COMMISSIONING

1. GENERAL

1.1 General

.1 For general commissioning procedures and activities, refer to Division 1.

.2 The commissioning process shall be applied to all products, equipment and systems provided under this Division.

.3 Work specified in this section shall be performed by the Contractor.

2. THE COMMISSIONING PROCESS

2.1 The Commissioning Team

.1 The Commissioning Team shall be formed and consist of:

.1 The Commissioning Agent, as provided by the Contractor.

.2 The Contract Administrator's representative.

.3 The City's staff representative.

.4 Manufacturers' and Suppliers' representatives as required by the Contractor.

2.2 Duties of the Team

.1 The duties of the team are summarized below:

.1 The Commissioning Agent shall plan, organize and implement the commissioning process and shall within one month of the award of the contract submit the name and address of the commissioning agent.

.2 The Commissioning Agent shall provide a complete description of the systems operation, performance and flow data to the Contract Administrator for review.

.3 The Commissioning Agent shall prepare the commissioning plan and provide demonstration and instructions to the City's staff over a period of time to enable the staff to become familiar with the systems.

2.3 Commissioning Schedule

.1 Within one (1) month of commencing with the project work the Commissioning Agent shall review design intent and intended commissioning procedures with the Contract Administrator. At least ninety (90) days prior to the planned start of commissioning, submit a detailed plan identifying the orderly progression of the prestart commissioning check and subsequent commissioning performance check of each sub-system, leading up to the ultimate commissioning of entire systems.

.2 Submit a schedule for the commissioning phase of the work. This schedule shall show:

.1 Completion dates for each trade in each major section of the building.

.2 Timing of the various phases of the commissioning, testing, and demonstration process.

.3 Submission dates for the various documents required prior to verification of commissioning by the Contract Administrator.

.4 Prepare a commissioning statement addressing each of the five (5) phases that the process is perceived to be. In sequence, the phases are expected to be:

Phase 1 - System Readiness
Phase 2 - System Start-Up, Testing, Commissioning
Phase 3 - Verification of System Commissioning
Phase 4 - Validation
Phase 5 - Demonstration and Acceptance

.3 With the commissioning schedule noted above, submit a copy of all commissioning worksheets to be used during the commissioning process.

.4 Each phase except Phase 4 is applicable to each major and separate system making up the work in Division 13, Division 15 including controls, and Division 16 interface as applicable.

2.4 Commissioning Phases

.1 **Phase 1** - Before starting any of the separate systems, provide written verification stating that the specific system is ready for start-up and the following conditions have been met:

.1 Copies of all test and certificates have been submitted to the Contract Administrator.

.2 All safety controls installed and fully operational (dry run test).

.3 Flushing, chemical cleaning (as required), charging, fluid operating (as required), are complete.

.4 Equipment lubrication and pre-start checks are complete.

.5 Control functional checks, including all alarms performed.

.6 Start-up verification checks by manufacturers representatives completed.

.7 All deficiencies to be recorded reviewed by the commissioning team and, subsequently corrected before proceeding to the next phase, Phase 2.

.2 **Phase 2** - System Commissioning shall include but not necessarily be limited to:

.1 Activation of all systems.

.2 Testing and adjustment of all systems.

.3 As in the case of the System Readiness Phase, all deficiencies are to be recorded, reviewed by the Commissioning team and, subsequently, corrected. The process at the point of the deficiency shall be repeated before proceeding forward.

.4 Phase 2 is concluded when the installation is in full working order and acceptable for use. The work will include setting up the following:

.1 All flow measurement devices

.2 Manual valves

.3 Valve actuators

.4 Angle Check (pump control) valves

.5 Modulating valves

.6 UV reactors

.5 Fine Tuning:

.1 Setting up equipment for accurate response and precise sequencing.

.6 Testing:

.1 The Commissioning Agent shall perform a detailed check of the following:

.1 All items and functions to be later demonstrated to the City's representatives.

.3 **Phase 3** - Verification of Commissioning.

.1 Verification of commissioning by the Contract Administrator shall not commence until the commissioning process, Phase 2, has been totally completed. Submit test procedure completion test certificates at the time of requesting the commencement of the verification procedure. The verification process will include the demonstration of the following:

.1 Operation of all valves, actuators, flow meters and UV equipment.

.2 Operation of all equipment and systems, under each mode of operation.

.2 At the completion of Phase 3, the Contractor shall submit the following to the Contract Administrator:

.1 A letter certifying that all work specified under this contract is complete, clean and operational in accordance with the specification and drawings.

.2 A copy of Phase 2 Verification Certificates provided by the specialist trades for submission to the Contract Administrator.

.3 Record drawings as specified.

.3 Upon receipt of all documents and a satisfactory outcome of the verification procedure, the Contract Administrator will provide a Certificate of Verification for Phase 3.

.4 Substantial Performance may, thereupon, be declared.

.4 **Phase 4** – Validation. Participate in validation in accordance with Section 01010 and the approved Validation Protocol.

.5 **Phase 5** - Demonstration and Acceptance shall not commence until the commissioning process Phase 3 has been successfully completed - verification certificate issued and Substantial Performance declared. The demonstration process is a statement of satisfaction from the Contract Administrator upon completion. Total Performance will not be accomplished without this achievement.

3. EXECUTION

.1 The following systems are to be commissioned:

.1 Process Piping Drains - system pressure tests, pipe identification.

.2 UV system

.3 Check (pump control) valves

.4 Manual isolation valves

.5 Modulating valves and actuators

.6 Magnetic flow measurement meters

.7 Piping System - pressure tests, insulation, identification, water balance, hangers, and expansion.

END OF SECTION