

Memorandum

December 27, 2006

To: Bruce Chrisman
From: William Griffing *W. Griffing*
Subject: New FESHM Chapter 7050 – Rules for Demolition

Enclosed you will find FESHM Chapter 7050, Rules for Demolition. This is a new chapter that describes the Lab's expectations when planning work that involves demolition. It was developed as the result of a lessons learned at the SiDet Facility in which energized electrical utilities were cut during demolition. It has been reviewed by the Subcontractor Safety Subcommittee as well as site-wide. All comments have been addressed.

After final approval, please return this approval page to Elizabeth May at MS119 for posting on the web.

Encl.

Recommended for Approval:

Bruce Chrisman

1/2/07
Date**Approved:**

Piermaria Oddone

1/09/07
Date

RULES FOR DEMOLITION

PURPOSE

Safeguarding our workers, adjacent properties, and utilities is a continuous process that begins in project planning and design phase and runs through documentation of as-built conditions. This chapter establishes a process to be followed by all divisions and sections when confronted with demolition as a phase of work. Demolition activities can range from dismantling a building, to remodeling an area within a building, to removing an experimental structure.

It is the intent of this chapter to provide guidance regarding actions needed for any demolition activity when operating under FESHM 7010 ES&H Program for Construction – Fixed Price, FESHM 7011 ES&H Program for Construction – Time & Materials Activities (other than fixed price), FESHM 7020 Subcontractor Safety - Other Than Construction or FESHM 2060 Hazard Analysis for Fermilab Employees. This chapter is not a primer on how to do demolition safely. Standards to follow when performing demolition can be found in the Code of Federal Regulations 29 CFR 1926 Subpart T.

Appendix A is a flow chart that can be used as a guide when planning demolition work.

POLICY

It is recognized that demolition projects can consist of multiple work tasks that can be hazardous in nature. Premature structure collapse, utility location and hazardous materials are some of the most important elements to be considered during the design phase of all proposed work that involves demolition. It is also recognized that a demolition project can be as complex as the wrecking of a multiple story building or as straight forward as the remodeling of an office. To properly plan a demolition activity, an engineering survey must be performed to provide the persons responsible for the demolition the opportunity to evaluate the job in its entirety. The scope of the engineering survey will depend on the nature of the demolition project. There must be written evidence an engineering survey has been performed. Depending on the nature of the demolition project, written evidence can vary from contract drawings and technical specifications to a job hazard analysis.

All electric, gas, water, steam, sewer, and other services lines shall be shut off, capped, or otherwise controlled, at or outside the building or demolition area before work is started. All workers shall be informed of the location of any existing or relocated utilities. If it is necessary to maintain any power, water, or other utilities during

demolition, such lines shall be temporarily relocated as necessary and/or protected. The location of all overhead power sources shall also be determined, as they can prove especially hazardous during any machine demolition.

Procurement documents will clearly spell out Fermilab's expectations and requirements regarding demolition activities. Consideration will be given to selection of subcontractors based in part on qualifications to safely perform demolition work.

DEFINITIONS

Demolition – The dismantling, razing, or wrecking of any fixed building or structure or any part thereof. Accordingly, demolition applies not only to dismantling, razing or wrecking activities, but to activities involving rehabilitation or remodeling including those where no removal of load supporting structural members takes place.

Decontamination and Decommissioning File (D&D File) - The D&D File is a permanent file maintained by the ESH Section identifying the location and nature of contamination in all structures and underground enclosures. See FESHM Chapter 8070.

Competent Person- One who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Construction Coordinator (CC)- A person specifically assigned to oversee the work of a fixed-price construction subcontract for conformance to the subcontract documents. Construction Coordinators are primarily furnished by the FESS Engineering Group, which is at times supported by outside A/E personnel under FESS direction.

Project Engineer/Project Coordinator – A person assigned the responsibility for assembly of complete design documents for the purpose of bidding and/or construction.

Task Manager (TM) - A division/section-designated individual specifically assigned to oversee and direct a work activity. Usually this term applies to individuals directing Time & Material (T&M) subcontractors.

Landlord - The division/section responsible for the space.

DUTIES AND RESPONSIBILITIES

In addition to the duties and responsibilities listed in FESHM Chapters 7010, 7011, and 7020 the following are duties and responsibilities specific to this chapter.

