

SECTION 15300
FIRE SUPPRESSION MASTER SPECIFICATION

PART 1 - GENERAL

1.1 REFERENCES

- A. The Publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
- B. ANSI
1. ANSI B 16.1-89, Cast Iron Pipe Flanges and Flanged Fittings
 2. ANSI B 16.3-92, Malleable Iron Threaded Fittings
 3. ANSI B 16.5-88, Pipe Flanges and Flanged Fittings; Addenda B16.5A-92
 4. ANSI B 16.9-93, Factory Made Wrought Steel Buttwelding Fittings
 5. ANSI B 16.11-91, Forged Fittings, Socket-Welding and Threaded
 6. ANSI B 16.14-91, Ferrous Pipe Plugs, Bushings, and Locknuts with Pipe Threads
 7. ANSI B 16.21-92, Nonmetallic Flat Gaskets for Pipe Flanges
 8. ANSI B 16.39-86, Malleable Iron Threaded Pipe Unions Classes 150, 250 and 300
 9. ANSI B 36.10-85, Welded and Seamless Wrought Steel Pipe
- C. ASTM
1. ASTM A47-90, Standard Specification for Ferrite Malleable Iron Castings
 2. ASTM A53-93a, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless
 3. ASTM A105-94, Standard Specification for Forgings, Carbon Steel, for Piping Components
 4. ASTM A126-93, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
 5. ASTM A135-93, Standard Specification for Electric Resistance Welded Pipe
 6. ASTM A153-82, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware (R 1987)
 7. ASTM A181-94, Standard Specification for Forgings, Carbon Steel, for General Purpose Piping
 8. ASTM A197-87, Standard Specification for Cupola Malleable Iron (R 1992)
 9. ASTM A234-94, Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures
 10. ASTM A563-94, Standard Specification for Carbon and Alloy Steel Nuts
- D. NFPA
1. NFPA 1 Standard Fire Prevention Code (1997)
 2. NFPA 13 Installation of Sprinkler Systems (1996)
 3. NFPA 14 Installation of Standpipe and Hose Systems (1996)
 4. NFPA 17A Wet Chemical Extinguishing Systems (1998)
 5. NFPA 70 National Electric Code (1996)
 6. NFPA 72 National Fire Alarm Code (1996)
 7. NFPA 75 Electronic Computer/Data Processing Equipment (1995)
 8. NFPA 101 Life Safety Code (1997)
 9. NFPA 750 Water Mist Protection Systems (1996)
- E. OAK RIDGE NATIONAL LABORATORY DESIGN DOCUMENTS
1. ORNL Design Criteria –Fire Protection-Deviations – NFPA 13 and NFPA 101
 2. ORNL Technical Specification Section 15104A Fire Protection 4-24-96
 3. ORNL Technical Specification Section 16721 Fire Alarm Systems 4-2-97

F. OTHER

Standard Building Code (1997)

1.2 GENERAL REQUIREMENTS

- A. Purpose: This Section describes the design, equipment, material, installation, acceptance testing, manuals and training for the fire suppression systems which are required for the protection of property and life safety at the Spallation Neutron Source (SNS) Facility which is being constructed for the Department of Energy at Oak Ridge, Tennessee. The overall specification outlines system requirements for various suppression systems. The appendix details the specific performance requirements and system applicability for each of the buildings that make up the SNS project. This performance specification outlines the requirements for fire suppression system design and operation. This is a "design-build" turnkey project. The Contractor shall provide the Construction Manager with a completed system designed in accordance with the requirements presented in each Specification section.
- B. Design: System shall be designed, installed and tested in accordance with the requirements of this specification, as well as, NFPA 13, 14 and other appropriate codes and standards. Backflow preventors shall be installed in each riser room prior to the sprinkler or standpipe system piping. All valves controlling water supplies to the suppression systems and backflow preventers shall be capable of being fitted with tamper switches by the fire alarm contractor for valve supervision. Design of drainage for fire suppression system and backflow preventer flushing and testing shall allow for full flow testing.
- C. Terminology: Terminology used in this specification is as defined in NFPA 13, 14, and as described in various referenced sections or appropriate codes and standards.
- D. Service Conditions
 - 1. Items provided under this section shall be specifically suitable for the following service conditions.
 - a. Altitude: 1,000 feet
 - b. Ambient Temperature: -20 to 110 degrees F
 - c. Seismic Parameters: Addressed in the Appendices, as necessary, for each protected structure/building.
 - d. Radiation Exposure: Addressed in the Appendices, as necessary, for each protected structure/building.
 - e. Mercury: Addressed in the Appendices, as necessary, for each protected structure/building.
 - f. Site Water Supply. Fire protection water supply for the SNS Site is potable water for fire protection, domestic, and process use, supplied from an elevated storage tank with a minimum capacity of two hours of fire water flow at the maximum anticipated water demand, including peak domestic and process water demands. Calculations for fire protection supplies have been based on a supply elevation of 1306 feet. Distribution piping for the site is a looped 12-inch main to provide improved reliability. Feeds to individual facilities vary in size. The following information shall be used for estimating and design unless hydraulic calculations and/or flow test results support the use of improved water supply figures:

Estimated Water Supplies			
Sprinkler Feed Connection	Static*	Residual*	Flow*
Front End	90	80	1500 gpm

Klystron	90	80	1500 gpm
HEBT Service Building	90	80	1500 gpm
CHL/RF	90	80	1500 gpm
CUB	90	80	1500 gpm
Ring Service Building	80	70	1500 gpm
Ring (South Stairs)	80	70	1500 gpm
Target	100	90	1500 gpm
CLO	100	90	1500 gpm
*At point of feed connection to 12 inch water main			

E. Related Sections of SNS Specifications

1. Division 16 - Electrical
 - a. 16730 Fire Alarm Specification, Local Building Devices
 - b. 16735 SNS Site Fire Detection and Alarm System
 - c. 02667 Water Lines
 - d. 02640 Valves, Hydrants, and Blowoffs

1.3 QUALITY ASSURANCE

A. Contractor Qualifications

1. The Fire Suppression Systems Contractor shall be regularly engaged in the design, servicing, installation and testing of fire suppression systems.
2. The Fire Suppression Systems Contractor shall submit a list with a minimum of three (3) installations of similar scope and magnitude, which were completed within the last three (3) years. This list shall be submitted at the pre-bid meeting.
3. The Fire Suppression Systems Contractor shall hold all licenses and permits necessary to perform this work.
4. The Fire Suppression Systems Contractor is required to be a recognized sprinkler vendor licensed under the State of Tennessee by the Department of Commerce and Insurance, Division of Fire Protection for the design and installation of automatic systems.
5. The design of fire protection systems shall be done under the supervision of a Professional Engineer registered in the State of Tennessee as a Fire Protection Engineer, or by a Fire Protection Technician certified as NICET Level IV. The design shall bear the stamp of the supervising Fire Protection Engineer or Fire Protection Technician.
6. Contractors shall provide information on experience, certification and licensing for specialty work e.g. water mist suppression systems if such specialty work is a part of the proposed scope.
7. Contractors shall submit with their bids a list of all proposed subcontractors whom they may be using to perform work and a list of equipment manufacturers who will provide representatives for system testing and training.
8. The Construction Manager may reject any proposed Contractor who cannot show evidence of such qualifications.
9. The design, installation, and testing of systems for the Target building and "Hot Cell" may be subject to additional quality reviews and requirements by the CM or owner.

