# The National Board Body of Knowledge for the **Authorized Nuclear Inspector (ANI)**

SINCE 1919

Approved by: _____ 5-7-24

Executive Director — Approval Date

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# The National Board Body of Knowledge for the
# Authorized Nuclear Inspector (ANI)

The National Board has developed this Body of Knowledge to outline duties and responsibilities for individuals performing inspections during the construction phase of nuclear components, parts, and appurtenances in accordance with the *ASME Boiler and Pressure Vessel Code*.

## Objectives

An Inspector responsible for inspection of nuclear components, parts, and appurtenances during the construction phase should have knowledge, and the ability to apply that knowledge, of the following:

- Code Structure and Content
- Classification of Nuclear Items
- Responsibilities and Duties
- Quality Assurance Programs
- Verification of Design Documents
- Repair/Replacement Activities
- Material
- Fabrication
- Welding
- Nondestructive Examination
- Pressure Testing and Heat Treatment
- Overpressure Protection
- Calibration of Measurement and Test Equipment
- * Marking and Data Reports
- Record Retention

## * Reference Material

The following reference material is required to obtain and apply the knowledge of the listed objectives in this Body of Knowledge.

- ASME Section III, Divisions 1, 3, and 5, and Subsections NCA, NB, NCD
- ASME Section V, *Nondestructive Examination*
- ASME Section IX, *Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing and Fusing Operators*
- ASME QAI-1, *Qualifications for Authorized Inspection*
- ASME NQA-1, *Quality Assurance Requirements for Nuclear Facility Applications*
- ASNT SNT-TC-1A, *Personnel Qualification and Certification in Nondestructive Testing*
- NB-263, RCI-1, *Rules for Commissioned Inspectors*

## *Body of Knowledge Outline*

This outline provides information regarding the listed objectives of this Body of Knowledge, and further describes the duties and responsibilities of the Authorized Nuclear Inspector (ANI).

1. Code Structure and Content
   Understanding of *ASME Boiler and Pressure Vessel Code* structure and ability to locate the appropriate requirements within the Code books and related documents.

2. Classification of Nuclear Items
   Ability to identify nuclear components, parts, and appurtenances.

* 3. Responsibilities and Duties
   Understanding of the requirements for:
   - Authorized Inspection Agencies Personnel
   - Nuclear Facility Owners
   - Certificate Holders and Designers
   - Material Organizations and Approved Suppliers

4. Quality Programs
   Understanding of quality program elements as defined by:
* - ASME NCA-3300
   - ASME NCA-4000
   - ASME NQA-1

5. Verification of Design Documents
   Familiarity with the preparation, content, and approval of design documents, such as:
   - Design Specifications
   - Design Reports
   - Load Capacity Data Sheets
   - Design Report Summaries
* - Certifying Engineer (CE) Qualification Requirements

* 6. Material
   Ability to verify compliance of material in accordance with applicable Code requirements, such as:
   - Markings and Permitted Marking Methods
   - Material Certifications
   - Material Repairs
   - Examinations, Tests, and Treatments for Material (Charpy V-Notch Testing, and Drop Weight Testing)
   - Material Ordering
   - Unqualified Source Material

7. Fabrication

   Ability to verify compliance of fabrication and installation in accordance with applicable Code requirements, such as:

   - Cutting and Edge Preparation
   - Limits on Cold Forming
   - Limits on Out-of-Roundness for Shells
   - Tolerances on Heads
   - Alignment
   - Penetrations
* - Attachments

8. Welding

   Ability to verify compliance with welding requirements of the applicable code, such as:

   - Responsibilities
   - Permitted Welding Processes
   - Procedure Qualification Requirements
   - Welder Qualifications Requirements
   - Cleaning of Weld Surfaces
   - Alignment Tolerances
   - Repair of Weld Defects
   - Surface Weld Metal Buildup

9. Nondestructive Examination

   Ability to verify compliance for nondestructive examination (NDE), such as:

* - Examination Requirements and Acceptance Criteria
   - Fundamentals of Radiographic and Ultrasonic Methods
   - Procedure Qualification Requirements
   - Personnel Qualification Requirements
   - Reporting Requirements

* 10. Pressure Testing and Heat Treatment

   Ability to verify compliance and requirements for the following tests and treatments:

   - Heat Treatment
   - System, Component, Appurtunance, and Material Pressure Tests

11. Overpressure Protection

   Understanding of requirements for the overpressure protection, such as:

   - Types of Permitted Pressure Relief Devices
   - Capacity Certification
   - Performance Testing
   - Installation
   - Overpressure Protection Report
   - Marking, Stamping, and Data Reports

* 12.Calibration of Measurement and Test Equipment (M&TE)

Understanding of requirements for the calibration of M&TE which includes working and master standards, such as:

- Calibration Frequencies
- Calibration Methods
- Tolerances
- Identification
- Records

* 13.Certificates, Marking and Data Reports

Ability to determine data report and associated marking requirements which apply for a given type of construction/certificate.

14.Record Retention

Ability to determine record retention requirements per ASME Section III.