

FESHM 6015: HIGHLY PROTECTED RISK INSPECTION

Revision History

Author	Description of Change	Revision Date
J. Niehoff & J. Priest	Applied the FESHM Chapter formatting; Removed color photos within the chapter.	January 2013
W. James	Initial release of Chapter 6015	April 2010

TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	REFERENCES	1
3.0	DEFINITIONS	1
4.0	RESPONSIBILITIES	1
4.1	The Division/Section/Center (D/S/C) Heads	1
4.2	D/S/C Senior Safety Officers (DSO).....	2
4.3	The Building Manager.....	2
4.4	The ESH&Q Fire Protection Engineer (ESH&Q-FPE)	2
5.0	PROGRAM	2
5.1	Highly Protected Risk (HPR) Inspection	2
5.2	Scheduling of HRP Inspections.....	2
5.3	Conduct of Inspection	3
5.4	Reporting.....	3
5.5	Processing of the Inspection Report.....	3

TECHNICAL APPENDIX A: Highly Protected Risk (HPR) Report Example

1.0 INTRODUCTION

This program is to provide an inspection methodology of all FNAL facilities consistent with the best protected class of industrial risks (“Highly Protected Risk”) and a method by which the facility data and inspection results are recorded and retained.

2.0 REFERENCES

- Fermilab Environmental Safety & Health Manual (FESHM) Chapter 1010.1, ES&H Self-Assessment Program
- FESHM Chapter 6010, Fire Protection Program
- International Building Code (IBC), 2009 Edition
- International Fire Code (IFC), 2009 Edition
- National Fire Protection Association (NFPA) 1, Fire Code, 2009 Edition
- NFPA 101, Life Safety Code, 2009 Edition
- Fire Protection Handbook, Twentieth Edition
- Fermilab’s Facilities Engineering Services Section’s Design Guides
- Technical Appendix A: HPR Example Report

3.0 DEFINITIONS

- **Facility File** – The master historical/living document reflecting changes to a given facility.
- **Finding** - A violation of or non-conformance with a published standard. Published standards are FESHM chapters, the work smart standard set, and applicable DOE and executive orders.
- **Highly Protected Risk (HPR)** – a facility that is characterized by a level of fire protection of the best protected class of industrial risks.
- **Inspection Report** – A report in letter format of the items identified during the HPR inspection. Serves as the support document to iTrack entries. The document provides synopsis to the Division/Section/Center (D/S/C) Head of the HPR inspection and the entries placed into iTrack by the D/S/C requiring action on the part of the D/S/C.
- **iTrack**- Fermilab Issues Management Tracking System
- **Recommendation** - An opportunity for improvement of a work process or practice that does not rise to the level of a finding. May also be referred to as a Best Management Practice.

4.0 RESPONSIBILITIES

These responsibilities are supplement to the FESHM 6010, Section 4.0.

4.1 The Division/Section/Center (D/S/C) Heads

- Responsible for assuring that findings identified through the HPR Inspection process are addressed in a timely manner.

4.2 Division Safety Officers (DSO)

- Facilitating the conduct of HPR inspections
- Addressing the issues placed in iTrack.
- Only when required, updating the contents of the facility file and returning the report to ESH&Q within the allocated time period.

4.3 The Building Manager

- Responsible for carrying out the responsibilities assigned to him or her in FESHM 2050 as they may be required in the HPR inspection process.

4.4 The ESH&Q Fire Protection Engineer (ESH&Q-FPE)

- Developing and issuing a yearly schedule of buildings requiring an HPR inspection. Specific dates and times will be individually coordinated with the Division Safety Officer.
- During the course of the inspection providing possible solutions to findings for the D/S to consider, as appropriate.
- Drafting HPR Inspection report and providing to the Facility D/S/C Head DSO and ESH&Q representative a letter of the issues identified during the inspection.
- Enter the issues identified in the inspection into iTrack.

5.0 PROGRAM

The HPR program encompasses all aspects of fire protection at the Laboratory. The program includes inspection of fire prevention practices and procedures, quality construction, fire detection and suppression systems, verification of testing and maintenance of fire protection systems and equipment, and general review of processes and activities occurring within the building including basic housekeeping.

