

Section 01661

WATER RECEIVING FACILITY (WRF) START-UP

PART 1 GENERAL

1.01 SUMMARY

This Section includes testing, training, and Start-Up of all equipment installed at a Water Receiving Facility (WRF) requisite to satisfactory completion of the contract and, therefore, must be completed within the contract time.

1.02 MEASUREMENT AND PAYMENT

A. Unit Prices

1. No separate measurement or payment for Work performed under this Section. Include cost of same in Contract price bid for work of which this is a component part.
2. Refer to Section 01270 – “Measurement and Payment” for unit price procedures.

B. Stipulated Price (Lump Sum). If Contract is Stipulated Price Contract, payment for Work in this Section is included in total Stipulated Price.

1.03 REFERENCES

This specification references the following publications in their current editions. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

- A. AWWA C651-14: Standard for Disinfection Water Mains
- B. AWWA C655-09: Standard for Field Dechlorination
- C. TCEQ 30 TAC 290.38-47: Public Drinking Water; Subchapter D: Rules and Regulations for Public Water Systems

1.04 SUBMITTALS

A. Submit the following prior to the commencement of the testing period per Section 01330 – “Submittal Procedures” and Section 01782 – “Operations and Maintenance Data”:

1. Start-Up and training schedule including:
 - a. Date and time for the Owner’s witnessed Start-Up
 - b. Date and time for training for each system, both field and classroom

1.05 RELATED REQUIREMENTS

- A. Section 01110 – “Summary of Work”
- B. Section 01330 – “Submittal Procedures”
- C. Section 01782 – “Operation and Maintenance Data”
- D. Section 02514 – “Disinfection of Water Lines”
- E. Section 02515 – “Hydrostatic Testing of Water Lines”
- F. Section 02516 – “Cleaning and Flushing of Water Lines”
- G. Section 02990 – “Dechlorination Activities”
- H. Division 11 – “Equipment Specifications”
- I. Division 13 – “Special Construction Specifications”
- J. Division 15 – “Mechanical Specifications”
- K. Division 16 – “Electrical Specifications”

1.06 – 1.13 NOT USED

PART 2 PRODUCTS

2.01 MANUFACTURER(S) (NOT USED)

2.02 MATERIALS AND/OR EQUIPMENT

The Contractor shall provide all parts, lubricants, and consumables for equipment in accordance with the manufacturer’s recommendations or as specified in the individual equipment sections of the specifications. All spare parts provided shall be suitably packaged in a plastic or metal box and labeled with equipment numbers or names by means of solid plastic nametags attached to the box.

2.03 - 2.04 NOT USED

PART 3 EXECUTION

3.01-3.02 NOT USED

3.03 EXECUTION

- A. Prior to requesting a Substantial Completion Inspection for any portion of the Work the Contractor shall meet the following conditions:

1. Operational Testing:

Work requiring operational testing shall be completed in accordance with this Section and/or in accordance with the Manufacturer's instructions and applicable equipment specifications. Such Work shall be tested as a complete system. A complete system includes the mechanical, electrical, control, instrumentation, and programming required to automatically operate the Work as designed.

2. Manufacture Certification:

Work requiring inspections and written statements of the manufacturer shall be provided to the Owner.

3. Training:

Training of the Owner's operating personnel shall be complete.

4. Operation and Maintenance (O&M) Manuals:

Final Operations and Maintenance Manuals shall have been submitted and approved by the Engineer and the required number of copies transmitted to the Owner.

5. Spare Parts:

If spare parts are required for equipment, they shall be provided to the Owner.

3.04 – 3.07 NOT USED

3.08 TESTING AND TRAINING

A. Testing

1. The Contractor shall provide the services of a factory trained representative of the manufacturer for each item of equipment. Manufacturer's representative shall visit the site of the Work to inspect, adjust if necessary, and approve the installation. The representative shall have a minimum of 5 years of experience with the manufacturer and the product line. In each case, the Contractor shall arrange to have the manufacturer's representative revisit the job site as often as necessary at no additional cost to the Owner until all issues are resolved to the satisfaction of the Project Manager and/or Engineer.
2. The Contractor shall require that each manufacturer's representative provide a written statement certifying the equipment has been properly installed and lubricated, is in accurate alignment, is free from any undue stress imposed by connecting piping or anchor bolts, and has been operated satisfactorily under full-load conditions.

