SECTION 21 0800 - COMMISSIONING OF FIRE SUPPRESSION SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. General

B. Commissioning work shall be organized and structured to verify that all fire suppression system and equipment have been properly designed and installed and function together correctly to meet OPR (Owner Project Requirements) and BOD (Basis of Design). Commissioning shall be in accordance with NFPA 3, Recommended Practice for Commissioning and Integrated Testing of Fire Protection and Life Safety Systems, 2012 edition.

C. The Commissioning Authority (CxA) rcortractors. Oversight of the observation, coordination, verification, and commissioning shall be the responsibility of the CxA. The CxA process does not relive the fire suppression contractors of obligation to complete all portions of the work in a satisfactory manner and ensure systems are fully operational.

E. Refer to Division 01, Section 01 9113, for a full list of commissioning related definitions. A few critical definitions are included below:

1. *Commissioning*. A systematic process that provides documented confirmation that specific and interconnected fire and life safety systems function according to the intended design criteria set forth in the project documents and satisfy the owner's operational needs, including compliance requirements of any applicable laws, regulations, codes, and standards requiring fire and life safety systems.
2. *Commissioning Authority (CxA*). The qualified person, company, or agency that plans, coordinates, and oversees the entire Cx process.
3. *Commissioning Plan*. The document prepared for each project, which identifies the processes and procedures necessary for a successful Cx process.
4. *Commissioning Record*. The complete set of commissioning documentation for the project, which is turned over to the owner at the end of the construction phase.
5. *Functional Testing*. Tests performed to verify compliance with manufacturers' specifications, applicable codes and standards, and the project BOD and OPR.

F. The purpose of the commissioning is to verify the design intent, develop the OPR and BOD, to verify that the OPR and BOD are verified through testing, and to provide training.

G. The Commissioning Team shall be made up of representatives from the Owner, Design Team, General Contractor (GC), manufacturers, and construction trades. The trades represented on the Commissioning Team shall include, but not be limited to: Mechanical (including sheet metal and piping), Integrated Automation, Electrical, Plumbing, Fire Suppression and other specialty trades as necessary; fitting, controls, test and

4. Prepare contract documents incorporating Commissioning Specification requirements and description of the electrical systems.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. The appropriate Contractor(s) shall furnish all special tools and equipment required for testing during the commissioning process. A list of all tools and equipment to be used during commissioning shall be submitted to the Commissioning Authority for approval. All the test equipment to be utilized shall be calibrated as per National Fire Protection Agency (NFPA) and written manufacturer recommendations. The owner shall furnish necessary utilities for the Commissioning Process.

2.2 TEST EQUIPMENT – PROPRIETARY

A. Proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the Commissioning Process as needed. Proprietary test equipment (and software) shall become the property of the owner upon completion of the Commissioning Process.

EXECUTION

3.1 GENERAL

A. A pre-construction meeting of all Commissioning Team members shall be held at a time and place designated by the owner. The purpose shall be to familiarize all parties with the Commissioning Process, and to ensure that the responsibilities of each party are clearly understood.

B. The Contractor shall complete all phases of work so the systems can be started, tested, balanced, and commissioning procedures undertaken. This includes the complete installation of all equClatnconing

schedules and of sufficient duration to complete the necessary tests, adjustments, and/or problem resolutions.

B. System performance problems and discrepancies may require additional technician time, CxA time, reconstruction of systems, and/or replacement of system components. The additional technician time shall be made available for subsequent commissioning periods until the required system performance is obtained.

C. The CxA reserves the right to question the appropriateness and qualifications of the technicians relative to each item of equipment, system, and/or sub-system. Qualifications of technicians shall include expert knowledge relative to the specific equipment involved and a willingness to work with the CxA. Contractor shall provide adequate documentation and tools to start up and test the equipment, system, and/or sub-system.

3.3 DEFICIENCY RESOLUTION

A. In some systems, maladjustments, misapplied equipment, and/or deficient performance under varying loads will result in additional work being required to commission the systems. This work shall be completed under the direction of the Owner, with input from the contractor, equipment manufacturer, and Commissioning Authority. Whereas all members shall have input and the opportunity to discuss, debate, and work out problems, the Owner shall make final determination over any additional required work to achieve performance.