5.1 Highly Protected Risk (HPR) Inspection

- 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 ESH&Q-FPE oversees the inspection process and maintains the inspection schedule. HPR report format may be found in Technical Appendix A.

5.2 Scheduling of HRP Inspections

- Prior to the beginning of the new calendar year, the ESH&Q-FPE will identify all building schedule for inspection during the upcoming year. This list will include the date of the last

inspection to be used as a benchmark for scheduling purposes. Coordination with the D/S/C DSO will occur arranging the specific date and time of inspection for a facility

5.3 Conduct of Inspection

- On the date and time specified, the HPR inspectors will meet the D/S/C representatives. It is recommended that someone familiar with the building and its operation accompany the D/S/C representatives and the inspectors. If there is a previous HPR inspection on file, the document will be used by the inspectors to spot check previous findings and to record new items.
- During the inspection the HPR Inspectors will be accompanied by a D/S/C representative with or without a building representative. DOE-FSO may elect to accompany the inspectors for select buildings.
- Violation of life, health, safety orders, codes, or acceptable practices will be recorded by the inspection team. If the violation can be immediately corrected, then a comment on the correction will be annotated next to the finding.
- The HPR inspectors will use the previous HPR inspection report to spot-check earlier findings and their status.
- At the conclusion of the inspection, the HPR Inspector will debrief all parties as to items found during the inspection which will require attention.

5.4 Reporting

- The ESH&Q-FPE will include the addition of the findings and recommendations of the recent inspection to the Facilities File. Items will be annotated with the year of inspection followed by the sequence number of the item, (i.e. 06-01 inspection year 2006 and the first item recorded).
- Information about the building or a process which is no longer valid will be struck through and current information included. If a finding has been corrected, the date that it has been noted will be recorded and precede the finding.

5.5 Processing of the Inspection Report

- Within 48 hours of the date of the inspection, an Inspection Report will be electronically transmitted to the division/section DSO for action and to the D/S Head.
- This report will identify only the current finding, recommendations and if there are any open findings from the last inspection.
- D/S/C will be informed that the findings will be placed into iTrack and assigned to the DSO or D/S/C designee for processing.
- Division/section/center responses will be filed by CY under a separate cover from the final report. Working documents will be filed under a third separate cover. The Inspection Report will serve as the support document to any iTrack entries.

TECHNICAL APPENDIX**HPR REPORT****FERMI NATIONAL ACCELERATOR LABORATORY****FIRE SAFETY EVALUATION****FOR THE**

<BUILDING NAME>

FIMS No. _____**RPV \$XXX,XXX**

OWNER: _____ <Division/Section/Center>
NEXT SCHEDULED SURVEY: _____
LAST SURVEY DATE: _____
FREQUENCY OF INSPECTION: EVERY YEAR, EVERY FIVE YEARS
NEXT SCHEDULED MANAGEMENT UPDATE: _____
LAST MANAGEMENT UPDATE: _____
FREQUENCY OF UPDATE: _____

NOTES:

TABLE OF CONTENTS

1.0	PURPOSE
2.0	STANDARDS AND CODES
3.0	EVALUATION INPUT DATA
4.0	FACILITY DESCRIPTION
4.1	CONSTRUCTION
4.2	INTERIOR FINISH, FURNISHINGS AND DECORATIONS
4.3	OCCUPANCY CHARACTERISTICS
4.4	FACILITY CRITICALITY
4.5	FACILITY VALUE
4.6	MPFL AND MCFL
5.0	ALARM AND DETECTION SYSTEM DESCRIPTION
6.0	FIRE SUPPRESSION SYSTEM DESCRIPTION
6.1	EXTERIOR FEATURES
6.2	INTERIOR FEATURES
7.0	FIRE HAZARD DESCRIPTION AND EVALUATION
7.1	EXTERIOR HAZARD DESCRIPTION AND EVALUATION
7.2	INTERIOR HAZARD DESCRIPTION AND EVALUATION
8.0	LIFE SAFETY EVALUATION
8.1	OCCUPANCY SEPARATION
8.2	OCCUPANT LOAD
8.3	NUMBER AND ARRANGEMENT OF EXITS
8.4	EXIT CAPACITY
8.5	TRAVEL DISTANCE, DEAD ENDS AND COMMON PATH OF TRAVEL
8.6	EGRESS FIRE BARRIER EVALUATION
8.7	EXIT MARKING AND LIGHTING
8.8	EMERGENCY PLANNING
9.0	FINDINGS
	APPENDIX A FIRE SAFETY SURVEY SUMMARY

BUILDING NAME _____
FIMS No. _____
FIRE SAFETY EVALUATION

1.0 PURPOSE

The purpose of the evaluation was to assess the property to determine the degree of compliance with the applicable fire and life safety standards. The intent of this report is to outline the obvious deficiencies or deviations from the codes and standards.

