

AN AMERICAN NATIONAL STANDARD

Qualifications of Inspection,
Examination, and Testing
Personnel for
Nuclear Power Plants

ANSI/ASME N45.2.6 - 1978

(REVISION OF ANSI N45.2.6-1973)

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FOREWORD

(This Foreword is not a part of the American National Standard on Qualification of Inspection, Examination, and Testing Personnel for Nuclear Power Plants.)

This Standard delineates the qualifications required of personnel who perform inspections, examinations, and tests that assure the quality of important parts of nuclear power plants prior to and during the construction, pre-operational, and startup testing and operating phases. The Standard was originally developed by the American National Standards Committee N45 on Reactor Plants and Their Maintenance.

In May of 1969, the N45 Committee of ANSI established an ad hoc committee (N45-2.6) on Qualification of Personnel. The purpose of this committee was to prepare a standard for general industry use that would define the qualifications of personnel whose activities result in or assure attainment of quality construction. The ad hoc committee was composed of representatives of key segments of the nuclear industry including utilities, reactor suppliers, construction contractors, component manufacturers, and consultants. The original version of the Standard was issued in 1973 as ANSI N45.2.6-1973.

In August, 1973, the U.S. Atomic Energy Commission issued Regulatory Guide 1.58—Qualification of Nuclear Power Plant Inspection, Examination, and Testing Personnel. The regulatory position in this guide was that ANSI N45.2.6-1973 should be extended in scope to include pre-operational and startup testing and the operational phase of a nuclear power plant.

Accordingly, the N45-2.6 Work Group met to revise the Standard to satisfy Regulatory Guide 1.58 and to make other improvements in the Standard, especially with regard to education and experience considerations. The Standard contained herein was developed from these activities.

In 1975, the N45-2 Subcommittee was reorganized into the ASME Committee on Nuclear Quality Assurance and began operating under the accredited ASME Procedures for Nuclear Projects which received accreditation on January 15, 1976. The ASME Committee on Nuclear Quality Assurance was chartered to develop the overall nuclear quality assurance codes and standards for nuclear power plant design, construction, and operation.

Suggestions for improvement gained in the use of this Standard will be welcomed. They should be sent to the Secretary, Committee on Nuclear Quality Assurance, American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, NY 10017.

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AMERICAN NATIONAL STANDARD

QUALIFICATIONS OF INSPECTION, EXAMINATION AND TESTING PERSONNEL FOR NUCLEAR POWER PLANTS**1. INTRODUCTION****1.1 Scope**

This Standard delineates the requirements for the qualification of personnel who perform inspection, examination, and testing to verify conformance to specified requirements of nuclear power plant items (structures, systems, and components of nuclear power plants) whose satisfactory performance is required to prevent postulated accidents which could cause undue risk to the health and safety of the public; or to mitigate the consequences of such accidents if they were to occur. The requirements may also be extended to other items of nuclear power plants when specified in contract documents.

1.2 Applicability

The requirements of this Standard apply to personnel who perform inspections, examinations, and tests during fabrication prior to and during receipt of items at the construction site, during construction, during preoperational and startup testing, and during operational phases of nuclear power plants. 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 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. The requirements of this Standard are optional, at the discretion of the employer, for application to personnel who perform calibration or to craftsmen who perform installation checkouts as part of their basic installation responsibility to ready the installation for preoperational testing.

This Standard is to be used in conjunction with ANSI N45.2.

The requirements apply to personnel of the owners, architect-engineers, nuclear power plant system designers and system suppliers, plant designers and plant constructors, equipment suppliers, outside testing agencies, and consultants. 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.

1.3 Responsibility

It is the responsibility of each organization participating in the project to assure that only those personnel within their respective organizations who meet the requirements of this Standard are permitted to perform inspection, examination, and testing activities covered by this Standard that verify conformance to quality requirements.

The organization or organizations responsible for establishing the applicable requirements for activities covered by this Standard shall be identified and the scope of their responsibility shall be documented. The work of establishing selection and training practices and qualification procedures and of providing the resources in terms of personnel, equipment, and services necessary to implement the requirements of this Standard, may be delegated to other qualified organizations and such delegations shall also be documented. It is the responsibility of each organization using personnel covered by this Standard to conform to the requirements of this Standard applicable to the organization's work.