3. The Contractor shall be responsible for scheduling all Operations Testing. The Engineer and the Owner's personnel will witness Operations Testing.
4. The Contractor shall notify the Project Manager at least 3 days in advance of conducting Operational Testing for each piece of equipment.
5. The Contractor shall furnish all personnel, and all other necessary equipment, facilities, and services required for conducting the tests and maintaining the equipment.
6. After successful demonstration, Contractor shall drain and clean equipment as necessary to achieve safe and sanitary conditions.

B. Training

1. Contractor shall submit a schedule of training requirement specified by each section for the Contract Documents to the Engineer and the Owner for approval. The schedule is to be submitted prior to furnishing the specified O&M Manuals.
2. The Contractor shall provide the services of a factory trained representative with a minimum of 5 years' experience with the manufacturer and the product line. The representative shall instruct the Owner's operating personnel in correct operation and maintenance procedures. Such instruction shall be scheduled at a time arranged with the Owner at least 2 weeks in advance and shall be provided after testing and while the respective manufacturer's equipment is fully operational. Training shall be conducted on two separate sessions on consecutive days or as otherwise specified. A minimum of 8 hours training shall be provided excluding travel time. Prior to scheduling any Operations Testing the Contractor shall have previously furnished the required technical manuals.
3. All training sessions shall be videotaped by a professional video group with at least 5 years' experience. The Owner shall be provided two copies of this video for future use. The video shall include a label with the date, equipment description, equipment model, equipment identifier number, location, and manufacturer's name, address and telephone number.

3.09 FLUSHING AND DISINFECTION

- A. Before the Start-Up and testing period of the WRF can begin, all of the lines leading to the WRF and continuing through the Flow Meter and Flow Control Valve Stations to the connection at the ground storage tank shall be flushed, disinfected and sampled to meet the requirements of Section 02514 – "Disinfection of Water Lines", Section 02515 – "Hydrostatic Testing of Pipelines", and Section 02516 – "Flushing of Water Lines".

3.10 START-UP

- A. The Contractor shall provide the effective coordination of all parties necessary for the successful WRF Start-Up, and is responsible for the Start-Up.
- B. The Contractor shall be required to start-up the equipment installed (see “ATTACHMENT A” for list of equipment covered by this testing period), and the Owner will operate it for a period of at least 7-days prior to acceptance of substantial completion. All equipment installed by the Contractor must properly run over the course of a minimum 7-day period or a longer specified time in the equipment specification. All equipment installed will be operated at their full range of operation and must be capable of performing at these levels for an extended period of time. If any item malfunctions during the test, the item shall be repaired or replaced and the test restarted at day zero with no credit given for the operating time before the aforementioned malfunction.
- C. If spare parts are used to complete the test, the Contractor must replace those spare parts consumed at no additional cost.
- D. The Start-Up shall not commence until all cable and equipment tests have been completed.
- E. All defects in materials or workmanship, which appear during this Start-Up period, shall be immediately corrected by the Contractor. Time lost for equipment repairs, wiring corrections, control point settings, or other reasons, which actually interrupt the Start-Up, may, at discretion of the Project Manager, be justifiable cause for extending the Start-Up test duration.
- F. During the Start-Up, the Contractor shall provide the services of authorized representatives of the manufacturers, in addition to those services required under Operations Testing, as necessary, to correct faulty equipment operation.
- G. Traffic Control Procedures
 - 1. The Contractor is responsible for implementing traffic control measures as necessary to abate safety concerns during the Start-Up of the water lines.
- H. Best Management Practices (BMP) for Surface Water Control
 - 1. The Contractor is responsible for implementing erosion control measures during the Start-Up.
 - 2. Allowable BMP details are provided in the Drawings covering Storm Water Pollution Prevention Details.
- I. Clean-Up and Repair Activities
 - 1. During the Start-Up, Contractor is responsible for:
 - a. Removal of all temporary equipment utilized for flushing, disinfection, and dechlorination activities

- b. Repair of any erosion or other damage caused by the flushing, disinfection, or dechlorination activities
2. The Project Manager, Engineer, and Contractor shall conduct a joint site inspection after completion of Start-Up activities to verify necessary repairs were completed by the Contractor and site is restored to proper working condition.

ATTACHMENT A

[Design Engineer is to complete blanks per site requirements]

Equipment To Be Tested	Length of Test (days)	Applicable Specification Section	Required Performance Tests

END OF SECTION