



U.S. NUCLEAR REGULATORY COMMISSION

REGULATORY GUIDE

OFFICE OF STANDARDS DEVELOPMENT

REGULATORY GUIDE 1.58
(Task RS 901-5)

QUALIFICATION OF NUCLEAR POWER PLANT INSPECTION, EXAMINATION, AND TESTING PERSONNEL

A. INTRODUCTION

Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," requires that the quality assurance program provide for indoctrination and training of personnel performing activities affecting quality as necessary to ensure that quality assurance personnel achieve and maintain suitable proficiency. This guide describes a method acceptable to the NRC staff for complying with the Commission's regulations with regard to qualification of inspection, examination, and testing personnel for all types of nuclear power plants.

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

B. DISCUSSION

Working Group N45.2.6 of the ASME Committee on Nuclear Quality Assurance has prepared a standard that delineates the qualifications of personnel who perform inspections, examinations, and tests during fabrication, receipt at the construction site, construction, preoperational and startup testing, and the operation phase¹ of nuclear power plants. This standard was approved by the ASME Committee on Nuclear Quality Assurance and the ASME Nuclear Power Codes and Standards Committee and was subsequently approved and designated ANSI N45.2.6-1978²

by the ANSI Board of Standards Review on August 31, 1978. The standard contains requirements indicated by the verb "shall" and a set of recommendations indicated by the verb "should." The recommendations as well as the requirements of the standard were evaluated with respect to importance to safety. Applicability of the set of recommendations in Section 3.5 of the standard is addressed in Regulatory Position 6.

The American Society for Nondestructive Testing (ASNT) has developed Recommended Practice No. SNT-TC-1A-1975,³ which establishes guidelines for the qualification and certification of nondestructive testing personnel. The applicability of ANSI Standard N45.2.6-1978, ASNT Recommended Practice No. SNT-TC-1A-1975, and the ASME Boiler and Pressure Vessel Code to personnel performing nondestructive examinations is clarified in this guide. ASNT Recommended Practice No. SNT-TC-1A-1975 has been reviewed by the NRC staff and is considered acceptable for the qualification of nondestructive testing personnel for the nondestructive test methods covered by that document subject to certain exceptions. For those nondestructive examinations required by Section III and Section XI of the ASME Boiler and Pressure Vessel Code, it is indicated that ASNT Recommended Practice No. SNT-TC-1A-1975 should be used in conjunction with the additional provisions of the Code.

Where conformance to this regulatory guide is indicated in an application without further qualification, this means that the requirements of ANSI N45.2.6-1978, as supplemented or modified by the regulatory positions of this guide, will be followed.

⁰The substantial number of changes in this revision has made it impractical to indicate the changes with lines in the margin.

¹ANSI N45.2.6-1978 does not apply to NRC-licensed operators and senior operators for the performance of duties specified in 10 CFR Part 55, "Operators' Licenses."

²ANSI N45.2.6-1978, "Qualifications of Inspection, Examination, and Testing Personnel for Nuclear Power Plants," may be obtained from the American Society of Mechanical Engineers, 345 East 47th Street, New York, New York 10017.

³Copies of SNT-TC-1A-1975, "Recommended Practice for Nondestructive Testing Personnel Qualification and Certification," may be obtained from the American Society for Nondestructive Testing, 3200 Riverside Drive, Columbus, Ohio 43221.

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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. This guide was revised as a result of substantive comments received from the public and additional staff review.

Comments should be sent to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Docketing and Service Branch.

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C. REGULATORY POSITION

The requirements for qualification of nuclear power plant inspection, examination, and testing personnel⁴ that are included in ANSI N45.2.6-1978 are acceptable to the NRC staff and provide an adequate basis for complying with the pertinent quality assurance requirements of Appendix B to 10 CFR Part 50, subject to the following:

1. Section 1.2, "Applicability," of ANSI N45.2.6-1978 states that the standard applies "to personnel who perform inspections, examinations, and tests...during preoperational and startup testing, and during operational phases of nuclear power plants." However, for qualification of personnel (1) who approve preoperational, startup, and operational test procedures and test results and (2) who direct or supervise the conduct of individual preoperational, startup, and operational tests, the guidelines contained in Regulatory Guide 1.8, "Personnel Selection and Training," should be followed in lieu of the guidelines of ANSI N45.2.6-1978.

