PART 1 GENERAL PROVISION

1.1 Section Includes

1.1.1 Provide all material, labor, engineering and operations for the installation of a complete and operable fire sprinkler system as shown on the Drawings and as specified herein.

1.1.2 Install all equipment and materials including pipes, fittings, valves, sprinkler heads, backflow preventer, fire department connections, pipe supports, specialties and accessories necessary to provide a complete and approved fire sprinkler system.

1.1.3 Provide a fire service main from the water main into the building, valves, hydrants and components as described in the job scope and/or as shown on the Drawings. Make all connections to utilities as required to serve the fire sprinkler system. Flush the fire service main before connecting to the fire sprinkler system.

1.1.4 Apply and pay for all permits and fees required for work under this section.

1.1.5 This Contractor shall be completely responsible for the design, layout, submittals, installation, testing, certification and acceptance of the fire sprinkler system.

1.1.6 This Contractor shall be responsible for any damage to the building and property of others caused by leaks in the fire sprinkler system and shall pay for the replacement or repair of damaged property.

1.1.2 Related Requirements

1.1.2.1 Section 28 31 00 Fire Detection and Alarm

1.1.2.2 Basic Mechanical Requirements

1.1.2.3 Basic Materials and Methods

1.1.2.4 Wiring shall be provided under the Electrical Division, unless otherwise indicated. The Electrical Division will provide all wiring from flow switches, supervised valves, alarm bell, etc. Coordinate for proper operation.

1.2 Submittals

1.2.1 Shop drawings for the fire sprinkler system shall be submitted to the Owner for review and approval prior to system installation and shall include all of the following:

1.2.1.1 System layout and riser diagram showing actual location of all components.

1.2.1.2 Manufacturer's product data sheets for all equipment and materials including pipes, couplings, fittings, valves, sprinkler heads, backflow preventers, fire department connections, pipe supports, specialties and accessories.

1.2.1.3 Hydraulic calculations.

1.2.2 Record drawings, hydraulic calculations and Operation and Maintenance Manuals for the fire sprinkler system shall be submitted to the Owner after the system installation is complete and shall include a record of all changes made to the system from that shown on the approved shop drawings.

1.2.3 Provide spare parts to the Owner as specified:

1.2.3.1 Provide spare sprinkler heads of each type and temperature rating installed on the project.

1.2.3.2 Provide one sprinkler wrench for each type of sprinkler head installed on the project.

1.2.3.3 Mount sprinkler head cabinets on wall next to main riser assembly.
1.2.3.4 Provide a list of sprinkler heads installed on the project in the sprinkler cabinet.

1.2.3.5 Specialty sprinkler heads shall include extra escutcheons, cover plates, etc.

1.3 Quality Assurance

1.3.1 Contractor Qualifications

1.3.1.1 Work shall be performed by a contractor regularly engaged in the design and installation of fire sprinkler systems.

1.3.2 Regulatory Requirements

1.3.2.1 The Contractor shall assume full responsibility for compliance with all applicable codes, standards and regulations. This includes compliance for modification or extension of existing systems. All compliance deficiencies shall be corrected at no additional cost to the Owner.

1.3.2.2 Systems, work and materials shall comply with the applicable regulating agencies and organizations, which include, but are not limited to the following:

1.3.2.2.1 Indiana Department of Fire and Building Services

1.3.2.2.2 National Fire Protection Association (NFPA)

1.3.2.2.3 Underwriters Laboratories (UL)

1.3.2.2.4 Factory Mutual (FM)

1.3.2.2.5 Purdue University

1.3.2.3 Systems, work and materials shall comply with applicable codes, standards, and regulations, which include, but are not limited to the following:

1.3.2.3.1 Indiana Building Code

1.3.2.3.2 Indiana Fire Code

1.3.2.3.3 National Fire Protection Association

PART 2 PRODUCTS

2.1 General

2.1.1 All products, equipment and materials shall be new, UL listed, FM approved and installed in accordance with the manufacturer’s instructions and their listing or approval.