The Project Engineer/Coordinator (FESHM 7010) is responsible for:

- Coordinate completion of the engineering survey
- Coordinate identification of existing utilities
- Coordinate identification of waste reduction-FESHM Chapter 8022
- Incorporate the engineering survey into the design drawings
- Incorporated utility information into the design drawings
- Modify the design as appropriate to prevent premature collapse and utility damage
- Incorporate subcontractor requirements into the contract documents

Task Manager (FESHM 7011)

- Coordinate completion of the engineering survey
- Coordinate identification of existing utilities
- Coordinate identification of waste reduction-FESHM Chapter 8022
- Incorporate the engineering survey into the design drawings
- Incorporate utility information into the design drawings/job planning documents
- Modify the design as appropriate to prevent premature collapse and utility damage

D/S Landlord

- Using the D&D File and any other means necessary, determine any contamination and hazardous materials in the structure to be demolished.

PROCEDURES

Design Phase

To ensure that environmental impacts of proposed actions are considered early in the decision-making process, Fermilab shall conduct necessary NEPA reviews in the initial phase of the activity planning process. Refer to FESHM Chapter 8060.

This chapter requires that an engineering survey of the structure be conducted by a competent person. The purpose of the survey is to determine the condition of the framing, floors, and walls so that measures can be taken, if necessary, to prevent the premature collapse of any portion of the structure. When indicated as advisable, any adjacent structure(s) should also be similarly checked. Appendix B - Demolition Engineering Survey Checklist can be used as a guideline when a survey is performed.

Utility location is one of the most important elements of the pre-job planning. All electric, gas, water, steam, sewer, and other services lines should be shut off, capped, or otherwise controlled, at or outside the building before demolition work is started. If it is necessary to maintain any power, water, or other utilities during demolition, such lines shall be temporarily relocated as necessary and/or protected. The location of all

overhead power sources should also be determined, as they can prove especially hazardous during any machine demolition.

The design team will use all reasonable means of identifying existing utilities:

- Existing utility maps
- Previous design and as-built documents
- JULIE locating of utilities
- On site physical review
- Corporate knowledge

The design team will incorporate all known utility information into design and construction drawings.

The landlord is responsible for determining whether radiological contaminated material, asbestos, lead, or any other hazardous materials, chemicals, or gases are present at the site to be demolished. The landlord shall review the Decontamination and Commissioning File (D&D File) of the structure, building or site to identify any known contaminants. When the presence of any such substance is apparent or suspected, testing and removal or purging shall be performed and the hazard eliminated prior to demolition.

The design team will follow FESHM Chapter 8022 Waste Minimization and Pollution Prevention Awareness Program to identify any demolition material that can be recycled, reused, or reduced. Disposal of demolition debris must be compliance with FESHM Chapters 8021 and 8023, as applicable. Debris shall not be disposed on site unless specifically authorized in the contract documents and approved by the D/S Environmental Officer in consultation with the ES&H Section.

Depending on the nature of the demolition project, contract documents may include the following:

- Identify appropriate qualifications for subcontractors on projects regarding demolition activities. These will include past safety performance indicators along with minimal qualifications for the site superintendent as outlined in FESHM 7010 and 7011.
- Clearly define the subcontractor's responsibility to protect and/or support adjacent structures and utilities during demolition activities.
- Preparatory meetings before the start of each new phase of demolition activities.

Procurement Phase

Depending on the nature of the demolition project, the following may be required:

- A pre-bid meeting including discussion of requirements for demolition.

