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# REGULATORY GUIDE

OFFICE OF NUCLEAR REGULATORY RESEARCH

REGULATORY GUIDE 1.8
(Task OL 403-5)

## QUALIFICATION AND TRAINING OF PERSONNEL FOR NUCLEAR POWER PLANTS

### A. INTRODUCTION

Paragraph 50.34(b)(6)(i) of 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," 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 related matters. This regulatory guide describes a method acceptable to the NRC staff for complying with those portions of the Commission's regulations with regard to the training and qualifications of nuclear power plant personnel. Personnel of test, training, research, and mobile reactors are not covered by this regulatory guide.

The Advisory Committee on Reactor Safeguards has been consulted concerning this guide and has concurred in the regulatory position.

Any information collection activities mentioned in this regulatory guide are contained as requirements in 10 CFR Parts 50 and 55, which provide the regulatory basis for this guide. The information collection requirements in 10 CFR Part 50 have been approved under OMB Clearance No. 3150-011, those in 10 CFR Part 55, under OMB Clearance No. 3150-0018.

### B. DISCUSSION

Subcommittee ANS-3, Reactor Operations, American Nuclear Society Standards Committee, developed a standard containing criteria for the qualification 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." 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. A revision of ANSI N18.1-1971 was subsequently approved by the ANSI Board of Standards Review and designated ANSI/ANS-3.1-1978, "Selection and Training of Nuclear Power Plant Personnel."

A first proposed Revision 2 to Regulatory Guide 1.8 endorsing ANSI/ANS-3.1-1978 was issued for public comment in February 1979. As a result of experience gained from the accident at Three Mile Island Unit 2 (TMI-2), additional public comments in the area of personnel qualifications were requested on proposed Revision 2 to Regulatory Guide 1.8 in May 1979. All of the comments from both requests were forwarded to the ANS-3 Subcommittee for its use during the development of a revision to ANSI/ANS-3.1-1978. Subsequently, Draft Standard ANS 3.1, dated December 6, 1979, incorporating the upgraded requirements was issued. In September 1980, public comments were requested on a second proposed Revision 2 to Regulatory Guide 1.8 that endorsed Draft Standard ANS 3.1. The public comments received were held in abeyance pending Commission action on proposed rules on operator qualifications and licensing in SECY 81-84, "Qualification of Reactor Operators,"[1] February 2, 1981, and SECY 81-84A, "Discussion of Revisions to Reactor Operator Qualifications,"[1] June 15, 1981. The Commission did not approve either of these proposals and directed the staff to continue to study the issue.

*The substantial number of changes in this revision has made it impractical to indicate the changes with lines in the margin.

[1]Copies are available for inspection or copying for a fee in the NRC Public Document Room, 1717 H Street NW., Washington, DC.

During 1981, Draft Standard ANS 3.1 was updated to factor in additional lessons learned from the TMI-2 accident and changing regulatory requirements. The standard was approved by the American Nuclear Society's Nuclear Power Plant Standards Committee (NUPPSCO) and the ANSI Board of Standards Review and was reissued as ANSI/ANS-3.1-1981, "Selection, Qualification and Training of Personnel for Nuclear Power Plants."[2] A third proposed Revision 2 of Regulatory Guide 1.8 was developed to endorse ANSI/ANS-3.1-1981 with certain additions and exceptions and was issued for public comment in January 1985. As a result of the public comments and Commission actions concerning training and qualifications, this Revision 2 of Regulatory Guide 1.8 now endorses 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 will remain with ANSI N18.1-1971, "Selection and Training of Nuclear Power Plant Personnel." The bases for the additions and exceptions to ANSI/ANS-3.1-1981 are contained in NUREG-0737, "Clarification of TMI Action Plan Requirements,"[3] which includes the March 28, 1980 letter to all power reactor applicants and licensees regarding qualification of reactor operators, and NUREG-0094, "Guide for the Licensing of Facility Operators, Including Senior Operators,"[3] and the Commission's "Policy Statement on Engineering Expertise on Shift" (50 FR 43621). The regulatory position related to the radiation protection manager is revised from what was included in Revision 1 of Regulatory Guide 1.8 (1975). The industry has adopted the requisite qualifications in ANSI/ANS 3.1-1981, and the current change endorses that industry position.