B. Sub-Contractors

1. The Construction Manager must approve all sub-contractors in writing.
2. All sub-contractors shall meet the quality assurance requirements listed for the Contractor in Section 1.3.A

1.4 SUBMITTALS

- A. Construction Manager approval is required for all submittals. After verifying all field measurements and after complying with the applicable procedures specified in the Contract Documents, the Contractor shall submit for review and approval, with such promptness as to cause no delay in the work, all technical Submittals, as specified. The Submittals shall be submitted in accordance with any appropriate General and Supplementary Conditions.
- B. Data
1. Water Flow Tests: For each building or structure, Contractors shall perform a hydraulic flow test to confirm the available water supply for fire protection systems within that building, in accordance with the following:
 - a. Domestic and process water flow requirements and water tower low level elevation (1306 ft.) shall be considered in the flow test results.
 - b. In addition, after reducing water supply for domestic and process requirements, only ninety percent of remaining water supply flow and pressure will be considered available for fire protection purposes.
 - c. Flow test results (including compensation for items a. and b.) shall be submitted to the Construction Manager, prior to system acceptance testing.
 2. Hydraulic Calculations: Contractors will submit hydraulic calculations based on the site water supply information in section 1.2.D and the fire protection system design densities identified in this specification to protect specific hazards.
 3. Manufacturers Catalog Data: Submit data (including catalog cuts, brochures, specifications, product data and/or information regarding UL Listings or Factory Mutual approvals) in sufficient detail and scope to verify compliance with the requirements of the contract documents. When multiple products are shown on a single sheet, Contractor will clearly identify the selected product. Components for use in radiation environments shall detail materials used in component construction.
 4. Material, equipment and fixture lists: A complete itemized listing of equipment and materials proposed for incorporation into the work shall be submitted. Each entry shall include an item number, the quantity and the name of the manufacturer or supplier of each item.
- C. Shop Drawings
1. Shop drawings shall be provided in the format required by the project General and Supplementary Conditions. Current AE drawings shall be provided to the Contractor and used as backgrounds for the shop drawings. Drawings shall contain no extraneous information. Drawing information should meet or exceed the requirements of NFPA 13. Marked-up copies of catalog data sheets or manufacturer's "typical" diagrams are not acceptable in lieu of the required drawings or diagrams. Plans for system testing shall be submitted for approval with shop drawings.
 2. Shop drawings shall include:
 - a. A drawing legend sheet identifying:
 - 1) All symbols used on the drawings, by type of device or equipment, manufacturer and manufacturers part number. This information shall correspond to the manufacturer's catalog data sheets required as part of the equipment list.
 - 2) All conventions, abbreviations and specialized terminology used on the drawings, as necessary to understand and interpret the information contained thereon.
 - 3) All color codes and device numbering systems.
 - 4) A complete drawing list/index identifying all drawings in the shop drawing package by title, drawing number and Specification cross-reference.
 - b. Plan view drawings based upon the project architectural plans and drawn to 1/8-inch scale or larger, showing:
 - 1) Name of Project.

- 2) Location, including street address.
 - 3) Point of compass.
 - 4) Graphical scale indicator.
 - 5) Locations of all walls, partitions extending to within 18" of the ceiling, major room fixtures that may obstruct optical detectors or visible alarm appliances, ceiling obstructions, exits and anticipated fire department response points.
 - 6) Use or occupancy of each room or area (i.e., office, mechanical, storage, laboratory, etc.)
 - 7) Essential details including specialties, concealed spaces and ventilators.
 - 8) Layouts of sprinklers and/or hose systems in designated areas.
 - 9) Fabrication numbers of pipelines, locations, test pipes, drain connections, valves, hangers and other pertinent features.
 - 10) Automatic sprinkler systems and other fire protection extinguishing systems on separate drawings. Do not incorporate layouts of fire protection systems on drawings that show other piping systems.
- D. Material Samples
1. Material samples shall be provided concurrent with the Shop Drawing Submittal. Contractor shall provide samples in accordance with the requirements of the General and Supplementary Conditions. In addition, samples shall be submitted in original factory cartons (if applicable) with all factory documentation. Such documentation shall include evidence of UL Listing or FM approval, as required. Samples of the following items shall be included:
 - a. Sprinklers
 - b. Pressure switches
 - c. Tamper switches
- E. Record Drawings
1. Record Drawings shall be maintained in accordance with the requirements of the General and Supplementary Conditions. Prior to final document turnover, all redlines shall be incorporated into the drawings electronically (in a format compatible with the SNS site-wide documentation) to produce final, usable Record Drawings.
- F. Operation and Maintenance (O & M) Manuals
1. Preliminary O & M Manuals
 - a. Preliminary O & M Manuals shall be provided with the shop drawings. The manuals will be reviewed for required content and approved or disapproved on that basis. Upon completion of the project, the Contractor shall revise the approved, preliminary manual to be consistent with the system as installed and specifically to coordinate the testing and maintenance schedule with the approved Contractor testing protocols and with the device numbers indicated on the Contractor's Record Drawings.
 2. Final O & M Manuals (Including Final Record Drawings)
 - a. The Final Operations and Maintenance Manual shall constitute the basis for the on-site training sessions required elsewhere in this Section and, as such, shall be both specific to this system, containing a minimum of superfluous information, and suitable for that purpose. This manual shall be written, compiled and edited specifically for this project and the system installed. The Final O & M manual shall include copies of appropriate Record Drawings. Unedited manufacturer's catalog data sheets and/or equipment manuals are unacceptable as content for this submittal.
- G. Reports

1. Test Reports (procedures and checklists) for all required tests shall be submitted in accordance with the appropriate requirements of the General and Supplementary Conditions.
 - a. The Test Reports shall include a detailed narrative description of each test/verification performed (consistent with the approved test protocols required elsewhere in these specifications), the date and time, results and the initials of the parties performing and witnessing each test/verification.
 - b. The Test Reports shall become a part of the permanent record and contain signatures of contractor's representatives involved in each phase of testing.

