PREACTION SYSTEMS
DESIGN, INSTALLATION, AND PLAN SUBMITTAL REQUIREMENTS

EFFECTIVE DATE: JULY 1, 2012

1.0 PERMITS

1.1 This handout supplements the San Jose Fire Department's (SJFD) handouts "FIRE SPRINKLER SYSTEMS DESIGN, INSTALLATION, AND PLAN SUBMITTAL REQUIREMENTS" and "FIRE ALARM SYSTEMS, PERMIT APPLICATION, PLAN SUBMITTAL, DESIGN, INSTALLATION AND INSPECTION REQUIREMENTS". See the mentioned fire alarm and fire sprinkler handouts for submittal requirements.

1.2 **Installation of preaction systems shall be limited to APPROVED high value areas only. Preaction systems shall not be allowed in areas such as offices, conference rooms, etc.**

1.3 Two permit applications shall be submitted, one each for the fire sprinkler and fire alarm portions of the preaction system. *See Fee Schedule.*

NOTE**: When the building is protected by both a wet system and a preaction system, plans for preaction system(s) may be submitted as part of a fire sprinkler system plans submittal. However, two additional, separate, permit applications (one for the preaction piping and another for the preaction fire detection system) shall be required in addition to the permit application for the fire sprinkler system. If a clean agent fire extinguishing system (CAFES) will be installed as well, a third additional permit shall be required.* ***Plans and permit applications for the preaction piping (fire sprinkler), preaction detection (fire alarm), and when applicable, CAFES shall be submitted at the same time.

2.0 DESIGN

2.1 All preaction systems shall be designed and installed in accordance with the 2010 Edition of NFPA 13, "Standard for the Installation of Sprinkler Systems"; 2010 Edition of NFPA 72, "National Fire Alarm Code"; 2010 California Fire Code; the San Jose Municipal Code, Chapter 17.12.1140 as modified by Local Ordinance 28839; and this handout.

2.2 Preaction systems shall be designed for ordinary hazard, group 2 as a minimum. In San Jose, a**ll preaction systems shall be "fail-safe"** not "**fail-secure".**

***NOTE:** A fail-safe device is one that, in the event of failure of the operational controls, it will still respond to a fire. "Fail-safe" should not be confused with "fail-secure" A fail-secure system secures the system in the event of a failure of the operational controls such that automatic release of the system will not happen in the event of failure of the operational controls.*

Significantly, despite popular belief to the contrary, a system's being "fail-safe" means not that failure is impossible/improbable, but rather that the system's design prevents or mitigates unsafe consequences of the system's failure; that is, it will still respond automatically to a fire.

2.3 In addition to showing the area to be protected, plans shall show the configuration of the equipment to be installed in the area. The minimum distance allowed between the sprinkler deflectors and potential water spray distribution obstructions (e.g.: machines, cable trays, etc.) is 18 inches.

2.4 The preaction valve, preaction control valve, emergency bypass valve, and control panel shall not be located in the same area protected by the preaction system. These shall be located within 10 feet of an exterior exit door, in an enclosure directly accessible from a rated corridor, a stair enclosure, or a location approved by the Fire Department.

2.5 An operational matrix chart indicating the sequence of operations for all equipment affected by the operation of the preaction system shall be provided with the submittal for plan review. All trades/contractors/subcontractors involved shall concur with the operational matrix. See the Examples by Configuration (attached).

2.6 **Preaction Fire Sprinkler Component - system design requirements:**

2.6.1 Where steel pipe is used in preaction and dry pipe systems, piping materials shall be limited to internally galvanized steel.

Exceptions: 1. Non-galvanized fittings shall be permitted.

2.6.2 Per section12.5, the area of sprinkler operations shall be increased by **30 percent** without revising the density.

2.6.3 When using large drop sprinklers, the minimum number of design sprinklers for ordinary hazard and miscellaneous storage in accordance with this standard shall be 25 for gas charged preaction systems. For other storage configurations, the number of design sprinklers shall be in accordance with the appropriate NFPA storage standard.

Note: Extended coverage heads shall not be permitted.

2.6.4 Where pneumatic control equipment is used, the lines shall be protected against crimping and mechanical damage. Where installations could be exposed to conditions that could lead to loss of integrity of the pneumatic lines, special precautions shall be taken to ensure that no loss of integrity will occur. The control equipment shall be specifically listed for the number and type of actuating devices utilized, and their compatibility shall have been listed.

2.6.5 Where a preaction system is being added to an existing sprinkler system, the tie-in may be from the main supply line of the affected floor or system provided the hydraulics are for an area of operation in accordance with section 2.6.2 herein. This shall require the **existing wet system to be calculated as flowing simultaneously and balanced with the preaction system flowing** should the preaction system not be of sufficient size to accommodate the area designated by section 2.6.2 herein. Installation of a tie-in, down stream of the existing water flow switch, will cause a dual alarm to be indicated. This event must be properly identified at the main fire alarm panel.