2.1.2 All products, equipment and materials shall be rated for the maximum working pressures involved, but not less than 175 PSI cold water pressure, unless noted otherwise.

2.2 Pipe

2.2.1 General

2.2.1.1 Pipe shall conform to ASTM Standards.

2.2.1.2 Pipe shall have the manufacturer’s name or brand, and applicable ASTM Standard marked on each length of pipe.

2.2.1.3 Pipe shall have a factory applied protective coating to provide resistance to microbiologically influenced corrosion (MIC).

2.2.1.4 Thin-wall pipe is not acceptable.

2.2.1.5 Grooved couplings shall be rigid type except flexible couplings shall be used in locations where vibration attenuation and stress relief are required.
2.2.2 Schedule 40

2.2.2.1 Black steel pipe, ASTM A135 or A53, joined by welded joints, rigid grooved couplings, or threaded joints

2.2.2.2 Grooves shall be dimensionally compatible with the coupling.

2.2.3 Schedule 10

2.2.3.1 Black steel pipe, ASTM A135, joined by welded joints or rigid grooved couplings

2.2.3.2 Grooves shall be dimensionally compatible with the coupling

2.2.3.3 Cut grooves are not acceptable

2.2.4 The following piping shall be galvanized

2.2.4.1 Piping exposed to weather

2.2.4.2 Drain piping open to the atmosphere

2.2.4.3 Piping used in a corrosive atmosphere (where noted on the Drawings)

2.2.4.4 Piping shall be galvanized (ASTM A795) schedule 40 only inside the building, upstream of the backflow preventer.

2.3 Fittings

2.3.1 General

2.3.1.1 Plain end, pressure fit type fittings are not acceptable

2.3.1.2 Hole cut mechanical tee fittings are not acceptable

2.3.1.3 Galvanized piping shall have galvanized fittings

2.3.1.4 1½" pipe and smaller shall have threaded fittings

2.3.2 Welded

2.3.2.1 Standard weight, black steel in accordance with applicable ASME and ASTM standards

2.3.2.2 The branch fitting diameter shall not exceed half of the nominal pipe size

2.3.3 Grooved Fittings

2.3.3.1 Fittings shall be ductile iron, minimum 350 PSI working pressure, and in accordance with ASTM A536

2.3.3.2 Fittings shall be full flow standard pattern or full flow short pattern

2.3.4 Threaded

2.3.4.1 Cast iron, Class 125, ASME B16.4

2.3.4.2 Malleable iron, Class 150, ASME B16.3

2.3.5 Flanged

2.3.5.1 Cast iron, Class 125, ASME B16.1

2.3.5.2 Gaskets shall be full face, 1/8" minimum thickness, and red sheet rubber

2.3.5.3 Flange bolts shall be hexagon head machine bolts with heavy semi-flushed hexagon head nuts, cadmium plated, with dimensions in accordance with ASME B18.2

2.3.6 Flexible Sprinkler Hose Fittings

2.3.6.1 Flexible sprinkler hose fittings shall be either FlexHead or VicFlex
2.3.6.2 Flexible sprinkler hose fittings shall only use manufacturer approved brackets

2.4 Valves

2.4.1 General

2.4.1.1 Valves shall be the same size as the pipe size shown on the Drawings

2.4.2 Double Check Valve Assembly

2.4.2.1 Indiana Department of Environmental Management, ASSE 1015 listed and USC approved

2.4.2.2 The double check valve assembly shall consist of two resilient seated full flow isolation valves, two independently operating, spring loaded poppet-type internally epoxy coated cast iron check valves and four resilient seated test cocks for field testing. Stainless steel springs and corrosion resistant materials shall be used throughout. Double check valve assembly shall be a Watts Series LF709, Febco LF850, or approved equal.

