

1. COMMISSIONING

1.1 General

- .1 Equipment furnished under the supply contracts will be commissioned by the Contractor under this Contract. The supplier for the City-supplied equipment contracts will provide the services of a qualified representative to assist in the commissioning and performance testing of all of the equipment. Coordinate commissioning for the City-supplied equipment contracts and integrate with commissioning of this Contract.
- .2 At the time of the commissioning, the Contract Administrator shall advise the Contractor of the commissioning requirements. These requirements are dependent on the anticipated operational requirements of the City's water supply system to meet the water demands at the time.
- .3 The Contractor shall refer to Sections 01210, 01212, 13000, 15000, 16000, and 17000 for details on the commissioning procedures not included in this section.
- .4 The Contractor shall note that on materials and equipment installed in this Contract, warranty will not begin until issuance of Total Performance.

2. INTENT

- .1 This Section describes the Contractor's responsibilities in the commissioning and hand over of the process, electrical, and other systems to be installed as part of this work.

3. DEFINITIONS

- .1 System: For the purpose of this specification section, a system shall be defined as the equipment, piping, controls, ancillary devices, electrical power, etc. which together perform a specific function at the facility.
- .2 Commissioning: For the purpose of this specification section, commissioning shall be defined as the successful operation of a system in accordance with its design requirements for a period of twenty eight (28) days, the last seven (7) of which shall be consecutive, unless otherwise specified.
- .3 Acceptance: For the purpose of this specification section, Acceptance shall be defined as the formal turnover of a system to the City for his operation and maintenance. This shall occur after the successful end of commissioning of each system through a formal agreement between the Contract Administrator, the City, and the Contractor. Success of the commissioning period is determined by the Contract Administrator.

4. COMMISSIONING TEAM

- .1 The work of commissioning will be conducted by teams comprised of personnel from the Contractor, the City and the Contract Administrator.

- .2 The City's appointed staff shall represent process personnel and operating staff.
- .3 The Contractor shall provide personnel representing the appropriate trades, including control and instrumentation personnel during the commissioning. These personnel shall be skilled workmen, able to expedite any minor repairs, adjustments, etc., as are required to complete commissioning with as few delays as possible.

5. COMMISSIONING PLAN

- .1 The Commissioning Team shall develop a detailed methodology for the commissioning of each system at least ninety (90) calendar days prior to planned start of commissioning. The plan shall be drafted by the Contractor and include the following:
 - .1 Detailed Schedule of Events, including but not limited to the schedule for completion of testing of all component parts of the system in accordance with Section 01650 prior to commissioning of a system.
 - .2 Method for introducing flow, disposing of partially treated effluent, and disposing of any sludge or other residual solids generated during the commissioning process. The Contractor will take responsibility for the implementation of these measures.
 - .3 Sampling and analytical program for tests necessary to verify compliance with performance specifications.
 - .4 Planned attendance schedule for manufacturer's representatives.
 - .5 Contingency plans in the event of a process malfunction.
 - .6 Drawings and sketches as required to illustrate the planned sequence of events.
 - .7 List and details for all temporary equipment (pumps, etc.) required to facilitate commissioning.
 - .8 List of all personnel who the Contractor plans for commissioning and hand-over with information indicating their qualifications for this work.
- .2 The Commissioning Plan shall be reviewed and agreed by the Commissioning Team prior to its implementation. The Contract Administrator shall be the final arbiter.

6. EQUIPMENT

- .1 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 203 shall be executed for each item.
- .2 As required in Section 01300 – Submittals, Operation and Maintenance Manuals will be submitted and reviewed by the Contract Administrator.
- .3 Staff training sessions shall be completed.

- .4 Temporary equipment will be installed and tested as necessary to ensure that it functions reliably and consistently through the commissioning period.
- .5 Conduct sampling and analysis in accordance with the requirements of the latest version of "Standard Methods for the Examination of Water and Wastewater", AWWA/WEF.

7. CONTROLS

- .1 All controls which are the responsibility of this Contractor shall be installed and tested prior to commissioning.
- .2 The Contract Administrator shall arrange for the simulation of the control sequences or shall allow for the operation of the system without the features included in the work of others. Every effort shall 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.

8. PLANT UTILITY SERVICES

- .1 The City shall provide power, chemicals, and other ancillary services as necessary to operate the plant through the commissioning period. Provision of these services shall be limited to reasonable levels.

9. MANPOWER

- .1 Supply all staff required during commissioning as necessary to assist the City's staff in the operation of the plant.
- .2 Supply competent staff capable of maintaining, repairing and adjusting the equipment and controls to achieve the intended design functions during the commissioning period.
- .3 Ensure equipment manufacturer's representatives are available as necessary to certify adjustments in equipment, to guide in setting correct operating limits, and to generally provide input as required for the appropriate operation of the equipment.

