

ASME Nuclear Codes and Standards

Workshop Supporting New Build and Nuclear
Manufacturing in South Africa

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Nuclear Quality Assurance NCA-4000

ASME Section III Definitions

- **Quality Assurance** - as used in ASME Section III comprises of all those planned and systematic actions necessary to provide adequate confidence that the items designed and constructed are in accordance with the rules of Section III.
- **Quality Assurance Program** – A controlled system of planned and systematic actions required to provide adequate confidence that an item designed and constructed are in accordance with Code Requirements
- **Quality Assurance Manual** – A written document that describes a Quality Assurance Program

Quality Assurance Manual Structure

Quality Assurance Manual

(NCA-4134)(NCA-3853.1)

- Organization
- Quality Assurance Program
- Design Control
- Procurement Document Control
- Instructions, Procedures, and Drawings
- Document Control
- Control of Purchased Items and Services
- Identification and Control of Items
- Control of Process

Quality Assurance Manual

(NCA-4134)(NCA-3853.1) (cont.)

- Inspections
- Test Control
- Control of Measuring and Test Equipment
- Handling, Storage, and Shipping
- Inspection and Test Status
- Control of Nonconforming Items
- Corrective Action
- QA Records
- Audits

Types of Certificate Holders

(Table NCA-8100-1)

- N Certificate Holder – Vessel, Components, Piping Systems, Pumps, Storage Tanks,
- NV Certificate Holder – Relief Valves
- NPT Certificate Holder – Parts, Appurtenance, Welded Tube Products, Piping subassembly
- NA Certificate Holder – Assembly of all items

- NS Certificate Holder – Supports
- QSC Quality Systems Certificate Holder – Materials
- OWN Certificate for Nuclear Power Plant Owner

N-type Certificate Holders shall Comply with:

ANSI/ASME NQA-1-1994 Edition

“Quality Assurance Program Requirements for Nuclear Facilities”, except as modified and supplemented in NCA- 4120(b) and NCA-4134

NS, QSC and OWN Certificate Holders have different requirements

- NS Certificate Holders shall comply with NCA-3680 and NCA-4120(b)
- QSC Certificate Holders shall comply with NCA-3850
(No ANI Involvement and Code Stamping)
- OWN Certificate NCA-4000 except only need to supplement program filed with the Jurisdiction

Organization

(NCA-4134.1)(NCA-3851.3)

NQA-1, Basic Requirement 1, Supplement 1S-1

- Persons or organization shall have:
 - * Sufficient authority
 - * Access to work areas
 - * Organizational freedom

Quality Assurance Program

(NCA-4134.2)(NCA-3850)

NQA-1, Basic Requirement 2, Supplement 2S-1 and 2S-3

- The Quality Assurance Program shall identify the activities and items to which it applies:
 - Activities
 - Appropriate equipment
 - Environmental conditions
 - Indoctrination and Training
 - Audit personnel

Quality Assurance Program

(NCA-4134.2)(NCA-3850) (cont.)

- The Quality Assurance Manual shall also include a statement of *policy and authority* indicating management support, review and monitor of activities
- Nondestructive examination personnel qualification shall be to NB/NC/ND/NE/NF/NG/NH-5520 in lieu of NQA-1 Supplement 2S-2
- Control of Quality Assurance Manual
- Revision changes shall have the acceptance of the AIA's Nuclear Inspector Supervisor

Design Control

(NCA-4134.3)

NQA-1, Basic Requirement 3, Supplement 3S-1

The design shall define:

- Design Bases
- Performance requirements
- Regulatory requirements
- Codes and standards

Design Control

(NCA-4134.3) (cont.)

- The design shall be controlled:
 - Design process
 - Design analyses
 - Change control
 - Interface

Design Control

(NCA-4134.3) (cont.)

- Measures established to ensure design specification are translated into :
 - Specifications
 - Drawings
 - Procedures
 - Instructions
- The design documents shall be verified for:
 - Adequacy and compliance with the design specification

Procurement Document Control

(NCA-4134.4)(NCA-3855.4)

NQA-1, Basic Requirement 4, Supplement 4S-1

- The procurement documents issued at all tiers shall include:
 - Scope of work
 - Technical requirements
 - Quality Assurance requirements
 - Right of access
 - Documentation requirements
 - Nonconformances

Procurement Document Control

(NCA-4134.4))(NCA-3855.4) (cont.)

