

## COMMISSIONING AND PERFORMANCE TESTING

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### 1. GENERAL

#### 1.1 Work Included

- .1 This Section describes the Design Builder's and THPS Supplier's responsibilities for the satisfactory Commissioning and Guaranteed Performance Testing (GPT) of the work including process, electrical, mechanical, instrumentation and control and other systems to be supplied. The intent is that the THPS Supplier provide on-site technical assistance and supervision and the Design Builder provides the appropriate skilled tradesmen and supervision as required to ensure successful commissioning and performance testing.
- .2 Following successful commissioning, and at the times specified in the Section 11355, the THPS Supplier will conduct Guaranteed Performance Tests to demonstrate critical performance requirements. The THPS Supplier to coordinate Guaranteed Performance Testing with the Design Builder.

#### 1.2 Definitions

- .1 For the purpose of this Section, "Acceptance" shall occur after a successful Performance Test and the THPS Supplier, and Design Builder have signed the "Certificate of Satisfactory Process Performance" (**Form 104**).
- .2 "Commissioning" is defined as the successful operation of all systems with sludge, steam, and process gas in accordance with the design requirements for a period of fourteen (14) successful days to prove compliance with the requirements listed in Division 1 and Division 11. The last seven (7) days of Commissioning must be consecutive and without a Critical Failure.
  - .1 During Commissioning with sludge, steam and process gas, conditions will be simulated which represent maximum or most severe, average, and minimum or least severe conditions.
  - .2 It is anticipated that to achieve fourteen (14) full days of successful operation, the actual elapsed time may last up to sixty (60) days or more.
  - .3 At the successful completion of commissioning the THPS Supplier and Design Builder will sign the "**Certificate of Satisfactory Commissioning**" (**Form 104**).
- .3 "Guaranteed Performance Testing" is described as the testing of the equipment to prove compliance with the design requirements for equipment as specified in the Contract Documents.
  - .1 Equipment will be subjected to Guaranteed Performance Testing (GPT) where specified in the Division 11. These tests will be conducted after the successful Operational Testing as defined by the signing of **Form 103** and after successful commissioning and the signing of **Form 104**.
  - .2 The THPS Supplier will be responsible for providing direction to Design Builder to conduct the Guaranteed Performance Testing.

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- .4 For the purpose of this Section, "System" means a combination of equipment, piping, controls, ancillary devices, electrical power, etc. which together perform a specific function at the facility.
- .5 "Critical Failure" shall be deemed as one that prohibits the process from functioning successfully for an eight (8) hour period, or one that requires the use of available standby equipment, or one that creates a safety hazard.

### 1.3 Submittals

- .1 Submittals in accordance with Section 01300.
- .2 The THPS Supplier shall submit for the Design Builders approval a detailed methodology for commissioning Goods supplied under this Contract at least thirty (30) days prior to planned start.
- .3 The detailed overall methodology plan will be prepared by the Design Builder with input from the THPS Supplier and include the following:
  - .1 Detailed schedule of events prior to commissioning.
  - .2 Method for introducing flow, and disposing of any sludge or other residual solids generated during commissioning.
  - .3 Planned attendance schedule for THPS Supplier's Representatives.
  - .4 Contingency plans in the event of a process malfunction.
  - .5 Drawings and sketches as required to illustrate the planned sequence of events.
  - .6 List and details for all temporary equipment required for commissioning.
  - .7 List of all personnel who the THPS Supplier plans for commissioning with information indicating their qualifications for this work.
- .4 Organize a pre-commissioning meeting to review the Process plan, confirm testing requirements and roles.

### 1.4 Controls

- .1 All controls, which are the responsibility of the Design Builder, will be installed and tested prior to commissioning.
- .2 The Design Builder will arrange for the simulation of the control sequences or will allow for the operation of the system without the features included in the work of others. Every effort will be made to ensure that the commissioning period provides for the full and comprehensive operation of the equipment under all anticipated normal and adverse operating conditions.

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### 1.5 Plant Utility Services

- .1 The Design Builder will provide power, chemicals, and other ancillary services as necessary to operate the plant through the commissioning period. Provision of these services will be limited to reasonable levels.
- .2 The Design Builder will provide one complete fill of all chemicals prior to start of commissioning and provide additional chemicals as required to complete the commissioning Testing. The quantities of chemicals provided will be sufficient to test the operation and function of the entire Work.

### 1.6 Manpower

- .1 The Design Builder will supply competent staff capable of maintaining, repairing and adjusting the equipment and controls to achieve the intended design functions during the commissioning period.

