

## FESHM 7040: CONCRETE CUTTING AND CORING ACTIVITIES

### Revision History

<b>Author</b>	<b>Description of Change</b>	<b>Revision Date</b>
Jim Niehoff	<ul style="list-style-type: none"><li>• Applied FESHM Chapter formatting template</li><li>• Revised electrical FESHM chapters.</li></ul>	January 2015
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## 1.0 INTRODUCTION

The necessity to cut or core into the concrete of an existing structure always presents the possibility of interrupting buried utilities. Such utilities are sometimes in the form of embedded electrical service, pressurized piping, water piping and drain piping. Interruption of such utilities can present hazards to the personnel performing the cutting or coring activity as well as disruption of normal business and scientific activities. For these reasons, various measures are employed to determine the paths of these buried utilities. In practice and despite best efforts, these measures often fail to accurately locate embedded utilities. Given the difficulty of accurately locating embedded utilities, there is a general presumption at the Laboratory that such utilities can be intercepted during a concrete cutting or coring activity.

Consequently, additional steps are always taken to ensure the safety of the worker from the unexpected release of energy. These and other hazards associated with concrete cutting and coring activities (e.g. silica exposure) will be dealt with as a distinct phase of work in the hazard analysis from written for the job.

## 2.0 REFERENCES

- FESHM 7010 ES&H Program for Construction
- FESHM 7020 Subcontractor Safety Other Than Construction
- FESHM 7030 Excavation
- FESHM 9120 AC Electrical Power Distribution Safety
- 29 CFR 1926 – Safety and Health Regulations for Construction
- NFPA-70E (2009) - Standard for Electrical Safety in the Workplace
- 10 CFR Part 851 - Worker Safety and Health Program

## 3.0 DEFINITIONS

- **Building Manager** - A 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. Depending on the specific building, a division/section may designate the area directly adjacent to the building, including parking areas, outside storage, outside equipment, etc., as the responsibility of the building manager.
- **Construction Coordinator (CC)** - A person specifically assigned to oversee the work of a construction subcontract for conformance to the subcontract agreements/documents. Construction Coordinators serve as the primary construction point of contact between the Subcontractor and the Laboratory.
- **Electrical Coordinator** – A Division/Section designated individual who is competent and knowledgeable in the electrical circuitry and electrical equipment of the conventional AC Power Distribution System in the area of jurisdiction. See FESHM 9120 for more detail.

- **FERMI-JULIE** – The one-call system established at Fermilab to act on requests for locating buried utilities. The FERMI-JULIE office can be reached by phone at extension 5000. See FESHM 7030 for more detail.
- **FERMI-JULIE Coordinator** – The Fermilab employee assigned duties, under both Chapter 7030 and this Chapter, to coordinate locates of buried utilities and process excavation permits.
- **Task Manager (TM) or Construction Coordinator (CC)** – A division/section/center-designated individual specifically assigned to oversee and direct a work activity. The Task Manager has primary responsibility for developing hazard assessments for the work, as prescribed in FESHM 2060 – Work Planning and Hazard Analysis. An approved TM list indicating individual experience and competency to direct specific work activities can be found at: <https://esh-docdb.fnal.gov:440/cgi-bin/ShowDocument?docid=75>

## 4.0 RESPONSIBILITIES

### 4.1 Task Managers/Construction Coordinators Overseeing Concrete Cutting or Coring Activities is responsible for:

- Contacting FERMI-JULIE prior to cutting or coring
- Overseeing the actual locating activity
- Preparing or assuring that an Electrical Hazard Analysis (HA) / Work Permit is prepared and approved by the area D/S/C Electrical Coordinator (ref. FESHM 9120). This Permit may serve as the single HA for the job activity if it addresses all known job hazards. Alternatively, this Permit may be in addition to a separately prepared HA.
- Confirming that all known electrical circuits through the cutting/coring area are de-energized.
- Confirming that hazard mitigation steps and safe work practices identified in the associated HA(s) are followed

### 4.2 FERMI-JULIE Coordinator is responsible for:

- Arranging for the services of a commercial locating service unless otherwise requested by the requesting Division/Section
- Assisting the TM, CC or other Fermilab employee overseeing the coring/cutting work with any drawings that identify area utilities.

