

**1**            **GENERAL**

**1.1**            **SECTION INCLUDES:**

- .1            This Section specifies roles and responsibilities of Commissioning Training.

**1.2**            **RELATED SECTIONS:**

- .1            Section 01 78 00 – Closeout Submittals.
- .2            Section 01 91 13 – Commissioning (Cx) Requirements.
- .3            Section 01 91 33 – Commissioning (Cx) Forms.

**1.3**            **TRAINEES**

- .1            Trainees: personnel selected for operating and maintaining this facility including, but not limited to, Facility Manager, building operators, maintenance staff, security staff, and technical specialists as required.
- .2            Trainees may be available for training during any stage of construction.

**1.4**            **INSTRUCTORS**

- .1            The Cx Manual will contain:
  - .1            Descriptions of systems.
  - .2            Instruction on design philosophy, design criteria, and design intent.
- .2            Contractor and certified factory-trained manufacturers' personnel: to provide instruction on the following:
  - .1            Start-Up, operation, shut-down and maintenance of equipment, components and systems.
  - .2            Control features and reasons for, results of, implications on associated systems of adjustment of set points of control and safety devices.
  - .3            Instructions on servicing, maintenance and adjustment of systems, equipment and components.
  - .4            Training to be completed after Installation and Performance Verification are completed.

**1.5**            **TRAINING OBJECTIVES**

- .1            Training to be detailed and of sufficient duration to ensure:
  - .1            Safe, reliable, cost-effective, energy-efficient operation of systems in normal and emergency modes under all conditions.
  - .2            Effective on-going inspection, measurements of system performance.
  - .3            Proper preventive maintenance, diagnosis, trouble-shooting and maintenance.
  - .4            Ability to update documentation.

- .5 Ability to operate equipment and systems under emergency conditions until appropriate qualified assistance arrives.

## 1.6 TRAINING MATERIALS

- .1 Instructors to be responsible for content and quality. Provide copies for all those in attendance.
- .2 Training materials to include:
  - .1 "As-Built" Contract Documents.
  - .2 Operating Manual.
  - .3 Maintenance Manual.
  - .4 Testing, adjusting and balancing and performance verification reports where applicable.
- .3 Owner's Representative will review training manuals.
- .4 Training materials to be in a format that permits future training procedures to the same degree of detail with or without the instructor.

## 1.7 SCHEDULING

- .1 Contractor to include in schedule time for training. Provide a detailed commissioning schedule indicating all Cx tasks and training.
- .2 Deliver training during regular working hours, training sessions to be determined in Commissioning meetings.
- .3 Training to be completed prior to Substantial Completion.

## 1.8 RESPONSIBILITIES

- .1 Be responsible for:
  - .1 Implementation of training activities,
  - .2 Coordination among instructors,
  - .3 Quality of training, training materials,
- .2 Owner's Representative will evaluate training and materials.
- .3 Upon completion of training, provide written report, signed by Instructors, witnessed by Owner's Representative. Include list of those in attendance.

## 1.9 TRAINING CONTENT

- .1 Training to include demonstrations by Instructors using the installed equipment and systems.
- .2 Content includes:
  - .1 Review of facility and occupancy profile.
  - .2 Functional requirements.

- .3 System philosophy, limitations of systems and emergency procedures.
  - .4 Review of system layout, equipment, components and controls.
  - .5 Equipment and system start-up, operation, monitoring, servicing, maintenance and shut-down procedures.
  - .6 System operating sequences, including step-by-step directions for starting up, shut-down, operation of valves, dampers, switches, adjustment of control settings and emergency procedures.
  - .7 Maintenance and servicing.
  - .8 Trouble-shooting diagnosis.
  - .9 Inter-Action among systems during integrated operation.
  - .10 Review of O&M documentation.
- .3 Provide specialized training as specified in relevant Technical Sections of the construction specifications.

2            **PRODUCTS (NOT APPLICABLE)**

3            **EXECUTION (NOT APPLICABLE)**

END OF SECTION