1.5 CONFLICTS

- A. The referenced codes and standards represent minimum requirements for items not otherwise addressed in the Plans and Specifications. The Construction Manager reserves the right to specify requirements that exceed the requirements of either, the referenced codes and standards, typical industry practice, or both. Such differences between the bid documents and the referenced codes and standards/typical industry practice shall not be recognized as conflicts and shall not be grounds for adjustments to the contract.
- B. In the event of conflicts between these Specifications and/or the contract drawings and/or the referenced codes and standards, it is the Contractor's responsibility to notify the Construction Manager of such conflict in writing at least 7 days prior to bid. Any conflicts, which are not identified prior to bid, shall be subject to resolution, at the Construction Manager's discretion, by applying the more stringent criteria.
- C. No construction or installation will be authorized until the required submittals are received, reviewed and accepted by the Construction Manager. Any construction or installation performed without written authorization from the Construction Manager shall be entirely at the Contractor's own risk.
- D. As the specified submittals are essential to the Construction Manager's quality assurance effort and necessary to document the installation for future expansion, modification, service, testing and maintenance, overdue and/or unacceptable submittals may, at the sole discretion of the Construction Manager, result in the immediate suspension of all payments to the Contractor until such time as the problem is corrected.

1.6 CONDUCT OF WORK

- A. Contractor is to coordinate his work with the Construction Manager's Representative. All work shall be conducted during normal working hours unless operations must be interrupted or shut down for the contractor to perform his work. Under these conditions, the contractor shall coordinate with the Construction Manager's representative to ensure minimal impact on operations.
- B. No welding, flame cutting or any other type of hot work by the Contractor shall be permitted on the premises unless specifically approved in writing by the Construction Manager's Representative. It is anticipated that a welding permit procedure will be in place prior to installation.
- C. The Contractor shall maintain the site in a safe and orderly condition at all times.
- D. A material storage area will be assigned to the Contractor. The material storage area may be used for pipe cutting and threading, and component assembly. Overnight storage of material is limited to the assigned storage area. Materials brought to the work area shall be

installed the same day, or returned to the assigned storage area. This area shall be kept clean and orderly. Packing materials shall be properly discarded.

- E. The Contractor shall be responsible during the installation and testing periods for any damage caused by him (or his subcontractors) or by defects in his (or his subcontractors) work, materials, or equipment. The Contractor shall pay for the necessary replacement or repair of such damage or shall make good all damage or defects in his work resulting from any cause whatsoever, replacing all damaged or defective materials and equipment with perfect items.
- F. The Contractor shall employ, on the job at all times, an individual who shall be responsible for the progress and execution of the work. Qualified workmen shall do all work. Workmanship shall be of the best standard practice.
- G. Contractor shall neither deviate from nor make any change to the approved shop drawings unless the Construction Manager specifically approves the change. Where a building, structure, or equipment interferes with the location of this work as shown on the approved shop drawings, such conflicts shall be resolved with the Construction Manager.

PART 2 - MATERIALS

2.1 COMPONENTS

- A. Product Listing and Approvals
 1. As appropriate, all system components shall be listed by Underwriter's Laboratories, Inc. (UL) or approved by Factory Mutual (FM) if the component is from a category of devices that are listed/approved by UL or FM.
 2. Components requiring approval shall be delivered to the project site with factory applied UL and/or FM stickers. System components, which do not meet these requirements, are not acceptable unless specifically approved in writing by the Construction Manager.
 3. All non-metal components and component parts such as valve seats, gaskets, and seals used in radiation service condition areas identified in the appendices must be compatible with the radiation environment. Information on components for these areas must be submitted with shop drawings, and approved by the CM except where the product is specifically identified as acceptable for use in these areas in this specification.
- B. General
 1. Use pipe, fittings and flange materials that are hot dipped galvanized and have threaded or grooved ends for dry pipe sprinkler systems.
 2. Materials for inside wet pipe sprinkler systems may be non-galvanized.
 3. Do not use bushings or reducing flanges in place of standard fittings.
 4. Provide water control valves with supervisory switches. Provide alarm isolation valve on riser trim with supervisory switch.
- C. Threaded Piping-Interior Wet Sprinkler Systems and Standpipe Systems
 1. Pipe (to 1-½ inch): Steel, ASTM A53, furnace welded, Schedule 40.
 2. Pipe (2-inch to 10 inch): Steel, ASTM A53 Grade A or B, ERW or seamless, ANSI B 36.10, Schedule 40.
 3. Fittings (to 6-inch): Malleable Iron, ASTM A197, Threaded, and ANSI B16.3 Class 150.
 4. Flanges (to 12-inch): Malleable Iron, ASTM A47 Grade 32510 or ASTM A197, threaded companion, ANSI B 16.1 Class 125.
 5. Flanges (to 12-inch): Cast Iron, ASTM A126 Class A or B, threaded companion, ANSI B 16.1 Class 125

