13.01 FIRE ALARM SYSTEMS

PART 1 - GENERAL

1.1 REQUIREMENTS -- The latest editions to the following codes and standards shall apply as a minimum but not be all inclusive to the design and installation of fire alarm systems:

A. Maryland State Fire Prevention Code (COMAR 12.03.01 and 12.03.02)

B. National Fire Protection Association (NFPA) 101 - Life Safety Code

C. Building Officials and Code Administrators International, INC. (BOCA) National Building Code

D. **NFPA 1** National Fire Prevention Code

E. NFPA 70 - National Electrical Code

F. NFPA 72 - National Fire Alarm Code

G. NFPA 80 - Fire Doors and Windows

H. NFPA 90A - Standard for Air Conditioning and Ventilating Systems

I. NFPA 101 - Life Safety Code

J. NFPA 170 - Fire Safety Symbols

K. ANSI/ASME A17.1 -- Safety Code For Elevators and Escalators as adopted by the State of Maryland.

L. Americans with Disabilities Act (ADA)

1.2 SYSTEM DESCRIPTION

A. All new fire alarm and detection systems shall be analog/addressable systems.

B. The system and components shall be the product of a single manufacturer.

1.3 QUALITY ASSURANCE -- The system and all components shall be listed by Underwriters Laboratory (UL) for fire protective signaling service (local and remote station, emergency communication and relocation equipment, and protective signaling systems) under UL 864.

1.4 SEQUENCE OF OPERATION

A. Manual Pull Station: Activation of any manual pull station shall automatically operate all audible and visual appliances and produce an alarm signal at the control unit and the remote annunciators. All manual pull station signals shall be automatically transmitted to UMCP Department of Facilities Management, Work Control via CCMS as an "Alarm" signal.

B. Smoke Detector: Activation of any smoke detector shall start the alarm verification mode. When the smoke detector latches into the alarm mode the fire alarm system shall automatically operate all audible and visual appliances and produce an alarm signal at the control unit and at the remote annunciators. All smoke detector alarm signals shall be automatically transmitted to UMCP Work Control via CCMS as an "Alarm" signal.

1. Elevator Recall - Smoke detectors at elevator landings, in elevator machine rooms, and in elevator shafts shall also recall the elevator(s) to the designated floor or to the designated alternate floor as required by the elevator safety code.

2. Door release - Smoke detectors used to shut smoke or fire doors shall release the detector's associated door. Smoke detectors used to shut a door in a fire-rated stair enclosure shall release all of the doors in the stair enclosure. Each smoke detector used for door release shall be provided with an alarm verification feature and shall indicate a supervisory signal only.

3. Suppression System Activation - Smoke detectors used to activate a fire suppression system (Pre-action sprinkler system, deluge system, or special extinguishing system) shall be crossed-zoned. Cross-zoning of detectors reduces the allowable spacing for the smoke detectors by ½.

C. Heat Detector: Activation of any heat detector shall automatically operate all audible and visual appliances and produce an alarm signal at the control unit and at the remote annunciators. All heat detector alarm signals shall be automatically transmitted to UMCP Work Control via CCMS as an "Alarm" signal.

1. Elevator Shunt-trip - Heat detectors in elevator shafts, and in elevator machine rooms shall also operate the shunt trip circuit breaker for the elevator main line in accordance with the elevator safety code.

2. Suppression System Activation - Heat detectors may be used in conjunction with smoke detectors to activate a fire suppression system (Pre-action sprinkler system, deluge system, or special extinguishing system).

D. Water Flow Alarms: Activation of a water flow alarm shall automatically operate all audible and visual appliances and produce an alarm signal at the control unit and at the remote annunciators. Each individual water flow switch shall have a distinct address. All water flow alarm signals shall be automatically transmitted to UMCP Work Control via CCMS as a "Water Flow" signal.