2.6.6 Preaction systems require return bends or dry pendants to all drops.

2.6.7 Pressure gauges shall be provided in accordance with NFPA 13, Section 7.3.1.3. Pressure gauges shall be incremented such that the normal system pressure is readable without interpolation (e.g.: 1 psi increments starting at 0 on the air maintenance side). Maximum dial pressure may be as low as city static for gauges serving the normally dry piping (e.g. 0 to 60 psi).

2.6.8 The pressure maintenance device shall be set at the minimum pressure allowed by the manufacturer for proper operation of the system. There shall be as little gas pressure in the system as possible.

2.6.9 All preaction systems shall be equipped with an alarm bypass test connection per NFPA 13, section 8.17.1.3.

2.6.10 For the application of Systems Connections per section 8.17.4, all preaction systems shall meet the criteria for double interlock preaction systems. Hence, all preaction systems shall be equipped with a trip test (inspector's test) connection. The test connection shall be installed at the end of the most distant preaction pipe of the uppermost story and shall be provided with a sign. The discharge shall be piped to a safe location capable of accepting the full flow from the system being tested for the duration of the test.

2.7 **Preaction Fire Detection Component - system design requirements:**

2.7.1 The preaction control panel (PCP) and any subpanel shall be monitored by the building Fire Alarm Control Unit (FACU). All shall have standby power of no less than 60 hours. As a minimum, the following signals shall be transmitted by the PCP to the FACU: (1) **Alarm** – preaction water flow or smoke detector or manual pull station, (2) **Supervisory** – preaction low air and preaction valve tamper, and (3) **Trouble**.

Note: FACU may be a control panel for an alarm system or for a sprinkler monitoring system.

2.7.2 A permanent sign indicating the Sequence of Operation shall be installed adjacent to the Preaction Control Panel. If the FACU is a separate panel from the PCP, a sign indicating the location of the PCP and the area protected by the preaction system, shall be installed adjacent to the FACU. Only buildings with existing systems capable of remaining in service and being supplemented may be approved with an additional panel. New installations shall utilize a single Master Fire Control Unit listed for Releasing Service.

2.7.3 Spot-type or air sampling-type smoke detectors shall be installed in areas protected by a preaction system and the following shall be complied with:

(a) The number of air changes for each room shall be indicated on the plans. In addition, the ceiling height, shape and surface shall be reflected on the plans.
(b) The area covered by a spot-type smoke detector shall be in accordance with NFPA 72, section 17.7.6. Each sampling port of an air sampling-type smoke detector shall be treated as a spot-type detector for the purpose of location and spacing.
(c) For gas-charged systems, the activation of any one spot-type or air sampling type smoke detector shall cause all preaction solenoid valves within the system to be released. For non-gas charged systems, alarm verification or cross zoning of spot-type smoke detectors may be allowed.

2.7.4 If the building has an existing fire alarm (evacuation) system, audible and visible notification devices tied to the FACU shall be installed in the area covered by the preaction system.

(a) Dedicated and separate monitoring of air pressure, control valves, flow switches, smoke, and heat detectors shall be provided.

2.7.5 The configuration of the contents in the area to be protected shall be considered when locating and spacing fire alarm devices.

2.7.6 Initiation device cross-zoning (verification) is prohibited.

2.7.7 Preaction control panels shall close fire-smoke dampers and shut down air handlers.

3.0 INSPECTIONS

3.1 In addition to the standard hydrostatic test, an air pressure leakage test at 40-psi (2.8 bars) shall be conducted for 24 hr. Any leakage that results in a loss of pressure in excess of 1.5 psi (0.1bar) within the 24 hr. shall be cause for retest.

3.2 In addition to the signage indicated by the referenced SJFD handouts, instruction signs at entrances to and inside the protected areas shall be provided. *Key plans* indicating the location of the control panels and each area controlled by each control valve, inspectors test valve, and all auxiliary drain valves are required. These signs shall be installed at locations as directed by the Fire Department's installation inspector(s). Also, all controls and valves shall be labeled to indicate the name, function, and normal position.

3.3 A timed release of water through the test connection shall be performed on all preaction systems to prove a solid stream of water shall be produced at the furthest extent of the system within 60 seconds upon activation of the test valve.

3.4 The following tests will be performed for system approval:

3.4.1 Alarms monitoring the supervisory air pressure –use test connection or the connection used to control the level of priming water.

3.4.2 Preaction water flow (flow switch) and exterior mechanical sprinkler alarm (water motor) actuation upon water supply.

3.4.3 Operation test (preaction valve to trip) - opens solenoid valve or operates by electrical actuation.

3.4.4 Testing detection system without operating the preaction valve.

3.4.5 Monitoring system of valves, smoke/heat detectors, horns and strobes, etc.

3.4.6 When the system is gas charged, the compressor shall re-pressurize the system from 0 psi to compressor shut off pressure (working pressure) within 30 minutes.

3.5 Inspection record will be signed off only after the completion of alarm/functional testing.

3.6 Inspection shall be scheduled by the installing contractor only. When scheduling for inspection, request for sufficient time to complete a thorough inspection of the work performed. Travel time is included in your inspection time.

4.0 DOCUMENT REVISIONS

4.1 This document is subject to revisions. For general information and to be sure that you are reading the most current document, please call (408) 535-7750, and ask for the current version date.