2. Section 1.2, "Applicability," of ANSI N45.2.6-1978 states: "The requirements of this Standard are not intended to apply to personnel who only perform inspection, examination, or testing in accordance with ASNT 'Recommended Practice No. SNT-TC-1A', since these personnel are certified in accordance with the requirements of SNT-TC-1A and its applicable supplements." SNT-TC-1A-1975 is acceptable for the qualification of personnel performing nondestructive examinations and should be used where applicable, subject to the following:

a. SNT-TC-1A-1975 applies to qualification of nondestructive testing personnel for the following non-destructive test methods:

- (1) Radiographic Testing
- (2) Magnetic Particle Testing
- (3) Ultrasonic Testing
- (4) Liquid Penetrant Testing
- (5) Eddy Current Testing
- (6) Neutron Radiographic Testing
- (7) Leak Testing

b. For qualification of personnel performing non-destructive examinations required by Section III and Section XI of the ASME Boiler and Pressure Vessel Code, SNT-TC-1A-1975 should be used in conjunction with the additional provisions of the Code.

3. Section 1.2, "Applicability," of ANSI N45.2.6-1978 states: "The ASME Boiler and Pressure Vessel Code, as well as other ANSI Standards, have been considered in the development of the Standard, and this Standard is intended to be compatible with their requirements." While Section III and Section XI of the ASME Boiler and Pressure Vessel Code address requirements for the qualifications of certain personnel who perform inspection, examination, and testing, these sections do not address the qualification of all

personnel described in ANSI Standard N45.2.6-1978. ANSI N45.2.6-1978, subject to the exceptions of the regulatory positions, should be used in conjunction with Section III and Section XI of the ASME Boiler and Pressure Vessel Code for the qualification of inspection, examination, and testing personnel where the ASME Code does not address the requirements covered by ANSI N45.2.6-1978.

4. Section 1.5, "Referenced Documents," of ANSI N45.2.6-1978 states: "Other documents that are required to be included as a part of this Standard are either identified at the point of reference or described in Section 6 of this Standard." The specific applicability or acceptability of listed standards has been or will be covered separately in other regulatory guides, where appropriate.

5. Section 3.4, "Level III Personnel Capabilities," of ANSI N45.2.6-1978 specifies the capability requirements of Level III personnel. In addition, the individual should be capable of reviewing and approving inspection, examination, and testing procedures and of evaluating the adequacy of such procedures to accomplish the inspection, examination, and test objectives.

6. Section 3.5, "Education and Experience-Recommendations," of ANSI N45.2.6-1978 states that the education and experience specified are recommendations and that other factors may provide reasonable assurance that a person can competently perform a particular task. The set of recommendations has been reviewed by the NRC staff and found to be acceptable with one exception. In addition to the recommendations listed under Section 3.5 for Level I, II, and III personnel, the candidate should be a high school graduate or have earned the General Education Development equivalent of a high school diploma. Since only one set of recommendations is provided for the education and experience of personnel, a commitment to comply with the regulatory positions of this guide in lieu of providing an alternative to the recommendations of the standard means that the specified education and experience recommendations of the standard will be followed.

7. Section 4, "Performance," of ANSI N45.2.6-1978 states: "When a single inspection or test requires implementation by a team or group, personnel not meeting the requirements of this Standard may be used in data-taking assignments or in plant or equipment operation provided they are supervised or overseen by a qualified individual participating in the inspection, examination, or test." These personnel should have sufficient training to ensure an acceptable level of competence in the performance of their activities.

