ASME NQA-1–2004
(Revision of ASME NQA-1–2000)

Quality Assurance Requirements for Nuclear Facility Applications

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

ASME NQA-1–2004

(Revision of ASME NQA-1–2000)

Quality Assurance Requirements for Nuclear Facility Applications

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

Three Park Avenue • New York, NY 10016

Date of Issuance: December 22, 2004

The 2004 edition of this Standard is being issued with an automatic addenda subscription service. The use of an addenda allows revisions made in response to public review comments or committee actions to be published on a regular yearly basis; revisions published in addenda will become effective 6 months after the Date of Issuance of the addenda. The next edition of this Standard is scheduled for publication in 2007.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. The interpretations will be included with the above addenda service.

The American Society of Mechanical Engineers
Three Park Avenue, New York, NY 10016-5990

CONTENTS

(A detailed Contents precedes each NQA Part.)

(04)

FOREWORD

Early in 1975, the American National Standards Institute (ANSI) assigned overall responsibility for coordination among technical societies and development and maintenance of nuclear power quality assurance standards to the American Society of Mechanical Engineers (ASME). The ASME Committee on Nuclear Quality Assurance was constituted on October 3, 1975, and began operating under the ASME Procedures for Nuclear Projects. The ASME Committee on Nuclear Quality Assurance currently operates under the ASME Operating Procedures and Practices for Nuclear Codes and Standards Development Committees. This Committee prepared ANSI/ASME NQA-1, Quality Assurance Program Requirements for Nuclear Power Plants, and ANSI/ASME NQA-2, Quality Assurance Requirements for Nuclear Power Plants, which were first issued in 1979 and 1983, respectively, as American National Standards.

NQA-1-1979 was based upon the contents of ANSI/ASME N45.2-1977, Quality Assurance Program Requirements for Nuclear Facilities; ANSI N46.2, Revision 1, Quality Assurance Program Requirements for Post Reactor Nuclear Fuel Cycle Facilities; and the following seven daughter Standards of ANSI/ASME N45.2:

N45.2.6-1978	Qualifications of Inspection, Examination, and Testing Personnel for Nuclear Power Plants
N45.2.9-1979	Requirements for Collection, Storage, and Maintenance of Quality Assurance Records for Nuclear Power Plants
N45.2.10-1973	Quality Assurance Terms and Definitions
N45.2.11-1974	Quality Assurance Requirements for the Design of Nuclear Power Plants
N45.2.12-1977	Requirements for Auditing of Quality Assurance Programs for Nuclear Power Plants
N45.2.13-1976	Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants
N45.2.23-1978	Qualification of Quality Assurance Program Audit Personnel for Nuclear Power Plants

Since the 1979 Edition was issued, NQA-1 was revised and published in 1983, 1986, 1989, 1994, 1997, and 2000. From its initial publication in 1979, the Standard has retained the 18-criteria structure of 10 CFR 50 Appendix B in a portion of the document. For this edition, Part I is organized by the 18-criteria structure and is intended to meet and implement the criteria of 10 CFR 50 Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants, dated January 20, 1975.

The ASME NQA-2-1983 standard incorporated the requirements of the following quality assurance Standards not included in ASME NQA-1:

N45.2.1-1980	Cleaning of Fluid Systems and Associated Components for Nuclear Power Plants
N45.2.2-1978	Packaging, Shipping, Receiving, Storage, and Handling of Items for Nuclear Power Plants
N45.2.3-1973 (R1978)	Housekeeping During the Construction Phase of Nuclear Power Plants
N45.2.5-1978	Supplementary Quality Assurance Requirements for Installation, Inspection, and Testing of Structural Concrete, Structural Steel, Soils, and Foundations During the Construction Phase of Nuclear Power Plants
N45.2.8-1975 (R1980)	Supplementary Quality Assurance Requirements for Installation, Inspection and Testing of Mechanical Equipment and Systems for the Construction Phase of Nuclear Power Plants
N45.2.15-1981	Hoisting, Rigging, and Transporting of Items for Nuclear Power Plants

In 1984, the NQA Committee initiated work to expand the Standard to address quality assurance program requirements appropriate to site characterization of high-level nuclear waste repositories. This effort resulted in the preparation of a new standard, ASME NQA-3, Quality Assurance Program Requirements for the Collection of Scientific and Technical Information for Site Characterization of High-Level Nuclear Waste Repositories, which was issued in 1989.

