FESHM 2001: ENVIRONMENT, SAFETY & HEALTH FOR PROJECTS

Revision History

Author	Description of Change	Revision Date
J. Donald Cossairt	• Incorporate the addition of responsibilities of ESH&Q Project Coordinators • Editorial corrections	June 2015
J. Donald Cossairt	Initial release of Chapter 2001	November 2012

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1.0 INTRODUCTION

All projects at Fermilab are bound by the requirements of the Director's Policy Manual, the Fermilab Engineering Manual, and this Fermilab ES&H Manual (FESHM) including the Fermilab Radiological Control Manual (FRCM), and the Quality Assurance Manual. The purpose of this chapter is to provide an overview of major environment, safety, and health requirements that apply to such activities.

2.0 DEFINITION

Project: A unique effort having defined start and end points undertaken to create a product, facility, or system. Built upon interdependent activities planned to meet a common objective, a project focuses on attaining or completing a deliverable within a predetermined cost, schedule and technical scope baseline. Projects include planning an execution of construction, assembly, renovation, modification, environmental restoration, decontamination and decommissioning, capital equipment, and technology development activities. A project is not constrained to any specific element of the budget structure (e.g., operating expense). (Adapted from DOE O413.3B, *Program and Project Management for the Acquisition of Capital Assets,* 11-29-2010.)

3.0 RESPONSIBLILITIES

All personnel involved with projects are subject to the requirements of FESHM 1010 and all other requirements of the FESHM, FRCM, and QAM. In addition, each Project Manager (PM) is directed to the specific requirements of this chapter where their specific responsibilities are enumerated.

3.1 ESH&Q Project Coordinator Responsibilities.

At the discretion of the Chief Safety Officer, an ESH&Q Project Coordinator (ESHQPC) may be appointed for designated projects. The ESHQPC is responsible for:

- Assuring that various ESH&Q requirements specified elsewhere are carried out on a time scale consistent with project milestone dates.
- Monitoring project activities to assure conformance with accepted ESH&Q standards as delineated separately in FRCM, FESHM, and QAM.
- Promptly reporting to the Project Manager and the Chief Safety Officer significant issues related to ESH&Q that merit mitigation.
- Attending project-related meetings and discussions and participate in the associated Project Management Group (PMG) meetings.
- Being available for internal and DOE reviews as appropriate.

4.0 PROCEDURES

4.1 General Procedures

- Projects of a wide range of sizes and complexity constitute a major focus of activities at Fermilab. Project Managers shall determine the environment, safety, and health impacts of their projects and are encouraged to work with the appointed ESHQPC to assist in this.

- Some projects are subject to the requirements of DOE O413.3B and its hazard analysis (HA) and critical decision processes. Projects below the applicability threshold of this DOE Order 413.3B are still required to perform a written hazard analysis (HA).
- For all projects, consultation with the staffs of the relevant division/section, the Division Safety Officer (DSO) or the ESH&Q Section will be of paramount importance. The appointed ESHQPC is expected to assist in such consultations.
- It is quite common for projects of all scopes and sizes to overlap multiple organizational units. Thus, all relevant organizations must be involved in defining the environment, safety, and health requirements early in the planning process.
- Projects are required to comply with a number of other Fermilab policies in addition to the provisions of this chapter, including those cited as references below. The integration of the requirements of all Fermilab policies shall include environment, safety, and health requirements at all stages of project design, and execution including utilization and operation as well as decontamination and decommissioning. The appointed ESHQPC is charged with providing assistance to the projects on these topics.

4.2 Specific Environment, Safety, and Health Policies

There are several FESHM Chapters that are directly applicable to projects. Given the scientific mission of Fermilab, most, but not all, projects are related to the development, constructions, and operation of particle accelerators or high energy physics experiments.

4.2.1. FESHM 8060, National Environmental Policy Act (NEPA) Review

The purpose of this chapter is to ensure that actions proposed by Fermilab receive the appropriate and timely review of potential impacts to the 'quality of the human environment', which includes impacts to the natural and built environment as well as human health. NEPA requires federal agencies to consider, and document, the potential ES&H impacts of proposed actions prior to initiating those actions. Consequently, the terms of NEPA must be met during the planning phase of a project and/or when substantial project changes are being considered. The NEPA evaluation should begin as soon as there is enough information about the proposed project to engage in meaningful analysis but before it's too late to modify the proposed design. This is an important initial step required of all projects.

The project manager or their designee, in consultation with the appropriate ES&H personnel, are responsible for coordinating NEPA reviews and submitting an Environmental Review Form to the ESH&Q Section. The NEPA Program Manager within the ESH&Q Section compiles NEPA documentation that is submitted to DOE FSO for approval and concurrence on the recommended level of review.

4.2.2. FESHM 8010, Environmental Protection Program

In addition to NEPA requirements, there are many topics in the area of environmental protection that clearly merit early consideration in the planning and execution of projects. This chapter describes Fermilab's Environmental Management System and also contains a convenient index to other environmental topics. Input on the environmental protection ramifications of projects is often quite important at an early stage given the need to meet regulatory requirements pertaining to environmental permits. The lead times required to obtain

such permits or modifications of existing permits is set by outside regulatory agencies beyond the control of Fermilab or the Department of Energy. Design features needed to meet environmental protection requirements can best be included at optimum cost early in design.

