TRAINING ON PRESERVICE & INSERVICE INSPECTION OF NUCLEAR POWER PLANT SYSTEMS AND COMPONENTS

INSTRUCTOR:

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A PROFESSIONAL DEVELOPMENT PROGRAM PRESENTED BY:

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“COMPREHENSIVE TRAINING SERVICES FROM INDUSTRY EXPERTS”
Background

This PSI/ISI training course is provided as an introduction to the requirements of the U. S. Nuclear Regulatory Commission, ASME Section XI, and other Industry related documents used for determining requirements for the preservice/inservice inspection/examination of nuclear power plant systems and components. Specific emphasis will be placed on the ASME Code boundary classification process, Owner responsibilities, development of PSI/ISI Program Documents, examination plans and schedules, and detailed requirements for performance of the preservice and inservice examinations of components/piping/supports and containments. Several examples will be used to illustrate the correct application of the technical requirements.
Training on Preservice & Inservice Inspection of Nuclear Power Plant Systems and Components

PSI/ISI Training Agenda

- Purpose of Preservice & Inservice Inspection
- Background of ASME Section XI Codes & Standards
- U. S. Nuclear Regulatory Commission Requirements
- Interface with other Industry Requirements
  - EPRI
  - NEI
- ASME Code Classification System for Components & Systems
- General ISI Inspection Requirements (Sub Section IWA)
- Class 1 Inspection Requirements (IWB)
- Class 2 Inspection Requirements (IWC)
- Class 3 Inspection Requirements (IWD)
- Supports (IWF)
- Class MC – Metal Containments (IWE)
- Class CC – Concrete Containments (IWL)
- Mandatory Appendices Review
- Non Mandatory Appendices Review
- Risk Informed ISI Applications (Code Case N-716-2 & Others)
- PSI Program Development Details for the AP1000 Plants – (An Overview)
- ISI Program Development Criteria & Examples
- Course Review
- Back to school – A Final EXAM!!
- Classroom Discussion
Mr. Glenn Perkins has over thirty-eight years experience in the nuclear power industry encompassing a wide spectrum of areas in both PWR and BWR applications. His primary areas of expertise reside in the Engineering Programs areas with particular emphasis regarding ASME Section XI Programs.

Glenn’s career in the nuclear power industry has encompassed a broad spectrum of both technical and managerial assignments in the key areas of Engineering Programs Management, Project Management, System / Program Engineering, Start-Up / Commissioning, and Construction.

Key Program areas in which Glenn has detailed and current Programs expertise include:

- Programs Management
- Inservice Inspection
- Pressure Testing Programs
- Snubber Programs
- Containment IWE/IWL
- Risk Informed Inservice Inspection Programs (RI-ISI)
- Welding Programs
- Repair / Replacement
- Augmented Programs
  - BWRVIP
  - Break Exclusion Regions (BER)
  - MRP - 139
  - Alloy 600
  - Generic Letter 88-01
- License Renewal Programs
- Secretary of ASME Section XI – Working Group Procedure Qualification & Volumetric Examinations
- Member of the ASME Section XI Sub Group – NDE
NOTICE

The instructor for this training is a recognized expert in their field and has extensive experience in the subject matter. However, the views expressed by the instructor do not necessarily represent the views of the American Society of Mechanical Engineers or the U. S. Nuclear Regulatory Commission. Attendance at this training session should not be construed to provide preferential treatment or advantage for the attendees or their organizations in any matter involving the ASME Boiler and Pressure Vessel Code Committee, or the U. S. Nuclear Regulatory Commission.

These notes are intended for use as educational material and are not intended to replace the applicable edition and addenda of the ASME Boiler and Pressure Vessel Code or the OM Code or, regulations set forth by the U. S. Nuclear Regulatory Commission. All requests for interpretation or other inquiries relative to the ASME Boiler and Pressure Vessel Code or, the OM Code, should be addressed to the Secretary, Boiler and Pressure Vessel Committee, American Society of Mechanical Engineers, United Engineering Center, Three Park Avenue, New York, NY 10016. Comments and questions related to the USNRC rulemaking may be addressed to Mr. Wallace E. Norris, U. S. Nuclear Regulatory Commission, Mail Stop 07D4, Washington, DC 20555, Telephone: (301) 415-3266, E-mail: wen@nrc.gov.