E. Valve Tamper Switch: Activation of a valve tamper switch shall initiate a supervisory alarm at the system control panel and at the remote annunciators. Supervisory audible and visible alarms at these locations shall be distinct from either alarm or trouble conditions involving the same or related devices. Each individual tamper switch shall have a distinct address. All valve tamper alarms shall be transmitted to UMCP Work Control via CCMS as a "Valve Tamper" signal.

F. Duct Smoke Detector: Activation of a duct smoke detector shall initiate a supervisory alarm at the system control panel and at the remote annunciators. A duct smoke detector activation shall also initiate an air handling unit shutdown as required by NFPA 90A. All duct detector alarms shall be transmitted to UMCP Work Control via CCMS as a "Trouble" signal.

G. Fire Pump Supervisory Signals: In buildings with fire

pumps, individual supervisory signals shall be provided for the following conditions:

1. Fire pump running

2. Fire pump loss of power in any phase

3. Fire pump phase reversal

Activation of a fire pump supervisory signal shall initiate a supervisory alarm at the system control panel and at the remote annunciators. Each set of contacts in the fire pump controller shall have a distinct address. All fire pump supervisory signals shall be transmitted to UMCP Work Control via CCMS as a "Trouble" signal.

H. High/low air pressure signals: Buildings with dry-pipe or pre-action sprinkler systems shall provide a supervisory signal for system high and low air pressure. Activation of a high/low air signal shall initiate a supervisory alarm at the system control panel and at the remote annunciators. Each pressure switch shall have a distinct address. All high/low air supervisory signals shall be transmitted to UMCP Work Control via CCMS as a "Trouble" signal.

I. Trouble Signals: Loss of primary power, short circuit, open faults, ground faults, missing detectors, abnormal detector status (e.g.: dirty detector, replacement incompatible with the defined address), disabled devices and abnormal control functions shall initiate audible and visible trouble signals at the control unit and remote annunciators. Audible trouble signals shall sound until silenced. Silenced trouble signals shall be continuously indicated by a textual message and a trouble LED until restored to normal operation. The trouble LED shall remain illuminated until all abnormal conditions are cleared. Upon a return to normal operation, the audible trouble signal shall resound until restored to normal position. Subsequent trouble events shall resound audible trouble signals until silenced. All trouble events shall automatically be transmitted to UMCP Work Control via CCMS as a "Trouble" signal.

J. Smoke Control Systems:

1. Stair Pressurization System -- Stair pressurization systems shall be activated for any alarm signal in

the building. Stair pressurization systems shall also be manually activated at the annunciator panel with a key operated switch.

2. Atrium Smoke Removal Systems -- Atrium smoke removal systems shall be activated by any atrium waterflow switch or atrium smoke detector. Atrium smoke removal systems may also be manually activated at the atrium smoke removal control panel with a key operated switch.

K. Special Door Locking Arrangements:

1. Delayed Egress Locks -- Doors with delayed egress locks installed in accordance with NFPA 101 shall unlock upon actuation of the fire alarm system.

2. Stair Enclosure Doors -- Stair doors that do not permit re-entry in accordance with NFPA 101 shall unlock upon actuation of the fire alarm system.

PART 2 - COMPONENTS

2.1 CONTROL PANEL

A. The fire alarm and detection system shall be microprocessor based, power-limited, supervised, 24 VDC, non-coded system. The system shall be capable of providing the following functions:

1. Integral clock/calendar

2. Alarm verification (assigned by detector address)

3. Three-pulse temporal pattern evacuation signal

4. Functional walk-test of all initiating and signaling devices.

The following manufacturers and systems, shall be acceptable:

1. Cerberus Pyrotronics - Model MXL

2. Simplex Time Recorder - Model 4100 or 4120

3. Notifier - Model AM2020

2.2 Fire Alarm Annunciator: Textual annunciation shall be provided at the control unit and remotely in a location as approved by UMCP/DAEC. The textual display shall consist of an 80 character supertwist alphanumeric display, which shall include a 32 character user defined message for each device or function. All events displayed on the textual display shall also be recorded on an integral, 40-column, thermal strip printer.The connection between the remote annunciator and the system control panel shall be electrically supervised. A building graphic shall be provided above each remote annunciator. Each building graphic shall include the building outline, all stairs, all exterior doors, all elevators, the location of the fire department connection, the location of the fire alarm control panel, the location of the main sprinkler valve, a North arrow, a "You Are Here" indicator, and the four sides of the building (Side 1, Side 2, Side 3, & Side 4) as indicated by UMCP/DAEC.