2.0 STANDARDS AND CODES

At the time of the original inspection the applicable portions of the following documents were used to originally evaluate the facility:

- a. DOE 420.1X, Facility Safety
- b. DOE Standard 1066 Fire Protection
- c. The Facility's code of record, includes:
 - 1.) NFPA 101-1991
 - 2.) NFPA 101M-1988
 - 3.) Uniform Building Code, 1991 Edition
- d. Factory Mutual Loss Prevention Data Sheets. Data sheets available at Fermilab were used.

3.0 EVALUATION INPUT DATA**CURRENT SURVEY EVALUATION INPUT DATA**

CONTACTS: _____

SURVEY DATE: _____

EVALUATION BY: J. Priest, ESH Sr. Fire Protection Engineer

INPUT DOCUMENTS:

CURRENT MANAGEMENT SURVEY INPUT DATA

CONTACTS: _____

SURVEY DATE: _____

EVALUATION BY: J. Priest, ESH Sr. Fire Protection Engineer

ORIGINAL EVALUATION INPUT DATA

BUILDING LOCATION: _____

CONTACTS: _____

SURVEY DATE: _____

EVALUATION BY: _____

INPUT DOCUMENTS: _____

4.0 FACILITY DESCRIPTION

4.1 CONSTRUCTION

The building is (1) one story and 12 feet high. Its gross floor area is 3000 sq. ft. (50 ft x 50 ft).

The general building construction type is Type II (000), as defined by NFPA 220 (2006) and IIB as defined by the IBC. The structural framing consists of steel columns and beams. These columns and beams are unprotected.

The roof consists of a metal deck supported by steel supported by unprotected steel beams. Exterior walls are concrete block units with metal cladding for weather protection.

4.2 INTERIOR FINISH, FURNISHINGS AND DECORATIONS

Interior walls are finished with paint. Ceilings are primarily metal deck. Floors are painted concrete. No furnishings or decorations are installed.

4.3 OCCUPANCY CHARACTERISTICS

This building contains equipment that circulates cooling water for high voltage equipment, provides power supply equipment for tunnel magnets, and has a cut off control room for electronic controls on tunnel magnets. The control room is air conditioned to keep equipment cool. This facility is classified as an Ordinary Hazard Industrial (Special Purpose) Occupancy per the NFPA 101 and IBC Use Group F.2.

The building is normally unoccupied and locked. Only occasional maintenance takes place for one (1) to two (2) hours per week by one (1) person.

4.4 FACILITY CRITICALITY

Loss of this operation would have an immediate impact on the operation of the accelerator ring. The equipment used in this operation is not totally unique to Fermilab, but will take approximately three (3) to four (4) months to fabricate and put back into operation. There is not another facility at Fermilab or off-site that could perform this function until the lost equipment is put back into operation.

4.5 FACILITY VALUE

The replacement value of the entire building is estimated to be \$94,080. The cost to replace all contents is estimated to be \$336,110. The high value equipment is distributed throughout the facility. The total facility is estimated to be valued at \$430,190.

4.6 MPFL AND MCFL

MAXIMUM POSSIBLE FIRE LOSS (MPFL). There are four (4) fire areas within this facility. Based on the fact that there is no automatic fire suppression system installed and assuming the failure of manual fire fighting efforts, the MPFL and MCFL are both \$344,250. This assumes a twenty percent salvage value.

These values were obtained from Section 4.5 of this report.

5.0 ALARM AND DETECTION SYSTEM DESCRIPTION

A fire alarm system is provided for the building. The fire alarm actuating devices consist of the following:

1. A manual pull station located at the exit.
2. A smoke detector in ceiling of the main room.

The first alarm indicating devices consist of horns and strobes.

