

8 FIRE PROTECTION

8.1 Design Criteria

8.1.1 Codes and Standards

The latest edition of the codes, standards, orders, and guides referred to in this section will be followed, with a reference point of August 2008 being the anticipated design completion date. All work will be in accordance with BNL's Implementation Plan for DOE 413.3, "Program and Project Management for the Acquisition of Capital Assets."

8.1.2 DOE Orders

DOE O5480.4 – Environmental Protection, Safety and Health Protection Standards
DOE O413.3A – Program and Project Management for the Acquisition of Capital Assets
DOE O414.1C – Quality Assurance
DOE O420.1B – Facility Safety
DOE O420.2B – Safety of Accelerator Facilities
10 CFR 851

8.1.3 Codes, Standards, and Guides

Building Code of New York State (NYSBC) – 2002 Edition
American National Standards Institute
ANSI 117.1 Accessible and Useable Buildings and Facilities
American Society for Testing Materials Standards
Factory Mutual
Mechanical Code of New York State
National Institute of Standards and Technology
National Fire Protection Association (NFPA) Standards
Occupational Safety and Health Administration (OSHA)
Underwriters Laboratory
New York State Fire Prevention Code - 2002 Edition
Americans with Disabilities Act Accessibility Guideline (ADAAG)

8.2 Preliminary Design

8.2.1 Fire Zones

The NSLS-II complex is divided into five fire zones, corresponding to the ring pentants.

8.2.2 Fire Protection System

Scope/Major elements	Fire water main Hydrants Piping, sprinklers and accessories
Redundancy	System loop is fed from two connection points to the site system
Capacity	Per Code
Coverage	Entire NSLS-II complex
Hazard classifications	Ordinary Hazard Group 1 unless noted otherwise
Accelerator tunnel	See narrative
Experimental Hall	See narrative
Office / Public spaces	See narrative
Utility areas	See narrative
Gas cabinets	See narrative
Chemical storage areas	Extra Hazard Group 2
Fire hose allowance	Per NFPA 13
Fusible link rating	As required for application
Minimum supply pressure	TBD
Materials of construction	
Piping	Ductile iron, cement lined (buried) Schedule 40 black steel (above ground)
Valves	Butterfly or OS&Y – Supervised
Pumps	Not required.

Within each fire zone a single fire service will be extended from the site water main to the Service Buildings as described below. The available pressure has not been verified at this time. Fire flow data will be obtained during Title II from the BNL Fire Protection Engineering Group. Installation of a fire pump is not anticipated.

Supply for the fire protection systems shall originate from the water main loop on the interior (courtyard) side of the Ring Building. This interior loop shall be fed from an exterior (road side) loop water main in two locations. In turn, the exterior loop is also fed from two locations from the water mains on the sight. (See Civil discussion for additional information on the water distribution plan.)

A fire service shall enter each of the Service Buildings and supply the four (4) combined sprinkler and standpipe systems for the Service Building, adjacent LOB, and approximately 20-percent of the Ring Building. The service will be provided with two (2) full size Underwriters Laboratory and Factory Mutual listed reduced pressure principle backflow prevention devices piped in parallel. Downstream of the service entry there will be a wet alarm valve assembly for the combined sprinkler and standpipe systems. The combined sprinkler and standpipe systems are: the Service Building with the area above the Mezzanine floor, the remained of the Experimental floor, the Tunnel, and the LOB. Each floor within a system shall be individually annunciated and provided with a supervised zone control valve. The header will have two (2) fire department Siamese connections. One connection shall be located on the front face of the building, and the other on the interior face (courtyard) of the building. Each shall be located near an entry point into the facility. A water motor gong connected to each wet alarm valve assembly will be provided. The water motor gong shall be located adjacent to the entrance on the exterior interior ring wall.

The multiple wet sprinkler systems will be designed to provide 100-percent protection of the facility. A 2 inch capped pipe fed from the Experimental floor sprinkler system shall be provided by each of the beamline entrances for protection of hutches. Where the piping installation will be subject to freezing temperatures, dry sprinklers will be employed.

Interior piping will be Schedule 40 steel pipe. No other piping material will be acceptable. The piping will be joined by welding, threaded fittings, or roll-groove fittings and couplings. Pipe and fittings used in dry pipe portions of the system will be galvanized inside and outside.

Unless otherwise indicated, the entire sprinkler system will be designed as an Ordinary Hazard Group 1 occupancy with 0.15 GPM/SF density. The remote hydraulic area for each system shall be calculated at 2500 square feet.

A fire standpipe system is not required for this facility based on the Building and Fire Codes of New York State. However, per BNL's requirements, a fire standpipe system will be provided that will serve 2-1/2 inch fire department valves. These valves will be located in the Ring Building approximately every 200 feet around the Experimental Hall. The 2-1/2 inch fire department valves will have 2-1/2 x 1-1/2 inch reducers. Additional fire department valves will be located in stairs and at all other entrance as required to achieve total coverage. Hose valves in stairs shall be located on the floor level and not the intermediate level stair landing.

Fire hydrants will be located along the Loop Road outside of the Ring Building and along the Service Road inboard of the Ring Building at distances meeting DOE and local code requirements, but not more than 300 ft from all building entrances. Hydrants will not be located less than 50 feet from the building.