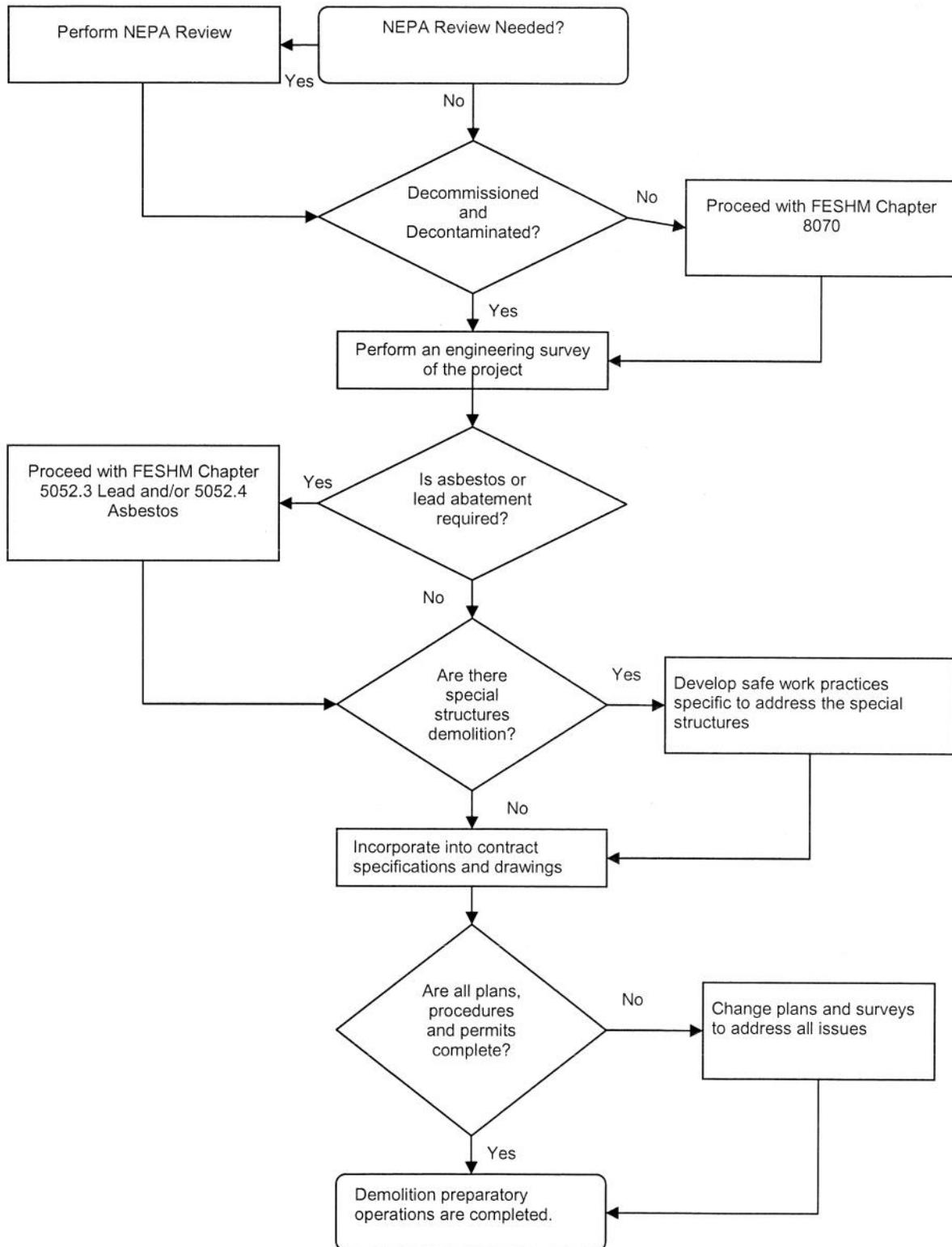
- Safety qualifications and qualifications of site superintendent if/as required in Exhibit A will be considered in the subcontractor selection.
- Pre-construction meetings including discussion of requirements for demolition activities.
- A demolition plan from the subcontractor including the means and method of demolition, site security from unauthorized access, and an emergency plan addressing fires, cave-ins, and evacuation procedures.

Construction Phase

Demolition Activities

- The TM/CC is to attend and take pro-active role in preparatory meeting with subcontractor superintendent and competent person prior to the beginning of any demolition activity. Suggested agenda items include:
 - Review permits, HA, LOTO, disablements
 - Review shop drawings, materials on hand
 - Discuss routing of existing utilities / interferences
 - Confirm extent of demolition
 - Establish stop points (inspections)
 - Establish schedule for any further meetings
- All electric, gas, water, steam, sewer, and other services lines should be shut off, capped, and LOTO procedures implemented at or outside the building before demolition work is started. The subcontractor must verify with the TM/CC that all utilities have been abandoned and or LOTO procedures are in place.
- When utilities and other services in the area of the demolition cannot be de-energized or depressurized, the following procedures apply:
 - A special preparatory meeting must be held to review the known utility information, discuss the means and methods to be utilized, identify associated hazards, and develop an HA. Meeting attendees will include:
 - TM/CC
 - Superintendent
 - Competent Person
 - Subcontractor safety representative
 - ESH
- TM/CC presence is strongly recommended at the demolition site when:
 - Demolition activity first begins or enters a new phase.
 - Demolition activities are near energized electrical cable.
 - Demolition activities are near existing structures.