The first alarm system is arranged so that when any one of the alarm actuating devices are initiated, the indicating devices will automatically actuate throughout the building. An alarm signal will also be sent to the site fire department via FIRUS.

6.0 FIRE SUPPRESSION SYSTEM DESCRIPTION

6.1 EXTERIOR FEATURES

One (1) hydrant is provided so that hose lays from hydrants to all exterior and interior portions of the unprotected building are no more than 300 feet.

6.2 INTERIOR FEATURES

Portable dry chemical hand extinguishers are provided. No sprinklers or standpipes are provided.

7.0 HAZARD DESCRIPTION AND EVALUATION

7.1 EXTERIOR HAZARDS DESCRIPTION AND EVALUATION

7.1.1 EXTERIOR HAZARD DESCRIPTION. Fire hazards exposing the building are as follows:

North: Non-PCB oil-filled transformer exposures within approximately 15' of the building. Transformers are on concrete pads.

South: Open.

East: Open to roadway and APO and berm beyond.

West: ICW pond.

7.1.2 EXTERIOR HAZARD EVALUATION.

Fire exposures meet the requirements of NFPA 80 A.

There are means provided to contain a transformer PCB oil (less than 50 ppm) spill, including water from firefighting operations resulting from a fire involving these materials.

Fire department access to the facility is adequate.

Exterior housekeeping is adequate.

7.2 INTERIOR HAZARDS DESCRIPTION AND EVALUATION

7.2.1 INTERIOR HAZARDS DESCRIPTION. The primary fire hazard within the building is an electrical fire involving high voltage equipment; open cable trays; high voltage switch gear; and computer and electronic control equipment.

There are two oil bath resistance tanks (approximately 15 gallons each). The flash point of the oil is in excess of 300°F.

7.2.2 INTERIOR HAZARD EVALUATION. Using the building construction type and fire hazard characteristics described above, the existing active and passive fire protection systems were assessed to determine the degree of compliance with the applicable codes and standards.

Given below are the identified code deficiencies. Appendix A lists the fire protection features that were found to be in compliance with the applicable codes and standards.

8.0 LIFE SAFETY EVALUATION

8.1 OCCUPANCY SEPARATION

This facility has one (1) separate and distinct occupancy.

8.2 OCCUPANT LOAD

Given below are the NFPA 101 and IBC occupancy loadings.

<u>Occupant Occupancy</u>	<u>Load Factor</u>	<u>Floor Area</u>	<u>Occupant Load</u>
NFPA 101: Industrial Bldg. (Special Purpose)	300	3000	10
IBC: Accessory & Equipment Storage Area	300	3000	10

Based on the occupant loading values discussed on Section 4.3, the actual occupant loading within this facility is less than the loading required by the NFPA 101 and the IBC.

8.3 NUMBER AND ARRANGEMENT OF EXITS

Given below are the minimum required NFPA 101 and IBC exits and available within the building.

<u>NFPA 101 EXITS</u>	<u>IBC EXITS</u>	<u>AVAILABLE EXITS</u>
1 Section 40.2.4.1.2	4 Section 1013.2	4

The exits are within 100 feet of any point within the building and do not pass through any intervening storage areas, therefore, they are acceptable.

8.4 EXIT CAPACITY

The building exit capacity is adequate. In addition, the minimum clear width of the exit access is acceptable (IBC 1008.1.1 requires at least 32 inches and NFPA 101, Section 7.2.1.2.4 requires at least 28 inches for existing buildings). Exit access route was free of obstruction. The one exit discharges to a public way free of obstruction.

8.5 TRAVEL DISTANCE, COMMON PATH OF TRAVEL AND DEAD ENDS

8.5.1 TRAVEL DISTANCE (TD). Given below are the travel distance NFPA 101 and IBC travel distance requirements for an unsprinklered building and the actual maximum travel distances within the building.

<u>NFPA 101 TD</u>	<u>IBC TD</u>	<u>ACTUAL MAX. TD</u>
400'	400'	50'

Based on the above, the travel distances are within the required limitations.