2.3 Supervision: Style 4 (Class B) supervision of all initiation devices is required. Notification appliance wiring shall also be Style Y (Class B).

2.4 Power Supply: Primary power shall consist of a two-wire 120 VAC branch circuit from the emergency power distribution panel. The branch circuit disconnect shall be arranged and protected to prevent inadvertent disconnection and ensure optimum reliability. Standby power consisting of rechargeable batteries shall be provided. Batteries shall be capable of powering the system in the normal (standby) mode for 24 hours followed by 5 minutes of operation in the alarm mode (15 minutes for a voice system).

2.5 Passwords and Security: Access to control unit and remote annunciator switches wiring and power supplies shall be restricted by keyed-alike locks. Passwords shall be the same as the assigned University Building Number.

2.6 VOICE/ALARM SYSTEMS

A. Each voice/alarm system shall be capable of providing the following functions:

1. User defined automatic voice evacuation message. Message shall be in a fmelae voice.

2. Public address at control unit and at remote

location(s) as required by UMCP/DAEC.

B. Public Address: During some events and emergencies it may be desirable to disable the voice alarm system and direct occupants over the fire alarm speakers. In the public address mode, the voice alarm signals will be used to transmit instructions. The public address function shall be capable of manually overriding all other signals and users. A hand-held push-to-talk microphone shall be provided at the control panel and each remote panel. Microphone shall be supervised from disconnection. An audio control switch module shall be furnished to provided manual control of audio functions. These switches and associated LED indicators shall be supervised from disarrangement or failure. Audio power amplifiers shall be furnished with self-contained filtered 24VDC power supply, transformer, and amplifier monitor circuits. Amplifiers shall provided an output with a frequency response of 120 Hz to 12000 Hz. A sufficient quantity of amplifier capacity to operate all system speakers simultaneously plus 20 percent spare capacity shall be provided.

2.6 ALARM INITIATING DEVICES

Alarm initiating devices consist of conventional and analog detectors and manual stations connected to the system control unit via Style D or Style 6 (Class A) circuits.

2.7 Duct Smoke Detector Assemblies: Duct smoke detector assemblies shall consist of an analog duct detector (ionization or photoelectric) and an air duct sampling assembly with sampling tube and detector housing. Each duct smoke detector shall be provided with a remote alarm lamp and keyed test switch located in a visible and accessible location.

2.8 Addressable Manual Station: Manual stations shall be red in color, non-coded, double-action, nonbreak-glass type mounted in a semi-flush backbox. Manual station covers shall be hinged and secured with a lockset. Lockset shall be keyed the same as the control unit lockset. Manual pull stations installed in areas subject to damage, vandalism, and/or false alarms shall be protected by a STI Stopper II as manufactured by Safety Technology International, Inc.

2.9 Addressable Heat Detectors: Addressable heat detectors shall be plug-in type with base. The detector base shall be of the

twist lock type with screw terminals for field wiring. Heat detectors shall be of the rate compensated type.

2.10 NOTIFICATION APPLIANCES

Alarm notification appliances shall consist of audible and visual signals for public signaling of fire. All notification appliances subject to damage and/or vandalism shall be protected by an STI Fire Alarm Signal Damage Stopper as manufactured by Safety Technology International, Inc.