2.4.3 Gate Valves

2.4.3.1 1½” pipe and smaller: OS&Y, bronze, screwed

2.4.3.2 2” pipe and larger: OS&Y, resilient-seated, iron body, bronze mounted, flanged

2.4.4 Butterfly Valves

2.4.4.1 Iron body (lug-style or grooved end), 300 PSI working pressure, and gear operator with position indicator

2.4.5 Check Valves

2.4.5.1 1½” pipe and smaller: bronze, screwed

2.4.5.2 2” pipe and larger: iron body, bronze mounted, flanged

2.4.5.3 Shall be of the non-slam type, semi-steel body, bronze trim, top and bottom center guide, stainless steel spring, flanged

2.4.6 Globe and Angle Valves (Drains and Flow Regulation)

2.4.6.1 1½” pipe and smaller: bronze, renewable composition disc, screwed

2.4.6.2 2” pipe and larger: iron body, bronze mounted, renewable composition disc, flanged

2.4.7 Straight Globe Hose Valves (Roof Manifolds and Pumped Wall Hydrants)

2.4.7.1 2½” straight globe valve, cast brass, 300 PSI, hose thread outlet, cap and chain. Potter-Roemer 4115 or approved equal.

2.4.8 Hose Valves

2.4.8.1 Where pressure is 100 PSI or higher

2.4.8.1.1 2½” [non-adjustable pressure regulating angle valve][pressure restricting angle valve], cast brass, [400][175] PSI rated, hose thread outlet, brass finish with cap and chain. Potter-Roemer [4053][ 4085] or approved equal.

2.4.8.2 Where pressure is less than 100 PSI

2.4.8.2.1 2½” angle hose valve, cast brass, 300 PSI rated, hose thread outlet, brass finish with cap and chain. Potter-Roemer 4065 or approved equal

2.4.9 Ball Drip Valves

2.4.9.1 3/4” automatic drain, cast brass, Potter-Roemer Series 5982 or approved equal.

2.4.10 Dry Pipe Valves
2.4.10.1 Dry pipe valve and trim package including but not limited to: drain valves, check valves, test valve, alarm pressure switch, low-air supervisory switch, drain cup, reset bar and pressure gauges, to provide a complete assembly. Provide accelerator as required. Viking or approved equal

2.5 Sprinkler Heads

2.5.1 Temperature Ratings

2.5.1.1 Ordinary temperature, except where higher temperature sprinkler heads are required

2.5.1.2 Sprinkler heads shall be color coded

2.5.1.3 Sprinkler heads located in Electrical Switchgear Rooms shall be 212°F

2.5.2 Sprinkler heads in finished ceilings shall be white finish recessed pendent type with adjustable two piece escutcheons, unless otherwise noted.

2.5.3 Sprinkler heads in equipment rooms, rooms without finished ceilings and unfinished spaces shall be plain brass pendent or upright as required.

2.5.4 Pendent and horizontal sprinkler heads in areas subject to freezing shall be dry type (walk-in coolers/freezers, cold rooms, loading docks, etc.).

2.5.5 Pendent and horizontal sprinkler heads on dry-pipe or dry-preaction shall be of the dry type only.

2.6 Fire Department Connections

2.6.1 General

2.6.1.1 Fire department connections shall be a [3] way with 2½" outlets and [6]" inlet complete with clappers, hose threads, caps and chains. Sign plate shall have 1" letters and read ["AUTO SPKR AND STANDPIPE"]. Potter Roemer Series or approved equal.

2.6.2 Wall Type

2.6.2.1 Polished brass or polished chrome plated

2.6.3 Free Standing

2.6.3.1 Cast brass body with polished brass or polished chrome plated finish. Polished brass or polished chrome plated trim and seamless cover sleeve. Cast brass base plate.

2.7 Roof Manifolds

2.7.1 General

2.7.1.1 Roof manifold shall be a [3] way with 2½" outlets and [4]" inlet, complete with valves, caps and chains. Potter Roemer Series or approved equal.