- 6. Trim Piping: Galvanized as per outdoor requirements.
- D. Grooved Piping: Interior Wet Pipe Sprinkler systems and Standpipe Systems
 - 1. Pipe (2 ½-inch to 12-inch): Steel, ASTM A 53 Grade A or B, ERW or seamless, ANSI B36.10, standard weight Schedule 40.
 - 2. Fittings (2 ½-inch to 12-inch): Cast of Ductile Iron with groove and shoulders for use with EPDM rubber gasketed grooved pipe couplings, listed or approved for fire protection service, Victaulic, acceptable for use in radiation environments.
 - 3. Couplings (2 ½-inch to 12-inch): Clamps cast of Ductile Iron, EPDM rubber gasketed, 500 psig minimum working pressure, listed or approved for fire protection service and specific application, Victaulic, acceptable for use in radiation environments.
- E. Threaded piping: Exterior Sprinkler Systems or Standpipes and Interior Dry Pipe Sprinkler Systems
 - 1. Pipe (to 1 ½-inch): Steel, ASTM A53, furnace welded, Schedule 40, Galvanized, and ASTM A153.
 - 2. Pipe (2-inch to 10-inch): Steel, ASTM A53 Grade A or B, ERW, Schedule 40, Galvanized, ASTM A153
 - 3. Flanges (to 12-inch): Malleable Iron, ASTM A47 Grade 32510 or ASTM 197, threaded, ANSI B36.10, standard weight, Galvanized, ASTM A153.
 - 4. Flanges (to 12-inch): Malleable Iron, ASTM A47 Grade 32510 or ASTM 197, threaded, ANSI B36.10, standard weight, Galvanized, ASTM A153.
- F. Grooved Piping: Exterior Sprinkler Systems and Standpipes and Interior Dry Pipe Sprinkler Systems:
 - 1. Pipe (2 ½-inch to 12-inch): Steel, ASTM A53 Grade A or B, ERW, or Seamless, ANSI B36.10, standard weight, Schedule 40 Galvanized, ASTM A153.
 - 2. Fittings (2 ½-inch to 12-inch): Cast of Ductile Iron, with groove and shoulders for use with EPDM rubber gasketed, grooved pipe couplings, listed or approved for fire protection service, Victaulic, acceptable for use in radiation environments.
 - 3. Couplings (2 ½-inch to 12-inch): Clamps cast of Ductile Iron, Galvanized, EPDM rubber gasketed, listed or approved for fire protection service and specific application, Victaulic, acceptable for use in radiation environments.
 - 4. Unions (to 2-inch): Malleable Iron, ASTM A197, threaded, Brass-to-Iron seats, ANSI B16.39 Class 150, Galvanized, ASTM A153, for valve trim and drains.
- G. Gaskets: non-asbestos, red rubber sheet, ASTM D2000 M2AA507A13, 1/16-inch thick, full face, ANSI B16.21, SEPCO No. 20
- H. Bolts: Steel, ASTM A307 Grade A or B, Heavy hex head.
- I. Nuts: Steel, ASTM A563, Grade A, heavy hex.
- J. Joint Compound: Tyte Unyte, J.C. Whitlam Manufacturing Co., Rectorseal No.5, Rectorseal Corporation, or Teflon PTFE thread seal tape, SEPCO. Teflon tape is NOT acceptable in radiation environments.
- K. Plugs: Cast Iron, ASTM A126 Class A or B, square head, threaded, ANSI B16.14, Galvanized, ASTM A153.
- L. Valves-various- (See descriptions for specialty fire suppression system valves),

Service	Size (inch)	Manufacturer/Model	End Type
Shutoff			

Gate	1/4to1/2	Milwaukee 148-UL	Screwed
Butterfly	1/2 to 2	Milwaukee BB-FP-UL	Screwed
Gate	1/2 to 2	Crane No. 459 (OS&Y)- UL	Screwed
Gate	2 ½ to 12	Milwaukee 1552CB2-UL (OS&Y)	Flanged
Control			
Angle	1/4 to 2	Milwaukee 582M-UL	Screwed
Globe	1/4 to 2	Milwaukee 590-UL	Screwed
Check			
Swing	1/4 to 2	NIBCO T-413W-UL	Screwed
Swing	2 1/2 to 12	Milwaukee F-2971-UL	Screwed

NOTE-Valves used in radiation environments identified in appendices require specific submittal and approval per section 1.4.2.1.

- M. Valve Stem Packing: non-asbestos, manufacturers standard.
- N. Sprinkler Head: UL-Listed standard type, configuration of head and deflectors listed for purpose and location. Provide high temperature and special design heads where called for in Appendix A.
- O. Hangers: Where possible, use C-clamps (including beam and large flange clamps) as illustrated in NFPA 13, to attach hangers to building structures. Clips shall be used, as necessary, to prevent movement due to water hammer, vibration or seismic activity.
- P. Dry Pipe Valves (Dry Pipe Sprinkler Systems): UL-Listed dry pipe valves, complete with galvanized trim including priming chambers (accelerators and exhausters, as required by NFPA 13) and pressure operated electric switches. Gem Model F 302 or F3021.
- Q. Alarm Check Valves (Wet Pipe Sprinkler Systems): UL-Listed alarm check valves, complete with galvanized trim package, including retard chambers and external bypass. Gem Model F20, F200, or F2001.
- R. Standpipe Outlet Valves: Elkhart Brass Company, Model U25 angle valve - female inlet 1 ½ inch or 2 ½-inch NPT, Male outlet 1 1/2 inch or 2 ½-inch, National Standard Hose Thread - Finish to be cast brass, to be supplied with optional brass cap, with rocker lug fittings, connected by chains.

- S. Flow indicator: Switch, water-flow (paddle type), two single pole, double throw, snap acting switches, adjustable retard range from 0 to 90 seconds.
- T. Low level air switch (Dry pipe sprinkler systems): Complete with adjustable range of 10 to 130 psi; proof pressure range of 300 psi; two single pole, double throw, snap-acting switches, United Electric Control Co., Type J33AX, Model 5835.
- U. Air Compressor (Dry Pipe Sprinkler Systems): Shall have sufficient capacity to restore normal system air pressure plus 25% in system within 30 minutes. Shall be equipped with pressure switches to automatically start and stop the compressor at pressures to be determined in during detailed system design. Shall be electric drive, 115/230 V, 60 Hz, single-phase, complete with starter, motor overload protection, necessary relief valves, drain valves, internal piping, wiring and tank. Oil used in air compressors shall be PCB-free.
- V. Alarm Water Pressure Switch (Wet and Dry Pipe Sprinkler and Standpipe Systems): Adjustable range of 2 to 20 psi; 300 psi proof pressure; two single-pole, double throw, snap-acting switches, United Electric Control Co. Type J33AX, Model 5355.
- W. Dielectric pipe coupling (for use in the tunnel areas where "ground breaks" are required): Watts Model 3200, Flanged fittings, with type GB gasket, acceptable for use in radiation environment.
- X. Ball Valve with Supervisory Switch (required in trim piping of wet or dry sprinkler systems to allow supervision and maintenance or service on alarm attachments): Potter BVS-1/2 inch Stock No. 1010150, with NEMA 4 enclosure.
- Y. Water Motor Mechanical Alarms: UL listed water motor mechanical alarms.
- Z. Backflow Preventer: FEBCO Model 860, 880 or 880V (with model 601 air gap kit) sized same as incoming feed or system piping at inlet, unless otherwise shown adequate by hydraulic calculation and approved by the CM. Indicating Isolation valves shall be installed on each side of the backflow preventer, and provisions for full flow testing per NFPA 13 and 25 shall be provided.
- AA. Water Mist System
 1. The system shall be designed to meet, at a minimum, the "fire suppression" performance objective as defined in NFPA 750. The system shall be freestanding and not dependent on any other system for actuation. The system will be monitored by the building fire alarm system for supervisory and alarm conditions. The postulated fire hazards in the space include small quantities of acetone or alcohol, hydraulic fluid, plastics/rubber, cables with Butyl rubber or PVC insulation, and ordinary combustibles. The design basis fire has a peak heat release rate of 700 kW.
 2. The system shall be an open head deluge total flooding system. The system shall be divided into two zones of operation. Suppression Zone 1 shall be the portion of the Hot Cell from Column line 6 to the wall located midway between column line 10 and column line 11. Suppression Zone 2 shall be the portion of the Hot Cell east of the wall located midway between column line 10 and column line 11.
 3. A cross-zoned smoke detection system will be provided in each suppression zone, using VESDA detectors. Specification Section 16730 contains requirements for Vesda detector components in other areas of this project. That specification is referenced and generally applies to the water mist system, with the following considerations. The water mist detection system shall use welded stainless steel piping for detection, and the detection and programming modules shall be mounted at the hot cell per drawings. Discharge of sampled air shall be back into the hot cell. A releasing panel shall be used which is compatible with the Vesda detectors and the water mist

