PART 1 - GENERAL

1.1 WORK INCLUDED

A. Compile Product Data and related information appropriate for University's maintenance and operation of products provided under this Contract.

B. Prepare operating and maintenance data as specified herein and as specified in individual Specification Sections.

C. Instruct University's personnel in the maintenance and operation of equipment and systems.

1.2 FORM OF SUBMITTAL

A. Prepare data in the form of an instructional manual for use by University's personnel.

1. Format
   a. Size: 8-1/2 by 11 inches.
   b. Paper: 20 lb. minimum, white, for typed pages.
   c. Text: Manufacturers' printed or neatly typewritten data.
   d. Drawings
      (1) Provide reinforced punched binder tab that is bound with the text.
      (2) Fold larger Drawings to the size of the text pages.
   e. Provide fly-leaf for each separate product or each piece of operating equipment.
      (1) Provide typed description of products and major component parts of equipment.
      (2) Provide indexed tabs.
   f. Cover: Identify each volume with typed or printed title "Operating and Maintenance Instructions". List the following:
      (1) Project No.
      (2) Title of Project.
      (3) Identify general subject matter covered in the volume.

2. Binders
   b. When multiple binders are used, correlate the data into related groups.

3. Submit Operations and Maintenance manual on or before 75 percent progress payment submittal.
1.3 CONTENT OF MANUAL

A. Table of Contents: Include in each volume, neatly typewritten.

1. Identify Contractor, name of responsible principal, address, and phone number.
2. List each product included, indexed to the content of the volume.
3. List, with each product, the name, address, and telephone number of:
   a. Subcontractor or installer.
   b. Maintenance contractor, as appropriate.
   c. Identify area of responsibility of each of the previously mentioned parties.
   d. Nearest source of supply for parts and replacement.
4. Identify each product-by-product name and other identifying symbols as set forth in the Contract Documents.

B. Product Data

1. Include only those sheets that are pertinent to the specific product.
2. Annotate each sheet to:
   a. Clearly identify the specific product or part installed. Include part nomenclature as indicated in the Design, model number, serial number, operating data and options provided.
   b. Clearly identify the data applicable to the installation.
   c. Delete references to inapplicable information.

C. Drawings

1. Supplement Product Data with Drawings as necessary to clearly illustrate:
   a. Relations of component parts of equipment and systems.
   b. Control and flow diagrams.
2. Coordinate Drawings with information in Project record documents to assure correct illustration of completed installation.
3. Do not use Project record documents as maintenance Drawings.

D. Written text: As required to supplement Product Data for the particular installation.

1. Organize in a consistent format under separate headings for different procedures.
2. Provide a logical sequence of instructions for each procedure.

E. Copy of each warranty, bond, and service contract issued.

1. Provide information sheet to the University's personnel.
   a. Proper procedures in the event of failure.
   b. Circumstances that might affect the validity of warranties or bonds.

1.4 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit 4 copies of the complete manual in its final form.
B. Content, for each unit of mechanical equipment and each mechanical system, shall be as follows:

1. Description of unit or system, and component parts
   a. Function, normal operating characteristics, and limiting conditions.
   b. Performance curves, engineering data, and tests.
   c. Complete nomenclature and commercial numbers of replaceable parts.
   d. Include with the Manual the Submittal for the equipment. Update to reflect actual installed equipment.

2. Operating procedures
   a. Start-up, break-in, and normal operating instructions.
   b. Regulation, control, stopping, shutdown, and emergency instructions.
   c. Summer and winter operating instructions.
   d. Special operating instructions.

3. Systems Demonstration
   a. Prior to final inspection, demonstrate operation of each system to University's Representative and University personnel. All work, required for each system to be fully functional, shall be complete and the system shall be fully operational prior to the demonstration.
   b. Instruct designated personnel in operation, adjustment, and maintenance of equipment and systems, using operation and maintenance data as basis of instruction.

4. Maintenance procedures
   a. Routine operations.
   b. Guide to "trouble-shooting".
   c. Disassembly, repair, and reassembly.
   d. Aligning, adjusting, and checking.

