



ASME NQA-1 Quality Assurance Requirements for Nuclear Facility Applications

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ASME NQA-1

- Due to the expansion of the global supply chain and advances in technology, many codes and standards and industry guidance have recently been updated and are being promoted as the penultimate in QA “standards”.
- These include
 - Standards from accredited Standards Developing Organizations such as ASME and ISO,
 - Guidance documents from treaty organizations such as IAEA, and
 - Recommended practices from commercial sources including consortiums of large suppliers and training organizations

ASME NQA-1

- Of all these competing documents, only one is endorsed by multiple regulatory bodies, only one has been tested through decades of safe reactor and facility operating experience, and only one serves as the basis of QA requirements for safety codes for the design and manufacture of critical, safety related structures, systems and components for all types of nuclear facilities – ASME NQA-1.

Definition

- ASME NQA-1 is a national consensus Standard published by ASME. The Standard is supported by a committee of industry and governmental volunteers that report to the ASME Board of Nuclear Codes and Standards. The Standard was developed under procedures accredited as meeting the criteria for a standard by the American National Standards Institute (ANSI). The Standard is developed using the consensus process that considers all inputs from all stakeholders.

Content

- The Standard reflects industry experience and current understanding of the QA requirements necessary to achieve safe, reliable and efficient utilization of nuclear energy, by
 - Focusing on the achievement of results,
 - Emphasizing the role of the individual and line management,
 - Maintaining criteria applicable to current technology, and
 - Applying the requirements in a manner consistent with the relative importance of the item to safety.

Application

- The Standard is intended to be invoked in written contracts, policies, procedures, specifications or other appropriate documents.
- The organization invoking the Standard shall be responsible for specifying which requirements, or portions thereof apply, and appropriately relating them to specific items and services.

NQA's Origins

- 10 CFR 50 Appendix B (1974) – A Federal law; necessarily broad enough to cover many approaches and technologies. Appendix B was too general to be implemented by itself
- N45.2 Committee(s) made up of a broad cross-section of stakeholders, developed lower tier detailed documents sufficient to implement the top tier requirements into two groups
- ANS N45.2 (QA and Administrative)
 - Became the core content of NQA-1 1979 ; then became “Part I QA Requirements” of NQA-1997
- ANS N45.2 (Work Practices)
 - Became core content of NQA-2 1983; was incorporated into a merged NQA-1 & NQA-2 in 1994 as “Part II Subparts”

NQA's Origin

- Early in 1975, the American National Standards Institute (ANSI) officially assigned overall responsibility for coordination among technical societies of the nuclear power quality assurance standards to the American Society of Mechanical Engineers (ASME).

NQA – 35 Years of Service

Editions

- 1979 - Initial publication
- 1983 - 1st endorsed by NRC
- 1994 - Reformatted Standard into 4 Parts
- 1997 - Major performance based revision
 - Merged NQA-1 with NQA-2 into NQA-1 (Parts I, II, III, IV)
- 2000 - Added industry experience
- 2004 - Experience and technology updates
- 2008 - Incorporation of NRC comments
- 2012 – Inclusion of new technology and practices
- 2014 – Inclusion of added industry experience
- 2016 – Moving to All Electronic formatting

Ongoing Incorporation of Industry Initiatives

- Enhancements to NQA reflect major industry initiatives:
 - Configuration Management
 - QA Controls for Computer Software
 - Dedication of Commercial Grade Items
 - Stronger Design Organization Controls
 - Details for Effective Corrective Action Programs
 - Quality Records in Electronic Media
- The concept of applying the requirements in a manner commensurate with the importance of the activity – in a graded fashion – has been fundamental since inception in 1979.
- Depending on the context of application, this can be through contract, specification or by description of scope in written QA Program descriptions.

A Description of NQA-1

NQA-1 is:

- A comprehensive set of quality assurance requirements and processes that support the health and safety of the public and workers in the utilization of nuclear energy
- Focused on activities that ultimately produce a design and components that can be relied upon for critical applications related to the use of nuclear energy.