8. An important concept that is not addressed directly in ANSI N45.2.6-1978, ANST Recommended Practice No. SNT-TC-1A-1975, or the ASME Boiler and Pressure Vessel Code is that occupational radiation exposure should be maintained as low as is reasonably achievable (ALARA). In all cases where inspection, examination, and testing personnel may be exposed to radiation fields during their activities in restricted areas, these personnel should receive instruction in radiation protection and radiation-dose-reduction considerations related to work they are expected

⁴The terms "inspection," "examination," and "testing" are defined in Section 1.4, "Definitions," of ANSI N45.2.6-1978.

to perform. Regulatory Guide 8.8, "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Is Reasonably Achievable," describes techniques, features, and recommendations to maintain occupational exposures ALARA.

9. Section 1.2, "Applicability," of ANSI N45.2.6-1978 states: "The requirements of this Standard do not apply to personnel who perform inspections for government or municipal authorities, or who perform as authorized inspectors in accordance with the ASME Boiler and Pressure Vessel Code." The requirements and recommendations of ANSI N45.2.6-1978, subject to the provisions of Regulatory Positions 1 through 8, are considered acceptable for use by or for all NRC permit holders and licensees, including those that are government or municipal authorities.

10. Section 2.2, "Determination of Initial Capability," and Section 2.3, "Evaluation of Performance," of ANSI N45.2.6-1978 deal with the use of evaluation of job performance and determination of initial capability to perform the job. Use of the measures outlined in these sections to establish that an individual has the required qualifications in lieu of required education and experience should result in documented objective evidence (i.e., procedures and record of

written test) demonstrating that the individual indeed does have "comparable" or "equivalent" competence to that which would be gained from having the required education and experience.

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.

This regulatory guide will be used in evaluation of applications for construction permits and operating licenses docketed after September 30, 1980.

In addition, the NRC intends to apply Regulatory Positions C.5, 6, 7, 8, and 10 of this regulatory guide to operating plants and plants under construction. The remaining regulatory positions cover areas of concern that were addressed by the August 1973 version of Regulatory Guide 1.58 and are already being implemented by operating plants and plants under construction. Implementation schedules for Regulatory Positions C.5, 6, 7, 8, and 10 will be determined on a case-by-case basis by the Office of Nuclear Reactor Regulation. It is expected that these positions will be required to be implemented by February 27, 1981.

VALUE/IMPACT STATEMENT

1. ACTION

1.1 Description

The Commission's regulations require that an applicant establish a quality assurance program that provides for the indoctrination and training of personnel performing activities affecting quality as necessary to ensure that quality assurance personnel achieve and maintain suitable proficiency. This action, issuance of Revision 1 to Regulatory Guide 1.58, will provide updated guidance concerning the qualification of personnel who perform inspections, examinations, and tests during fabrication, receipt at the construction site, construction, preoperational and startup testing, and the operation phase of nuclear power plants.

1.2 Need for Action

Regulatory Guide 1.58, "Qualification of Nuclear Power Plant Inspection, Examination, and Testing Personnel," dated August 1973, provides guidance on the qualifications of inspection, examination, and testing personnel and endorses ANSI Standard N45.2.6-1973. On August 31, 1978, a revised version of the standard was approved by the ANSI Board of Standards Review and was designated ANSI N45.2.6-1978. The revision to the standard reflects increased experience in the qualification of nuclear power plant inspection, examination, and testing personnel. Some confusion has arisen over the applicability of Regulatory Guide 1.58 and ANSI Standard N45.2.6 to certain categories of key personnel involved in preoperational and startup test programs. The guidance in Revision 1 to Regulatory Guide 1.58 reflects experience in the application of qualification criteria that removes any confusion with regard to acceptance criteria and that establishes an NRC position on the approved national standard.

1.3 Value/Impact of Action

Guidance on the qualification of nuclear power plant inspection, examination, and testing personnel was contained in Regulatory Guide 1.58 (August 1973) and was being used by the NRC staff in the evaluation of applications for operating licenses. Since the purpose of this action is to provide updated guidance to reflect experience with use of current guidance, to remove any confusion with regard to acceptance criteria, and to establish an NRC position on the approved national standard, this value/impact is based on changes to guidance contained in Regulatory Guide 1.58 (August 1973) and subsequently published (July 1979) for comment in proposed Revision 1 to Regulatory Guide 1.58 (Task RS 901-5).