PART 3 - EXECUTION

3.1 QUALIFICATIONS

System design and installation shall be supervised by an experienced fire alarm technician or fire protection engineer with not less than five years experience with fire alarm systems. Shop drawings shall be prepared and signed by a NICET Level III or IV certified engineering technician or a registered fire protection engineer. The signature of the technician or engineer constitutes an affidavit that the statements, representations, and information presented in the submittal constitute a complete operational system conforming with applicable state codes and recognized engineering practices. All field installation work shall be continuously supervised by a NICET Level II or III fire alarm system technician.

3.2 FIRE ALARM CONTROL PANEL (FACP)

A. LOCATION: The FACP shall be located in:

1. Buildings with automatic sprinkler system: In the same room as the sprinkler system alarm check valve.

2. Buildings without sprinkler system: In the main electrical room.

B. LOCKSET: The lockset for the FACP shall be keyed for a "B" key, CAT15, or a "T45" key.

C. BATTERY BOX: Auxiliary batteries shall be stored in a battery box located adjacent to the FACP. The lockset for the battery box shall be keyed the same as the FACP.

3.3 ANNUNCIATOR PANEL

Annunciator panels shall be located at the main entrance to

the building, in a public area such as a lobby, and in plain view unobstructed by the opening of doors or other parts of the building. The lockset to gain access to the annunciator panel shall be keyed the same as for the FACP. Annunciator panels with reset functions that are not keyed activated shall be provided in a tamper proof locked cover to prevent unauthorized tampering.

3.4 INITIATING DEVICES

A. Manual Pull Stations: Manual pull stations shall be provided at the following locations:

1. At the exit from each floor at the stair enclosure exits on the corridor or room side located not more than 5 feet from the stair door.

2. At each door opening to the exterior of the building.

3. At the exit from each High-Hazard Occupancy (High-Hazard as defined by NFPA 101).

4. Manual pull stations shall be located so that the travel distance to any station from any point in the building does not exceed 200 feet.

5. At each exit from an Assembly Occupancy (Assembly Occupancy as defined by NFPA 101).

6. Telephone and electrical rooms in high-rise buildings.

7. Where required by NFPA 72.

Manual pull stations shall be installed 42 to 54 in. above the finished floor. All manual pull stations shall be located to be readily accessible, unobstructed, and visible.

B. Smoke Detectors: Analog smoke detectors shall be installed in accordance with NFPA 72 at the following locations:

1. At each elevator lobby as required by the elevator safety code.

2. In each elevator machine room as required by the elevator safety code.

3. At the top of each sprinklered elevator shaft and bottom of each sprinklered elevator shaft as required by the elevator safety code.

4. At un-enclosed vertical openings as required by NFPA 101.

5. At atriums for smoke removal systems as required by NFPA 101.

6. High-value and high-risk areas such as art galleries, archival records storage, musical instrument storage rooms, library stack areas, and computer rooms.

7. At doors with magnetic hold-open devices.

8. For activation of a pre-action sprinkler system and other special fire suppression systems.

9. In all fire pump rooms.

10. At each FACP.

All smoke detectors shall be programmed for a 30 second alarm verification cycle.

C. Duct Smoke Detectors: Duct smoke detectors shall be provided for mechanical unit shutdown as required by NFPA 90A.

D. Heat Detectors: Heat detectors shall be provided in accordance with NFPA 72 at the following locations:

1. In all sprinklered elevator machine rooms within two feet of the sprinkler head as required by the elevator safety code.

2. At the top of each sprinklered elevator shaft and bottom of each sprinklered elevator shaft within two feet of the sprinkler head as required by the elevator safety code.

3. In any unsprinklered storage room, mechanical room and electrical room.

4. As required for activation of a pre-action sprinkler system and other special fire

extinguishing systems.