It is the responsibility of the organization performing these activities to specify the detailed methods and procedures for meeting the requirements of this

Standard, unless they are specified in the contract documents.

1.4 Definitions

1.4.1 Inspection. A phase of quality control which by means of examination, observation, or measurement determines the conformance of materials, supplies, parts, components, appurtenances, systems, processes, or structures to predetermined quality requirements.

1.4.2 Examination. An element of inspection consisting of investigation of materials, supplies, parts, components, appurtenances, systems, processes, or structures to determine conformance to those specified requirements which can be determined by such investigation. Examination is usually nondestructive and includes simply physical manipulation, gaging, and measurement.

1.4.3 Testing. The determination or verification of the capability of an item to meet specified requirements by subjecting the item to a set of physical, chemical, environmental, or operating conditions.

1.4.4 Refer to ANSI N45.2.10 for other definitions to be used in conjunction with this Standard.

1.5 Referenced Documents

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 issue or edition of the referenced document that is required will be specified either at the point of reference or in Section 6 of this Standard.

2. GENERAL REQUIREMENTS

2.1 Planning

Plans shall be developed for staffing, indoctrination, and training of an adequate number of personnel to perform the required inspections, examinations, and tests and shall reflect the schedule of project activity so as to allow adequate time for assignment or selection and training of the required personnel.

2.1.1 Indoctrination. Provisions shall be made for the indoctrination of personnel as to the technical objectives of the project; the codes and standards that are to be used; and the quality assurance elements that are to be employed.

2.1.2 Training. The need for formal training programs shall be determined, and such training activities shall be conducted as required to qualify personnel who perform inspections, examinations, and tests. On-the-job participation shall also be included in the program, with emphasis on first-hand experience gained through actual performance of inspections, examinations, and tests. Records of training, when used as the basis for certification, shall be maintained.

2.2 Determination of Initial Capability

The capabilities of a candidate for certification shall be initially determined by a suitable evaluation of the candidate's education, experience, training, test results, or capability demonstration.

2.3 Evaluation of Performance

The job performance of inspection, examination, and testing personnel shall be reevaluated at periodic intervals not to exceed three years. Reevaluation shall be by evidence of continued satisfactory performance or redetermination of capability in accordance with Subsection 2.2. If, during this evaluation or at any other time, it is determined by the responsible organization that the capabilities of an individual are not in accordance with the qualifications specified for the job, that person shall be removed from that activity until such time as the required capability has been demonstrated.

Any person who has not performed inspection, examination, or testing activities in his qualified area for a period of one year shall be reevaluated by a re-determination of required capability in accordance with Subsection 2.2.

2.4 Written Certification of Qualification

The qualification of personnel shall be certified in writing in an appropriate form, including the following information:

- (1) employer's name
- (2) identification of person being certified
- (3) level of capability
- (4) activities certified to perform
- (5) basis used for certification, including:
 - (a) records of education, experience and training
 - (b) test results, where applicable
 - (c) results of capability demonstration
- (6) results of periodic evaluations

- (7) results of physical examinations, when required
- (8) signature of employer's designated representative
- (9) date of certification and date of certification expiration

2.5 Physical

The responsible organization shall identify any special physical characteristics needed in the performance of each activity. Personnel requiring these characteristics shall have them verified by examination at intervals not to exceed one year.

3. QUALIFICATIONS

3.1 General

The requirements contained within this Section define the minimum capabilities that qualify personnel to perform inspections, examinations, and tests which are within the scope of this Standard.

There are three levels of qualification. The requirements for each level are not limiting with regard to organizational position of professional status, but rather, are limiting with regard to functional activities which are within the scope of this Standard.

3.2 Level I Personnel Capabilities

A Level I person shall be capable of performing the inspections, examinations, and tests that are required to be performed in accordance with documented procedures and/or industry practices. The individual shall be familiar with the tools and equipment to be employed and shall have demonstrated proficiency in their use. The individual shall also be capable of determining that the calibration status of inspection and measuring equipment is current, that the measuring and test equipment is in proper condition for use, and that the inspection, examination, and test procedures are approved.