- Procurement documents shall require suppliers to provide a Quality Assurance Program consistent with the applicable requirements of Section III

Instruction, Procedures, & Drawings

(NCA-4134.5)(NCA-3853.2)

NQA-1, Basic Requirement 5

- Activities affecting quality shall be prescribed by and performed in accordance with:
 - Documented instruction
 - Procedures
 - Drawings shall include or reference the appropriate acceptance criteria

Document Control

(NCA-4134.6)(NCA-3853.3)

NQA-1, Basic Requirement 6, Supplement 6S-1

- The Quality Assurance Program shall address:
 - Document preparation
 - Approval
 - Minor and major changes
 - Issue and retrieval

Control of Purchased Items and Services

(NCA-4134.7)(NCA-3855)

NQA-1, Basic Requirement 7, Supplement 7S-1

- The control of items and services shall provide for the following:
 - Procurement planning
 - Supplier selection
 - Bid and performance evaluation
 - Control of suppliers' documents
 - Control of changes in items or services

Control of Purchased Items and Services

(NCA-4134.7)(NCA-3855) (cont.)

- The control of items and services shall provide for the following:
 - Acceptance of item or service
 - Nonconformances - Resolution to conform with this section

Control of Purchased Items and Services

(NCA-4134.7)(NCA-3855) (cont.)

- Not applicable in the procurement of Authorized Inspection Agencies
- Documentary evidence is required at site prior to installation or use
 - Material certification meeting NCA-3800 and NCA-3900
 - Data report for stamped items

Identification and Control of Items

(NCA-4134.8)(NCA-3856)

NQA-1, Basic Requirement 8, Supplement 8S-1

- Controls shall assure that correct and acceptable items are used or installed
- Identification methods:
 - Item identification
 - Physical identification
 - Marking
- Specific Requirements:
 - Limited life items
 - Stored items

Identification and Control of Items

(NCA-4134.8)(NCA-3856) (cont.)

- Welding materials shall be controlled for all classes
- A checklist shall be used for inspecting the attributes listed in the material specification
- Checklists SHALL include spaces for:
 - Inclusion of document numbers and revision to which examinations and tests were made
 - Signature, initials or stamp and date of examinations performed by Certificate Holder
 - Signature, initials or stamp and date on which activities were witnessed by the ANI.

Control of Processes

(NCA-4134.9)(NCA-3857)

NQA-1, Basic Requirement 9, Supplement 9S-1

- Processes shall be controlled by:
 - Instruction, procedures, drawings
 - Checklist, traveler, or other appropriate means
- Special process shall be performed in accordance with:
 - Instructions, referenced procedures
 - Personnel and equipment qualification requirement

Inspections

(NCA-4134.10)(NCA-3858)

NQA-1, Basic Requirement 10, Supplement 10S-1

- Inspection requirements to verify conformance of an item or activity shall be planned and executed. The QA Program shall include requirements for:
 - Personnel
 - Inspection hold points - No work shall proceed beyond the mandatory hold point without the consent of the Certificated Holder's Representative or the Authorized Nuclear Inspector , as appropriate.

Inspections

(NCA-4134.10)(NCA-3858) (cont.)

- Inspection planning
- In-process inspection
- Final inspection
- Inservice inspection
- Records

Inspections

(NCA-4134.10)(NCA-3858) (cont.)

- Travelers, checklists or process sheets shall be prepared for documenting inspection results including document numbers and revision for the inspection requirements
- Spaces shall be provided for signatures, initials or stamps for the Certificate Holder and the Authorized Nuclear Inspector

Test Control

(NCA-4134.11)(NCA-3858)

NQA-1, Basic Requirement 11, Supplement 11S-1

- The Quality Assurance Program shall address:
 - Test requirements
 - Test procedure
 - Test results
 - Records

Control of Measuring and Test Equipment

(NCA-4134.12)(NCA-3858.2)

NQA-1, Basic Requirement 12, Supplement 12S-1

- The Quality Assurance Program shall address:
 - Selection
 - Calibration and control
 - Handling and storage
 - Records

Control of Measuring and Test Equipment

(NCA-4134.12)(NCA-3858.2) (cont.)