E. Interface Modules (Monitor): Addressable interface modules shall be provided to monitor any conventional (non-addressable) alarm notification appliance. Such as:

1. Non-addressable heat detectors.

2. Non-addressable smoke detectors.

3. Valve tamper switches, and sprinkler system butterfly valves.

4. Water flow switches.

5. Pressure switches.

6. Fire pump supervisory alarms.

7. Kitchen Suppression System Activation.

F. Interface Modules (Control): Addressable interface modules shall be provided within three feet of the device being controlled for the control of the following auxiliary functions:

1. HVAC Shutdown: of respective air handler upon activation of associated duct smoke detector.

2. Door Holders: release doors automatically upon activation of associated smoke detector.

3. Door Lock Release: unlock all doors with special locking arrangements as required by NFPA 101.

4. Elevator recall: recall elevators as required by the elevator safety code.

5. Elevator Shunt Trip: operate the shunt trip circuit breaker for the elevator main line in accordance with the requirements of the elevator safety code.

G. Water Flow Detectors: Water flow detectors shall be provided to monitor sprinkler systems for waterflow. Water flow detectors shall be provided for the following:

1. At each alarm check valve (Pressure switch).

2. At each dry-pipe valve (Pressure switch).

3. At each pre-action system valve (Pressure switch).

4. At each sprinkler or standpipe system riser.

5. One flow switch per sprinkler system zone on each floor.

See the UMCP design guidelines for sprinkler and standpipe system for more specific information on water flow detectors.

H. Sprinkler/Standpipe Valves: Provide supervision for each sprinkler/standpipe system control valve.

I. Fire Pump Supervision: For each fire pump provide individual supervision of the following fire pump alarms:

1. Fire pump running.

2. Fire pump loss of power in any phase.

3. Fire pump phase reversal.

J. High/Low Air Pressure Supervision: Provide supervision of low and high air pressure for each dry-pipe system and each pre-action system.

3.5 OFF-SITE SUPERVISION

Provide in or adjacent to the control panel, all equipment and wiring necessary to connect to system to the campus CCMS. Activation of any of the following signals shall automatically be reported to CCMS via relays:

A. Fire Alarm System in Alarm.

B. Valve Tamper.

C. System Trouble.

D. Waterflow.

E. Fire Alarm System Power Off.

3.6 SPARE PARTS

The fire alarm system contractor shall supply the University with a minimum of one replacement for each six devices (or

fraction thereof) installed of the following devices:

A. Analog Smoke Detectors.

B. Addressable Manual Stations.

C. Interface Modules (monitor).

D. Interface Modules (control).

E. Horn/Strobe Signals.

F. Speaker/Strobe Signals.

G. Strobe Signals.

H. Duct Smoke Detectors.

I. Door Hold Open Devices.

J. Addressable Heat Detectors.

3.7 SIGNS

Provide and install 5 inch by 7 inch engraved red plastic signs with white lettering (helvetica or sans serif type) above each manual pull station. Secure signs to surface with pan head screws and suitable anchors. These signs shall read as follows:

IN CASE OF FIRE EMERGENCY!

1. PULL FIRE ALARM
2. LEAVE BUILDING
3. CALL FIRE DEPARTMENT
   DIAL 9-1-1

The fire alarm is **NOT** connected to the fire department.

Notify 405-2222 immediately if fire alarm system is disabled.

3.8 WIRING

All field wiring shall be installed in conduit. Conduit and boxes shall be sized according to National Electrical Code(R) requirements based on the number of conductors. Initiating device circuit wiring shall be two-conductor, twisted with integral shield and ground. Notification

appliance circuits shall be minimum 14 AWG. Primary power (AC) branch circuit conductors shall be minimum 12 AWG. All conductors which are terminated, spliced, or otherwise interrupted shall be connected to terminal blocks. Make all connections with pressure type terminal blocks, which are securely mounted. The use of wire nuts or similar devices shall be prohibited.

A. Identification: Fire alarm circuits shall be identified by red junction box covers stenciled in white letters "FIRE ALARM."

3.9 SYSTEM TESTING

All initiating and notification appliances, control equipment, accessories, and auxiliary functions shall be tested in accordance with NFPA 72 acceptance test procedures.

3.10 TRAINING

Provide complete certified factory technical training for a minimum of two of the University's select representatives. The University's select representatives shall, upon completion of the above training, be factory qualified to perform complete maintenance and repair of the fire alarm system. The contractor shall assume the responsibility to coordinate with the University the location and time required for the above certified factory technical training.

