




**THE NATIONAL BOARD  
BODY OF KNOWLEDGE  
FOR**

**AUTHORIZED NUCLEAR  
INSERVICE INSPECTORS**

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Executive Director (date of approval)

\*Denotes Revisions

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# **THE NATIONAL BOARD**

## **BODY OF KNOWLEDGE FOR**

### **AUTHORIZED NUCLEAR INSERVICE INSPECTORS**

The National Board has developed this Body of Knowledge to outline duties and responsibilities for individuals performing inspections during the inservice examination and testing and repair/replacement of nuclear components, parts, systems, and appurtenances in accordance with the *ASME Boiler and Pressure Vessel Code*.

#### **OBJECTIVES**

An Inspector responsible for inspection of nuclear components, parts, systems, and appurtenances during inservice examination and/or repair/replacement activities 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
- Inservice Inspection Plan Documents
- Repair Replacement Activities
- Materials and Services
- Welding
- Nondestructive Examination
- Pressure Testing and Heat Treatment
- Calibration of Measurement and Test Equipment
- Radiation Health Physics
- ASME Section XI Certification Requirements
- Record Requirements

#### **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 V, *Nondestructive Examination*
- ASME Section IX, *Welding and Brazing Qualifications*
- ASME Section XI, *Rules for Inservice Inspection of Nuclear Power Plant Components*
- ASME QAI-1, *Qualifications for Authorized Inspection*
- ASME NQA-1, *Quality Assurance Requirements for Nuclear Facility Application*
- ASNT SNT-TC-1A, *Personnel Qualification and Certification in Nondestructive Testing*
- ASNT CP-189, *Standard for Qualification and Certification of Nondestructive Testing Personnel*
- Title 10 of the US Code of Federal Regulation, Part 50.55a Codes and Standards
- Title 10 of the US Code of Federal Regulation, Part 50, Appendix B, Quality Assurance requirements
- \*RCI-1, NB-263, *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 Inservice Inspector.

### *1. Code Structure and Content*

Understanding of *ASME Boiler and Pressure Vessel Code* book 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 Agency Personnel,
- Plant Owners,
- Repair/Replacement Organizations,
- Component and Part Manufacturers, and
- Material Organizations.

### *4. Quality Assurance Programs*

Understanding of quality control system elements as defined by:

- Owners,
- Certificate Holders,
- Repair/Replacement Organizations, and
- Material Organizations.

### *5. Inservice Inspection Plan Documents*

Familiarity with the preparation, content, and approval of Inservice Inspection Plan documents, such as:

- Implementation Schedule,
- Examination Categories and Items,
- Test and Examination Requirements,
- Examination Methods,
- Percentage of Parts Selected for Examinations,
- Disposition of Test Results,
- Test Type and Frequency, and
- Sequence of Successive Examinations.

### *6. Repair/Replacement Activities*

Ability to verify repair/replacement activities are performed in accordance with the Owner's Repair/Replacement Program requirements, as well as review the Repair/Replacement Program and its implementation.

### *7. Materials and Services*

Verify compliance of materials in accordance with applicable code requirements, such as:

- Markings and Permitted Marking Methods,
- Material Certifications,
- Material Repairs,
- Examinations, Tests, and Treatments for Material, and

- Procurement of Materials and Services.

#### 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, and
- Alternative ASME Section XI Welding Techniques.

#### 9. *Nondestructive Examination*

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

- NDE Requirements,
- Fundamentals of Visual, Eddy Current, Radiographic, and Ultrasonic Methods,
- Procedure Qualification Requirements,
- Inservice and Construction Code NDE Personnel Qualification Requirements, and
- NDE Reporting Requirements.

#### 10. *Pressure Testing and Heat Treatment*

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

- Impact Testing,
- Charpy V Notch testing,
- Heat Treatment,
- Component Pressure Tests, and
- System Pressure Test.

#### 11. *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,
- Master Standards,
- Identification, and
- Records.

#### 12. *Radiation Health Physics*

Familiarity and understanding of the following areas:

- Terms and Definitions,
- Radiation Types and Characteristics, and
- Exposure Effects and Limits.

### *13. ASME Section XI Certification Requirements*

Familiarity and understanding of the following, as applicable to ASME Section XI:

- Construction Code Stamping and Data Reports,
- Owner's Report for Inservice Inspections (NIS-1) Form, and
- Owner's Report for Repair/Replacement Activity (NIS-2) Form.

### *14. Record Requirements*

Ability to determine record preservation and transfer requirements in accordance with ASME Section XI.

### *15. Record Retention*

Ability to determine record retention requirements as applied to ASME Sections I, IV, and VIII.