PD632
Design in Codes and Standards for Nuclear Power Plant Construction

Day One

Module 1: Introduction to ASME Section III
- An overview of ASME Section III contents
- The engineering process and Section III
- Classification of Components
- NRC Regulatory Guides for design
- B&PV Code Editions and Addenda

Module 2: NCA General Requirements with Focus on Design Aspects
- Overview of NCA General Requirements
- NCA-1000 – the scope of Section III
- NCA-2000 – Classification of Components and Support
- NCA-3000 – Responsibilities and Duties
- NCA-4000 – Quality Assurance
- NCA-5000, 7000, 8000, & 9000

Module 3: ASME Section III NC-1000, -2000, -4000 through -8000 Interfaces with NC-3000

Note: The Course focuses on Class 2 Components, and with discussion of similarities and differences with Class 1 and Class 3 Components.

Module 4: ASME Section III – NC-3100 General Design Rules
- Design Loading
- Temperature limits
- Components, attachments and appurtenances
- Materials
- Design and service loadings
- Cladding and Stress
- External Pressure

Day Two

Module 5: ASME Section III – NC-3300 Vessel Design and NC-3200 Alternative Design for Vessels
- Minimum Wall and Corrosion Allowance
- Openings and Reinforcements
- Nozzles
- Fatigue Analysis around an opening
- NC-3200 Alternative Rules for Design of Vessels
Module 6: ASME Section III – Design by Stress Analysis by the new Appendix XIII

- Use of the Appendix XIII in NC
- Failure modes
- Step-by-Step Stress Analysis
- Stress Classifications
- Allowable Stresses and Design Margins
- Level D Extreme Loads and Appendix XXVII
- Design Margins vs. Real-Life Failures

Day Three

Module 7: ASME Section III – NC-3400 Pump Design

- Types of Class 2 pumps
- Design requirements for various types of Class 2 Pumps
- Specific Rules and References to Design by Stress Analysis Appendix XIII

Module 8: ASME Section III – NC-3500 Valve Design

- Class 2 Valve design and ASME B16.34
- Pressure Boundary (ASME III)
- Operability (ASME QME)
- Wall Thickness
- Pressure Rating and Hydrotest

Day Four

Module 9: ASME Section III – NC-3600 Piping Design

- The Piping System, including pipe, fittings, components, supports, and equipment
- Wall Thickness
- Branch Reinforcement
- Flexibility Factors
- Flanged Joints
- Design Loads
- Stress Indices and Stress Intensification factors
- Pressure transients
- Seismic Design & Qualification
- Pipe rupture hazards analysis
- Thermal fatigue

Module 10: ASME Section III Fatigue Analysis and Environmental Fatigue

- Analysis for Cyclic Operation by Appendix XIII
- SCFs and FSRFs
- NUREG/CR 6909
- ASME Code Cases