5. Preventative Maintenance (PM) Schedule
   a. A tabular listing of all systems and equipment within the facility which require preventative maintenance, to include:
      (1) System or equipment name.
      (2) System or equipment number.
      (3) PM activity to be performed on that system or piece of equipment.
      (4) Consumable materials required for performance of the PM activity, such as lubricants, including the specification and quantity needed.
      (5) Frequency of performance of PM activity.
      (6) Date of performance of first round of each PM activity relative to facility commissioning and acceptance by the University.
   b. The requirements of this section cannot be met merely by the supply of O&M manuals from equipment vendors. The extraction of recommended preventative maintenance activities from vendor manuals for all equipment and incorporation onto a summary table as described above is required.

6. Servicing and lubricating schedule, with list of lubricants required.
7. Manufacturer's printed operating and maintenance instructions.
8. Description of sequence of operation by control manufacturer.
9. Original manufacturer's parts list, illustrations, current prices, recommended quantities to be maintained in storage, assembly drawings, and diagrams required for maintenance.
   a. Predicted life of parts subject to wear.
   b. Items recommended to be stocked as spare parts.
10. As-installed control diagrams by controls manufacturer.
11. Contractor's and Subcontractors' coordination drawings and as-built color-coded piping diagrams.
12. Charts of valve tag numbers, with the location and function of each valve.
13. Other data as required in the various Specification Sections.

C. Content, for each electrical and electronic system, as appropriate

1. Description of system and component parts.
   a. Function, normal operating characteristics, and limiting conditions.
   b. Performance curves, engineering data, and tests.
   c. Complete nomenclature and commercial numbers of replaceable parts.
2. Circuit directories of panelboards.
   a. Electrical service.
   b. Controls.
   c. Communications.
3. As-built color-coded wiring diagrams.
4. Operating procedures
   a. Routine and normal operating instructions.
   b. Sequences required.
   c. Special operating instructions.
5. Maintenance procedures
   a. Routine operations.
   b. Guide to "trouble-shooting".
   c. Disassembly, repair, and reassembly.
   d. Adjustment and checking.
6. Manufacturer's printed operating and maintenance instructions.
7. Original manufacturer's parts list, illustrations, current prices, recommended quantities to be maintained in storage, assembly drawings, and diagrams required for maintenance.
   a. Predicted life of parts subject to wear.
   b. Items recommended to be stocked as spare parts.
8. Other data as required in the individual Specification Sections.

D. Prepare and include additional data as may be required for instruction of the University's personnel.

E. Additional requirements for operating and maintenance data as specified in the individual Specification Sections.
F. Provide complete information for products specified in the individual Specification Sections.

1.5 SUBMITTAL REQUIREMENTS

A. Submit 2 copies of the draft of the proposed format and table of contents prior to preparation of the data and a minimum of 45 days prior to the date of Substantial Completion or the scheduled training (whichever occurs first).

B. Submit 1 copy of the complete data in final draft form a minimum of 30 days prior to the scheduled training or inspections scheduled to establish Substantial Completion.

C. Submit the specified number of copies of the approved data in final form a minimum of 7 days prior to the scheduled training or the inspections scheduled to establish Substantial Completion (whichever occurs first).

D. Submittal and acceptance of the operations and maintenance data is a prerequisite for issuance of the Certificate of Substantial Completion.

1.6 INSTRUCTIONS OF UNIVERSITY’S PERSONNEL

A. Work requiring instruction of the University's personnel is specified in the individual Specification Sections.

B. Schedule the instructional meeting or meetings after submittal and acceptance of the operations and maintenance data and prior to the date of Substantial Completion. Completion of instructional meetings is a prerequisite for issuance of the Certificate of Substantial Completion.

C. Upon the University's taking beneficial occupancy or after final acceptance (whichever is earlier), fully qualified representatives of the manufacturers shall fully instruct the University's Representative and University personnel in the operation, adjustment, and maintenance of all equipment and systems.

D. Basis of Instruction: Operating and maintenance manual. Review contents of manual with University personnel in full detail to explain all aspects of operations and maintenance.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01830