3.3 Level II Personnel Capabilities

A Level II person shall have all of the capabilities of a Level I person for the inspection, examination or test category or class in question. Additionally, a Level II person shall have demonstrated capabilities in planning inspections, examinations, and tests; in setting up tests including preparation and set-up of related equipment, as appropriate; in supervising or maintaining surveillance over the inspections, exami-

nations, and tests; in supervising and certifying lower level personnel; in reporting inspection, examination, and testing results; and in evaluating the validity and acceptability of inspection, examination, and test results.

3.4 Level III Personnel Capabilities

A Level III person shall have all of the capabilities of a Level II person for the inspection, examination or test category or class in question. In addition, the individual shall also be capable of evaluating the adequacy of specific programs used to train and test inspection, examination, and test personnel whose qualifications are covered by this Standard.

3.5 Education and Experience—Recommendations

The following is the recommended personnel education and experience for each level. These education and experience recommendations should be treated to recognize that other factors may provide reasonable assurance that a person can competently perform a particular task. Other factors which may demonstrate capability in a given job are previous performance or satisfactory completion of capability testing.

3.5.1 Level I

- (1) Two years of related experience in equivalent inspection, examination, or testing activities, or
- (2) High school graduation and six months of related experience in equivalent inspection, examination, or testing activities, or
- (3) Completion of college level work leading to an Associate Degree in a related discipline plus three months of related experience in equivalent inspection, examination, or testing activities.

3.5.2 Level II

- (1) One year of satisfactory performance as Level I in the corresponding inspection, examination or test category or class, or
- (2) High school graduation plus three years of related experience in equivalent inspection, examination, or testing activities, or
- (3) Completion of college level work leading to an Associate Degree in a related discipline plus one year related experience in equivalent inspection, examination, or testing activities, or

(4) Four-year college graduation plus six months of related experience in equivalent inspection, examination, or testing activities.

3.5.3 Level III

(1) Six years of satisfactory performance as a Level II in the corresponding inspection, examination or test category or class, or

(2) High school graduation plus ten years of related experience in equivalent inspection, examination, or testing activities; or high school graduation plus eight years experience in equivalent inspection, examination, or testing activities, with at least two years as Level II, and with at least two years associated with nuclear facilities—or if not, at least sufficient training to be acquainted with the relevant quality assurance aspects of a nuclear facility, or

(3) Completion of college level work leading to an Associate Degree and seven years of related experience in equivalent inspection, examination, or testing activities, with at least two years of this experience associated with nuclear facilities—or if not, at least sufficient training to be acquainted with the relevant quality assurance aspects of a nuclear facility, or

(4) Four-year college graduation plus five years of related experience in equivalent inspection, examination, or testing activities, with at least two years of this experience associated with nuclear facilities—or if not, at least sufficient training to be acquainted with the relevant quality assurance aspects of a nuclear facility.

4. PERFORMANCE

Personnel who are assigned the responsibility and authority to perform functions covered by this Standard shall have, as a minimum, the level of capability shown in Table 1. 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.

5. RECORDS

A file of records of personnel qualification shall be established and maintained by the employer. Collection, storage, and control of records required by this Standard shall be in accordance with ANSI N45.2.9.

6. REVISION OF ANSI STANDARDS REFERRED TO IN THIS DOCUMENT

When any of the Standards referred to in this document is superseded by a revision approved by ANSI, the revision is not mandatory until it has been incorporated as part of a contract.

Revisions to this Standard issued after the date of a specific contract invoking this Standard may be used by mutual consent of the purchaser and the supplier.

Table 1 Minimum Levels of Capability for Project Functions

Project Function	Level		
	L-I	L-II	L-III
Recording inspection, examination, and testing data*	X	X	X
Implementing inspection, examination, and testing procedures	X	X	X
Planning inspections, evaluations, and tests; setting up tests including preparation and set-up of related equipment		X	X
Evaluating the validity and acceptability of inspection, examination, and testing results		X	X
Reporting inspection, examination, and testing results		X	X
Supervising equivalent or lower level personnel		X	X
Qualifying lower level personnel		X	X
Evaluating the adequacy of specific programs used to train and test inspection, examination and testing personnel			X
Qualifying same level personnel			X

*Except as exempted by Section 4 of this Standard.