DEMOLITION FLOW CHART



DEMOLITION ENGINEERING SURVEY CHECKLIST

PROJECT INFORMATION

Project Name	
Project Location	
Contractor Name	

DESCRIPTION OF STRUCTURE TO BE REMOVED

Location of Work on Project		
Name of Structure		
Date of Original Construction		
Original Function		
Work to be Performed		
Structural Frame Material		
Foundation Material		
Wall Materials		
Floor Materials/ Floor Loading Design – psf		
Equipment to be Deployed on Floors		
Length of Structure		
Width of Structure		
Height of Structure	Maximum =	Average =
Depth of Basement		
Stacks or Chimneys	YES	NO
Tanks or Vessels	YES	NO
Underground Tanks	YES	NO
Electrical Towers	YES	NO

SCOPE OF WORK

Roof Describe construction & materials	
Structural Frame Describe construction & materials	

Foundation Describe construction & materials	
Floors Describe construction & materials	
Basement Excavation Describe construction & materials	
Stacks or Chimneys Describe construction & materials	
Elevated Water Tanks Describe construction & materials & location	
Combustible Materials Describe construction & materials & location	
Tanks and Vessels Describe construction & materials & location	
Underground Tanks Describe construction & materials & location	
Transformers Describe construction & materials & location	
Electrical Towers Describe construction & materials & location	
Utility Disconnection / Relocation Describe utilities & action to be taken	
Other Significant Items Describe construction & materials & location	
Other Significant Items Describe construction & materials & location	
Other Significant Items Describe construction & materials & location	

METHODS TO BE IMPLEMENTED

Sequence for Environmental Remediation

1st Area Type and remediation methods	
2nd Area Type and remediation methods	
3rd Area Type and remediation methods	

4th Area Type and remediation methods	
5th Area Type and remediation methods	
6th Area Type and remediation methods	

Sequence for Structural Removal

1st Structure Type and removal methods	
2nd Structure Type and removal methods	
3rd Structure Type and removal methods	
4th Structure Type and removal methods	
5th Structure Type and removal methods	
6th Structure Type and removal methods	

KNOWN STRUCTURAL HAZARDS

Known Physical Damage	
Known Structural Failures	
Structural Alterations	
Fire Damage	
Unusual Structural Conditions	
Pre-stressed Concrete Locations	
Post Tensioned Concrete w/o Grouted Tendons	
Post Tensioned Concrete w/ Grouted Tendons	

STRUCTURES TO BE PRESERVED (Describe structure, conditions and location)

Stacks and Chimneys	
Aerial Electrical Systems	
Electrical Conduits	
Transformers	
Underground Electrical Ducts	
Manholes	

Underground Vaults	
Underground Piping	
Underground Storage Tank	
Adjacent Structures	
Combustible Materials	
Oxygen Lines	
Natural Gas Lines	
Water Lines	
Telephone / Communication Lines	
Other Utilities	
Utilities to be Maintained Until Completion of Removal Work	

TEMPORARY STRUCTURAL MEASURES

Soil Retention Required	
Planned Measures to Prevent Failure	
Planned Shoring of Floors and Roof	
Planned Shoring or Bracing of Walls	

HAZARDOUS CONDITIONS

Combustible Materials	YES	NO	
Location			
Explosion Hazards	YES	NO	
Location			
Toxic Substances	YES	NO	
Location			
Radioactive Materials	YES	NO	
Location			
Oxygen Deficiency	YES	NO	
Location			
Toxic or Explosive Gases	YES	NO	
Location			
Lead Exposures	YES	NO	
Location			
Silica Exposures	YES	NO	
Location			
Asbestos Exposures	YES	NO	
Location			
Wall / Floor Openings	YES	NO	
Location			

Fall Hazards Created	YES	NO	
Location			
Process Piping & Tanks	YES	NO	
Location			
Energized Electrical Equip.	YES	NO	
Location			
Excavation & Trenches	YES	NO	
Location			
Confined Spaces	YES	NO	
Location			

Form Completed By:	Date:
Signature:	
Department:	Ext: Email: