

## *Technical Description*

Crane Nuclear offers to provide the services as described in this Technical Description subject to the pricing, terms and conditions delineated in the Commercial Description.

### **Principles of Air Operated Valves**

<b>Standard Class Size:</b>	6 students per instructor
<b>Course Duration:</b>	3 days
<b>Prerequisite:</b>	None
<b>Supplied Materials:</b>	A training manual for each student
<b>Suggested Training Aides:</b>	Various control valves and accessories
<b>Suggested Attendees:</b>	Plant instrument and control technicians, electricians and their foreman, engineering, QC and operations personnel

### **Course Description:**

This course introduces the various types of air-operated control valves used in the modern power generation industry. The course is structured around an examination of the major components of the actuator, positioning system accessories, and controllers/transmitters. The criteria for selecting, sizing and applying the actuator are discussed. Basic pneumatic principles are reviewed and the various types of positioning systems are covered.

### **Course Terminal Objectives:**

Each student will be required to pass a written test with a minimum score of 80% in order to successfully complete this course. Upon successful completion of this training course, the student will:

- Identify the basic types of air-operated valves.
- Describe the operation of pneumatic actuators and positioning systems.
- State the major factors to be considered in the selection and application of valves, actuators and positioning systems.

### **Course Enabling Objectives:**

After completing this course, the student will:

- Identify the major components of the process control loop and be able to describe the significant functions of each component.

- Understand the difference between an on/off valve and a control valve.
- Identify the major general categories of air operated control valves.
- Explain the construction, characteristics and use of globe, butterfly and ball valves.
- Define valve trim, balanced and unbalanced.
- Define Cv.
- List at least three factors considered in control valve selection.
- State at least two factors in control valve sizing.
- State at least two sources of noise in a control valve.
- Describe the difference between closed-loop and open-loop control.
- Identify the purpose of a control valve actuator.
- Explain the two basic kinds of AOV actuators and their basic operation.
- List five basic functions of an actuator.
- Identify at least three factors used in actuator selection.
- Explain the reasons for applying a valve positioner.
- Understand how to set the benchset of an actuator.
- Identify the forces acting on a typical valve and actuator.

**Course Benefits:**

- Increase the plant's self-sufficiency in AOV maintenance.
- Increase the reliability of the plant's AOVs.
- Reduce the plant's cost of AOV maintenance.