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PRESERVICE & INSERVICE INSPECTION
TRAINING COURSE SYLLABUS

Format / Course Outline

- PSI/ISI Historical Perspective

- Federal Law Applicability
  - 10CFR50 Part 52
  - 10CFR50.55(a)
  - 10CFR50 Appendix B – Criteria IX & X
  - NRC Generic Letters
  - NRC Regulatory Guides
  - Individual Units Technical Specifications
  - FSAR’s
  - NRC Information Notices
  - NRC Regulatory Issues Summaries (RIS)
  - NRC Inspection Procedures

- ASME Codes and their interrelation
  - Section III
  - Section V
  - Section XI

- Development of ASME Code Boundaries (ASME Class 1, 2 & 3)
  - 10CFR50.2 for Class 1
  - Reg. Guide 1.26 for Class 2 & 3
  - Non ASME Classed Components

- Introduction to ASME Section XI
  - Introduction
  - General
  - Owner Responsibilities
  - Duties of the Authorized Nuclear Inservice Inspector
Training on Preservice & Inservice Inspection of Nuclear Power Plant Systems and Components

- Articles
  - 1000 Scope & Responsibility
  - 2000 Examination & Inspection
  - 3000 Acceptance Standards
  - 4000 Repair/Replacement Activities
  - 5000 System Pressure Tests
  - 6000 Records & Reports

- Committee Function
  - Standards Committee on Nuclear Inservice Inspection
  - Sub Groups, Working Groups
  - Technical Inquiries to B&PV
  - Subsection IWA - General Requirements

  - Article IWA – 1000 Scope & Responsibility
    - IWA - 1100 – Scope
    - IWA - 1200 – Jurisdiction
    - IWA – 1300 – Application
    - IWA – 1400 – Owner’s Responsibility
    - IWA – 1500 – Accessibility
    - IWA – 1600 – Referenced Standards & Specifications
    - IWA – 1700 – Standard Units

  - Article IWA – 2000 Examination & Inspection
    - IWA – 2110 - Duties of the Inspector
    - IWA – 2120 - Qualification of AIA & Inspectors
    - IWA – 2130 – Access for the Inspector
    - IWA - 2200 – Examination Methods
    - IWA - 2300 – Qualification of NDE Personnel
      EPRI PDI qualification
  - IWA – 2400 – Inspection Plan
    - IWA – 2420 - Inspection Plans & Schedules
    - IWA – 2430 - Inspection Intervals
    - IWA – 2440 - Application of Code Cases

  - IWA – 2600 Weld Reference Section Development

  - IWA – 3000 Standards for Examination Evaluation

  - IWA – 4000 Repair Replacement Activities (Applicable to all Division I Sections)
Training on Preservice & Inservice Inspection of Nuclear Power Plant Systems and Components

- IWA – 5000 System Pressure Tests
  Identifies periodicity, scope, test requirements, pressure/temperature, boundaries, etc.

- IWA – 6000 Records & Reports
  - IWA – 6100 Scope
  - IWA – 6200 Requirements
  - IWA – 6300 Retention

- Subsection IWB – Requirements for Class 1 Components of Light Water Reactors

  - Article IWB – 1000 Scope & Responsibility
    - IWB – 1100 - Scope
    - IWB – 1200 - Components Subject To Examination
    - IWB – 2000 - Examination & Inspection

  - Article IWB – 2000 Examination & Inspection
    - IWB – 2200 - Preservice Examination
    - IWB – 2400 - Inservice Inspection Schedules
    - IWB – 2500 - Examination & Pressure Test Requirements

  Detailed Review of Examination Categories and their Application for PSI & ISI

  - Article IWB – 3000 Acceptance Standards
    Limited review of details

- Article IWB – 5000 System Pressure Tests
  Discussion on Periodicity, pressure / temperature, boundaries, etc.

- Subsection IWC – Requirements for Class 2 Components of Light Water Cooled Plants

  - Article IWC – 1000 Scope & Responsibility
    - IWC – 1100 - Scope
    - IWC – 1200 - Components Subject To Examination
Training on Preservice & Inservice Inspection of Nuclear Power Plant Systems and Components

- Article IWC – 2000 Examination & Inspection
  - IWC – 2200 - Preservice Examination
  - IWC – 2400 - Inservice Inspection Schedules
  - IWC – 2500 - Examination & Pressure Test Requirements

Detailed Review of Examination Categories and their Application for PSI & ISI

- Article IWC – 3000 Acceptance Standards

Limited review of details

- Article IWC – 5000 System Pressure Tests

Discussion on Periodicity, pressure / temperature, boundaries, etc.

