

SECTION 01820

DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

1. This Section includes administrative and procedural requirements for instructing the Board's personnel in the operation and maintenance of systems, subsystems, and equipment.

1.2 SUBMITTALS

- A. Training Session Matrix: One month prior to Preliminary Acceptance submit to the AOR and OR a training session matrix that indicates all required training sessions and proposed dates and blocks of time for each. This matrix will be used to confirm scheduling of all required training sessions with the end user.
- B. Sign-off sheets: Submit copies of proposed sign-off sheets for each training session a minimum of 10 days prior to the scheduled training. Sign-off sheets are to include the following information:
 1. Name of training session
 2. Date of training
 3. Beginning/Ending time
 4. Detailed, itemized summary listing all areas of training for that session.
 5. Listing of hand-out materials distributed at the session.
 6. Signature lines for Trainer, Contractor, and CPS personnel being trained.
 - a. Signature by CPS personnel evidences training received only to the extent listed on the sign-off sheet summary.
- C. Demonstration and Training Videotape: Submit three (3) copies at end of each training module.

1.3 QUALITY ASSURANCE

- A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 1 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

1.4 COORDINATION

- A. Coordinate instruction schedule with the Board's operations and schedule through the Owner's Representative. Adjust schedule as required to minimize disrupting the Board's operations and to ensure attendance by designated CPS representatives.
- B. Coordinate content of training modules with content of emergency, operation, and maintenance manuals. Provide copies of this coordinated material at each training session.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows: **<EDIT FOR PROJECT-SPECIFIC ITEMS NOT SPECIFIED ELSEWHERE>**
 - 1. Motorized doors, including **[overhead coiling doors] [overhead coiling grilles] [and] [automatic entrance doors]**.
 - 2. Equipment, including **[stage equipment] [projection screens] [loading dock equipment] [waste compactors] [food-service equipment] [residential appliances] [and] [laboratory fume hoods] <Insert type of equipment>**.
 - 3. Fire-protection systems, including **[fire alarm] [fire pumps] [and] [fire-extinguishing systems]**.
 - 4. Intrusion detection systems.
 - 5. Conveying systems, including **[elevators] [wheelchair lifts] [escalators] [and] [cranes]**.
 - 6. Medical equipment, including medical gas equipment and piping.
 - 7. Laboratory equipment, including laboratory **[air] [and] [vacuum]** equipment and piping.
 - 8. Heat generation, including **[boilers] [feedwater equipment] [pumps] [steam distribution piping] [and] [water distribution piping]**.
 - 9. Refrigeration systems, including **[chillers] [cooling towers] [condensers] [pumps] [and] [distribution piping]**.
 - 10. HVAC systems, including **[air-handling equipment] [air distribution systems] [and] [terminal equipment and devices]**.
 - 11. HVAC instrumentation and controls.
 - 12. Electrical service and distribution, including **[transformers] [switchboards] [panelboards] [uninterruptible power supplies] [and] [motor controls]**.
 - 13. Packaged engine generators, including transfer switches.
 - 14. Lighting equipment and controls.
 - 15. Communication systems, including **[intercommunication] [surveillance] [clocks and programming] [voice and data] [and] [television]** equipment.
 - 16. **<Insert other systems and equipment.>**
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

- a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
2. Documentation: Review the following items in detail:
- a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project Record Documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
3. Emergencies: Include the following, as applicable:
- a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
- a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
- a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
8. Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.
- B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. Engage qualified instructors to instruct the Board's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 1. The Owner's Representative will furnish Contractor with names and positions of participants.
- B. Scheduling: Provide instruction at mutually agreed on times as approved in the training schedule matrix. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 1. The training schedule will be coordinated through the Owner's Representative.
- C. Signoff Sheets: At the conclusion of each training module obtain sign-offs using the approved sign-off sheets. Executed sign-off sheets are to be submitted as part of the closeout documentation evidencing compliance with training requirements.

- D. **Demonstration and Training Videotape:** Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
 - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- E. **Cleanup:** Collect used and leftover educational materials and give to the Board. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

END OF SECTION