13.02 FIRE-SUPPRESSION AND PROTECTION SYSTEMS

A. CODE REQUIREMENTS

All requirements of State of Maryland and the Office of the State Fire Marshal shall apply to the specifications and design requirements, including the following:

A. NFPA 1 National Fire Prevention Code

B. Underwriters Laboratories Inc. (UL), Fire Protection equipment list

C. Factory Mutual Approval Guide

D. Maryland Occupational Safety and Health Act

E. NFPA 13 - Standard for the Installation of Sprinkler Systems

F. NFPA 13D - Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and manufactured Homes

G. NFPA 13R - Standard for the Installation of Sprinkler Systems in Residential occupancies up to and Including Four Stories in Height

H. NFPA 14 - Standard for the Installation of Standpipe and Hose Systems

I. NFPA 15 - Standard for the Installation of Water Spray Fixed Systems

J. NFPA 20 - Standard for the Installation of Centrifugal Fire Pumps

K. NFPA 70 - National Electrical Code

L. NFPA 72 - National Fire Alarm Code

M. NFPA 101 - Life Safety Code

N. NFPA 170 - Fire Safety Symbols

0. NFPA 231 - General Storage

P. NFPA 231C - Rack Storage of Materials

Q. NFPA 1963 - Fire Hose Connections

R. UMCP Design Criteria Facilities Standards Manual for Architecture and Engineering Services (DCFS)

S. Washington Suburban Sanitary Commission (WSSC) - Plumbing and Gas Fitting Regulations

B. PIPING

A. Connection shall be made to the UMCP on-site water system. The connection between -system piping and underground piping shall be made with a cast iron flanged piece, properly fastened.

B. A backflow preventer shall be installed in accordance with WSSC regulations. The backflow preventer shall be listed by UL for fire protection use.

C. All piping exposed installed outside, or otherwise exposed to weather, shall be externally galvanized.

C. VALVES

A. All valves on connections to water supply to sprinklers shall be UL listed butterfly type indicating valves except for the following which shall be O.S.& Y:

1. All indicating valves on the supply side of the backflow preventer.

2. The indicating valve immediately adjacent to the backflow preventer on the system side.

3. All indicating valves on the suction side of the fire pump.

4. Where indicated on the contract drawings.

B. Post Indicator Valve - when indicated on the contract drawings, a gate valve on incoming water service shall be operable by a UL listed post indicator valve with tamper switch. Post indicator valve shall be installed a minimum of 40 feet from the building.

D. PIPING ACCESSORIES

A. No sprinkler piping is to be supported from any mechanical or electrical devices and/or equipment (ducts, lights,etc.). No,chains, wire or perforated band iron will be permitted for hangers. Hanger assemblies installed outside, or otherwise exposed to weather, shall be externally galvanized.

B. Install iron pipe sleeves of ample diameter at all points where pipes cut beams or floors or walls, so sized and installed that sprinkler pipes will not bend.

1. Install sleeve before walls or concrete work is built or poured, with sleeves being flush with wall surfaces.

2. Sleeves for underground pipes shall be caulked with oakum and molten lead and be watertight.

E. SPRINKLERS

A. Sprinklers that may be subject to mechanical damage due to their location (under stairwells, low hanging sprinklers in corridors, storage rooms, under ducts, etc.) shall be provided with guards listed by UL for the model and type of sprinkler used.

B. Sprinklers under open grating shall be provided with approved shields.

F. FIRE DEPARTMENT CONNECTIONS

Each fire department connection shall be the flush type. Free standing type fire department connections shall only be installed when approved by UMCP/DAEC and shall be located a minimum of 40 feet from the building. Each fire department connection shall have two (two) 2-1/2 inch inlets with threads conforming to the American National Fire Hose Connection Screw Thread as defined in NFPA 1963, equipped with UL listed screw caps with pin lugs and chains. The Fire department connections shall be not less than two feet and not more than 3 feet 6 inches in elevation, measured from the ground level

to the center line of the inlets. Two fire department connections are required when two or more risers are provided.