## 5.0 PROCEDURE

- There may be times when it is known with certainty that an area, where concrete cutting or coring is being considered, is free of embedded utilities. This certainty may have been reached by various means including corporate knowledge of construction of the facility, review of as built drawings or other means. In these special cases, the FERMI-JULIE Coordinator is not required to arrange a locate. It is sufficient for the TM or CC to confirm

in writing see Technical Appendix in Section 6.0 that such area is devoid of embedded utilities. This certification shall be attached to the general hazard analysis and may take the form of a memo to the record or some other manner suitable to the governing D/S/C. This certification must then be signed by the Task Manager, Building or Area Manager, and the area Electrical Coordinator as a minimum. Other signatures may be required at the discretion of Division/Section/Center management. This certification cannot be executed if the area in question is within 50 feet of a beamline or beamline enclosure.

- When it is not known with certainty that an area is free of embedded utilities, FERMI-JULIE shall be contacted to secure the services of a commercial locating service that will locate all embedded utilities in the area. At the discretion of the Division/Section, trained Fermilab employees may perform locates if proficient in the use of the locating equipment and the interpretation of the data.
- For all cases except as noted in Procedure Step 1 above, the Electrical Hazard Analysis / Work Permit will be prepared in accordance with FESHM 9120. It allows for an additional level of review and approval by the area D/S/C Electrical Coordinator, especially regarding potential electrical hazards. The Electrical Coordinator may also be able to assist in the practical location and identification of embedded electrical utilities in the area of work activity by physically examining the area
- The Electrical HA / Work Permit must assume that an energized circuit will be cut and therefore include shock and electrocution as an associated hazard of the work activity. The Permit shall include a listing of all circuits that must be switched off and/or locked out before cutting begins. An arc flash hazard is generally not encountered for most drilling and coring activities, but may exist in selected locations having embedded utilities of higher ampacity or voltage than routinely encountered.
- The cutting/coring equipment must be adequately grounded and have 120 VAC power supplied through a Ground Fault Circuit Interrupter (GFCI), even if double insulated. Because the tool chuck and bit are not always grounded, the tool operator shall wear rated rubber insulating gloves while working to provide additional protection against voltage step potential at the tool. If there is a credible arc flash hazard, the worker must be protected by suitable Personal Protective Equipment (PPE) as required by NFPA 70E. Also see FESHM Chapter 9120 for additional detail.
- All individuals involved in the work activity shall receive a job briefing, understand the scope of work, and understand the associated hazards and mitigation requirements. They shall also sign off on all HAs prepared for the work activity.
- All known electrical circuits or other utilities (process piping, natural gas, domestic water, sewer, etc.) running through the coring/cutting area will be de-energized or isolated unless they have been positively located and have a clearance twelve inches or more from the cutting/coring activity.
- Every effort will be made to plan the work during times when de-energizing circuits or turning off utilities will cause the least disruption to operations.
- After the cutting or coring activity, the cut or bore area should be visually examined to determine whether or not utilities have been intercepted. If there was an intrusion event

involving hazardous energy, the energy source shall be isolated and made safe as soon as possible.

- If previously unknown utilities were identified or discovered in the process of the locating or coring/cutting activities, both the FERMI-JULIE Coordinator and the area Electrical Coordinator shall be provided with this information to facilitate updating of drawings.
- Excavation under or beyond concrete being cut or cored also requires an excavation permit that meets the requirements of FESHM 7030.

## 6.0 TECHNICAL APPENDIX

To: *Name*, FERMI-JULIE Coordinator  
From: *Your Name*  
Subject: SAMPLE - Coring Activities in Wilson Hall 9 NE

Scope of Work: The subcontractor, ABC Construction, will be providing anchors, approximately 1-inch in depth into the concrete slab at Wilson Hall, Northeast corner of the 9th floor adjacent to the East elevators, to support a new metal stud and drywall partition.

Corporate knowledge of site utilities: Similar work has been performed at this site since the 1970s. The only embedded electrical raceways are located in the vertical concrete columns. There is however, post tension cabling located in this area that will not be affected. This is based upon “As-Built” information and the previous use of the Hilti Scanner Model FS10.

This area is well understood and has been reviewed by Facilities Engineering Services Section - Engineering and therefore; this activity will proceed and satisfies the requirements set forth by FESHM Chapter 7040.

Utilities (Electrical – Optional)

\_\_\_\_\_  
(Utility Locate Service).

Reviewed By:

\_\_\_\_\_  
(Optional) Project Manager or Other

\_\_\_\_\_  
(Building Manager)

\_\_\_\_\_  
(D/S/C Senior Safety Officer)

\_\_\_\_\_  
(Electrical Coordinator)

cc: Reviewers  
Project File