2.7.1.2 Provide automatic ball drip on downstream side of valve and pipe to closest discharge point

2.7.2 Floor Type: Provide remote gate valve, located in a heated area and provided with an indication floor stand with extension stem and stem to valve coupling. Outlet shall be installed vertically and be made freeze proof by connection to above mentioned valve system.

2.7.3 Wall Type: Provide remote gate valve, located in a heated area and provided with a wall type indicator post with extension rod, coupling and extension barrel. Outlet shall be installed horizontal and be made freeze proof by connection to above mentioned valve system.

2.8 Automatic Nitrogen Inerting Vent Systems (wet pipe systems)

2.8.1 General
2.8.1.1 Provide and install automatic nitrogen inerting vent system designed to vent gas within the wet pipe sprinkler system.

2.8.1.2 The back pressure regulator on the nitrogen inerting vent is factory set at 35 psi to prevent loss of nitrogen gas during nitrogen inerting procedure.

2.8.1.3 This Contractor shall provide the owner with a nitrogen inerting start-up kit which includes approved nitrogen regulator, 3/8” supply hose rated for 300 psi, and handheld gas analyzer.

2.8.2 Corrosion Monitoring Station

2.8.2.1 Provide and install a corrosion monitoring station with a corrosion monitoring probe on the system’s main riser to monitor internal corrosion activity within the fire sprinkler systems.

2.8.3 Manufacturers

2.8.3.1 Automatic nitrogen inerting vents shall be Engineered Corrosion Solutions Model EAAV-2N or approved equal.

2.8.3.2 Nitrogen Inerting Start-up Kit shall be Engineered Corrosion Solutions Model NISK-1 or approved equal.

2.8.3.3 Corrosion monitoring station shall be Engineered Corrosion Solutions Model ICMS-1 including an Engineered Corrosion Solutions detector probe DCMP-3 or approved owner equal.

2.9 Nitrogen Generation Systems (Preaction and Dry Systems)

2.9.1 Nitrogen generator cabinet with two external valves to connect to the air supply serving the dry pipe system. The system shall include automatic vents to achieve at least 95% nitrogen concentration in the system. The system shall include integrated gas stream analyzer to measure the level of nitrogen in the system. Nitrogen generation system shall be Engineered Corrosion Solutions, South-Tek, or approved equal.

2.10 Air Compressors (Preaction and Dry Systems)

2.10.1 The air compressors shall be electric motor driven, air cooled, single stage, oil-less, and sized appropriately to serve dry pipe systems and nitrogen generation systems.

2.10.2 The air compressor shall be equipped with adjustable pressure switch, pressure gauge, check valve, safety relief valve and controls.

2.10.3 The air compressor shall be mounted horizontal, with an ASME rated tank (minimum 20 gallon) and shall include an automatic blow down device piped to a drain and belt guard.

2.10.4 The air compressor shall have an output pressure rating of at least 100 PSI and shall be rated for continuous duty.

2.10.5 The air compressor shall be capable of restoring normal air pressure plus 25% in the dry pipe system within 30 minutes.

2.10.6 The motor shall be [110/60/1][220/60/3] with thermal protection.

2.11 Hose Cabinets

2.11.1 Hose Valve Cabinets

2.11.1.1 20 gauge steel, 18"x18"x8" valve cabinet with [wire glass][solid panel] door, prime coat finish, 18 gauge frame, continuous steel hinge. Cabinet shall be fully recessed and contain 2½” angle hose valve with cap and chain. Provide "Fire Department Valve" decal. Potter Roemer Series 1810 or approved equal.

2.11.2 Combination Hose Valve/Fire Extinguisher Cabinets
2.11.2.1 20 gauge steel, 18" W x 24"H x 8"D valve and extinguisher cabinet with [duo wire glass] [solid panel] door, prime coat finish, 18 gauge frame, continuous steel hinge. Cabinet shall be fully recessed and contain 2½" angle hose valve with cap and chain and fire extinguisher. Provide "Fire Department Valve" and "Fire Extinguisher" decals. Potter Roemer Series 1880 or approved equal.