G. DRAINS AND TEST PIPING

A. All risers, including the alarm check valve, shall be equipped with drains with sizes as specified in NFPA 13. The alarm checkvalve drain ("main drain") shall be piped to the outside of the building at a point free from causing water damage. **Where** this arrangement is not practical, the drain shall be piped to a floor drain or sump approved for the purpose by the Departments of Physical Plant and the UMCP/DES.

B. All drains and test piping shall piped to the outside of the building at a point free from causing water damage. Where this arrangement is not practical, the drain shall be piped to a f loor drain or sump approved for the purpose by the Departments of Physical Plant and the UMCP/DAEC.

H. DRY PIPE SYSTEM

Dry systems shall only be installed when adequate heat or insulation can not be provided to prevent sprinkler piping from freezing.

A. An air compressor (Reliable Model A or equivalent) with an automatic air maintenance device (Reliable Model B-1 or equivalent) shall be, installed and sized in accordance with NFPA 13.

B. A separate test connection shall be provided in accordance with NFPA 13 to test the dry-pipe system alarms.

J. PRE-ACTION SYSTEM

Pre-action systems shall only be installed where required by UMCP/DAEC and the facility program.

A. The pre-action valve shall be activated by rate compensated heat detectors or cross-zoned smoke detection as approved UMCP/DAEC. Refer to section 13.1.

K. FIRE PUMP, MOTOR AND CONTROLLER

A fire pump shall only be installed when the existing water supply is not adequate to meet the required sprinkler demand.

L. EXCESS PRESSURE PUMP

An excess pressure pump shall be installed on all systems that do not have a fire pump. The excess pressure pump shall be Gamewell or equal 1/4 HP motor 120v single phase, 60 HZ.

M. DRY STANDPIPE SYSTEM

A. Dry standpipe systems shall be the manual - -dry type as defined by NFPA 14.

B. Each standpipe riser shall be installed with a UL listed 2½ inch NST fire department hose valves with screw caps on each floor in an accessible, protected, and readily visible location in accordance with NFPA 14.

C. Each dry standpipe riser shall have a drain sized and located in accordance with NFPA 14. Each drain shall be piped outside the building in accordance with item 2.10.B of this section.

D. All dry piping shall be installed so that the entire system may be drained. The number of auxiliary drains shall be kept to a minimum.

E. All dry piping, hangers and fittings shall be galvanized.

F. Each dry standpipe shall be provided with an air and vacuum valve installed at the top of each riser. The air and vacuum valve shall be a 1 inch APCO Series 140 air and vacuum. valve, manufactured by Valve and Primer Corporation or approved equal.

N. PROTECION

Protection: All exposed piping devices (non-brass and chrome) are to be painted with two coats of bright red paint. Painting to conform to the protective coating section of the

specifications.

O. QUALIFICATIONS

System design and installation shall be supervised by an experienced sprinkler system technician or fire protection engineer with not less than five years experience with sprinkler systems alarm systems. Shop drawings shall be prepared and signed by a Class III Sprinkler Contractor licensed in the State of Maryland or a registered fire protection engineer. The signature of the technician or engineer constitutes an affidavit that the statements, representations, and information presented in the submittal constitute a complete operational system conforming with applicable state codes and recognized engineering practices. All field installation work shall be performed by a Class III Sprinkler Contractor licensed in the State of Maryland.

13.03 FUEL STORAGE TANKS

A. All installations/or removals must be in accordance with the requirements of OSHA, Federal, and State EPA regulations, COMAR, The Maryland Department of the Environment and the International Mechanical Code. Also Reference Section 1, Environmental Health and Safety in facility design for UST regulatory considerations/citation. The contractor shall be responsible for all required inspections and permit applications.