4.2.3. FESHM 2060, Work Planning and Hazard Analysis

The purpose of this chapter is to specify the HA process for all tasks and projects at Fermilab. While this chapter covers tasks ranging from mundane work activities to complex projects, the HA process specified here is applicable to projects and can be used to meet the HA requirements of DOE O413.3B. Projects of all types shall develop a written HA within the procedures of this FESHM chapter. Large projects should create a preliminary hazard analysis report (PHAR) early in the life of the project that is developed further as the project proceeds to a final HA. For projects involving new or modified particle accelerators or modules thereof, the PHAR or HA constitutes the first stage of environment, safety, and health assessment that eventually becomes the Safety Assessment Document (SAD) (see FESHM 2010 below). PHARs correctly point to applicable FESHM and FRCM chapters as references to accepted Fermilab methodologies for hazard mitigation as appropriate.[1] For projects that are not related to particle accelerators, the HA process is reviewed and approved within the applicable Division or Section unless the Critical Decision (CD) process of DOE O413.3B applies.

4.2.4. FESHM 2010, Planning and Review of Accelerator Facilities and Operations

This chapter defines the formal review process to assure that accelerator facilities and their operations comply with Fermilab ES&H standards and with DOE O 420.2C, *Safety of Accelerator Facilities*. This process shall be applied to new accelerator projects or when significant modifications, including decommissioning, occur. The review of SAD's is conducted by the FESHCom Safety Assessment Document Review Subcommittee.

4.2.5. FRCM chapter 8, ALARA Management of Accelerator Radiation Shielding

Nearly all accelerator projects involve the production of ionizing radiation. This FRCM chapter sets forth the policies for the design of new facilities, major modifications to existing facilities and for preparing radiation shielding assessments. Shielding assessments are conducted by the FESHCom Shielding Assessment Review Subcommittee. The shielding assessment constitutes an important part of the accelerator SAD.

4.2.6. FESHM 6010, Fire Protection Program

This chapter describes the Fermilab Fire Protection Program and incorporates the requirements of DOE Order 420.1B. It is designed 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"). The program includes policies, requirements, codes, standards, guidelines, and interpretations. For facilities, the "code of record" (the code in effect at the time of design) is in effect for the life of the facility. The current code is applied only in the event of major renovation or if a significant hazard endangers the building occupants as determined by the ESHQ Fire Protection Engineer.

[1]FESHM 2010 will soon be being revised to incorporate the requirements DOE O420.2C. Thus, for accelerators, the PHAR mentioned can be written to concurrent fulfill the role of the Preliminary Safety Assessment Document (PSAD) discussed in older versions of FESHM 2010 that were based on predecessors to DOE O420.2C.

Additional internal building requirements are to be found in sections:

- 6020.4 Concepts of Egress
- 6040.1, Fire Construction Requirements-Fire Retardant Coatings
- 6040.2, Interior Finishes
  6040.3, Protection of Openings in Fire Rated Assemblies

4.2.7. FESHM 6020.3, Storage and Use of Flammable Gases

The use of flammable gases in physics experiments presents a unique type of installation, requiring special considerations. In many cases, mixing of gases is involved. Large volumes of gases may be present; thus even small leaks or ruptures of thin windows may cause incursions into the flammable concentration region with a large inventory to support fire. Some flammable gases may be stored in the liquid state, increasing the inventory in terms of mass. Electrical equipment is an integral part of such installations and can provide an ignition source if such a system is improperly designed, fabricated, or operated. The purpose of this chapter is to mitigate the hazards associated with storage and use of flammable gases.

This chapter applies to activities using flammable gases, both for approved experiments taking beam and in testing labs or shops at Fermilab. It excludes fuels; welding, burning or brazing gases and transportation of compressed gases addressed by other chapters. It also excludes liquid hydrogen targets and the area immediately around them, but does not exclude hydrogen storage or piping outside the tent or immediate vicinity of the target if there is no tent.

Compliance of all flammable gas system components with other relevant mandatory Fermilab ES&H Standards is required. If the amount of flammable gas stored at any single location exceeds 10,000 pounds, the requirements of OSHA part 1910.119, Process Safety Management of Highly Hazardous Chemicals, shall be followed.

4.2.8. FESHM 6013, Facility Incident Reporting Utility System (FIRUS)

The FIRUS computer network monitors and reports on the status of fire, security and utility sensors in laboratory buildings, experiments and systems. Internal diagnostic systems provide for constant monitoring and reporting of the system to key manned and unmanned operating stations. If sensor(s) are activated, disconnected or communications between the sensors, mini, console and front are disrupted, audible alerts are transmitted to selected manned consoles. As facilities mature, fire, security, utility and other devices will be connected to the network. For experiments this is a necessary part of the process to bring the experiment on-line. Monitoring of the experiment via FIRUS will be necessary especially if there are flammable gases involved or if there is other unique, high hazard conditions present or having the potential to exist.

5.0 REFERENCES

5.1 Fermilab Director's Policies

http://www.fnal.gov/directorate/Directors_Policy/policies.shtml