

ELEMENTS OF THE FIRE PROTECTION PROGRAM

INTRODUCTION

The 6000 series of the Fermilab Environment, Safety, and Health Manual chapters describe the organization and structure of the Laboratory Fire Protection Program, incorporates the requirements of DOE Order 420.1B.

POLICY

This program is to provide a level of fire protection and fire suppression capability sufficient to minimize losses from fire and related hazards consistent with the best protected class of industrial risks (“Highly Protected Risk”).

STANDARDS

The technical basis for an acceptable program is a body of policies, requirements, codes, standards, guidelines, and interpretations. The most recent version of the following are used as the primary design standards at the Laboratory:

- International Fire Code (IFC) 2009
- International Building Code (IBC) 2009
- National Fire Protection Association 29 CFR 1910 (OSHA general industry standards)
- 29 CFR 1926 (OSHA construction standards)

With regard to facilities, the “code of record” (the code in effect at the time of design) is in effect for the life of the facility. Refer to Specific Fire Prevention Program Requirements. The current code will apply to the facility in the event of a major renovation or if a significant hazard endangers the building occupants as determined by the Environment, Safety, and Health Section Fire Protection Engineer (ES&H-FPE).

DEFINITIONS

International Code Council (ICC) - recognized publisher of building and fire codes.

Building Manager (BM) - designated employee for each building on site that will serve as the contact point for all activities that will affect that building as a result of daily operations or services requested from both internal and external sources.

Fire Protection Engineer (FPE) - highly trained and educated professional responsible for overseeing the overall implementation and development of the Fermilab fire protection systems.

Fire Systems Maintenance (FSM) Technician - individuals trained in the inspection, testing, and minor maintenance of fire protection systems throughout the Laboratory (including Water Based Systems, Fire Alarm Components, and Special Systems).

FIRUS - Facility Incident Reporting and Utility System (FIRUS) - lab-wide system that monitors building fire alarm systems and provides alarms at the Communications Center in Wilson Hall.

Highly Protected Risk (HPR) - a facility that is characterized by a level of fire protection of the best protected class of industrial risks.

Irregularity Report - a form issued by FESS Fire Systems Maintenance (FSM) technicians and Fermilab Fire Department (FFD) personnel to communicate critical deficiencies in fire protection systems to the ES&H Fire Protection Engineer (ES&H-FPE). The form is presented in chapter 6010.1.

NFPA - National Fire Protection Association (NFPA) - organization dedicated to fire safety through creating consensus standards and codes.

RESPONSIBILITIES

Directorate

Overall responsibility for the fire protection program rests with the Director's Office. The Director assures that adequate resources are available to carry out the elements of the fire protection program as delineated in this chapter.

Division/Section Heads

Heads of divisions and sections are responsible for the implementation and continuing operation of the fire protection program within the areas for which they have responsibility. This includes assuring that all assessments, inspections, tests, and maintenance of fire detection and suppression equipment are conducted by support organizations in accordance with the requirements hereafter set forth. General facility audits or audits of inspection reports, irregularity reports, or other documentation (e.g.,

using the Tripartite Assessment process) can be conducted to ensure compliance with the various elements of the Fire Protection Program.

For all fire protection system designs, it is the responsibility of the landlord division/section to assure that reviews are performed which assure that a satisfactory level of protection is being provided, that the installation is satisfactory, that acceptance tests are adequate to assure proper operation of the fire protection system, and that the system has been properly tested.

Division and Section personnel must periodically audit their fire protection systems through the Tripartite Assessment process.

Building Managers (BM)

The Building Managers assigned to specific buildings within each division or section are responsible for periodic inspections of fire protection system components in accordance with Appendix A. Any deficiencies noted during the inspections must be corrected by 1) creating a requisition or work order to correct the condition or 2) contacting the FESS FSM technicians, FFD, or ES&H-FPE directly for immediate assistance

Senior Safety Officer (SSO)

The SSO, or designee for each division or section, will review Fire Department Run Reports and investigate the incident as needed.

The SSO reviews the Building Fire Inspection Report issued by the FFD and aids in correcting any findings, as appropriate.

Accelerator Division (AD)

The Accelerator Division maintains the FIRUS system, including the hardware and software.

Facilities Engineering Services Section (FESS)

The Facilities Engineering Services Section engineering staff (FESS-ENG) provides design and consulting services, reviews shop drawing submittals, and oversees the installation and acceptance testing of fire protection systems for both new construction and modifications to existing facilities. "Turn key" purchases may occur in which case the Laboratory is purchasing these services from a vendor.

