

## Practical Basics of Mechanical, Welding, and Electrical Workshop

### DAY 1

8:30 – 9:00            Opening/Introduction  
Instructors and Staff Introductions followed by brief summary of what will be covered during this workshop including the site visit

#### Mechanical:

9:00 – 10:15            Piping and pipe supports

- Piping materials, sizes, uses
- Pipe support types
- Snubbers
- Potential Inspection Attributes

10:15 – 10:30            Break

10:30 – 10:50            Insulation

- Purpose and types
- Potential Inspection Attributes

10:50 – 12:00            Valves

- Gate, Globe, Swing and lift Check, Ball, Butterfly, Safety/Relief
- Potential Inspection Attributes

12:00 – 13:00            Lunch

13:00 – 13:30            Valve operators

- Function, movement characteristics, types
- Potential Inspection Attributes

13:30 – 14:15            Pumps and Heat Exchangers

- Pumps - Centrifugal and positive displacement pumps and considerations for use
- Heat Exchangers – function and types
- Potential Inspection Attributes

14:15 – 14:30            Break

14:30 – 15:00            Heating, Ventilating, and Air Conditioning (HVAC)

- Basic principles including refrigeration cycle
- Potential Inspection Attributes

- 15:00 – 15:20 Piping and Instrumentation Diagrams (P&IDs)
- Use and symbols

**Welding:**

- 15:20 – 16:30 Welding
- Welding Processes – SMAW, GMAW, GTAW
  - Thermal Gouging Processes
  - Weld Joints

**DAY 2**

- 8:30 – 9:15 Welding (cont'd.)
- Qualifications
    - Welder
    - Procedure
  - Potential Inspection Attributes

**Non-Destructive Examination (NDE):**

- 9:15 – 10:15 NDE
- Liquid Penetrant
  - Magnetic Particle
  - Radiography
  - Ultrasonic
  - Potential Inspection Attributes

- 10:15 – 10:30 Break

**Electrical and I&C:**

- 10:30 – 11:30 Electrical
- Electric Motors
  - Generators
    - Main
    - Diesel
  - Transformers
  - Switchgear
  - Motor Control Centers
  - Relays and Contacts
  - Potential Inspection Attributes

11:30 – 12:00 Electrical

- Cable Ampacity
- Insulation
- Cable Routing
- Splicing
- Terminations
- Testing
- Bus duct
- Short circuit
- Grounding
- Lightning protection
- Cathodic protection
- Heat tracing
- Fire protection
- Potential Inspection Attributes

12:00 – 13:00 Lunch

13:00 – 13:45 Electrical (cont'd.)

13:45 – 14:30 Instrumentation and Control

- Temperature Sensing Elements
  - Thermocouple
  - Resistance Temperature Detector (RTD)
- Pressure Sensing Elements
  - Direct – Gauge
  - Differential Pressure
- Flowrate Measuring devices
- Electrical One Line Diagrams
- Potential Inspection Attributes

14:30 – 14:45 Break

**Functional Area Generic Inspection Attributes**

14:45 – 16:15 Review of Functional Area Generic Construction and Commissioning Inspection Attributes

16:15 – 16:30 Wrap-up of Class Room Presentation

### **DAY 3**

#### **NPP ONSITE INSTRUCTION - Transit to NPP**

- 12:00 – 12:15 Introduction for NPP Visit
- 12:15 – 12:45 Review of Site Safety Requirements (by licensee)
- Personal Protective Gear
  - Equipment Hazards (Heat, electrical...)
  - Security Aspects
  - Emergency
  - Radiological
- 12:45 – 14:30 Review of Available Equipment Installation Drawings for Mechanical, Electrical and Instrumentation and Control and Discuss Related Generic Inspection Attributes

### **DAY 4**

- 8:30 – 12:00 Tour of Turbine building; examination of mechanical systems/equipment using available drawings and generic inspection attributes
- 12:00 – 13:00 Lunch
- 13:00 – 16:30 Continue tour of turbine building; examination of electrical systems/equipment using available drawings and generic inspection attributes

### **DAY 5**

- 8:30 – 9:30 Continue tour of turbine building; examination of instrumentation and control systems/equipment using available drawings and generic inspection attributes
- 9:30 – 12:00 Continue tour of turbine building; examination of mechanical and electrical systems/equipment using available drawings and generic inspection attributes
- 12:00 – 12:30 Wrap-up and award certificates of completion/ Adjourn