8.5.2 DEAD ENDS (DE). The dead end requirements stem from NFPA 101 only. Section A.7.6 requires that the DE be no more than 50 feet. The maximum dead end is 50 feet. It is located in the Power Supply Room. The configuration is acceptable.

8.5.3 COMMON PATH OF TRAVEL (CPOT). The common CPOT requirements stem from NFPA 101 only. Section A.7.6 requires a maximum 100 foot CPOT. This requirement has been met. (See Section 8.3)

All common paths meet the above requirements.

8.6 EGRESS FIRE BARRIER EVALUATION

No egress fire barriers are required.

8.7 EXIT MARKING AND LIGHTING

The means of egress is adequately marked to direct occupants to a place of safety. Emergency lighting is provided to illuminate the exit signs if normal lighting is lost.

The means of egress is provided with adequate illumination under normal conditions while the building is occupied. Sufficient emergency lighting is provided to illuminate the means of egress.

8.8 EMERGENCY PLANNING

All fire alarms are transmitted to the on-site fire department. The fire department responds to all fire related alarms. Building occupants are instructed to exit the building immediately upon hearing a fire alarm.

9.0 FINDINGS

- PENDING Vacscan device on platform leading to enclosure is powered by a long extension cord. An electrical outlet should be brought to the device. 04/2006: Installation of new outlet assigned to AD Electrical Coordinator.
- PENDING Hazard Maps for the above locations are dated 2002, these maps should be reviewed, updated and re-printed for posting and distribution. 04/2006: All Main Injector Haz Maps will be reviewed by AD/ESH and new/corrected maps developed with ESH&Q Section.

FIRE SAFETY SURVEY SUMMARY
FIMS No. BUILDING: #_____**CONSTRUCTION**

1. Construction classification (NFPA 101/IBC): Industrial (Special Purpose) - II (000) / IBC - Type IIB NFPA101
2. Height/Area: 12' / 3000 sq. ft.
3. Occupied levels above exit discharge: None
4. Occupied levels below exit discharge: None
5. Exterior walls: Concrete block
6. Ground floor: Concrete
7. Floor/ceiling assemblies: Unprotected steel beams and columns
8. Roof: Flat metal deck
9. Occupancy separation fire barriers: None (Non-rated HCB walls between main room and control room with 3 exits to main room.)
10. Area separation fire barriers: None
11. Vertical compartmentation: None
12. Horizontal compartmentation: None
13. Interior Finish: Paint on walls

OCCUPANCY

1. Operations conducted: Power supply for tunnel magnets and control system.
2. Occupancy classifications (NFPA 101/IBC): Industrial (Special Purpose) / Use Group F.2.
3. Classification of hazard of contents: Ordinary
4. Occupant load: Normally zero. Building usually locked and unoccupied.

5. Hazardous areas: None

RISK LEVEL

1. Facility criticality: Loss of building could shut ring operations for two (2) to four (4) months.
2. Facility value: \$430,190
3. MPFL/MCFL: \$344,250/\$344,250

EXITING

1. Required exits/available exits: 4/4
2. Exit capacity: Adequate
3. Travel distance: Adequate
4. Dead end conditions: Adequate
5. Common path of travel conditions: Adequate
6. Egress compartmentation: None
7. Exit marking: Adequate
8. Normal and emergency lighting: Adequate

FIRE PROTECTION

1. Fire hydrants: Acceptable
2. Fire Department Connection: None
3. Water supply lead in valve: None
4. Fire Department access: Adequate
5. Fire alarm system: Adequate
6. Fire detection system: Requires Further Evaluation

7. Fire extinguishers: Adequate
8. Standpipe/hose stations: None
9. Automatic sprinklers: Inadequate
10. Special hazards systems: None
11. Smoke control system: None

EXTERIOR FIRE HAZARDS

1. Exposures: Adequate
2. Housekeeping: Adequate
3. Hazardous liquid run off control: Inadequate

INTERIOR FIRE HAZARDS

1. Primary hazard: Electrical - wiring, high voltage, computer control system.
2. Utilities

Electrical systems: See (1) above
and lighting: Adequate - Ordinary Classification

HVAC: On roof - Also electric space heaters (2) in building, air conditioned control room.

Water: None

3. Material handling systems: None
4. Housekeeping: Adequate
5. Furnishings and decorations: None