Fire Suppression

I. Water Based Fire Suppression Systems

A. Location Installation Requirement

1. Include sprinkler systems at all areas required by code and directed by Amtrak Engineering Services..

B. System Types

1. In general, provide NFPA 13 compliant wet-pipe sprinkler systems throughout all buildings or structures except where other type of fire suppression systems is warranted due to the type of hazard or environmental considerations of the space(s) being protected, e.g. areas subject to freezing.

2. All fire suppression system piping, equipment and appurtenances shall be UL listed / FM approved. .

3. Provide dry-pipe sprinkler systems in areas subject to freezing in accordance with NFPA 13; cold rooms, loading docks, unheated spaces, etc. Anti-freeze or heat tracing is acceptable for systems with less than 5 heads and should be considered on a case-by-case basis.

4. Light Hazard Sprinkler Classification is not permitted. Ordinary Hazard Group 2 shall be substituted for Back of House Spaces (including Yard Facilities and Warehouses). Light Hazard Classification with Quick Response Sprinklers can be used in Public Spaces at the discretion of the Amtrak Fire & Life Safety Group.

5. Single-interlock pre-action sprinkler systems are required in spaces containing high value equipment or contents and spaces which are highly sensitive to the effects of accidental sprinkler water discharge. Examples are:

a. Data center/computer rooms

b. Electrical switchgear/substation rooms

c. Amtrak Digital Technology's "Amtrak Premises Distribution System Standards," latest version, shall be followed for fire protection equipment in Digital Technology spaces.

6. Consider other system options in addition to a pre-action sprinkler for spaces containing high value equipment or contents and spaces which are highly sensitive to the effects of accidental sprinkler water discharge. These include Clean Agent gaseous suppression where room integrity is guaranteed and hybrid water mist systems (Victaulic Vortex). The design of these types of systems must comply with the appropriate NFPA standards and local codes.

7. New standpipe systems to be wet, Class I type with 2-1/2 inch hose valve connections for fire department use. Do not provide hoses. Occupant-use hoses (1-1/2 inch hose) are not permitted. Provide Fire Standpipe Systems for multi-story buildings as required by code.

8. Provide closed head, low expansion foam systems (6% concentrate) for interior fuel oil storage rooms where quantities exceed 660 gallons. The design and installation of foam systems must comply with the applicable NFPA standards and the applicable local codes.

9. Provide sprinkler and standpipe check valves with removable clappers associated with all Fire Department connections. Valves shall be oriented such that it is possible to remove the clapper as installed.

10. Hydraulic lift elevators shall be protected with automatic fire sprinklers in the elevator pit **and** the space where the hydraulic fluid tank is located per NFPA 13 and ASME A17.1. The hydraulic elevator sprinkler system shall have a control valve and water flow switch dedicated solely for the hydraulic elevator, pit and hydraulic fluid tank space.

11. **NOTE:** Waterflow switches and valve supervisory switches shall be shown on BOTH Fire Alarm Drawings and Sprinkler Drawings in both Bid Package and Shop Drawings to ensure proper coordination between disciplines.

C. Sprinkler Types

1. Sprinkler heads should be frangible glass bulb type but may be of the thermo-sensitive fusible solder link type where the sprinkler is subject to damage.
2. Provide quick response sprinklers in all occupancies except where flammable liquids are stored or handled.
3. Specify 286F temperature heads for areas with locomotives and coaches.
4. Dry pendent or dry horizontal sidewall type sprinklers may be cost effective options for small areas requiring suppression which may be subject to freezing conditions, such as small cold rooms, small outside canopy areas, etc.
5. Consider use of concealed sprinklers before others in areas accessible to the public. Choose other sprinkler styles (pendent, upright, recessed, flush, special application, etc.) based on the following items: the hazard being protected, aesthetics, NFPA 13 requirements, approvals/listings, and manufacturers recommendations.
6. Extended Coverage Sprinklers shall be permitted predicated on Amtrak Fire Life Safety Design approval and where the sprinkler system has a booster fire pump.

