

Verify that all sections and divisions listed throughout this section are included in the specifications.

SECTION 01 79 00 DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This Section contains requirements for training the University's personnel, by persons retained by the Contractor specifically for the purpose, in the proper operation and maintenance of the equipment and systems installed.

1.2 RELATED WORK AND DOCUMENTS

- A. Section 01 33 23 Shop Drawings, Product Data and Samples.
- B. Section 01 78 00 Close-Out Submittals.
- C. Section 01 91 00 Commissioning.
- D. Division 11 Equipment.
- E. Division 13 Special Construction.
- F. Division 14 Conveying Systems Sections: Individual sections stipulate specific installation and start-up requirements for Elevators (if used).
- G. Division 21 Fire Suppression.
- H. Division 22 Plumbing.
- I. Division 23 Heating, Ventilating, and Air Conditioning.
- J. Division 25 Integrated Automation.
- K. Division 26 Electrical.
- L. Division 28 Electronic Safety and Security.

1.3 QUALITY ASSURANCE

- A. Where required by the Contract Documents, the Contractor shall provide on-the-job training of the University's personnel. The training sessions shall be conducted by qualified, experienced, factory-trained representatives of the equipment manufacturers. Training shall include instruction in both operation and maintenance of the subject equipment.

1.4 SUBMITTALS

- A. The following information shall be submitted to the University's Representative in accordance with the provisions of Section 01 33 23 Shop Drawings, Product Data and Samples. The material shall be reviewed and accepted by the University's Representative not less than 21 days prior to the provision of training.
 - 1. Lesson plans for each training session to be conducted by the manufacturer's representatives. In addition, training manuals, handouts, visual aids, and other reference materials shall be included.
 - 2. Subject of each training session, identity and qualifications of individuals to be conducting the training, and tentative date and time of each training session.
 - 3. Electronic copies in the form of CD/DVD of all training sessions and field instructions shall be submitted to the University at conclusion of training.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Where specified, the Contractor shall conduct training sessions for the University's personnel to instruct the staff on the proper operation, care, and maintenance of the equipment and systems installed.

Training shall take place at the Project Site and under the conditions specified in the following paragraphs. Approved operation and maintenance manuals shall be available at least 30 days prior to the date scheduled for the individual training session.

2.2 LESSON PLANS

- A. Formal written lesson plans shall be prepared for each training session. Lesson plans shall contain an outline of the material to be presented along with a description of visual aids to be utilized during the session. Each plan shall contain a time allocation for each subject.
- B. One complete set of originals of the lesson plans, training manuals, handouts, visual aids, and reference material shall be the property of the University and shall be suitably bound for proper organization and easy reproduction. The Contractor shall furnish 10 copies of necessary training manuals, handouts, visual aids and reference materials at least 7 days prior to each training session.

2.3 FORMAT AND CONTENT

- A. Each training session shall be comprised of time spent both in the classroom and at the specific location of the subject equipment or system. As a minimum, training session shall cover the following subjects for each item of equipment or system:
 - 1. Familiarization:
 - a. Review catalog, parts lists, drawings, etc., which have been previously provided for the plant files and operation and maintenance manuals.
 - b. Check out the installation of the specific equipment items.
 - c. Demonstrate the unit and indicate how all parts of the specifications are met.
 - d. Answer questions.
 - 2. Safety:
 - a. Using material previously provided, review safety references.
 - b. Discuss proper precautions around equipment.
 - 3. Operation:
 - a. Using material previously provided, review reference literature.
 - b. Explain all modes of operation (including emergency).
 - c. Check out University's personnel on proper use of the equipment.
 - 4. Preventive Maintenance:
 - a. Using material previously provided, review preventive maintenance (PM) lists including:
 - 1) Reference material.
 - 2) Daily, weekly, monthly, quarterly, semiannual, and annual jobs.
 - (a) Show how to perform PM jobs.
 - (b) Show University's personnel what to look for as indicators of equipment problems.
 - 3) Corrective Maintenance.
 - (a) List possible problems.
 - (b) Discuss repairs-point out special problems.
 - (c) Open up equipment and demonstrate procedures, where practical.
 - 4) Parts.
 - (a) Show how to use previously provided parts list and order parts.
 - (b) Check over spare parts on hand. Make recommendations regarding additional parts that should be available.
 - 5) Local Representatives.
 - (a) Where to order parts: Name, address, telephone.
 - (b) Service problems.
 - (c) Who to call.
 - (d) How to get emergency help.
 - 5. Operation and Maintenance Manuals:
 - a. Review any other material submitted.