- system. That panel shall monitor the Vesda system, actuate the water mist system, and provide input to the building fire alarm panel for supervisory and alarm. Activation of two or more independent detectors within each suppression zone shall cause a discharge of the suppression system in that zone only. Automatic selector valves shall be provided to electrically open upon receipt of a signal from the fire alarm system and direct water to the appropriate suppression zone. The system shall be designed for simultaneous operation of both suppression zones. Access into the hot cell for detection and suppression is limited to the openings shown on drawings.
4. System components, piping, nozzles, etc. shall be seismically designed. The Seismic design shall be a static, lateral force design per section 1632 of the 1997 UBC. In determining the lateral force, the Importance Factor (Ip) shall be taken as 1.5 and the Seismic Coefficient (Ca) shall be taken as 0.21g. Seismic design calculations for water mist equipment must have an independent peer review by a qualified structural or mechanical engineer with 5 or more years experience in seismic design.
 5. Water mist system piping shall be welded stainless steel
 6. Spray heads or nozzles within the hot cell will be of all metal construction, with no o-rings.
 7. The system shall be a single or twin fluid, high or intermediate pressure design. The system shall use a gas-driven pump unit or pressurized cylinders to develop system pressure. System design pressure must not exceed 800 psi.
 8. Piping/nozzles shall not obstruct the operation of overhead cranes, movable equipment, or be located where subject to mechanical damage. Piping shall not be located directly beneath removable concrete T-beams. Piping shall be installed around the perimeter of the space with sideways oriented nozzles directed inward towards the protected space. Two levels of piping/nozzles shall be provided, one level near the top of the space and one level approximately 8 to 10 feet above the floor, or as required by design.
 9. The system shall be UL Listed or FM approved for the intended application. Where such listing or approval is not available, the manufacturer shall provide test data that demonstrates the system will perform its intended function. The system shall be designed, installed, and tested in accordance with NFPA 750.
 10. Low point drains shall be provided, where necessary, to drain trapped sections of pipe.
 11. A manual release device shall be provided outside the protected space, in the vicinity of the water mist equipment.
 12. Nozzles and piping shall be located in a 6- inch x 6-inch envelope from the lining of the hot cell walls or ceiling. Nozzles and piping located where subject to mechanical damage shall be protected with listed guards. The guards shall not significantly reduce the effectiveness of the water mist system.
 13. All equipment except for water mist nozzles and required piping shall be located outside the protected space. The area designated for water mist equipment is between column lines 10 and 11 in the Service Gallery, Room TA-112. Ancillary systems (3000 cfm/ zone) for ventilation will not be controlled by the water mist system. Equipment shall be located along the hot cell wall in this area.
 14. The duration of discharge shall be suitable for the hazard. A 100% reserve supply shall be provided and shall be connected to the system and be available to be manually placed in service with minimal effort.
 15. Storage containers shall be protected from mechanical, chemical, or other damage.
 16. A UL listed or FM approved releasing panel shall be provided to monitor the system and shall be capable of interfacing with the building fire alarm control panel. The panel shall contain, as a minimum, the following:
 - a. Low gas cylinder warning indicator
 - b. Low standby pressure warning indicator
 - c. Indicator light for general system fault
 - d. Alarm bell with reset button
 - e. Lamp test button

BB. Wet Chemical Extinguishing System

1. Any wet chemical suppression system shall be a pre-engineered, fixed pipe, automatic wet agent fire suppression system designed, provided and installed for kitchen exhaust hood(s), plenum(s), ductwork and cooking appliances requiring protection.
2. The suppression system, hood(s), ductwork and appliances shall conform to and be in accordance with UL 300, NFPA17A, and NFPA 96.
3. The system shall use Aqueous Potassium Carbonate wet agent contained in one or more stored, Department of Transportation (DOT) pressure-rated steel cylinder and valve assemblies. The cylinders shall be sized and filled in accordance with the appropriate standards.
4. Sufficient cylinder and valve assemblies shall be provided to protect the entire hazard area. Bracketing shall be provided to mount the cylinder securely to the intended mounting surface. The system control equipment shall be capable of all functions associated with automatically and manually discharging the wet agent from all cylinder and valve assemblies, including automatically shutting off the heat source or fuel to all protected cooking appliances upon system discharge.
5. System activation shall be by fusible link.
6. Nozzles shall be located to protect the exhaust duct(s), plenum(s) and all cooking appliances requiring protection. Nozzle choice, coverage and location shall be per the applicable UL-Listed system manual.
7. The distribution system shall be stainless steel piping.
8. All internal surfaces of piping or tubing are to be clean. All cut ends of pipe or tubing are to be reamed to remove burrs.

PART 3 - EXECUTION

3.1 DESIGN AND INSTALLATION

A. General Information

1. The Construction Manager's representative will be considered the authority having jurisdiction over final approval of drawings, interpreting of codes, inspection of finished system and witnessing of tests.
2. The Contractor shall be responsible to coordinate the fire protection layouts with the other disciplines to facilitate the layouts and prevent interferences. Where drawings indicate a routing for sprinkler and/or standpipe feed mains, that routing shall be adhered to unless the Construction Manager grants specific exemptions.
3. Provide supports and hangers for piping and appliances, per the appropriate codes and standards (NFPA 13, 14, 20, 750, etc) and these specifications.
4. In addition, systems, hangers and supports shall be designed and installed to meet seismic requirements for Category PC-1 or PC-2 as indicated in the Appendix of this Section.
5. Arrange suppression system piping to drain through main drain valve.
6. Provide any trapped section of piping with an auxiliary drain, complete with nipple and cap or brass plug. Trapped sections of piping serving a single sprinkler are exempt from this requirement.
7. Post-indicator valves for the sprinkler and standpipe systems will be provided by others in the feed mains outside the buildings. The work scope for sprinkler and standpipe systems begins at a flanged connection within the valve room. Each incoming water supply will be protected from a backflow of fire protection water by the installation of a backflow preventer.
8. Provide an outside screw and yoke gate valve on each side of the backflow preventer and on the supply side of sprinkler and standpipe system alarm check/check valves inside building.