- Periodic checks may be performed to determine that calibration is maintained
- When periodic checking is used, discrepancies need only be resolved to the prior check, provided that the discrepancy is discovered by the periodic check
- Method and frequency of periodic checking shall be specified in the Quality Assurance Program

Handling, Storage, and Shipping

(NCA-4134.13)(NCA-3857.4)

NQA-1, Basic Requirement 13, Supplement 13S-1

- The Quality Assurance Program shall provide requirements for:
 - Instructions
 - Special requirements (procedures, tools, and equipment, operators)
 - Marking
 - Records

Inspection & Test Status

(NCA-4134.14)(NCA-3858.4)

NQA-1, Basic Requirement 14

- The status of inspection and test activities shall be maintained through indicators, such as:
 - Physical location and tags
 - Marking
 - Traveler
 - Stamps
 - Inspection records
 - Other suitable means

Control of Nonconforming items

(NCA-4134.15)(NCA-3858.5)

NQA-1, Basic Requirement 15, Supplement 15S-1

- The Quality Assurance Program shall prescribe for control of nonconforming items. These controls shall provide for:
 - Identification
 - Evaluation
 - Segregation
 - Disposition
 - Notification

Corrective Action

(NCA-4134.16)(NCA-3859.2)

NQA-1, Basic Requirement 16

- Conditions adverse to quality shall be identified and corrected as soon as practical. Significant conditions adverse to quality shall:
 - Be reported to appropriate levels of management
 - Have the cause determined and corrective action taken
 - Have implementation verified

The requirements for corrective action shall also apply to the subcontractor's corrective action measures

Quality Assurance Records

(NCA-4134.17)(NCA-(NCA-3853.4)

NQA-1, Basic Requirement 17, Supplement 17S-1

- The Quality Assurance Program shall provide requirements for:
 - Records administration
 - Receipt
 - Storage, preservation, and safekeeping
 - Retrieval
 - Disposition

Quality Assurance Records

(NCA-4134.17)(NCA-(NCA-3853.4) (cont.)

- Indexing of records and accessible to the Owner, the Owner's designee and the Authorized Nuclear Inspector
- Reproduction of radiographs shall be subject to Owner's approval
- Accuracy of reproduction shall be the same as the original size
- Retention of Lifetime Records as listed in Table NCA-4134.17-1
- Retention of Nonpermanent Records as listed in Table NCA-4134.17-2

Audits

(NCA-4134.18)(NCA-3859.1)

NQA-1, Basic Requirement 18, Supplement 18S-1

- The Quality Assurance Program shall provide requirements for:
 - Scheduling and preparation
 - Performance and reporting
 - Response
 - Follow-up action
 - Records

Audits

(NCA-4134.18)(NCA-3859.1) (cont.)

NQA-1, Basic Requirement 18, Supplement 18S-1

- Audit shall be performed to verify compliance with all aspects of Quality Assurance Program and its effectiveness
- Results of audits shall be made available to the Authorized Nuclear Inspector
- Audit frequency shall be specified in the Quality Assurance Manual
- Each ongoing Code activity is to be audited at least once annually

Program Implementation

(NCA-8151)

- The Society (ASME) requires that an audit acceptable to the Society be performed at each shop or field site to assure that the Quality Assurance Program described in the Manual is implemented and enforced
- Authorization to apply a Code Symbol Stamp to an item will be granted only after a survey by the Society has satisfactorily demonstrated the adequacy and implementation of the Quality Assurance Program

ASME Survey Teams

ASME Survey Team for International
Manufacturers

ASME Team Leader
2 ASME Team Members
ANI Supervisor
ANI

ASME Survey Teams

ASME Survey Team for International
Manufacturers (Renewal)

ASME Team Leader

ASME Team Member

ANI Supervisor

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