MOBILE FIRE - RESCUE DEPARTMENT
FIRE CODE ADMINISTRATION

Clean Agent System Plan Review
NFPA 2001 and NFPA 72

Date of Review___/___/_____ **BLD20___-_____**

Project Address:_____Project Name: _____

Contractor's Business Name:_____Phone: _____

Contractors Name: _____

System Manufacturer _____System Model _____

Reference numbers following worksheet statements represent an NFPA code section unless otherwise specified.

Worksheet Legend: ✓ **or OK** = acceptable **N** = need to provide **NA** = not applicable

1._____Two sets of drawings.

2._____Equipment is listed for intended use and specification listing sheets are required.

3._____Type of agent is provided and design manual for pre-engineered systems.

Floor Plan Detailing the Following Items, Section 5

4._____Scale: use a common scale, also provide room description and dimensions.

5._____An equipment symbol legend is provided.

6._____ Sectional view of the room with floor and ceiling assemblies and isometric view of the system are provided.

7._____ A floor plan and a isomeric detail of the agent distribution system including calculation reference points, pipe diameters and lengths, and equivalent length of fittings, 5.1.2.2 (18) and (19). detailing device and nozzle locations and positions and detail the method of securing the agent container and pipe system to the structure, 5.1.2.2(21) and (22).

8._____ Methods for installation of detectors, fire detection devices, alarm signaling devices and selected wiring
practices including the selected conductors for these devices, 5.1.2.2 (15), (16), (24) and (25).

9._____ The system control panel is installed at a constantly attended location and connected to the building fire alarm system, if such a system is required.

10._____ A sequence of operation for the clean agent system complying with Section 5.1.2.2 (23).

11._____ Provide calculations for clean agent serving the enclosed volume, the backup power duration and the voltage drop for the number of installed alarm initiating and alarm signaling devices, 5.1.2.2 (26)

Analysis of Hazards to Personnel:

12._____ If a halocarbon agent is used, means shall be provided to limit personnel to the time exposure and the "No Observed Adverse Exposure Limit" values in Table 1.5.1.2.1(a), 1.5.1.2.1.

13._____If a halocarbon agent is used and the concentration will exceed the "No Observed Adverse Exposure Limit" values in Table 1.5.1.2.1, an exposure and means of egress of analysis shall be performed in accordance with Section 1.5.1.2.1(2).

14._____ If a halocarbon agent is used in an area that is not normally occupied and the design requires a volume of agent that exceeds the "Lowest Observed Adverse Exposure Limit" values in Table 1.5.1.2.1(a) an approved means of limiting exposure of personnel to the discharge shall be provided, 1.5.1.2.1(3).

15._____ If design information is not sufficient to ensure that the "Lowest Observed Adverse Limit" is not exceeded, additional analysis and engineering controls as prescribed in Section 1.5.1.2.1 (4) shall be provided and approved by the fire code official.

16._____ If an inert clean agent is used, a pre-discharge alarm shall be provided and personnel exposure limits shall not exceed the values in Section 1.5.1.3 at the indicated concentrations.

17._____Safeguards shall be provided to ensure that personnel are evacuated and exposures are limited prior to the discharge and after the discharge of a clean agent. The safeguards shall provide a means of affecting rescue of individuals trapped within an enclosure protected by a clean agent (Section 1.5.1.4.1).

18._____Minimum clearances between clean agent system components and electrical equipment shall be provided in accordance with the requirements of Sections 1.5.2.1 through 1.5.2.5.

19._____Mixing of agents within the same storage container shall be in accordance with the requirement in Section 1.8.

Electrical Components:

20._____A primary and standby source of power shall be to the control unit in accordance with Section 7.7.2.4.4.

21._____Demonstrate that the main power supply for the system is on a dedicated branch circuit and properly labeled, 7.7.2.4.3.

Clean Agent Information:

22._____Type of system: flooding or local application.

23._____Type of hazard protected and agent quantity.

24._____Indicate the type of agent: Halocarbon or Inert Gas, 1.5.1.2 and .3, 5.1.2.2 (7).

25._____The design concentration is in compliance with Section 5.4.2 for flame extinguishment or 5.4.3 for inerting.

26._____Volume of area protected is_____, if the volume above the ceiling is not included then drop ceilings must be secured. An additional amount of clean agent is required if the ventilation system cannot be shutdown prior to discharge, 5.3.5.1.

27._____Calculations: provide nozzle flow rate and orifice size, pipe lengths/type and equivalent lengths, gas temperature, reference points, gas quantity, and the volume of the area protected, 5.1.2.2, 5.3.1.

28._____Discharge time within 10 seconds for halocarbon agents, inert agents up to 1 minute, based on achieving a 95-percent concentration with a 20-percent safety factor, 5.7.1.2.