2.11 Accessories

2.11.1 Water Flow Switches

2.11.1.1 Provide vane type water flow indicator for each automatic sprinkler system zone. Indicator shall be designed for horizontal or vertical mounting, have 2 sets of contacts and have a field adjustable instantly recycling pneumatic retard from 0-70 seconds. Potter VSR-F or approved equal.

2.11.2 Valve Supervisory Switches

2.11.2.1 Die cast enclosure with red enamel finish and tamper resistant screws. Two sets of contacts. Mounting device shall be weatherproof and suitable for indoor or outdoor use. Potter or approved equal

2.11.2.1.1 Post Indicating Valves: Potter PCVS-2

2.11.2.1.2 OS&Y Valves: Potter OSYSU-2

2.11.2.1.3 Butterfly Valves: Potter PCVS-2

2.11.3 Pressure Gauges

2.11.3.1 3½" dial type with pressure range of not less than twice the normal working pressure. Provide gauges where shown on the Drawings and as required

PART 3 EXECUTION

3.1 Examination

3.1.1 Verification of Conditions

3.1.1.1 Examination shall be done before design approval and fabrication. Prefabrication is done at This Contractor's risk.

3.1.1.2 Examine existing conditions at the project site and become familiar with conditions under which the work will be performed.

3.1.1.3 Verify all dimensions. Be responsible for all measurements, fitting and assembly of all work.

3.1.1.4 Coordinate all work and placement of components with allowable space and other trades.

3.1.1.5 This Contractor shall be responsible for any redesign and refabricating.

3.2 Preparation

3.2.1 Equipment and Materials

3.2.1.1 Inspect pipe and fittings for soundness and clean all dirt and other foreign matter prior to installation. Damaged equipment and materials will be rejected.

3.3 Installation

3.3.1 General

3.3.1.1 The Drawings indicate general intent and location. Install piping in the most direct and straight manner as possible.
3.3.1.2 Sprinkler system shall be zoned on a floor-by-floor basis. In addition, systems protecting special hazards shall be zoned separately.

3.3.1.3 Install piping high enough to permit relocation of lights without moving ceiling grid

3.3.1.4 Conceal piping in finished areas unless otherwise shown on the Drawings.

3.3.1.5 Install vertical lines plumb and horizontal lines parallel to building lines

3.3.1.6 Install horizontal piping pitched to low points and in a manner to make it possible to test and empty entire system. Provide valves at low points to facilitate system drainage.

3.3.1.7 Protect open pipe ends whenever work is suspended during construction to prevent foreign material from entering

3.3.1.8 Install chrome plated and other finished components with care so that marring does not occur to the finish.

3.3.1.9 Protect piping that passes through non-sprinkler areas with fire resistive construction as required by code and approved by the Owner.

3.3.2 Connection to Utilities

3.3.2.1 Contractor shall make all connections to utilities as required to install the system. All connections to utilities and their shutdown shall be arranged with the Owner. Existing systems will be shut down and drained by the Owner.

3.3.3 Pipe Hangers and Supports

3.3.3.1 Support piping from the structure above with hangers

3.3.3.2 Sizing, spacing and installation shall be in accordance with NFPA 13, unless otherwise shown on the Drawings or specified herein.

3.3.3.3 Comply with other sections of this specification relating to Basic Mechanical Materials and Methods

3.3.3.4 Seismic Performance (Buildings with a Seismic Design Category "C" or higher):

3.3.3.4.1 Piping shall be capable of withstanding the effects of earthquake motions determined in accordance with the Indiana Building Code and NFPA 13

3.3.4 Pipe Sleeves

3.3.4.1 Provide sleeves for pipes passing through building walls and floors.

3.3.4.2 The annular spaces between pipe and sleeves shall be completely sealed with caulking at both ends or shall be fire stopped where required.