On March 20, 1985, the Commission issued a "Policy Statement on Training and Qualification of Nuclear Power Plant Personnel" (50 FR 11147) that recognizes industry commitment to accredit training programs. In the policy statement, the NRC endorsed the training accreditation program managed by the Institute of Nuclear Power Operations (INPO) because 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. The Commission has decided to withhold action on promulgating new training and qualifications regulations during an evaluation period. During that period, NRC will continue to evaluate the results of the accreditation program to determine if the voluntary industry efforts ensure qualifications that meet or exceed the minimum standards included in this guide.

The Commission's "Policy Statement on Engineering Expertise on Shift" issued on October 28, 1985 (50 FR 43621) provides two options for meeting nuclear power plant staffing requirements (paragraph 50.54(m)(2)(i) of 10 CFR Part 50) and the requirement to have a shift technical advisor (STA) available to the shift (NUREG-0737, I.A.1.1). One option in the Policy Statement, which is preferred by the Commission, 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 C.1.j reflects the guidance provided in this Policy Statement.

## C. REGULATORY POSITION

### 1. Positions in ANSI/ANS-3.1-1981 that Are Endorsed by this Regulatory Guide

For the positions listed in ANSI/ANS-3.1-1981, "Selection, Qualification and Training of Personnel for Nuclear Power Plants," as shift supervisor, senior operator, licensed operator, and shift technical advisor, the requirements contained in the standard provide an approach acceptable to the NRC staff for complying with the qualifications and training requirements of 10 CFR Parts 50 and 55 subject to the guidance regarding the STA function provided in the Commission's "Policy Statement on Engineering Expertise on Shift" and the clarifications, additions, and exceptions in paragraphs a through k below. For radiation protection supervisory personnel, Section 4.4.4 of the standard contains an approach acceptable for the position of radiation protection manager (RPM) subject to the following:

a. In lieu of the description in Section 5.1 of ANSI/ANS-3.1-1981, cold license examinations should be defined as those that are administered before the unit has completed preoperational testing and initial operations as described in its Final Safety Analysis Report as amended and approved by the Commission. Hot examinations are those administered after this condition is attained.

b. Hot license applicants must meet the training elements in Sections 4.3.1.1.c, 4.3.1.2.c, and 4.5.1.2.c of the standard and the experience elements in Sections 4.3.1.1.b, 4.3.1.2.b, and 4.5.1.2.b of the standard. Cold license applicants are subject to the training elements identified above, but they are exempt from the experience elements.

c. Paragraph 2 of Section 4.3.1.1.a of ANSI/ANS-3.1-1981 is not applicable. An individual who meets the Commission's "Policy Statement on Engineering Expertise on Shift" is required on all shifts to provide engineering expertise (see Regulatory Position C.1.j).

d. The minimum educational requirement for shift supervisors, Section 4.3.1.1.a, and for senior operators, Section 4.3.1.2.a, is a high school diploma or equivalent.

e. An applicant for a senior operator (SO) license should have 4 years of responsible power plant experience. Responsible power plant experience for an SO is defined as having actively performed as a designated

[2]Copies may be obtained from the American Nuclear Society, 555 North Kensington Avenue, LaGrange Park, IL 60525.