### 1.7 Process Control Narratives

- .1 The THPS Supplier shall prepare Process Control Narratives (PCNs) or operating descriptions. The Design Builder will review these descriptions and will become familiar with the requirements in order that commissioning can be completed in an appropriate manner.

### 1.8 Design Parameters

- .1 Design parameters for the systems to be tested shall be as defined in the specifications.
- .2 Control systems shall be completed and the related control software deficiencies corrected prior to the completion of commissioning.

## 2. EXECUTION

### 2.1 Preparation

- .1 A commissioning concept plan will be provided by the Design Builder which will outline major activities and sequences necessary to successfully integrate various process elements of the project
- .2 The commissioning concept plan will be used as a basis to develop detailed commissioning plans for the supplied equipment. The detailed commissioning plans are the responsibility of the Design Builder, with the necessary assistance from the THPS Supplier and/or manufacturer.
- .3 All process, mechanical, electrical, control and miscellaneous equipment related to a system shall be successfully installed and tested in accordance with Section 01650 and any specific requirements noted in other divisions. **Form 103** shall be executed for each item.
- .4 Initial staff training sessions shall be completed (**Form T1**, Section 01664). Temporary equipment will be installed and tested as necessary to ensure that it functions reliably and consistently through the commissioning period.

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- .5 Piping, wiring, and other conduit systems shall be finished and tested.
- .6 Electrical connections shall be completed and inspected to the satisfaction of the authorities having jurisdiction.

### 2.2 System Test

- .1 Introduce process and utility streams in a manner which precludes the damage of any component.
- .2 Commence the System Test period and operate for forty five (45) calendar days.
- .3 All Equipment and Systems shall be operated in the automatic/manual and the remote/local modes as required to prove proper operation.
- .4 The THPS Supplier will ensure all backup provisions function satisfactorily.
- .5 All minor and major alarm conditions will be induced to ensure that the process reacts as intended, the applicable alarms are annunciated.
- .6 Submit the results of the System Test to the Design Builder.
- .7 Upon successfully completing the System Test and required documentation, **Form 104** - will be completed.

### 2.3 Guaranteed Performance Testing Plan

- .1 Equipment will be subjected to Guaranteed Performance Tests as described in Division 11. These tests will be conducted after Form 104 is signed.
- .2 It is the responsibility of the THPS Supplier to provide Guaranteed Performance Test procedures consisting of a detailed schedule of events, including but not limited to the schedule and method for demonstrating performance and completion of testing of all component parts of the System. Submit GPT plan no later than sixty (60) calendar days prior to start of GPT.
- .3 Should the GPT reveal any defects, THPS Supplier must promptly rectify those defects and repeat the tests until the equipment meets the GPT criteria specified in the Contract documents. THPS Supplier to bear all additional costs incurred due to repeat of GPT.
- .4 If the equipment does not meet one or more of the specified performance test acceptance criteria, the equipment will be rejected as not conforming to the performance guarantees. In this event:
  - .1 THPS Supplier to modify the equipment or replace it with new equipment and re-test such that the equipment will meet the specified Guaranteed Performance Test requirements, at no additional cost. THPS Supplier will bear all the associated costs related to equipment modifications, replacement or re-design.
  - .2 Re-testing of the modified or replacement equipment, in accordance with these Specifications, will be completed by the THPS Supplier as soon as the equipment is

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modified or replaced with a new one and within sixty (60) calendar days of rejection of the initial performance tests.

- .3 Any and all tests and re-tests required to demonstrate conformance of the modified or replacement equipment with the specified performance guarantees will be at the expense of the THPS Supplier.
- .4 If the modified or replacement equipment meets all of the specified performance test acceptance criteria, the equipment will be accepted as conforming to the performance guarantees.
- .5 On the successful completion of the Guaranteed Performance Testing, the THPS Supplier, and Design Builder will sign **Form 105**.



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**CERTIFICATE OF SATISFACTORY GUARANTEED PERFORMANCE TESTING FORM 105**

We certify that the System listed below has been tested and meets the Guaranteed Performance Testing requirements as set out in the Section 11355.

**PROJECT:** \_\_\_\_\_

**SYSTEM** \_\_\_\_\_

**TAG NO:** \_\_\_\_\_

**REFERENCE SPECIFICATION:** \_\_\_\_\_

\_\_\_\_\_  
Print Name Signature Date

(Authorized Signing Representative of the THPS Supplier)

\_\_\_\_\_  
Print Name Signature Date

(Authorized Signing Representative of the Design Builder)

**END OF SECTION**