The following is a list of changes to be made to Regulatory Guide 1.58 (August 1973) as a result of the revision of the standard and the associated value/impact assessment for each change. (The first two changes result in the deletion of two regulatory positions contained in the August 1973 version of Regulatory Guide 1.58. The last seven changes

concern the addition or modification of regulatory positions included in this revision to the regulatory guide.)

a. The revised standard expands the applicability of its requirements and recommendations from personnel who perform inspections, examinations, and tests during the construction phase to personnel who perform these activities during fabrication, receipt at the construction site, construction, preoperational and startup testing, and the operation phase. Therefore, Regulatory Position 1 in the August 1973 version of Regulatory Guide 1.58, which expresses this applicability, is unnecessary and has been deleted from this revision. There is no change in the current position of Regulatory Guide 1.58 and present regulatory bases will not be altered.

b. In the August 1973 version of Regulatory Guide 1.58, Regulatory Position 3 provides additional guidance concerning the information to be included in the certificate of qualification under the category of "basis used for certification." The revised standard incorporates this additional guidance that was lacking in the previous version of the standard. Therefore, this regulatory position is unnecessary and has been deleted from this revision to the regulatory guide. There is no change in staff position and present regulatory bases will not be altered.

c. The revised national standard states that it is applicable to personnel who perform preoperational and startup testing. Regulatory Guide 1.8, "Personnel Selection and Training," is being revised to encompass requirements for personnel who perform preoperational startup and operational testing and will provide more definitive criteria for these personnel. Modifications to the requirements for the qualification of these personnel will be addressed in the value/impact assessment for the revision to Regulatory Guide 1.8. Regulatory Position 1 of this revision to Regulatory Guide 1.58 references Regulatory Guide 1.8 for the qualification of these personnel.

The value of this action is the clarification of the applicability of Regulatory Guide 1.58 and Regulatory Guide 1.8 to personnel who perform preoperational startup and operational testing. This action will benefit the NRC staff by providing additional guidance for license evaluations. The additional guidance is a clarification of regulatory requirements and will remove any confusion concerning qualification requirements of these personnel. Since there will be no change in the regulatory bases for license evaluations, the impact will be negligible.

d. The August 1973 version of Regulatory Guide 1.58 endorses ASNT Recommended Practice No. SNT-TC-1A as acceptable for the qualification of nondestructive testing personnel for the test methods covered by that document. Revision 1 to the regulatory guide endorses SNT-TC-1A-1975 in Regulatory Position 2. For those nondestructive examinations required by Section III and Section XI of the ASME Boiler and Pressure Vessel Code, SNT-TC-1A-1975 is

recommended for use in conjunction with the additional provisions of the Code.

This action clarifies the applicability of ASNT Recommended Practice No. SNT-TC-1A-1975 and the ASME Boiler and Pressure Vessel Code to personnel performing nondestructive examinations and does not represent a change in NRC staff or industry practice. There should be no impact.

e. Regulatory Position 3 of this revision to the regulatory guide addresses the compatibility of ANSI Standard N45.2.6-1978 and Section III and Section XI of the ASME Boiler and Pressure Vessel Code for the qualification of personnel who perform inspection, examination, and testing at nuclear power plants. It is stated that ANSI N45.2.6-1978, subject to the exceptions of the regulatory position, should be used in conjunction with the ASME Code where the ASME Code does not address the requirements covered by ANSI N45.2.6-1978. The original version of the standard, ANSI N45.2.6-1973, which was endorsed by the August 1973 version of Regulatory Guide 1.58, did not contain the Code-exclusion statement and was considered applicable to Code-covered activities. This new regulatory position does not represent a change from present staff practice. The impact should be minimal.