The NQA Committee has regularly updated and revised the Standards since the 1979 Edition was issued to improve its utility and value to the nuclear industry. In the early 1990s, the NQA Committee recognized that the NQA-1, NQA-2, and NQA-3 standards were not easily understood and applied by all users, and some potential users were not selecting NQA-1 and NQA-2 as their Standard of choice. The Committee decided to restructure the NQA Standards into a single multipart document that would improve the clarity of the standard, allow more rapid response to varied applications of NQA requirements and guidance, and provide a performance-based focus. The restructured requirements, guidance, and applications appendices facilitate judicious application of the entire Standard or portions of the Standard to the wide variety of work encountered by today's nuclear industry. The new structure aids improved understanding and supports effective implementation of the requirements, continues to address quality assurance program compliance aspects, and adds focus on quality results.

This multipart Standard, issued initially as NQA-1-1994, includes requirements and nonmandatory guidance to establish and implement a quality assurance program for any nuclear facility application. Part I contains quality assurance program requirements for the siting, design, construction, operation, and decommissioning of nuclear facilities. Part II contains quality assurance requirements for the planning and conducting of the fabrication, construction, modification, repair, maintenance, and testing of systems, components, or activities for nuclear facilities. Part III contains nonmandatory guidance and application appendices previously included in NQA-1, NQA-2, and NQA-3. Part IV contains NQA position papers, application matrices for users, cross-reference comparisons to NQA, and other quality program information.

The arrangement of the requirements in Part I (from former NQA-1), requirements for work practices in Part II (from former NQA-2), and nonmandatory guidance and applications appendices in Part III (from former NQA-1 and NQA-2) permits judicious application of the entire Standard or portions of the Standard. If this edition (or post-1994 edition or addenda) is invoked by a procurement document or contract, only Parts I and II should be considered requirements as applicable, unless other specific Parts, Subparts, or Appendices of NQA-1 are specified. The guidance in Part III is not intended to be automatically imposed as supplemental requirements. The extent to which this Standard should be applied will depend upon the specific type of nuclear facility, items, or services involved and the nature and scope and the relative importance of the activities being performed. The extent of application is to be determined by the organization imposing the Standard. For example, the organization may invoke all requirements, selected requirements, or requirements with appropriate changes. Part III is intended to provide explanatory information and guidance for use by organizations in developing and implementing their programs. It also provides examples of methods for implementing the requirements of Parts I and II. Other methods may be equally suitable. The Standard may be applied to any structure, system, component, or activity that is essential to the satisfactory performance of the facility. The Standard may also be applied to a structure, system, component, or activity independent of a facility if its satisfactory performance is essential.

The NQA Committee is aware of, and actively endorses, the growing worldwide movement toward rational, cost-effective quality assurance practices — practices that focus on results. Therefore, changes considered necessary to improve the understanding and effective implementation have been made that are intended to address compliance aspects with a focus on results. To assure consistency with outside activities of a similar nature, the Committee is maintaining liaison with other national and international groups that have a similar interest.

Requests for interpretation or suggestions for improvement of this Standard should be addressed to the Secretary of the ASME Committee on Nuclear Quality Assurance, The American Society of Mechanical Engineers, Three Park Avenue, New York, NY 10016-5990.

(04)

PREPARATION OF TECHNICAL INQUIRIES TO THE NUCLEAR QUALITY ASSURANCE COMMITTEE

INTRODUCTION

The ASME Nuclear Quality Assurance Committee will consider written requests for interpretations and revisions to NQA Standards and develop new requirements or guidance if dictated by technological development. The Committee's activities in this regard are limited strictly to interpretations of the requirements and guidance, or to the consideration of revisions to the present Standard on the basis of new data or technology. As a matter of published policy, ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, specific organizations, individual titles, or activity and, accordingly, inquiries requiring such consideration will be returned. Moreover, ASME does not act as a consultant for specific engineering problems or for the general application or understanding of the Standard requirements. If, based on the inquiry information submitted, it is the opinion of the Committee that the inquirer should seek assistance, the inquiry will be returned with the recommendation that such assistance be obtained.

All inquiries that do not provide the information needed for the Committee's full understanding will be returned.

INQUIRY FORMAT

Inquiries shall be limited strictly to interpretations of the requirements and guidance, or to the consideration of revisions to the present Standard on the basis of new data or technology.

Inquiries shall be submitted in the following format:

(a) Scope. The inquiry shall involve a single requirement/guidance or closely related requirements/guidance. An inquiry letter concerning unrelated subjects will be returned.