B. When at all possible, natural gas service or above ground fuel tanks are preferred over underground storage tanks.

C. Tanks shall be constructed of double wall fiberglass reinforced plastic (FRP) for underground use and double wall steel for above ground tanks.

D. Piping shall be either FRP or copper depending on size.

E. Material used in construction of the tank shall be compatible with the substance to be stored.

F. Low level alarm signal to DDC or Hawkeye as appropriate, and a high level alarm on a local horn or bell mounted at or near the tank vent approximately 8 foot above grade.

G. If the fuel storage tank is not located in the mechanical room with the generator set, then a remote level gauge near the generator is required.

H. Manholes, over-fill level alarms and/or other over-fill protection nozzles shall be provided as required.

I. Abandoned tanks must be removed and disposed of by the Contractor.

13.04 WET CHEMICAL FIRE EXTINGUISHING SYSTEMS

PART 1 - GENERAL

1.1 The installation of new wet chemical fire extingushing systems shall comply with the following:

A. FACTORY MUTUAL ENGINEERING AND RESEARCH CORPORATION (FM) Approval Guide

B. NFPA 17A -- Wet Chemical Extinguishing Systems

C. NFPA 70 -- National Electrical Code

D. NFPA 72 -- National Fire Alarm Code

E. NFPA 96 -- Ventilation Control and Fire Protection of Commercial Cooking Operations

F. UNDERWRITERS LABORATORIES INC. (UL) Fire Protection Equipment Directory

G. UL 300 -- Fire Testing of Fire Extinguishing System for Protection of Restaurant Cooking Areas.

1.2 Qualifications

Installation drawings, shop drawings, and as-built drawings shall be prepared, by or under the supervision of, an individual who is experienced with the types of works specified herein, and is currently certified by the National Institute for Certification in Engineering Technologies (NICET) as an engineering technician with minimum Level-III certification in Special Hazard System program. Contractor shall submit data for approval showing the name and certification of all involved individuals with such qualifications at or prior to submittal of drawings.

PART 2 - PRODUCTS

2.1 PRE-ENGINEERED WET CHEMICAL FIRE EXTINGUISHING SYSTEMS

Systems shall comply with NFPA 17A and NFPA 96, except as modified herein. Piping and accessories within the hoodshall be stainless steel or chrome plated. All other piping shall be galvanized malleable iron or galvanized steel, painted to match the adjacent surface chrome or nickel plated or stainless steel or black steel painted to match the adjacent surface. Exhaust hoods with grease extractors UL listed or FM approved are not required to have protection downstream of the grease extractors. Provide systems for protection of new or existing cooking equipment, including exhaust hoods and ducts for cooking equipment requiring protection by NFPA 96.

2.2 SYSTEM CONTROLS

Each system shall be mechanically actuated by fusible links and by remote manual actuation stations connected to the extinguishing system release mechanisms by stainless steel cables. Arrange each system to automatically shut off the flow of fuel and electrical power to cooking appliances as indicated [and to automatically actuate the building fire alarm fire alarm system as indicated. Electrical power to hood exhaust fans shall not be shut off unless specifically required by the UL listing or FM approval.

2.3 IDENTIFICATION SIGNS

Provide red rigid plastic signs with engraved 6 mm (0.25 inch) high white lettering at each remote manual actuation station. Sign legends shall be "Fire Extinguishing System" followed by a brief description of the equipment protected.

PART 3 - EXECUTION -- Tests and Inspection

A representative of UMCP DAEC will witness formal tests and approve systems before acceptance. Submit a written request for formal inspection at least 7 working days prior to inspection date. An experienced technician regularly employed by the system installer shall be present during the inspection. At the inspection, repeat any or all of the required tests as directed. Provide plastic containers, hose fittings, and hose at each nozzle to capture the wet chemical and discharge each system to demonstrate uniform distribution of the wet chemical among the nozzles. Furnish compressed air, nitrogen, wet chemical equipment, and personnel for the tests. Refill and reset systems after tests have been completed.