9. Paint piping ONLY as outlined in the building specific requirements of this specification.
 - a. Cover sprinkler heads, equipment and valve nameplates before painting. Such items that are painted will be rejected.
 - b. Paint galvanized surfaces where galvanized coating has been removed. Where galvanizing is intact, labeling identifying fire protection piping may be substituted for painting. See Section 15074.
 - c. Prime and paint exposed surfaces with Carbomastic primer and Carbomastic 15, coal tar epoxy paint.
 - d. Remove protective covers after painting.
 10. Identification and Labeling (See Section 15074):
 - a. Pressure sensitive identification labels and flow arrows for fire protection systems shall be used to identify installed fire protection piping as follows:
 - b. Provide labels on straight sections of pipelines inside buildings at maximum intervals of 40 ft.
 - c. Provide labels on straight sections of pipelines outside buildings at maximum intervals of 100 ft.
 - d. Provide labels on branch lines not more than 5 ft. from main header.
 - e. Provide labels on lines that penetrate walls or floors on each side of penetration not more than 5 ft. from penetration. Provide labels on banks of piping in a row, side by side, for ease of reference.
 - f. Label text letter heights shall be in accordance with NEMA Z35.1.
 - g. Labels shall be applied to surfaces that are clean, free of scale, dirt, dust and grease.
 11. Underground lead-ins for sprinklers and standpipe systems shall be flushed at a minimum of 10 fps prior to connection to the sprinkler system.
- B. Sprinkler System
1. Design and install sprinkler systems in accordance with NFPA 13 and this specification.
 2. The Contractor shall refer to the architectural reflected ceiling plans for preferred locations of the sprinkler heads in areas where there are ceilings.
 - a. The sprinkler heads shown on the reflected ceiling plans are the preferred locations. This does not relieve the sprinkler contractor from following all regulatory requirements including NFPA 13 and the fire suppression specifications.
 - b. When the preferred layouts conflict with the regulatory requirements of the codes and standards, or this specification, the Contractor shall resolve with the architect/engineer.
 3. Special attention is directed to the radiation environment in the tunnel areas, the need to provide components that will withstand radiation, and the need for a design that considers testing and drainage concerns.
 4. The design and provision of drainage facilities for sprinkler system and alarm testing is a part of the scope of this work. Sprinkler valve rooms do not have floor drains.
- C. Standpipe Systems
1. Install standpipe systems in accordance with NFPA 14 and this specification
 2. Provide a swing check valve and water flow devices for hose standpipe systems.
- D. Wet Chemical Systems
1. Design, install, and test Wet Chemical systems in accordance with NFPA 17A, NFPA 96 and this specification.
- E. Water Mist Systems

1. Installers shall be trained and certified in installation procedures for their products, by the selected fitting supplier. Cylinders, piping and system installation shall meet the seismic requirements for Category PC-2 as indicated in the Appendix of this Section.
2. The system manufacturer's authorized representative shall carry out system commissioning, with witnesses from the Construction Manager's Representative and others, as appropriate. A full discharge test is to be carried out. The test can be conducted with a limited number of gas cylinders. When a full discharge test to the protected space is not practical, a discharge test should be conducted instead by utilizing the flushing valve installed in each section. After the test the system is to be reset and all the gas and water cylinders refilled. The commissioning certificate shall be correctly completed and signed by all parties and will become a part of the permanent record.
3. Design of the system shall include a documented independent review by qualified personnel prior to submittal.

F. Backflow Preventers

1. Backflow preventers are required to be installed prior to the sprinkler or standpipe piping in each riser room. Where multiple feeds are provided, a backflow preventer shall be installed on each incoming feed. Additionally, a backflow preventer shall be installed on sprinkler systems protecting areas with a radiation environment (Linac, HEBT, Ring, and RTBT Tunnels) downstream of alarm check valves and test connections, and prior to piping entering the tunnel. Backflow preventers shall be sized the same as the incoming piping unless hydraulic calculations show a smaller size may be used. Design will include facilities for full flow flushing of backflow preventer in accordance with NFPA 13 and 25.

3.2 CONTRACTORS 100% TEST AND CERTIFICATION

A. General Info

1. All testing shall be performed in accordance with the appropriate codes and standards (NFPA 13, 14, 20, 750, etc.) and these specifications.
2. All devices shall be tested to verify proper operation and supervision.
3. The Contractor's 100% test shall be conducted with the system installation complete.
4. Upon completion of Testing, the Contractor shall provide written certification to the Construction Manager's Representative documenting successful completion of all required tests in accordance with these Specifications.

B. Sprinkler System

1. No special requirements at this time.

C. Standpipe Systems

1. No special requirements at this time.

D. Wet Chemical Systems

1. No special requirements at this time.

E. Water Mist Systems

1. Hydrostatic testing of the piping system shall be performed separately for each section. The sections shall be pressurized to a pressure of $1.5 \times$ working pressure. The pressure test should be maintained for a period of 30 minutes or as otherwise determined by the authority having jurisdiction.

3.3 FIRE SUPPRESSION SYSTEM ACCEPTANCE TEST

A. General Information

1. It is preferred that the Fire Alarm and Fire Suppression System Acceptance Tests be conducted concurrently. Where this cannot be done, the Construction Manager shall be notified in writing. The Construction Manager shall coordinate with the Contractor to make provisions for partial testing of the systems as is and final testing of systems when construction is complete.
2. All testing shall be conducted in accordance with NFPA 13, 14, 17A, 20, 750 and other appropriate standards.
3. Upon completion of installation of a fire suppression system, an Acceptance Test of the fire suppression system shall be performed in the presence of the Construction Manager and/or his designated Representative(s).
 - a. In preparation for the Acceptance Test, the Contractor shall submit Record Drawings, as required elsewhere in these Specifications.
 - b. The Contractor's Record Drawings will be reviewed for conformance to the applicable Specification requirements. Upon approval of the Record Drawings, one copy will be provided to reflect the Acceptance Test plan.
 - c. The Contractor shall develop the Acceptance Test Plan in accordance with the appropriate Codes and Standards. The Test Plan shall be submitted to the Construction Manager for approval.
4. Acceptance Testing will be conducted by the contractor and witnessed by the Construction Manager's Representative, unless otherwise specified below. The Acceptance Test shall be performed in accordance with the Acceptance Test Plan. The Acceptance Test Plan shall include at a minimum:
 - a. Functional testing of 100% of interface devices that supply signals to other systems, including the Fire Alarm System. Such devices may include: pressure switches, tamper switches, water flow devices, etc.
 - b. Functional testing of 100% of system components including: alarm valves, gate valves, dry pipe valves, etc.
 - c. The fire pump acceptance test shall be performed and witnessed by the pump manufacturer's representative, the package assembler, the appropriate field construction personnel and the Construction Manager's representative. Test documentation will include signatures of all parties.
5. 100% successful performance during Acceptance Testing is expected, based on the Contractor's Installation Testing Documentation and 100% Test Certification required elsewhere in these Specifications. In the event of system performance inconsistent with the Contractor's testing certifications, the Construction Manager will make a determination as to whether or not the test results constitute failure of the Acceptance Test. Failure of the Acceptance Test shall invalidate the Contractor's System Certification, in which case re-certification (including 100% Contractor retesting) and a repeat of the Acceptance Test shall be required at no additional cost.
6. Failure of the Acceptance Test may result in the immediate suspension of all payments to the Contractor, until such time as the required Contractor's retesting/re-certification is complete and the failed Acceptance Test is successfully repeated.