(b) Background. State the purpose of the inquiry, which would be either to obtain an interpretation of the Standard or to propose consideration of a revision to the present Standard. Provide the information needed for the Committee's understanding of the inquiry concisely, being sure to include reference to the applicable Standard, Edition, Addenda, Requirements, Parts, Subparts, Appendices, paragraphs, figures, and tables. If illustrations are provided, they shall be limited to the scope of the inquiry.

(c) Inquiry Structure

(1) Proposed Question(s). The inquiry shall be stated in a condensed and precise question format, omitting superfluous background information, and, where appropriate, composed in such a way that "yes" or "no" (perhaps with provisos) would be an acceptable reply. The inquiry statement should be technically and editorially correct.

(2) Proposed Reply(ies). State what it is believed that the Standard requires. If, in the inquirer's opinion, a revision to the Standard is needed, recommended wording shall be provided.

(d) Submittal. The inquiry shall be submitted in typewritten form; however, legible, handwritten inquiries will be considered. It shall include the name and mailing address and telephone number of the inquirer and be mailed to the following address:

Secretary
ASME Nuclear Quality Assurance Committee
Nuclear Department
Three Park Avenue
New York, NY 10016-5990

COMMITTEE ON NUCLEAR QUALITY ASSURANCE

(As of September 1, 2003)

STANDARDS COMMITTEE

J. G. Adkins, *Chair*
T. E. Dunn, *Vice Chair*
R. F. Hartstern, Jr., *Vice Chair*
S. J. Rossi, *Secretary*
J. W. Anderson
N. R. Barker
S. A. Bernsen
R. J. Blauw
D. A. Brown
J. M. Case
R. W. Clark
T. R. Colandrea
G. Danielson
D. H. Dorman
M. C. Eagle
B. Evans
R. J. Fitzgerald
M. A. Gavett
D. A. Harmon
H. H. Hoffman
D. Jennings
N. C. Kazanas
H. J. Kirschenmann
H. G. Kitchen
M. E. Langston
J. W. McIntyre
N. P. Moreau
C. H. Moseley, Jr.
T. Muraki
M. F. Nicol
T. V. Sarma
R. C. Schrotke, Jr.
M. E. Smith
W. K. Sowder
J. R. Yanek
J. A. Perry, *Honorary Member*

EXECUTIVE COMMITTEE

T. E. Dunn, *Chair*
R. F. Hartstern, Jr., *Vice Chair*
S. J. Rossi, *Secretary*
J. G. Adkins
G. Danielson
D. Jennings
M. F. Nicol
T. V. Sarma
R. C. Schrotke, Jr.
W. K. Sowder

Subcommittee on Applications

G. Danielson, *Chair*
J. J. Connelly, *Vice Chair*
M. E. Smith, *Secretary*
J. W. Anderson
M. A. Gavett
D. L. Hofmann
D. O. Lee
N. J. Linarez-Royce
R. C. Schrotke, Jr.
W. R. Smith

Subcommittee on Assessment and Verification

T. V. Sarma, *Chair*
M. E. Langston, *Vice Chair*
N. R. Barker, *Secretary*
S. A. Bernsen
R. J. Fitzgerald
J. Gutierrez
R. A. Jacobus
N. C. Kazanas
J. W. McIntyre
J. J. Pearson
D. L. Robinson
T. T. Suzuki
R. J. Vurpillat, Jr.

Subcommittee on Engineering and Procurement Processes

R. C. Schrotke, Jr., *Chair*
R. J. Blauw, *Vice Chair*
S. B. Ailes, *Secretary*
J. G. Adkins
K. W. Brayman
W. J. Bryan
T. Carter
J. M. Case
G. F. Deaton
T. E. Dunn
D. A. Harmon
M. L. Hermanson
H. H. Hoffman
C. R. Martin
P. T. McManus
N. P. Moreau
D. W. Mowery, Sr.
T. Muraki
R. W. Wells
J. R. Yanek

Subcommittee on Interfaces and Administration

W. K. Sowder, *Chair*
C. H. Moseley, Jr., *Secretary*
D. A. Brown
R. R. Cerzosimo
G. Danielson
O. P. Gormley
R. A. Sacco

Subcommittee on Program Management Processes

D. Jennings, *Chair*
H. J. Kirschenmann, *Vice Chair*
J. L. Day, *Secretary*
J. E. Bergstrom
L. L. Campbell
B. Evans
R. F. Hartstern, Jr.
K. A. Morrell
E. Schwartz
D. A. Winchester

Subcommittee on Waste Management

M. F. Nicol, *Chair*
P. L. Bussolini, *Vice Chair*
S. H. Horton, *Secretary*
D. A. Armour
A. E. Bradford
R. W. Clark
T. R. Colandrea
M. C. Eagle
J. M. Floyd
H. G. Kitchen
R. J. Laskey
M. L. Matthews
G. Olson
C. L. Pittiglio, Jr.
F. J. Schelling

ASME NQA-1–2004
SUMMARY OF CHANGES

Following approval by the Standards Committee of the Committee on Nuclear Quality Assurance, and after public review, ASME NQA-1–2004 was approved by the American National Standards Institute on November 8, 2004.