- b. Update material, as required.

PART 3 - EXECUTION

3.1 TRAINING

- A. Training shall be conducted in conjunction with the operational testing and commissioning periods. Classes shall be scheduled such that classroom sessions are interspersed with field instruction in logical sequence. The Contractor shall arrange to have the training conducted on consecutive days, with no more than 6 hours of classes scheduled for any 1 day. Concurrent classes shall not be allowed. Training shall be certified by listing attendees and subjects covered.
- B. Acceptable operation and maintenance manuals for the specific equipment shall be provided to the University prior to the start of any training. Video taping shall take place concurrently with all training sessions. All training sessions and field instruction shall be videotaped by the Contractor and tapes of all classes submitted to the University.
- C. The following services shall be provided for each item of equipment or system as required in individual Specification Sections. Additional services shall be provided, where specifically required in individual Specification Sections.
 - 1. As a minimum classroom equipment training for University's personnel will include:
 - a. Using slides and drawings, discuss the equipment's specific location in the facility and an operational overview.
 - b. Purpose and facility function of the equipment.
 - c. A working knowledge of the operating theory of the equipment.
 - d. Startup, shutdown, normal operation, and emergency operating procedures, including a discussion on system integration and electrical interlocks, if any.
 - e. Identify and discuss safety items and procedures.
 - f. Routine preventative maintenance, including specific details on lubrication and maintenance of corrosion protection of the equipment and ancillary components.
 - g. Operator detection, without test instruments, of specific equipment trouble symptoms.
 - h. Required equipment exercise procedures and intervals.
 - i. Routine disassembly and assembly of equipment if applicable (as judged by the University on a case-by-case basis) for purposes such as operator inspection of equipment.
 - 2. As a minimum, hands-on equipment training for University's personnel shall include:
 - a. Identify location of equipment and review the purpose.
 - b. Identifying piping and flow options.
 - c. Identifying valves and their purpose.
 - d. Identifying instrumentation.
 - e. Location of primary element.
 - f. Location of instrument readout.
 - g. Discuss purpose, basic operation, and information interpretation.
 - h. Discuss, demonstrate, and perform standard operating procedures and round checks.
 - i. Discuss and perform the preventative maintenance activities.
 - j. Discuss and perform startup and shutdown procedures.
 - k. Perform the required equipment exercise procedures.
 - l. Perform routine disassembly and assembly of equipment if applicable.
 - m. Identify and review safety items and perform safety procedures, if feasible.
 - 3. Classroom equipment training for the maintenance and repair personnel will include:
 - a. Theory of operation.
 - b. Description and function of equipment.
 - c. Startup and shutdown procedures.
 - d. Normal and major repair procedures.
 - e. Equipment inspection and troubleshooting procedures including the use of applicable test instruments and the "pass" and "no pass" test instrument readings.

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- f. Routine and long-term calibration procedures.
 - g. Safety procedures.
 - h. Preventative maintenance such as lubrication; normal maintenance such as belt, seal, and bearing replacement; and up to major repairs such as replacement of major equipment part(s) with the use of special tools, bridge cranes, welding jigs, etc.
4. Hands-on equipment training for maintenance and repair personnel shall include:
- a. Locate and identify equipment components.
 - b. Review the equipment function and theory of operation.
 - c. Review normal repair procedures.
 - d. Perform startup and shutdown procedures.
 - e. Review and perform the safety procedures.
 - f. Perform University approved practice maintenance and repair job(s), including mechanical and electrical adjustments and calibration and troubleshooting equipment problems.

END OF SECTION 01 79 00