DISCUSSION ON RI-ISI APPLICATIONS FOR CLASS 1 & 2 PIPING SYSTEMS AS AN ALTERNATIVE TO CODE REQUIREMENTS IN IWB & IWC

- Subsection IWD – Requirements for Class 3 Components of Light Water Cooled Plants

  - Article IWD – 1000 Scope & Responsibility
    - IWD – 1100 - Scope
    - IWD – 1200 - Components Subject To Examination

  - Article IWD – 2000 Examination & Inspection
    - IWD – 2200 - Preservice Examination
    - IWD – 2400 - Inservice Inspection Schedules
    - IWD – 2500- Examination & Pressure Test Requirements

Detailed Review of Examination Categories and their Application for PSI & ISI

- Article IWD – 3000 Acceptance Standards

Limited review of details
Training on Preservice & Inservice Inspection of Nuclear Power Plant Systems and Components

- Article IWD – 5000 System Pressure Tests
  
  Discussion on Periodicity, pressure / temperature, boundaries, etc.

- Subsection IWE – Requirements for Class MC & Metallic Liners of Class CC Components of Light Water Cooled Plants
  
  - Article IWE – 1000 Scope & Responsibility
    - IWE – 1100 - Scope
    - IWE – 1200 - Components Subject To Examination

  - Article IWE – 2000 Examination & Inspection
    - IWE – 2200 - Preservice Examination
    - IWE – 2300 - Visual Examination Personnel & Responsible Individual Qualifications
    - IWE – 2400 - Inservice Inspection Schedules
    - IWE – 2500 - Examination & Pressure Test Requirements

  Detailed Review of Examination Categories and their Application for PSI & ISI

    - IWE – 2600 Condition of Surface to be Examined

  - Article IWE – 3000 Acceptance Standards

  Limited review of details

  - Article IWE – 5000 System Pressure Tests

  Discussion on Periodicity, pressure / temperature, boundaries, etc.

- Subsection IWF – Requirements for Class 1, 2, 3 & MC Component Supports of Light Water Cooled Plants
  
  - Article IWF - 1000 Scope & Responsibility
    - IWF – 1100 - Scope
    - IWF – 1200 - Components Subject To Examination
    - IWF – 3000 - Support Examination Boundaries
Training on Preservice & Inservice Inspection of Nuclear Power Plant Systems and Components

- Article IWF – 2000 Examination & Inspection
  - IWF - 2100 - Scope
  - IWF – 2200 - Preservice Examination
  - IWF – 2400 - Inservice Inspection Schedules
  - IWF – 2500 - Examination Requirements

  *Detailed Review of Examination Categories and their Application for PSI & ISI*

- Article IWF – 3000 Acceptance Standards

  *Limited review of details*

- Subsection IWL – Requirements for Class CC Concrete Components of Light Water Cooled Plants

  - Article IWL – 1000 Scope & Responsibility
    - IWL – 1100 - Scope
    - IWL – 1200 - Items Subject To Examination

  - Article IWL – 2000 Examination & Inspection
    - IWL – 2200 - Preservice Examination
    - IWL – 2300 - Visual Examination Personnel & Responsible Individual Qualifications
    - IWL – 2400 - Inservice Inspection Schedule
    - IWL – 2500 - Examination Test Requirements

  *Detailed Review of Examination Categories and their Application for PSI & ISI*

- Article IWL – 3000 Acceptance Standards

  *Limited review of details*

- Article IWL – 4000 Repairs and Replacement

- Article IWL – 5000 System Pressure Tests

  *Discussion on Periodicity, pressure / temperature, boundaries, etc.*
Mandatory Appendices to ASME Section XI

Appendix I – Ultrasonic Exams
Appendix II – Owner’s Reports for Inservice Inspections
Appendix III – Ultrasonic Examinations of Vessel & Piping Welds
Appendix IV – Eddy Current Examination
Appendix V – Submittal of Technical Inquiries to the B&PV Committees
Appendix VI – Qualification of Personnel for Visual Examinations
Appendix VII – Qualification of NDE Personnel for Ultrasonic Examinations
Appendix VIII – Performance Demonstration for Ultrasonic Examinations
Appendix IX – Mechanical Clamping Devices for Class 2 & 3 Piping Pressure Boundary
Appendix X – Standard Units for Use in Equations

There are 14 Non-Mandatory Appendices that may be used as applicable to your needs.

AUGMENTED EXAMINATION REQUIREMENT SUMMARY

High Energy Line Breaks (HELB)
Leak Before Break (LBB)
Break Exclusion Zone (BEZ)