The FESS Fire Systems Maintenance (FSM) technicians are responsible for the inspection, testing and maintenance activities for all installed fire protection systems throughout the Laboratory as specified in Appendix A. They will issue Irregularity Reports, as required.

In addition, other FESS Operations personnel provide maintenance and testing for the underground water mains and fire hydrants, as well as other duties specified in Appendix A.

Environment, Safety and Health Section (ES&H)

The Environment, Safety, & Health Section Fire Protection Engineer (ES&H-FPE) reviews all fire protection system designs to assure that (1) a satisfactory level of protection is being provided, (2) the applicable fire protection provisions of the IBC International Building Code, the International Fire Prevention Code, and National Fire Protection Association Standards (NFPA) are being met, (3) the installation plan is satisfactory, and (4) acceptance tests are adequate to assure proper operation of the fire protection. The ES&H-FPE is responsible for documenting these reviews.

The ES&H-FPE will assist FESS-ENG as requested during the installation, testing, and acceptance of fire protection systems.

The ES&H-FPE conducts periodic assessments of Fermilab facilities to evaluate compliance of each facility with the requirements of the best protected class of industrial risks, or highly protected risks (HPR).

The ES&H-FPE monitors system operation, effectiveness, and failures (including the FIRUS system) found during routine testing via the Irregularity Report system and audits.

The ES&H-FPE reviews all Fire Department Run Reports.

The ES&H-FPE shall be notified by telephone, regardless of day or time, of all significant Fire Department Runs involving:

- Loss of water protection (i.e. broken water lines)
- Loss of electrical power resulting in Fire detection and/or FIRUS systems relaying on backup power.
- Any fire related event that results in physical damage to structures or equipment that had the potential for endangering personnel.

Notification of the ES&H-FPE will be made by the Comm Center upon direction of the Senior Fire Department Officer. This notification will not be made ahead of any time-urgent emergency response notifications or efforts.

The Fermilab Fire Department (FFD) of the Business Services Section (BSS-FFD) responds to fire emergencies.

The FFD assists the FESS FSM technicians by performing required testing of the fire protection systems, as specified in Appendix A. They will issue Irregularity Reports, as required.

The FFD generates a Fire Department Run Report, which documents the details of all responses to fire alarms and emergencies.

The FFD conducts a general fire inspection for all buildings semi-annually and issues a report of findings to the division/section SSO.

The FFD conducts a general inspection of all fire pump rooms monthly.

The FFD inspects all Village housing units semi-annually (includes alarm systems, CO detectors, GFCI tests, and fire extinguishers) and issues a report to the Building Manager.

The Security Department of the Business Services Section (BSS-SEC) oversees and directs the operation of the COM Center, including testing of FIRUS (see Appendix A).

The ES&H Section will periodically audit fire protection systems as part of the tripartite assessment process.

Other Organizations and Individuals

Fire protection responsibilities of organizations and individuals not specifically included in this chapter are:

- Fire Hazard Subcommittee / Chapter [1030](#) of this manual
- Subcontractors / Chapter [7010](#) of this manual
- Fermilab Fire Department (including Chief)
- Fermilab Emergency Response Plan
- ES&H Emergency Management Procedure Manual
- Fermilab's Emergency Response Plan Appendix J, Emergency Wardens

RESPONSIBILITIES MATRIX:

	DIR	D/S	BM	SSO	AD	FESS	ESH-FPE	BSS-FFD	BSS-SEC
Overall Responsibility	X	X							
FPS Audit		X					X		
FPS Design		X				X	*		
FPS Installation		X				X	*		
FPS Testing		X				X	*		
FPS Acceptance		X				X	*		
FPS Code & Compliance Review							X		
FPS Maint/Test/ Inspection		X	X			X		X	
FIRUS Maint					X				X
COMM Center									X
Fire Incident Response								X	
FFD Run Reports				X			X	X	
Irregularity Reports						X	X	X	
HPR Assessments							X		

* review only

PROGRAM ELEMENTS

The fire protection program encompasses all aspects of fire protection at the Laboratory. The program includes fire prevention practices and procedures, quality construction, protecting buildings and facilities with fixed fire detection and suppression systems, procedures for testing and maintenance of fire protection systems and equipment, providing fire fighting devices as appropriate, providing adequate water supplies for fire control, a system of oversight that ensures that DOE orders and mandatory standards applicable to fire protection are met, a staffed and equipped fire department, and most importantly, participation by all personnel from the directorate level down to managers, scientists, engineers, technicians, and supporting employees.