D. Fire Protection Water Supply

1. Avoid booster fire pumps, if possible, but provide where the water supply is inadequate to provide and maintain the required sprinkler and/or standpipe system demands in accordance with the applicable codes and standards.
2. Hydraulically calculate all sprinkler/standpipe systems, in the design phase of the project at the 30% Submittal, in accordance with NFPA standards and requirements to show that the system demand can be met by the available water supply. Municipal water supply data, in accordance with NFPA Standards, shall accompany all hydraulic calculations. The hydraulic calculations shall begin at the incoming municipal water supply (SOURCE) showing all elevation changes, pipe sizes, fittings to hydraulically most remote area located in the area of work unless otherwise permitted by Amtrak Fire Life Safety Design Group.
3. Provide a minimum 10 psi or 10 percent, whichever is greater, (10 percent of demand pressure at required flow) safety factor to accommodate future deterioration and increased demand on fire water supplies.
4. Fire Sprinkler and Standpipe systems shall not be out of service longer than 8-hours; the Amtrak Fire Safety Director / Emergency Management Representative and appropriate Site Lead (Amtrak Station Manager or Yard Master) will be notified 5 business days prior to commencement of work on sprinkler and standpipe systems. On the day of work, the Local Fire Department and Amtrak Fire Safety Director will be notified at the commencement of work that the sprinkler or standpipe system will be out of service. At the conclusion of the 8-hour out of service, the Local Fire Department and the Amtrak Fire Safety Director will be notified that the sprinkler or standpipe system is back in service.

E. Alarms/Monitoring/Control

1. Refer to Section EP4000.3.28 - Electronic Safety and Security for requirements.

F. Materials

1. Use schedule 40 black steel pipes for all pipe 2-½ -inches or less. Thread pipe with tapered pipe threads according to ASME B1.20.1.
2. Use schedule 40 galvanized piping for dry-pipe and pre-action sprinkler systems. Threaded fittings for dry systems should be either malleable or ductile; Victaulic roll-grooved fittings are also acceptable.

3. All sprinkler and standpipe system pipe 2 ½ inches or greater shall be painted fire department red and labeled SPRINKLER or STANDPIPE every 25 Feet. Signage shall be printed with red background and white lettering. Letters shall be a minimum of 2-inches. Painting shall be applied in accordance with manufacturer's guidelines.
4. Fire pumps should be electric horizontal split case. Vertical pumps should not be used in new buildings. Diesel fire pumps will be considered where reliable electrical power cannot be attained.
5. Fire pump controller to be reduced voltage type for pumps larger than 15 hp.

G. Testing and Maintenance

1. The sprinkler systems should be designed to minimize maintenance and testing requirements.
2. System shall be commissioned as per NFPA 3 Commissioning Recommendations and NFPA 4 for Testing
3. Amtrak and/or their representative(s), shall witness all acceptance testing (within the Commissioning Phase) of fire protection and life safety equipment accompanied by the manufacture's representatives and local municipal agencies (typically the fire department). Prior to any testing, testing procedures and a testing schedule shall be approved by Amtrak. Once approval is provided, written notice shall be provided, at least 10 business days prior to testing.

H. Miscellaneous Equipment and Devices

1. Include backflow prevention where a fire protection system connects to public or potable water supplies. For sprinkler systems in multi-story buildings, design each floor as an independent zone or zones, complete with a floor control valve assembly (FCVA) consisting of a control valve, flow switch, check valve, pressure gauge and test/drain connection.
2. Where system pressures exceed 175 psi, pressure reducing valves should be included. Pressure relief valves should not be used.
3. Where system pressures exceed 175 psi, fire hose valves should be pressure reducing and field adjustable. The pressure reducing fire hose valves should be capable of reducing the pressure in both static and flowing conditions.
4. Test connections for pressure reducing fire hose valves should be provided where pressure reducing fire hose valves are installed.
5. Fire Standpipe Hose connections located in public areas including train sheds and platforms shall be located in secure / limited access enclosures similar to Potter Roemer Fire Standpipe Enclosures.
6. Permanent Steel Ladders shall be provided for all sprinkler and standpipe system valves located more than 10 feet above finished floor.
7. Fire Sprinkler and Standpipe System drains shall be provided with a dedicated drain connected to the facility drainage system. In existing spaces, where sprinklers or standpipes are being added or modified, drains shall be piped into an existing facility drain. Free flow to existing floor drains is not permited. . Provide drainage in accordance with NFPA 13 & 14.
8. Provide automatic air venting in accordance with NFPA 13 & 14.
9. Fire Sprinkler and Standpipe Valve Assemblies and associated equipment shall be readily accessible for inspection, repair and use with a minimum 4-foot clearance around the equipment.
10. Each control valve shall be conspicuously marked with the number assigned to it on the riser diagram for the standpipe and sprinkler systems. Metal numbered tags at least 2-inches in diameter shall be securely attached to each valve. Each valve shall have a metal sign stating "Sprinkler or Standpipe Control Valve" securely hung

from the valve. Signage samples must be included as a part of the contractor's submittal package to Amtrak for approval.

11. Provide nameplate describing the hydraulic design criteria at each sprinkler zone control valve in accordance with NFPA 13.

II. Fire Separation

A. All new fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions will be identified by signage or stenciling within concealed spaces at no more than 30 ft intervals. Signage will state “FIRE AND/OR SMOKE BARRIER – PROTECT ALL OPENINGS”