10. OPERATING DESCRIPTIONS

- .1 Operating descriptions have been prepared for the plant systems. To some degree, the intent of these have been included in the Drawings and technical Specifications. Other information outlining the operating requirements is available from the Contract Administrator. The Contractor will review these descriptions and will make himself familiar with the requirements in order that he can undertake commissioning in an appropriate manner.

11. DESIGN PARAMETERS

- .1 Design parameters for the systems to be commissioned shall be as defined in the Specifications and/or the operating descriptions; as modified by the Commissioning Team. The Commissioning Team will identify to the Contractor which parameters shall be modified prior to commissioning and shall be responsible for any subsequent changes during the commissioning period.

12. PREPARATION

- .1 Each item of equipment included in the system to be commissioned shall be satisfactorily tested and Form 203 completed.
- .2 Piping, wiring, and other conduit systems shall be finished and tested.
- .3 Electrical connections shall be completed and inspected to the satisfaction of the governing authorities.
- .4 All other regulatory inspections shall be completed to the satisfaction of the governing authorities.
- .5 Control systems shall be completed and the related control software debugged.

13. SEQUENCE

- .1 Systems shall be commissioned in a logical manner. Upstream components shall be commissioned first to the degree possible.
- .2 The following sequence of events shall be followed:
 - .1 Operation and Maintenance Manuals shall be available as per the requirements of Section 01300 at least fourteen (14) days prior to the start of commissioning.
 - .2 The Contract Administrator will make Operating Descriptions available prior to testing. Draft Operating Descriptions are available at the beginning of the Contract.
 - .3 Initial operator training shall be undertaken two (2) weeks prior to commissioning.
 - .4 Equipment performance tests shall be conducted successfully.
 - .5 Start and run system in manual mode.
 - .6 Turn separate items of equipment to automatic in a planned and logical manner. Ensure that the control system is operating the equipment in a manner which precludes damage of the equipment and which is consistent with the process operating requirements.
 - .7 Commence commissioning period of twenty eight (28) days. The equipment shall operate continuously and successfully through the last seven (7) days of a commissioning period. Minor failures shall not void the commissioning period. A

minor failure is defined as one which does not present a safety hazard, does not impact overall process functioning and can be temporarily overcome by the use of available standby equipment. The last seven (7) days of the commissioning period shall be restarted if a critical failure occurs. A critical failure shall be deemed as one which prohibits the process from functioning successfully for an eight (8) hour period or one which creates a safety hazard.

- .8 Upon completing the commissioning period, the system shall be granted formal acceptance by the Contract Administrator.

14. COMMISSIONING

- .1 Water will be introduced to the system in a manner which precludes the damage of any equipment or structures.
- .2 Twice during the commissioning period, plant component settings will be modified to ensure that the system is subjected to flows and loads as close to design conditions as possible. Where necessary to achieve this, flows to the area being commissioned will be augmented to exaggerate the naturally occurring flows and loads. Where it is necessary to modify settings outside the limits of this Contract area within the plant, coordinate the changes with plant staff.
- .3 Assist in the operation of the plant to achieve the process objectives.
- .4 All components and systems shall be operated in the automatic/manual and the remote/local modes as required to prove proper operation.
- .5 Ensure all bypasses and backup provisions function satisfactorily.
- .6 All minor and major alarm conditions will be induced to ensure that the process reacts as intended, the applicable alarms are enunciated.
- .7 Samples of process flows, when necessary to prove performance, will be obtained and analyzed on a regular basis.

15. ACCEPTANCE

- .1 The commissioning of a system shall be considered acceptable when the process has operated in a stable manner, satisfying the design criteria for a period of twenty eight (28) days, the last seven (7) of which shall be continuous and consecutive, unless otherwise specified.
- .2 When a process system has been commissioned satisfactorily, the process system shall be formally accepted for operation and routine maintenance by the City's forces. (A form will be provided by the Contract Administrator.) On successful completion of commissioning Form 204 – Certificate of Satisfactory Process Performance attached to this specification will be signed by the representative of the Manufacturer, Contractor, Contract Administrator and City of Winnipeg.

- .3 An Acceptance Meeting must be held at the end of the twenty eight (28) day test to confirm the status of each system.
- .4 Notice of Acceptance for the entire project will be granted when all systems have been commissioned and accepted, and all requirements of the General Conditions have been completed.

**CERTIFICATE OF SATISFACTORY PROCESS PERFORMANCE
FORM 204**

We certify that the equipment listed below has been operated and tested as per the Specifications using water and that the equipment meets its Performance Testing Criteria. The equipment is therefore classed as “conforming”.

PROJECT: _____

SYSTEM DESCRIPTION: _____

TAG NO (S): _____

**REFERENCE
SPECIFICATION (S):** _____

(Authorized Signing Representative of the Manufacturer) _____
Date

(Authorized Signing Representative of the Contractor) _____
Date

(Authorized Signing Representative of the Contract Administrator) _____
Date

(Authorized Signing Representative of the City of Winnipeg) _____
Date

END OF SECTION