f. The revised standard, together with Regulatory Positions 5 and 6 of this revision to the regulatory guide, delineates the capability requirements for Levels I, II, and III personnel in greater detail and represents a significant change in qualification requirements for inspection, examination, and testing personnel for Level I qualification. The action provides additional guidance to the NRC staff and industry and alters present regulatory bases for license evaluations. The impact should be minimal.

g. The education and experience recommendations presented in the standard for the qualification of nuclear power plant inspection, examination, and testing personnel have been revised to reflect current experience in the use of the standard. The revised standard also encompasses more alternatives for meeting the education and experience provisions of the standard.

Regulatory Position 6 of this revision to the regulatory guide states that a commitment to comply with the regulatory guide will mean that the education and experience recommendations of the standard will be followed.

The value to the NRC staff should be reduced effort in determining the acceptability of various alternative proposals submitted by applicants. The revision of the education and experience recommendations reflects current experience in the use of the standard and does not represent a significant change in the regulatory basis for license evaluations. Therefore, the impact should be minimal.

h. The revised standard includes a statement that personnel not meeting the requirements of the standard may be used in data-taking assignments or in plant or equipment operation provided these personnel are under

the supervision of a qualified individual participating in the inspection, examination, or test. To prevent possible abuse of this authorization, Regulatory Position 7 of this revision to the regulatory guide states that personnel involved in inspections, examinations, or tests who do not meet the requirements of the standard should have sufficient training to ensure an acceptable level of competence in the performance of their activities.

The value to industry will be the ability to use less extensively trained personnel for those tasks that require little formal training. This action will not represent a significant change in present NRC staff practice. There should be no impact as a result of this position.

i. An important concept that is not addressed directly in ANSI N45.2.6-1978, ASNT Recommended Practice No. SNT-TC-1A-1975, or the ASME Boiler and Pressure Vessel Code is that occupational radiation exposures should be maintained as low as is reasonably achievable (ALARA). To provide guidance in this area, Regulatory Position 8 of this revision to the regulatory guide states that inspection, examination, and testing personnel who may be exposed to radiation fields during their activities should receive instruction in radiation protection and safety.

The value of this action will be to provide increased awareness of the ALARA concept. Present practice within the industry should not be affected. Therefore, the impact on industry should be minimal. Since the proposed action does not represent a change in NRC staff position, there will be no impact on the NRC staff.

2. TECHNICAL APPROACH

This section is not applicable to this value/impact statement since this action is an update of previously issued guidance.

3. PROCEDURAL APPROACH

Since this action is an update of information contained in an existing regulatory guide, the only appropriate procedural alternative is a revision to the existing guide.

4. STATUTORY CONSIDERATIONS

4.1 NRC Authority

Authority for this guide is derived from the safety requirements of the Atomic Energy Act; in particular, Appendix B to 10 CFR Part 50 requires that the quality assurance program provide for the indoctrination and training of personnel performing activities affecting quality as necessary to ensure that the personnel achieve and maintain suitable proficiency.

4.2 Need for NEPA Assessment

This action is not a major action, as defined by paragraph 51.5(a)(10) of 10 CFR Part 51 and does not require an environmental impact statement.

5. RELATIONSHIP TO OTHER EXISTING OR PROPOSED REGULATIONS OR POLICIES

Regulatory Guide 1.8 contains recommendations for the selection and training of nuclear power plant personnel. Regulatory Guides 8.8 and 8.10, "Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable," both deal with the ALARA concept and provide guidance that ensures that occupational exposures will be as low as is reasonably

achievable. This revised guide will be consistent with the guidance furnished in these aforementioned regulatory guides.

6. SUMMARY AND CONCLUSIONS

Revision 1 to Regulatory Guide 1.58, "Qualification of Nuclear Power Plant Inspection, Examination, and Testing Personnel," has been prepared. This revision endorses, with certain exceptions, ANSI N45.2.6-1978.

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NUCLEAR REGULATORY COMMISSION
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