[3]Copies may be obtained from the Government Printing Office, Post Office Box 37082, Washington, DC 20013-7082.

control room operator (fossil or nuclear) or as a power plant staff engineer involved in the day-to-day activities of the facility during or after the final year of construction. A maximum of 2 years of responsible power plant experience may be fulfilled by academic or related technical training on a one-for-one time basis. Two years should be nuclear power plant experience. At least 6 months of the nuclear power plant experience should be at the plant for which an applicant seeks a license. In addition, applicants for an SO position not holding a bachelor's degree in engineering or equivalent should have held an operator's license and should have been actively involved in the performance of licensed duties for at least 1 year.

f. In addition to the requirements stated in Section 5.2.1.2.1 of ANSI/ANS-3.1-1981, classroom instruction for all license applicants should include training in the use of installed plant systems for the control and mitigation of an accident in which the core is severely damaged.

g. In addition to the requirements in Section 5.2.1.3.1 of ANSI/ANS-3.1-1981, each applicant for an operator or senior operator license should serve 3 months as an extra person on shift in training for that position. These 3 months as an extra person on shift in training should include all phases of day-to-day operations under the supervision of licensed personnel.

h. Control room operating experience for hot license applicants, described in Section 5.2.1.3.1 of ANSI/ANS-3.1-1981, should include manipulation of controls of the facility during a minimum of five reactivity changes. Every effort should be made to have a diversity of reactivity changes for each applicant. Startups, shutdowns, large load changes, and changes in rod programming are some examples and could be accomplished by manually using such systems as rod control, chemical shim control, or recirculation flow.

i. All cold license applicants should participate in practical work assignments as described in Section 5.2.1.4 of ANSI/ANS-3.1-1981 for a minimum of 6 months.

j. In addition to the responsibilities described in Section 4.4.8 of ANSI/ANS-3.1-1981, the STA should assume an active role in shift activities. For example, the STA should review plant logs, participate in shift turnover, and maintain awareness of plant configuration and status. The educational requirements for the STA specified in Section 4.4.8.a of ANSI/ANS-3.1-1981 are not applicable. An independent STA should have a bachelor's degree or equivalent in a scientific or engineering discipline.

"Actively performing STA functions" means performing at least three shifts per quarter as the STA. If an STA has not actively performed, the STA should receive training sufficient to ensure that the STA is cognizant of facility and procedure changes that occurred during the absence.

Combining the functions of a senior operator and the STA is acceptable if the provisions of the Commission's "Policy Statement on Engineering Expertise on Shift" are met. In addition to the requirements specified in Section 4.4.8.c of ANSI/ANS-3.1-1981, the STA should have specific training in the response to and analysis of plant transients and accidents and training in the relationship of accident conditions to offsite consequences and protective action strategies.

k. The radiation protection manager should have the qualifications described in Section 4.4.4 of ANSI/ANS-3.1-1981 with the clarification that 3 of the 4 years of experience in applied radiation protection should be professional-level experience.

### 2. Positions in ANSI/ANS N18.1-1971 that Are Endorsed by this Regulatory Guide

For positions listed in the standard other than those under Regulatory Position 1 above, the requirements contained in ANSI N18.1-1971, "Selection and Training of Nuclear Power Plant Personnel," provide an approach acceptable to the NRC staff for complying with the qualifications and training requirements of 10 CFR Parts 50 and 55.

## 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.

Applicants and licensees may propose means other than those specified in Section C of this guide for meeting applicable regulations.

Except in those cases in which the applicant or licensee proposes an acceptable alternative means of complying with the Commission's regulations specified in Section A, the guidance provided in Section C has been approved for use by the staff after March 31, 1988, in the evaluation of the qualifications and training requirements for (1) nuclear power plant personnel as described in applications for an operating license, (2) applicants for operator and senior operator licenses, and (3) replacement personnel in those positions in operating nuclear power plants whose training programs have not yet been accredited by an accreditation program endorsed by the NRC.

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## 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, a copy of which was placed in the Public Document Room at that time. This analysis is also appropriate to Revision 2 of Regulatory Guide 1.8. A copy of the regulatory analysis is available for inspection and copying for a fee at the NRC Public Document Room, 1717 H Street NW., Washington, DC.