3.4 BUILDING SPECIFIC REQUIREMENTS

- A. All building specific requirements, if any, are outlined in the Appendices.

END OF SECTION 15300

APPENDIX A
BUILDING SPECIFIC REQUIREMENTS

3.4.A FELK Area-Specific Fire Protection Requirements:

Area Protected	Type of Suppression System	Application Rate (gpm/ft2) Temp. Rating	Interface Point-Water Supply	Special Conditions And comments
East end of Klystron Building	Wet Pipe Sprinkler System	0.20gpm/3000 sq ft Plus 500gpm for hose: 286 degree F rating.	Valve Room- Klystron Bldg.	FDC to be on south wall of Klystron Bldg. Seismic PC-2.
(West end of Klystron Bldg)	Wet Pipe Sprinkler System	0.20gpm/3000 sq ft Plus 500gpm for hose: 286 degree F rating.	Valve Room Klystron Bldg.	FDC on S. Klystron Building wall. Seismic PC-2.
Front End Building, Linac Tunnel *	Ordinary Hazard, Wet Pipe Sprinkler System	.20gpm/1500 sq ft Plus 250gpm for outside hose,; 165 degree F rating.	Valve Room- Front End Bldg.	FDC on West Front End Building wall. Seismic PC-2 Provide 1 ½" outlets for fire hose along walkway @ 200 ft. intervals in tunnel.

* Note that the Linac Tunnel area is a radiation environment. See specification. A backflow preventer is to be provided on the system piping downstream of the alarm check valve and flow device for this area to ensure that all contaminated water is retained in this area.

3.4.B Ring Area-Specific Fire Protection Requirements:

Area Protected	Type of Suppression System	Application Rate (gpm/ft2) Temp. Rating	Interface Point-Water Supply	Special Conditions And comments
HEBT Service Bldg	Wet Pipe Sprinkler System	0.20gpm/3000 sq ft Plus 500gpm for hose: 286 degree F rating.	Valve Room-west end of HEBT Service Bldg.	FDC to be on south wall of HEBT Service Bldg. Basis FM DS 5-4. Seismic PC-2
Ring Tunnel, HEBT Tunnel, and RTBT Tunnel areas - including access ways and egress areas. *	Ordinary Hazard, Group 2 Wet Pipe Sprinkler System	0.20gpm/1500 sq ft Plus 250gpm for outside hose, 165 degree F rating	Valve Room-adjacent to south ring tunnel stairwell.	FDC to be on east bldg wall. Basis FM 5-31,5-4. Seismic PC-2. Provide 1 ½ fire hose outlets at 200 ft. intervals, accessible from walkway, fed from sprinkler feed main
Ring Service Building	Ordinary Hazard, Group 2 Wet Pipe Sprinkler System	0.20gpm/1500 sq ft Plus 250gpm for hose: 212 degree F rating.	Valve Room – Ring Service Building	FDC to be on west bldg wall. Basis FM5-31, 5-4 Seismic PC-1.

* Note that the Ring Tunnel areas are radiation environments. See specification. A backflow preventer is to be provided on the system piping downstream of the alarm check valve and flow device for this area to ensure that all contaminated water is retained in this area

3.4.C Target Building and Beam Dumps Specific Requirements:

Area Protected	Type of Suppression System	Application Rate (gpm/sq. ft.) Temp. Rating	Interface Point-Water Supply	Special Conditions And comments
Basement area	Ordinary Hazard, Group 2 Wet Pipe Sprinkler System in 100% of the basement area, including access ways and exit stairs and enclosures.	0.20gpm/1500 sq ft Plus 250gpm for hose: 165 degree F	Valve Room-east end of Target at basement elevation	FDC to be on N.E. wall of building between column G and H on grade level. Seismic PC-2. Piping in TA-B147 and TA-B148 shall be painted as required elsewhere in this section. A separate alarm check valve shall be provided for the basement area.
Instrument Level, High Bay Areas, Building 2TU and 11TU and parts of hot cell complex described below. under "Hot Cell Complex", - Protection shall be provided in 100% of the building area including access ways, stairways, penthouses and enclosures except where water mist system is provided.	Extra Hazard, Group 1 Wet Pipe Sprinkler System	0.30gpm/2500 sq ft Plus 500gpm for hose: 212 degree F	Valve Room (above)	Instrument Level sprinkler piping shall have capped "tees" installed on cross-mains at intervals not to exceed 40ft for future expansion. Tees to be 4inch or sized to match cross-main if smaller. FDC to be on N.E. wall of building between column G and H on grade level. A minimum of 2 Systems for the north and south instrument floor, mezzanine, and TU building and one system for the center high bay area, hot cell perimeter areas shall be provided. Piping penetrations in the basement and hot cell area are limited and shown on drawings. Seismic PC-2
Hot Cell Complex	Water Mist System in Hot Cell, TA- 114* ALSO, Extra Hazard, Group 1 Wet Pipe Sprinkler protection in Service Gallery (TA-112, Inst. Decontamination Room (TA 113), and Manipulator Gallery (TA115) from sprinkler system protecting the center high bay area.	Automatic, open heads using VESDA detection-cross zoned Design in accordance with NFPA 750	Tank, Cylinders detectors, and "skid" located outside hot cell-location in Service Gallery, per drawings.	Seismic PC-2 Piping penetrations shown on drawings. This is a QA level one system and requires an independent review of system design.
Charcoal Filters	Water Spray-Manual Only (by charcoal filter vendor).	1½-inch NSHT threaded connection provided at	N/A	NOT by Sprinkler Contractor.