ASME NQA-1–2004 includes revisions, corrections, and editorial changes introduced in ASME NQA-1a–2002, as well as the following changes identified by a margin note, **(04)**, placed next to the affected area.

Page	*Location*	*Change*
iv, v	Foreword	Revised in its entirety
vi	Preparation of Technical Inquiries to the Nuclear Quality Assurance	Introduction revised
4–6	Part I, Introduction	Revised
9	Requirement 2, 303.3	Revised
11	Requirement 3, 300	In subparas. (c)(1), (2), (3), and the last paragraph, "characteristics" has been revised to read "critical characteristics"
12	Requirement 3, 500	Subparagraph (a) revised
13, 14	Requirement 3, 801.4	Revised
19–21	Requirement 7, 700	Revised in its entirety
27	Requirement 12	Revised in its entirety
28	Requirement 13, 400	Revised
39	Part II, Introduction, 700	Revised
40–43	Table 700	Formerly undesignated table, designated as Table 700 and revised
47	Subpart 2.1, 304.1	Revised
48	Subpart 2.1, Table 302.5	Redesignated and editorially revised
49	Subpart 2.1, Table 304.1	Revised
98	Subpart 2.16	Revised
139–142	Nonmandatory Appendix 7A-2	Revised in its entirety
150	Nonmandatory Appendix 17A-1, 204	Paragraphs 204.2 through 204.6 redesignated as 204.1.1 through 204.1.5, respectively
152–154	Nonmandatory Appendix 18A-1, 100	Revised
	Nonmandatory Appendix 18A-1, 600	Revised

Page	*Location*	*Change*
161	Nonmandatory Appendix 2.18A	Redesignated (formerly Appendix 2.18)
162, 163	Nonmandatory Appendix 2.18B	Added
166, 167	Nonmandatory Appendix 3.1	Added
180	Subpart 4.2, Table 600	Revised
184–197	Subpart 4.3	Added
198, 199	Subpart 4.4	Added
200–205	Subpart 4.5	Added

SPECIAL NOTE:

The interpretations to ASME NQA-1–2004 are included as a separate section for the user's convenience.

PART I: REQUIREMENTS FOR QUALITY ASSURANCE PROGRAMS FOR NUCLEAR FACILITIES
(FROM FORMER NQA-1)

CONTENTS

(04)

PART I
INTRODUCTION

This Standard reflects industry experience and current understanding of the quality assurance requirements necessary to achieve safe, reliable, and efficient utilization of nuclear energy, and management and processing of radioactive materials. The Standard focuses on the achievement of results, emphasizes the role of the individual and line management in the achievement of quality, and fosters the application of these requirements in a manner consistent with the relative importance of the item or activity.

100 PURPOSE

This Part sets forth requirements for the establishment and execution of quality assurance programs during siting, design, construction, operation, and decommissioning of nuclear facilities. Nonmandatory guidance is provided in the Appendices in Part III.

200 APPLICABILITY

The requirements of Part I apply to activities that could affect the quality of nuclear material applications, structures, systems, and components of nuclear facilities. Examples of nuclear facilities are facilities for power generation, spent fuel storage, waste management, fuel reprocessing, nuclear material processing, fuel fabrication, and other related facilities. Activities include siting, designing, procuring, fabricating, constructing, handling, shipping, receiving, storing, cleaning, erecting, installing, inspecting, testing, operating, maintaining, repairing, refueling, modifying, and decommissioning. The application of this Part, or portions thereof, shall be invoked by written contracts, policies, procedures, specifications, or other appropriate documents.

300 RESPONSIBILITY

The organization invoking this Part shall be responsible for specifying which requirements, or portions thereof, apply, and appropriately relating them to specific items and services. The organization implementing this Part, or portions thereof, shall be responsible for complying with the specific requirements to achieve quality results.