NQA-1 is not:

- A total Quality management system description
- Not procurement “boiler plate” that furthers procurement for a few select vendors
- Not a Safety Guide recommendation from a treaty organization focused on non-proliferation

A Description of NQA-1

NQA-1 is:

- An ANSI accredited Standard maintained by a broad cross section of stakeholders through:
 - Open and announced meetings with auditable proceedings
 - Balance of Interest among members
 - Technical Inquiry and Interpretation process
 - Standard content determined by consensus process
 - Periodic re-affirmation

NQA-1 is not:

- A document published and controlled by suppliers, facility owners, registrars, or users
- Not subject to modification and dilution through objections by any one signatory to a treaty
- Specific to any process, i.e. design, fabrication, construction, operating, etc.

A Description of NQA-1

NQA-1 is:

- A U.S. federally endorsed way to meet the requirements of 10 CFR 50 Appendix B and DOE O 414.1 (10 CFR 830.120)
- A critical element of implementing the requirements of Part 21
- The base of quality requirements to meet the requirements of ASME Sec. III NCA 4134.xx
- Supports ASME Sec. IX and XI

NQA-1 is not:

- Procurement “boiler plate” for a few select vendors

A Description of NQA-1

NQA-1 is:

- One of the Nuclear Standards controlled by the ASME Board of Nuclear Codes and Standards
- An ANSI accredited publication subject to routine audit for compliance with the rules for standards developing organizations

NQA-1 is not:

- Controlled by for-profit vendors
- Marketed as a panacea for all global supply chain issues – past, present or future.

A Description of NQA-1

NQA-1 is:

- Well established and mature set of quality requirements ; validated through more than 35 years of nuclear experience in power generation, operation of other nuclear facilities and Code component manufacturing
- Maintained and updated to reflect current industry issues and emergent technologies
- Used by other non-nuclear industries for effective achievement of quality

NQA-1 is not:

- A new “magic bullet” looking for an undefined problem
- Subject to market place cost pressures

A Description of NQA-1

NQA-1 is:

- Quality Assurance requirements for components and activities that **must** be met in all phases and all aspects of all types of nuclear facilities
- Nonmandatory guidance for proven good practices for certain critical activities

NQA-1 is not:

- Prescriptive as to how a business entity is organized or works – that is left to the business to decide

A Description of NQA-1

NQA-1 is:

- A standard that requires objective evidence that technical specifications and quality requirements are met by final deliverables.
- A carefully integrated set of requirements and associated guidance that, when implemented ensures control and verification that critical activities have been completed.

NQA-1 is not:

- Dependent on customer satisfaction or continuous improvement or other commerce aspects that play no role in nuclear safety
- Not a “mash-up” of selected process steps from selected standards

A Description of NQA-1

NQA-1 is:

- A standard that supports not only a Safety Code (ASME Section III) but also applicable to fabrication and manufacture of components and items, performance of activities such as training, analysis, verification, etc. through the entire life cycle of nuclear facilities including design, procurement, fabrications, construction, testing and operations and decommissioning.

NQA-1 is not:

- Dependent on customer satisfaction or continuous improvement – NQA-1 requires ***objective evidence*** that technical specifications and requirements are met by final deliverables.
- Developed by a for profit organization

Future of NQA-1

NQA-1 is:

- Relied upon for assurance of the final quality of activities and items essential for safe operations in all nuclear endeavors in the US
- Reviewed for endorsement by US NRC, USDOE, and USEPA with the goal of assuring the health and safety of the public

NQA-1 is not:

- A static document dependent on the business climate for revision
- Incompatible with a quality management system such as ISO 9000 or IAEA GS-R3 **if** NQA-1 QA requirements are fully utilized for Product Realization of nuclear activities and items relied on for safety functions

Summary

- ASME NQA-1 and its base concepts have stood the test of time over 35 years for all types of nuclear facilities in the United States and anywhere in the world that ASME Section III components are relied upon
- US nuclear plants have an average fleet availability of > 94%; in part due to the implementation of the basic QA controls that are reflected in NQA-1; the health and safety of the public and workers has been protected by these same basic principles
- As challenges due the global supply chain continue, ASME NQA-1 will continue to provide assurance of safe nuclear operations
- ASME NQA-1 is not incompatible with Quality Management System Models if used as the requirements for Product Realization of Nuclear Components

QUESTIONS?