B. Corrective work shall be completed in a timely fashion to permit the completion of the Commissioning Process. Experimentation to demonstrate system performance may be permitted. If the Commissioning Authority deems the experimentation work to be ineffective or

3.5 CONSTRUCTION PHASE OBSERVATION

A. Scope of Construction Phase Observation

1. The Commissioning Authority will conduct periodic observations during the Construction Phase to monitor progress and compliance with the design intent and contract documents. It is the responsibility of the contractor to address the issues noted on the Issues Log and notify Commissioning Authority of completion.
2. Commissioning Authority observations will coincide with Design Team observations and are not intended to take the place of this work.

B. Documentation and Reporting

1. Issues identified by the Commissioning Authority during Construction Phase will be documented on the Contractor Commissioning Issues Log and distributed to Commissioning Team members.
2. Progress during the Construction Phase will also be documented by the Commissioning Authority using Commissioning Process Reports.

3.6 ACCEPTANCE PROCEDURES

A. Pre-functional Checklists

1. Scope of Pre-functional Checklists

a. Tests and verifications included in the Pre-functional Checklists shall determine if all components, equipment, systems, and interfaces between systems are installed and are ready to operate in accordance with contract documents.

2. Documentation and Reporting Requirements

a. Pre-Functional Checklists shall be provided for each component, piece of equipment, system, and sub-system, including all interfaces, interlocks, etc. Each item to be tested shall have a different entry line with space provided for comments. The checklists will include spaces for each party to sign off on.
b. The checklist shall equipment characteristics and the installation status of the component or system.
c. The commissioning authority shall review and approve the completed checklist before scheduling functional performance testing.
d. Completed checklists shall be submitted to the Commissioning Authority for acceptance and inclusion in the commissioning report.

3. Acceptance of Pre-Functional Checklists

a. The Commissioning Authority will select, at random, 10 percent of the checklists for verification.
b. If 10 percent or more of the checklists are found to be inaccurate for each system or equipment type, all of the checklists for that system or equipment type will be rejected. Complete, accurate checklists will need to be resubmitted.

g. Loss of power to monitored circuits should be tested to confirm signal receipt at one of the following:

1) A constantly attended location at the premises
2) A monitoring station as described in NFPA 731, Standard for Installation of Electronic Premises Security Systems, Chapter 9
3) A supervising station as described in NFPA 72, National Fire Alarm and Signaling Code.

h. Integrated testing of data sharing systems should document the following:

1) Completion of acceptance testing for each component system
2) Verification of date transfer between component systems
3) Test of visual and audible signal upon loss of communication
4) Test of degrade mode for each component system
5) Proper function of integrated date sharing systems

i. The following is a list of subsystems that will be interconnected in the integrated system for the project:

1) Fire alarm system
2) Emergency communication systems
3) Building automation management system
4) Means of egress systems and components
5) Heating, ventilating, and air conditioning (HVAC) system
6) Gas detection system
7) Normal, emergency, and standby power systems
8) Automatic sprinkler systems
9) Fixed fire suppression and control systems
10) Automatic operating doors and closures
11) Smoke control and management systems
12) Explosion prevention and control systems .

b. If deficiencies are identified during Integrated System Testing, the General Contractor will be notified and action taken to remedy the deficiency. The final Integrated System Testing Procedure forms will be reviewed by the Commissioning Authority to determine if testing is complete and the system is functioning in accordance with the contract documents.

4. Documentation and Reporting Requirements

a. All measured data, data sheets, and a comprehensive summary, describing the operation of the plumbing system at the time of testing shall be submitted to the Commissioning Authority.

b. A preliminary Integrated System Test report shall be prepared by the Commissioning Authority and submitted to the Design Team for review. Any identified deficiencies need to be evaluated by the Design Team and General Contractor to determine if they are part of the contractor's or sub-contractor's contractual obligations. Construction deficiencies shall be corrected by the responsible contractor(s), and the specific Functional Performance Test repeated.

c. If it is determined that the fire suppression system is constructed in accordance with the contract documents, and the performance deficiencies are not part of the contract documents, the Owner must decide whether any required modifications needed to bring the performance of the Fire suppression system up to the finalized design intent shall be implemented, or if the test shall be accepted as submitted. If corrective wcorentorent24.4(n)performaeo, oorhe nneryalldet ermirn-12.3(e)0.5(i)3.1(f)-13.2( )].5(ia

NORTHWESTERN UNIVERSITY
PROJECT NAME _____ FOR: _____
JOB # _____ ISSUED: 03/29/2017

F. The contractor shall provide, at or before substantial completion, a proposed agenda and schedule of the above training for approval by the Commissioning Authority and the Owner.

END OF SECTION