29._____Retrofitted clean agents into existing systems shall result in a listed or approved design, 1.7.

30. _____ Location of storage container is easily accessible, 4.1.3.

31. _____ Storage container securing system is detailed in accordance with the manufacturer's listing manual, 4.1.3.4.

32. _____ Agent containers are located near or inside of the hazard area, 4.1.3.2.

33. _____ Manifold halocarbon agent containers are the same size and charge, inert agent containers may be different sizes, 4.1.4.5.

34. _____ Piping material types are noted on plans and are compatible with environment and clean agent. Cast iron, steel ASTM A 120, or nonmetallic pipe shall not be used, 4.2.1.

35. _____ Fittings and associated pressure ratings are noted on the plans or provide specification sheet, 4.2.3.

36. _____ Nozzles: provided is listing information for area coverage, height limits, and minimum design pressures, 4.2.5.1.

Operating Devices, Control Devices and Alarms:

37. _____ Devices are listed for their use and equipment data sheets are provided, 4.3.3.2, 4.3.2.1, and 4.3.4.1.

38. _____ Detail the location of manual release device(s), 4.3.3.5.

39. _____ Automatic detection and actuation shall be used, 4.3.1.2; manual activation must be approved, 4.3.1.2.1.

40. _____ Manual pull device is distinct in appearance and not more than 4 ft. above the floor, note or detail, 4.3.3.7.

41. _____ Detail the verbiage and location of warning and instruction signage at entrances and inside protected area, 4.3.5.5.1 – 4.3.5.5.2.

42. _____ Alarms or indicators for system operation are provided, 4.3.5.1.

43. _____ Audible and visual pre-discharge alarms are provided 4.3.5.2, and audible levels are per NFPA 72.

44. _____ If abort switches are used, they shall be located in protected area near the exit, use a constant manual pressure design, are connected to the alarm signaling devices, and are detailed on the shop drawings, 4.3.5.3.

45. _____ Alarms indicating failure of supervised devices or equipment are provided and detailed, 4.3.5.4.

Other:

46. _____ Protected area or room is properly sealed and the method is noted on plans, 5.3.

47. _____ Forced-air ventilation shuts down if it can affect the performance of the system, 5.3.5.

Additional Comments: _____

_____

Review Date: _____ _____

Fire Code Administration Staff Captain

Voltage Drop Calculations for Notification Appliance Circuit (NAC): _____

Each NAC shall have its voltage drop determined. This sheet shall be used for one NAC but every NAC should have a sheet completed and submitted with each permit application.

STEP 1: complete the following to provide data for determining the resistance of the conductor in Step 2

Wire length is from fire alarm control panel to the end of the fire alarm circuit = ft. X 2 = _ ft.

Wire Size = #_____AWG (American Wire Gauge)

Resistance (R) = _____OHMS for a given 1,000 ft. of the conductor specified

Step 2: complete the following to determine the total resistance (OHMS) for an NAC

(R) = Total Wire Resistance

From Step 1 divide the OHMS by 1,000, which will convert the conductor resistance to OHMS in each linear foot of wire

Determine OHMS per foot $= \frac{\text{_____ft.}}{1{,}000} =$ _____OHMS/ft.

Take the total feet of wire from Step 1 and OHMS/ft. from the line above and put both in the equation below

Circuit resistance =_____ft. X_____OHMS/ per ft. = (R) Total OHMS

Step 3: complete the following to determine the total alarm notification device amperage and devices may be rated in milliamps

(I) = Alarm Appliance Amperage

A. No. of Alarm Appliances = _____ B. Current amperage each_____= A x B_____(I)

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Total _____(I)

Step 4: complete the following to determine the total voltage drop for the branch circuit

Voltage (E) = (I) X (R) from totals in Steps 2 and 3 above

(E) = (I) X_____(R)

=_____(E) (shall not exceed 4.4)

Step 5: complete the following to determine if enough voltage is available to operate fire alarm notification devices

Maximum allowable voltage drop: notification devices cannot drop below their Nameplate Operating Voltage (NOV) range. As of 5/1/2004 UL required indicating devices to operate within their NOV. The UL NOV standard is 16VDC to 33VDC, consult the 2002 NFPA 72 Handbook 7.3 for more information. Fire Alarm Control Unit (FACU) are tested to UL 864 and are required to operate at the end of useful battery life, 20.4 V.

Allowable voltage drop is 20.4 V (FACU) - 16 VDC (NOV) = 4.4 V

If (E) from Step 4 exceeds 4.4 V then the NAC is not compliant with NFPA 72

Take (E) from Step 4 and put in the equation below

Voltage Drop = 20.4 V - _____(E) =_____V (shall not be less than 16V)