3.3.4.3 Provide chrome plated escutcheons large enough to cover the pipe sleeve in finished areas

3.3.5 Sprinkler Heads

3.3.5.1 Install sprinkler heads in accordance with the manufacturer's instructions

3.3.5.2 Coordinate location of sprinkler heads with ceiling grid, diffusers, light fixtures and other obstructions. Provide additional sprinkler heads which may be required for coordinated ceiling pattern and for centering, even though it may exceed minimum code requirements. Show actual sprinkler head locations on system layout submittal and record drawings

3.3.5.3 Sprinkler head locations shown on any drawings are for general intent only. This Contractor is responsible for a system layout in accordance with code requirements and Owner specification
3.3.5.4 Protect finishes against scratches, dents and discoloration. Defective items are not acceptable.

3.3.5.5 When a sprinkler head has been removed from the pipe for any reason, it shall not be reinstalled but replaced with a new sprinkler head.

3.3.5.6 Center sprinkler heads in grid or lay-in ceilings in both directions.
   3.3.5.6.1 Exception: In rooms with an area of 150 square feet or less, sprinkler heads may be centered in the grid or tile in one direction only.

3.3.5.7 Provide sprinkler head guards on heads below 7'-6" above the floor or walkway or where sprinkler heads may be exposed or subject to damage.

3.3.6 Main Riser and/or Header Assembly
   3.3.6.1 Provide main riser or header assembly consisting of double check valve assembly, fire department connection, drain valve, pressure gauge and flow switch.

3.3.7 Double Check Valve Assembly
   3.3.7.1 Install in compliance with state regulations. Mount horizontal, maximum 4 ft. above the floor.
   3.3.7.2 Test double check valve assembly to ensure proper operation. Inspection shall be performed by a registered inspector in accordance with the Indiana Department of Environmental Management. Submit reports to the Owner and include a copy in the Operation and Maintenance manuals.

3.3.8 Fire Department Connections
   3.3.8.1 Provide a check valve with ball drip valve in line connecting fire department connection to fire sprinkler system.

3.3.9 Inspectors Test Connections
   3.3.9.1 Inspector test connections shall be installed at the most remote point of each sprinkler zone system. Test connections shall be provided with a 1" pipe and valve. Test pipe shall discharge to the outside through a corrosion resistant orifice of the proper size, where it can easily be seen. Location of discharge shall be as approved by the Owner.

3.3.10 Sectional Control Assembly
   3.3.10.1 Provide and install sectional control assembly for each sprinkler zone. Sectional control assembly shall include supervised shut off valve, check valve, pressure gauge, water flow indicator, test valve, drain valve, sight glass, and orificed union of the proper size.

3.3.11 Air Compressors
   3.3.11.1 Install tank mounted air compressors on neoprene vibration isolation pads Kinetics Model NGD and 4" concrete pad.

3.3.12 Ball Drip Valves
   3.3.12.1 Locate ball drips in accessible locations and pipe discharge full size to nearest floor drain.

3.3.13 Valve Supervisory Switches
   3.3.13.1 Provide valve supervisory switches for all water supply shut-off valves.

3.3.14 Drains
   3.3.14.1 Pipe drains to terminate at floor drains or outside the building as shown on the Drawings or as specified.
3.3.14.2 Location of drains to the building exterior shall be approved by the Owner.

3.4 Wet Pipe Sprinkler System

3.4.1 General

3.4.1.1 Fire sprinklers shall be provided for the entire building

3.4.1.2 Do not install sprinkler piping or sprinkler heads in elevator shafts or elevator equipment rooms

3.4.1.3 Do not install sprinkler heads in transformer vault

3.4.1.4 Provide sprinkler heads at all stair landings, except intermediate landings

3.4.2 Design Criteria

3.4.2.1 System shall be hydraulically calculated to provide [0.20] GPM per square foot over the most hydraulically remote [1,500] square feet, including [250] GPM hose allowance. **The design area of operation shall not be decreased when allowed by NFPA 13.**

3.4.2.2 All spaces shall be designed for [Ordinary Hazard 2].

3.4.3 Paint Spray

3.4.3.1 Provide sprinkler heads in finishing room and for paint spray booth and related exhaust ductwork in accordance with NFPA 33. Maximum 12 ft. sprinkler spacing in ductwork. Use dry type heads in ductwork as required. All sprinklers shall be controlled by an accessible and supervised OS&Y sectional control valve.