400 TERMS AND DEFINITIONS

The following definitions are provided to assure a uniform understanding of select terms as they are used in this Part.

acceptance criteria: specified limits placed on the performance, results, or other characteristics of an item, process, or service defined in codes, standards, or other requirement documents.

audit: a planned and documented activity performed to determine by investigation, examination, or evaluation of objective evidence the adequacy of and compliance with established procedures, instructions, drawings, and other applicable documents, and the effectiveness of implementation. An audit should not be confused with surveillance or inspection activities performed for the sole purpose of process control or product acceptance.

Certificate of Conformance: a document signed or otherwise authenticated by an authorized individual certifying the degree to which items or services meet specified requirements.

certification: the act of determining, verifying, and attesting in writing to the qualifications of personnel, processes, procedures, or items in accordance with specified requirements.

characteristic: any property or attribute of an item, process, or service that is distinct, desirable, and measurable.

commercial grade item:[1] an item satisfying the following:

(a) not subject to design or specification requirements that are unique to those facilities or activities

(b) used in applications other than those facilities or activities

(c) to be ordered from the manufacturer/supplier on the basis of specifications set forth in the manufacturer's published product description (e.g., a catalog)

commercial grade item: [2] a structure, system, or component, or part thereof, that affects its safety function, that was not designed and manufactured in accordance with the requirements of this Standard.

[1] This definition is applicable to facilities and activities other than nuclear power plants licensed pursuant to 10 CFR Part 50.

[2] These definitions are for nuclear power plants pursuant to 10 CFR Part 50 and also provides sufficient quality criteria for facilities identified in Part I, Introduction.

PART II: QUALITY ASSURANCE REQUIREMENTS FOR NUCLEAR FACILITY APPLICATIONS

CONTENTS

PART II
INTRODUCTION

100 PURPOSE

Part II supplements the quality assurance requirements of Part I for the planning and execution of identified tasks during siting, design, construction, operation, and decomissioning of nuclear facilities. Applicable nonmandatory guidance for various subparts is provided in Part III.

200 APPLICABILITY

An appropriate quality assurance program, based on the nature and scope of the work to be performed and the relative importance of the items or services, shall be specified in contractual documents by selective applications of portions of Part I for programmatic activities and of this Part for work-oriented activities. The requirements of this Part (Part II) apply to siting, design, construction, operation, and decommissioning activities that affect the quality of structures, systems, and components for nuclear facilities. These activities include the performing function of attaining quality objectives and verifying that activities affecting quality have been correctly performed. These activities include planning, siting investigation, designing, procuring, fabricating, handling, shipping, storing, cleaning, erecting, installing, inspecting, testing, operating, maintaining, repairing, modifying, and decommissioning. To the extent applicable to the activities being performed, the application of this Part, or portions thereof, and the provisions of Part I shall be specified in written contracts, policies, procedures, or instructions.

300 RESPONSIBILITY

The organization invoking this Part shall be responsible for specifying which section, or portions thereof, apply and appropriately relating them to specific items and services. To the extent necessary, this organization shall invoke the applicable provision of Part I to specify a complete quality assurance program appropriate for the specific items or services.

The organization upon which this Part, or portions thereof, is invoked shall be responsible for complying with the specified requirements.

400 PLANNING AND PROCEDURES

401 Planning

A plan shall be developed outlining the work to be performed and the work procedures or instructions required to comply with the requirements of the defined work scope.

Planning for activities such as fabrication, installation, operation, modification, repair, maintenance, decommissioning, inspection, testing, and software verification and validation shall include a review of structure, system or component design and procurement specifications, materials lists, drawings, construction work plans, and schedules to ensure that appropriate activities have been incorporated; that the work can be accomplished as specified; and that time and resources, plus training, are sufficient to accomplish the work in accordance with the specified requirements.

Planning shall define the operations to be performed, the systematic sequential progression of operations, and the overall measures to be employed to preserve the quality of the work.

402 Procedures

Procedures and work instructions identified during planning shall be prepared. Preparation and approval of the procedures/instructions shall be in advance of the need to use the documents. The documents shall be kept current and revised as necessary to assure that the work is performed in accordance with the latest approved information.

The documents shall include the following as applicable:

(a) personnel safety and structure or facility protection considerations

(b) precautions to be observed

(c) work requirements such as those included in specifications, procedures, and instructions for performing an activity

(d) sequence of activities to be followed and steps within a given activity

(e) prerequisites

(f) software verification and validation, test and inspection objectives

(g) special equipment required

(h) identification of inspection and test equipment and related calibration requirements including recalibration dates

(i) sequence and frequency of activities for verifying

(j) acceptance criteria and methods for verifying

(k) responsibility and required qualifications of personnel

(l) approvals and authorizing or verifying signatures