaluation of submittals in connection with applications for construction permits, standard design certifications and design approvals, and combined operating licenses.

This guide will also be used to evaluate submittals voluntarily initiated by operating reactor licensees who propose modifications that go beyond the current licensing basis if there is a clear connection between the proposed modifications and this guidance. This regulatory guide will be used by the NRC staff in conjunction with the Standard Review Plan for reactors, NUREG-0800.

**APPENDIX**  
**HISTORY OF REGULATORY GUIDE 1.8,**  
**“Qualification and Training of Personnel for Nuclear Power Plants”**

The following is a chronology of industry and NRC actions regarding the qualification and training of personnel for nuclear power plants:

- Subcommittee ANS-3, Reactor Operations, American Nuclear Society Standards Committee, developed a standard that contained criteria for the qualifications and training of nuclear power plant personnel. This standard was approved by the American National Standards Institute (ANSI) Committee N18, Design Criteria for Nuclear Power Plants, and designated ANSI N18.1-1971, "Selection and Training of Nuclear Power Plant Personnel."<sup>1</sup>
- Regulatory Guide 1.8, "Personnel Selection and Training," endorsing ANSI N18.1-1971, was issued in March 1971, and Revision 1 was issued in September 1975.<sup>2</sup>
- A revision of ANSI N18.1-1971 was approved by the ANSI Board of Standards Review and issued as ANSI/ANS-3.1-1978, "Selection and Training of Nuclear Power Plant Personnel."<sup>1</sup>
- During 1981, ANSI/ANS-3.1-1978 was updated to factor in lessons learned from the TMI-2 accident and changing regulatory requirements; it was reissued as ANSI/ANS-3.1-1981, "Selection, Qualification and Training of Personnel for Nuclear Power Plants."<sup>1</sup>
- Revision 2 of Regulatory Guide 1.8, "Qualification and Training of Personnel for Nuclear Power Plants," issued in April 1987, endorsed Sections 4.3.1.1, "Shift Supervisor," 4.3.1.2, "Senior Operator," 4.5.1.2, "Licensed Operators," 4.4.8, "Shift Technical Advisor," and 4.4.4, "Radiation Protection," of ANSI/ANS-3.1-1981. Endorsement for all other positions remained with ANSI N18.1-1971, "Selection and Training of Nuclear Power Plant Personnel."
- A revision of ANSI/ANS-3.1-1981 was issued on May 19, 1987, and designated ANSI/ANS-3.1-1987, "Selection, Qualification and Training of Personnel for Nuclear Power Plants." The 1987 standard contained major revisions in content and format from the 1981 standard. These revisions resulted from actions taken by the NRC and industry since the 1981 standard in selection and training practices, including the following.

A "Policy Statement on Engineering Expertise on Shift,"<sup>2</sup> issued on October 28, 1985 (50 FR 43621), provided two options for meeting the requirements in 10 CFR 50.54(m)(2)(i) for nuclear power plant staffing and the requirement to have a shift technical advisor (STA) available to the shift (see Section I.A.1.1 of NUREG-0737,

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“Clarification of TMI Action Plan Requirements,”<sup>2</sup> November 1980). One option in the Policy Statement, the option preferred by the NRC staff, allows combining the functions of the STA with one of the required senior operators as long as specific training and education requirements are met. The other option allows for continuation of an approved independent STA program. Regulatory Position 2.13 of this guide reflects the guidance provided in this Policy Statement.

On March 20, 1985, the NRC issued a "Commission Policy Statement on Training and Qualifications of Nuclear Power Plant Personnel"<sup>2</sup> (50 FR 11147). The policy statement provided guidance on qualification programs and on a systems approach to training at commercial nuclear power plants. The policy statement also "endorses the INPO-managed Training Accreditation Program in that it encompasses the elements of performance-based training and will provide the basis to ensure that personnel have qualifications commensurate with the performance requirements of their jobs."

- Based on an April 17, 1990, decision of the U.S. Court of Appeals for the District of Columbia Circuit, the NRC developed a rule addressing requirements for the training and qualification of nuclear power plant personnel (10 CFR 50.120). Each licensee or applicant for a license must ensure that personnel listed in 10 CFR 50.120(b), regardless of whether they are employees or contractor personnel, have qualifications commensurate with the performance requirements of the jobs to which they are assigned. The rule requires that each licensee or applicant provide training to personnel using a systems approach to training (SAT). This rule superseded the above mentioned Policy Statement on training and qualifications.
- On April 23, 1993, ANSI/ANS-3.1-1993 was issued. This standard reflects actions of the NRC and industry since 1987, including the requirement to use the systematic approach to training (SAT) process to establish and maintain training programs for certain positions. In addition, this standard does not allow credit for simulator and classroom training to substitute for an operator's nuclear power plant experience; a compensating change has been made to the experience requirements.
- Draft Regulatory Guide DG-1012, the proposed Revision 3 to Regulatory Guide 1.8, was published for public comment in September 1996.
- Draft Regulatory Guide DG-1084, the second proposed Revision 3 to Regulatory Guide 1.8, was published for public comment in March 1999. DG-1084 reflected modifications made to DG-1012 following the first public comment period. Some regulatory positions remained unchanged from DG-1012, some were modified, and some were developed following the publication of DG-1012 for public comment.
- This final Revision 3 of Regulatory Guide 1.8 reflects further modifications made as a result of staff regulatory positions and the resolution of public comments.



## VALUE/IMPACT ANALYSIS

A separate value/impact analysis has not been prepared for this Regulatory Guide. A value/impact analysis was included in the Regulatory Analysis for the amendments to 10 CFR Part 55 published on March 25, 1987; in the Regulatory Analysis for the amendments to 10 CFR 50.120 published on July 21, 1993 (58 FR 39092); and in the Regulatory Analysis in Revision 3 of Regulatory Guide 1.28, "Quality Assurance Program Requirements" (August 1995). These analyses are also appropriate for Revision 3 of Regulatory Guide 1.8. Copies of these Regulatory Analyses are available for inspection and copying for a fee at the NRC Public Document Room, 2120 L Street, NW., Washington, DC. The Public Document Room's mailing address is Mail Stop LL-6, Washington, DC 20555; telephone (202) 634-3273, fax (202) 634-3343.

ADAMS Accession Number of  
Revision 3 of Regulatory Guide 1.8:  
ML003706932