3.5 Dry Sprinkler System

3.5.1 General

3.5.1.1 Provide air/nitrogen supply system in accordance with NFPA 13. Nitrogen supply shall be from air compressor and nitrogen generator furnished and installed by This Contractor.

3.5.1.2 Provide pressure maintenance device and check valve at connection.

3.5.2 Design Criteria

3.5.2.1 System shall be hydraulically calculated to provide [0.20] GPM per square foot over the most hydraulically remote [1,500] square feet, including [250] GPM hose allowance. **The design area of operation shall not be decreased when allowed by NFPA 13.**

3.5.2.2 All spaces shall be designed for [Ordinary Hazard 2].

3.6 Hydraulic Calculations

3.6.1 General

3.6.1.1 This Contractor shall prepare hydraulic calculations for the design of the system and submit to the Owner and Indiana Department of Fire and Building Services for approval before any fabrication or installation is started

3.6.1.2 Hydraulic calculations shall include the volume in gallons of all systems installed.

3.6.2 Flow Test Data

3.6.2.1 The following flow test data shall be used in the design of the system: Static pressure of [75] PSI, with a residual pressure of [64] PSI while flowing [2,000] GPM.

3.7 Existing Construction

3.7.1 Existing Sprinkler Systems
3.7.1.1 Provide all work necessary to accommodate renovations and alterations as required to meet code requirements and this Specification.

3.7.1.2 Modify sprinkler system to accommodate renovations and alterations that may affect spacing, coverage, etc.

3.7.1.3 Do not reinstall old sprinkler heads. Replace with new sprinkler heads and match existing system where possible.

3.7.1.4 Piping and sprinkler heads shown on the Drawings and old record drawings are for general information and reference only. This Contractor shall examine the project site for verification.

3.7.2 Notify the Owner of fire sprinkler system impairment. Plan work so that the interruption is minimized. Restore system to normal working order.

3.8 Standpipe Systems

3.8.1 Provide a [Class I manual-wet] standpipe in each stairway in accordance with NFPA 14.

3.8.2 Provide a [2½"] hose valve at the following locations. Valve shall be installed 4 ft. above the floor.

3.8.2.1 At each intermediate landing between floor levels in every stairway.

3.8.2.2 At the highest landing of stairways with stairway access to the roof.

3.8.3 At each standpipe where stairway does not access the roof, provide a roof manifold when the roof has a slope of less than 4” in 12”. Where lines pass through the roof, provide flashing and counterflashing as required for a watertight installation. Roof manifold is not required if stairway goes to roof.

3.8.4 All standpipes shall be interconnected at the bottom. Provide isolation valve for all risers.

3.8.5 Provide drain valves with hose connection at the low point of all standpipes downstream of the isolation valve.

3.8.6 Provide sign at each hose connection for manual standpipes "Manual Standpipe For Fire Department Use Only".

3.9 Automatic Nitrogen Inerting Vents

3.9.1 General

3.9.1.1 Provide an automatic nitrogen inerting vent and nitrogen injection port for each sprinkler zone and at the top of each multi-story standpipe or combination riser.

3.9.1.2 Device location shall be determined by This Contractor and approved by the Owner (consult with Engineered Corrosion Solutions for preferred locations).

3.9.1.3 Vents shall be located such that they are easily accessible and can be visually monitored from the floor. Install at the remote high point of the sprinkler zone piping.

3.9.1.4 Install a Nitrogen Injection Port at the riser on the system side of the control valve. This Contractor shall leave the provided ball valve in the closed position after installation.