Design of Fire Protection Systems

Fire Protection system designs undergo the review process detailed in FESHM Chapter [2010](#), PLANNING AND REVIEW OF ACCELERATOR FACILITIES AND THEIR OPERATIONS. In addition, the FESS Design and Construction Document Review and Distribution Procedures are used to review of project design and drawings of both new construction and modifications to existing facilities, including fire protection systems. These projects may be completed by subcontractors or may be "turn key" purchases from a vendor.

The ES&H-FPE reviews all fire protection system designs to assure that (1) a satisfactory level of protection is being provided, (2) the applicable fire protection provisions of the International Building Code, the International Fire Prevention Code, and National Fire Protection Association Standards (NFPA) are being met, (3) the installation plan is satisfactory, and (4) acceptance tests are adequate to assure proper operation of the fire protection. The ES&H-FPE is responsible for documenting these reviews.

Experiment Reviews

The ES&H-FPE reviews all experiments to assure that a satisfactory level of protection is being provided and that the applicable fire protection provisions of the International Building Code, the International Fire Prevention Code, and National Fire Protection Association Standards (NFPA) are being met. The ES&H-FPE is responsible for documenting these reviews.

Highly Protected Risk – Facility Inspections

Fermilab maintains facilities that are characterized as a “best protected” class of industrial risk (Highly Protected Risk), equipped with an appropriate level of fire protection. The frequency of inspection depends on the mission criticality of the facility to the Laboratory. The loss of those facilities that would have an adverse impact on the Laboratory would have a higher frequency of inspection. The inspection schedule ranges from annually to once every 5 years. The ES&H-FPE oversees the inspection process and maintains the inspection schedule.

Inspection and Maintenance of Fire Protection Systems (Irregularity Report system)

Appendix A specifies the schedule and responsibilities for the inspection, testing and maintenance activities for all installed fire protection systems throughout the Laboratory. Building Managers that detect serious irregularities must notify the FSM Technicians of those conditions. FSM technicians (and FFD) must submit all irregularities (using the Irregularity Report System) to the ES&H-FPE. The FSM technicians or ES&H-FPE will communicate with the affected division/section and

suggest corrective strategies. The division/section must then document the deficiency in frESHtrk and make the needed corrections.

Facility Incident Monitoring and Communication

The Facility Incident Reporting and Utility System (FIRUS), a proprietary supervising station system, monitors fire protection, security and utility systems at Fermilab.

FIRUS system alarms are monitored in the Fermilab Communications Center (COM Center), located on the ground floor of Wilson Hall. The COM Center also receives telephone calls reporting fires. The COM Center dispatches the FFD and security personnel. The Security Department of the BSS Section oversees and directs the operation of the COM Center. Auxiliary (back-up) FIRUS terminals are also located in the Main Control Room and Security Headquarters, Site 52.

The FFD generates a Fire Department Run Report, which documents the details of all responses to fire alarms and emergencies. The ES&H-FPE and the affected division/section Senior Safety Officer reviews the Fire Department Run Reports and investigates as needed.

Response to Fire Emergencies

The FFD and Security will respond to all fire emergencies at all times. If needed, additional assistance will be provided by nearby municipal fire departments. Further details are located in the Fermilab Emergency Response Plan and ES&H Emergency Management Procedure Manual.

Specific Fire Prevention Program Requirements

Additional elements of the Fire Protection Program and their associated chapter are:

- [6011](#) Periodic Testing of Emergency Lights
- [6012](#) Periodic Inspection of Fire Doors
- [6013](#) Facility Incident Reporting System (FIRUS)
- [6014](#) Fire Watch Protocols
- [6020.1](#) Placement of Portable Fire Extinguishers in Primary Beam Enclosures
- [6020.2](#) Use of Check Valves on Oxygen-Acetylene Cutting and Welding Equipment
- [6020.3](#) Storage and Use of Flammable Gasses
- [6020.4](#) Minimum Aisle and Doorway Widths for Safe Egress
- [6030](#) Fire Detection/Protection System Disablement
- [6040](#) Fire Construction Requirements
- [6040.1](#) Fire Retardant Coatings
- [6040.2](#) Interior Finish Materials

| 6040.3 Fire Stops for Cable Penetration