Area Protected	Type of Suppression System	Application Rate (gpm/sq. ft.) Temp. Rating	Interface Point-Water Supply	Special Conditions And comments
	Not permanently connected to fire protection water supply.	each filter by others. Note that fire hose shall be used to connect to piping outside the filter.		
Target Building	Manual Class 1 Standpipe with 2 ½ inch connections at each elevation in stairways 5 and 7.	Manual Class I Standpipe system - minimum 1000 gpm @ 100 psi with use of Fire Department Pumper	Risers to be adjacent to risers supplying sprinklers in target building.	FDC to be on N.E. wall of building between column G and H on grade level adjacent to FDC for sprinklers. Seismic PC-2 Note penetrations in basement are limited, shown on drawings. Standpipe FDC to be separate from sprinkler FDC and identified. Standpipe system shall have a separate feed from the underground main and will require a separate backflow preventer.

* Note that the hot cell is a radiation environment. See Specifications.

3.4.D Central Utility Building-Specific Sprinkler Requirements:

Area Protected	Type of Suppression System	Application Rate (gpm/ft ²) Temp. Rating	Interface Point-Water Supply	Special Conditions And comments
General Area Protection	Wet Pipe Sprinkler System	0.20 gpm/ 1,500 sq ft Plus 250 gpm for hose: 286 degree F rating.	Valve Room-Room 104	FDC to be on N. Bldg wall. Seismic PC-1

3.4.E CHL/RF Facility- Specific Sprinkler Requirements:

Area Protected	Type of Suppression System	Application Rate (gpm/ft ²)	Interface Point-Water Supply	Special Conditions And comments
General Area Protection	Wet Pipe Sprinkler System-	0.20gpm/sq.ft. over 3,000 sq. ft., Plus 500 gpm for hose streams: 286degree sprinklers	Riser Room, North Wall	FDC to be on N. Bldg wall. Basis – FM 7-95 Seismic PC-2

3.4.F Central Lab and Office Area-Specific Fire Protection Requirements:

Area Protected	Type of Suppression System	Application Rate (gpm/ft ²) Temp. Rating And Spacing	Interface Point-Water Supply	Special Conditions And comments
Auditorium wing-West Section- All Levels	Ordinary Hazard, Group 2 Wet Pipe Sprinkler System	0.20 gpm/1500 sq ft., plus 250gpm for hose. 165 degree F. Sprinklers at ceiling of lobby to be 155 degree F quick response.	Valve Area in Room B1-3-63.	FDC to be at Level B-1 outside of room B1-3-63. FDC to serve all sprinkler and standpipe systems. Floor control valves and water flow devices to be provided at each floor elevation, lobby ceiling, and auditorium. Risers to be in stairwells. Seismic PC-1
Auditorium wing-East Section- All Levels	Ordinary Hazard, Group 2 Wet Pipe Sprinkler System	0.20 gpm/1500 sq ft., plus 250gpm for hose. 165 degree F. Sprinklers at ceiling of atrium to be 155 degree F, quick response, with reflective heat shields to protect from sunlight.	Valve Area in Room B1-3-63.	FDC to be at Level B-1 outside of room B1-3-63. FDC to serve all sprinkler and standpipe systems. Floor control valves and water flow devices to be provided at each floor elevation, and atrium ceiling-risers to be in stairwells. Seismic PC-1
Shop/Laboratory Building-All Levels	Ordinary Hazard, Group 2 Wet Pipe Sprinkler System	0.20gpm/1500 sq ft Plus +250gpm for hose: 165 degree F	Valve Area in Room B1-3-63.	FDC to be at Level B-1 outside of room B1-3-63. FDC to serve all sprinkler and standpipe systems. Floor control valves and water flow devices to be provided at each floor elevation - risers to be in stairwells. Seismic PC-1
Control Wing- All Levels	Ordinary Hazard, Group 2 Wet Pipe Sprinkler System	0.20 gpm/1500 sq ft., plus 250gpm for hose. 165 degree F..	Valve Area in Room B1-3-63.	FDC to be at Level B-1 outside of room B1-3-63. FDC to serve all sprinkler and standpipe systems. Floor control valves and water flow devices to be provided at each floor elevation - risers to be in stairwells. Seismic PC-1
Special Hazard area-Diesel Generator Room	Ordinary Hazard, Wet Pipe Sprinkler System	0.30 gpm/2500 sq ft or room area, plus 500gpm for hose. 286 degree F	Feed from system in East Section of Auditorium Wing	Seismic PC-1
Special Hazard-Racked Storage Area of Material Handling at Level B-1	Special design-Racked Storage	0.30 gpm/2000 sq ft or room area, plus 500gpm for hose. 286 degree F.	Feed from Shop/Laboratory system.	Note Design to be coordinated and reviewed in conjunction with area use development and rack storage plans. Seismic PC-1

Area Protected	Type of Suppression System	Application Rate (gpm/ft2) Temp. Rating And Spacing	Interface Point-Water Supply	Special Conditions And comments
Loading Dock	Ordinary Hazard, Group 2 DRY Pipe Sprinkler System	0.20 gpm/1950 sq ft, plus 250gpm for hose. 165 degree F.	Feed from dry pipe valve located in room B1-3-63	FDC to be at Level B-1 outside of room B1-3-63. . FDC to serve all sprinkler systems. Requires isolation and dry pipe valve to prevent freezing. Seismic PC-1
Kitchen Cooking Appliances and Ventilation system	Wet Chemical System	To be determined during detailed design.	N/A	Ensure that system activation shuts off fuel supply/heat for the cooking equipment. Ensure system interfaces with the fire alarm system.
Control Room(s), Adjacent Computer Room, and raised floor areas	Special Design in NFPA 75	To be determined during detailed design.	System to originate in B-1-3-63. Floor control valves cover computer room and adjoining offices..	Special Design considerations this area. Seismic PC-1
Standpipe System for All Building areas	Class I Standpipe system - minimum 500 gpm @ 30 psi at the 2 most remote hose connections (1000gpm total) without fire dept. assistance..	Locate risers in each building stairwell, with outlets at each elevation	System to originate in room B1-3-63- Combined system with sprinklers.	FDC to be at Level B-1 outside of room B1-3-63. . FDC to serve all sprinkler systems. Seismic PC-1. Special hydraulic calculations.

Note-Sprinklers in areas with suspended ceilings shall be flush or semi recessed and approved by the A/E and the CM. In areas that are "Shelled" in bid options, sprinkler and standpipe piping shall be provided in an appropriate design for an ordinary hazard, group 2 occupancy in the building configuration "as shelled" with due consideration for beam pockets and other restrictions such as ducts and lighting fixtures, and any temporary construction. Where possible, consideration will be given to the planned future use of the area.