3.9.1.5 To initiate nitrogen inerting procedure

3.9.1.5.1 Completely drain the fire sprinkler system.

3.9.1.5.2 Attach source of nitrogen gas to the Nitrogen Injection Port installed at riser.

3.9.1.5.3 Pressurize the fire sprinkler system with nitrogen gas.

3.9.1.5.4 Then drain the fire sprinkler system through the main drain until system pressure reads 0 PSI.
3.9.1.5.5 Repeat nitrogen pressurization cycles until the fire sprinkler system concentration reaches 98% nitrogen or greater.

3.9.1.5.6 Fill the fire sprinkler system with water when nitrogen inerting is complete.

3.9.1.5.7 A Complete Nitrogen Inerting Protocol will be provided as part of ECS Consulting Services Package for Commissioning.

3.9.1.6 Provide and install relief valves not less than ½” in size on each wet-pipe system set to operate at 175 PSI.

3.9.2 Corrosion Monitoring Station

3.9.2.1 Corrosion Monitoring Station shall be located downstream of the double check valve assembly not more than 5 feet above finished floor and in accordance with manufactures recommendations.

3.10 Painting and Identification

3.10.1 Identify piping installed in this project, exposed or concealed, with a label.

3.10.2 Piping shall be labeled close to valves, at changes in direction, at branches, at access panels, before pipes pass through the floor and at entry point into rooms; however, spacing of labels shall not exceed twenty feet. Labels shall be in contrasting colors such as black on white placed in conspicuous location subject to approval by the Owner. The label shall consist of an arrow, approximately six inches in length with the width to be determined by letter height, and an abbreviation of the service ("FL" for Fireline). The following letter sizes shall apply:

3.10.2.1 Pipe under 1” diameter: Letter Size ½”
3.10.2.2 Pipe 1” to 3” diameter: Letter Size 1”
3.10.2.3 Pipe over 3” diameter: Letter Size 2”

3.10.3 All exposed fire sprinkler piping shall be painted. Except in mechanical, general storage and utility areas, paint shall match interior finish or as specified by Owner. Mechanical, general storage and utility shall be painted red equal to Glidden #4520 or Rustoleum #964.

3.11 Field Quality Control

3.11.1 Sterilization

3.11.1.1 This Contractor shall sterilize all piping upstream of fire sprinkler system double check valve assembly.

3.12 Closeout Activities

3.12.1 Testing and Acceptance

3.12.1.1 Perform all operational and acceptance tests required by NFPA 13 and 14.
3.12.1.2 All tests shall be made in the presence of the Owner's representative.
3.12.1.3 Test all piping hydrostatically at not less than 200 PSI for 2 hours without loss of pressure. Retest piping that fails initial tests after correction of defective work.
3.12.1.4 Make arrangements to pay for costs for all inspections by the authority having jurisdiction and obtain approval of the installation.
3.12.1.5 Complete and sign Contractor's Material and Test Certificates. Include copies of the certificates in the Operations and Maintenance Manuals.

3.12.2 Demonstration
3.12.2.1 When required approvals of this work have been obtained, and at time designated by the Owner, demonstrate to the Owner’s personnel the operation and maintenance of the systems.

3.12.2.2 Demonstrate equipment, specialties, and accessories. Review operating and maintenance information.

3.12.2.3 Schedule demonstration with Owner with at least seven days advance notice.

3.12.3 Commissioning

3.12.3.1 Nitrogen Generation System

3.12.3.1.1 Engage a qualified consultant for the nitrogen generation system and components to perform the following

3.12.3.1.1.1 Provide recommendation regarding size of the compressor and preferred operation of the air maintenance device.

3.12.3.1.1.2 Provide record drawings indicating locations of air vents.

3.12.3.1.1.3 Provide final adjustments and operating pressures.

3.12.3.1.1.4 Provide a quality control kit.

3.12.3.1.1.5 Provide field reports.

3.12.3.1.1.6 Provide Owner’s manual for system indicating system components and all necessary inspections and maintenance of components.