



Emergency Fire	
SOP Number:	125.03
Date:	11-May-2020

## Emergency Fire

### 1. Introduction

- 1.1 Research involving Magnetic Resonance Imaging (MRI) at high magnetic field strengths presents unique hazards to both research subjects and individuals working within and around the MRI system. Consequently, the potential for serious personal injury is present due to the sheer magnitude and strength of the static magnetic field along with the immense flexibility of the research system and associated peripheral hardware.
- 1.2 Due to the inherent hazards associated with the static magnetic field, access to CFMM is restricted to ensure the safety of all patients, subjects, visitors, and staff. The CFMM is conceptually divided into four MRI Zones of increasing level of potential risk and access restriction.
- 1.3 The static magnetic field in the CFMM MRI areas is always present. It is essential that everyone entering the facility is aware of the presence of the magnetic field, and that dangerous and potentially lethal levels of electricity are used by the MRI systems.
- 1.4 Dangerous and potentially lethal levels of electricity are used by the MRI systems. Therefore, it is important that all individuals working around the MRI systems be aware of the dangers and understand the safety issues concerning electricity. Current-carrying cables, connections, and junction points in the vicinity of the main magnetic field are particularly susceptible to damage due to the extreme Lorentz forces created through the normal operation of the system.
- 1.5 Periodically, the effects of prolonged mechanical fatigue may result in breakage, thereby causing electrical arcing, sparking, and high heat levels before the system can shut down. In these instances there is a high potential for personal injury as well as the possibility of a **fire** being ignited.

### 2. Signs of a Potential Fire

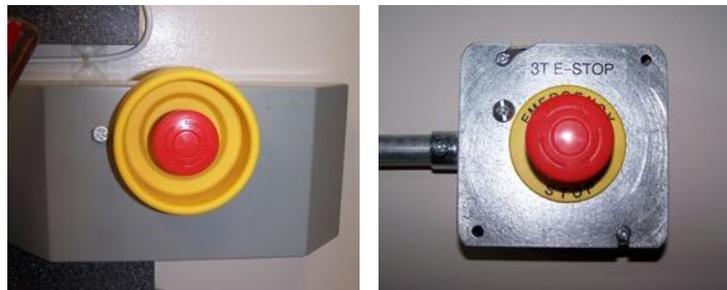
- 2.1 Signs of a potential fire are often present before the fire ignites. Level 1 and 2 MRI Personnel need to be aware of these signs to prevent injury to themselves as well as patients, volunteers, and other personnel working in the MRI Facility.
  - 2.1.1 The first sign of a potential fire is often an irregular noise, e.g. a loud popping sound or a sudden stop of the gradients. It is imperative that the operator determines the cause of the irregular noise before continuing with the scan session.
  - 2.1.2 The second sign of a potential fire is often the detection of subtle odour.
  - 2.1.3 The third sign of potential fire is small amounts of smoke. The scanners are equipped with an early smoke detection system within the bore and on the RF penetration panel which will automatically halt scanning and shut down the MRI system(s). There may not be enough smoke to set off the building smoke detector, so it is important to always be aware of the possibility of the presence of smoke anywhere in the MRI Zone III (equipment) and IV (magnet) rooms.
  - 2.1.4 The last sign is the smoke detector going off and the building fire alarm sounding.



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### 3. **Emergency Fire Procedure**

- 3.1 Upon observing any signs of a potential fire as described in Section 2.1 and a fire is now suspected use common sense and stay calm! Ensure your own safety and of those within the MRI areas.
- 3.2 Abort the current scan immediately (if applicable).
- 3.3 For the 3T/7T MRI area, shut off the electrical power to the magnet and equipment room by hitting one of the system electrical shutdown buttons (this will NOT quench the magnet). These buttons are red, surrounded by yellow. The electrical shutdown buttons for the 3T/7T MRI are located:
  - 3.3.1 On the walls beside the operator consoles.
  - 3.3.2 In the equipment rooms, as you enter the door.
  - 3.3.3 Inside the magnet rooms, right inside the doors.



*Electrical Shutdown Buttons*

- 3.4 For the 9.4T MRI area, shut off the electrical power to the entire system by switching the electrical breaker to OFF position (this will NOT quench the magnet). The electrical shutdown switch for the 9.4T MRI is located on the wall to the right of the front of the magnet.



- 3.5 Remove the volunteer/patient/animal from the scanner.
  - 3.5.1 Press the red EMERGENCY STOP button to unlock the bed and then pull the bed out manually using the handle at the end of the bed.
- 3.6 Contain the fire if possible. Follow these steps for a controllable fire (typically smaller than a soccer ball).



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- 3.6.1 There are *non-magnetic* fire extinguishers located in the corner of the 3T Control Room beside the Animal Prep Room and mounted between the magnet and animal prep room in the 9.4T (Figure 1).
- 3.6.2 There is also another fire extinguisher (NOT MRI compatible) in the fire hose cabinet just outside the patient prep area of the 3T/7T MRI (Figure 2).
- 3.6.3 If possible, use the non-magnetic fire extinguisher to put out the fire. If the fire is larger than a soccer ball, DO NOT approach or attempt to put out the fire, instead proceed to Section 4 and follow the steps outlined in “Emergency Fire Procedure for Uncontrollable Fires”.
- 3.6.4 If you have attempted to put out the fire, but it is not possible to contain it using the non-magnetic fire extinguisher, proceed to Section 4 below and follow the steps outlined in “Emergency Fire Procedure for Uncontrollable Fires”.



**Figure 1**



**Figure 2**

- 3.7 It is important to keep in mind that any smoke or odour caused by heat can contain chemicals that are harmful if inhaled. Limit your exposure and close the magnet room door to prevent the noxious fumes from permeating the rest of the building.
- 3.8 Close the magnet room door.
- 3.9 Call Campus Police / Emergency Dispatch by dialling 911 and explain that there was a small, controllable fire that has been extinguished at CFMM in Robarts Research Institute.
- 3.10 Evacuate the building if the fire alarm is sounding or if there is smoke.
- 3.11 Notify the CFMM Director or Senior MRI Level 2 or MRI Operator **immediately** following the incident. The facility staff must then file an appropriate UWO incident report of the situation.

#### 4. **Emergency Fire Procedure for Uncontrollable Fires**

- 4.1 Always remember to first:
  - 4.1.1 Ensure your own safety.
  - 4.1.2 Ensure the safety of others in the facility.
- 4.2 Follow steps 3.1 - 3.7 of Section 3 above: “Emergency Fire Procedure”.
- 4.3 If the fire is uncontrollable and cannot be contained using the non-magnetic fire extinguisher(s) and the fire is **INSIDE** the magnet room: Quench the magnet
- 4.4 From a safe place call the Campus Police / Emergency Dispatch by dialling 911 and inform them that there is an uncontrollable fire at CFMM in Robarts Research Institute.
  - 4.4.1 Emergency Dispatch will contact the Fire Department directly and will notify Robarts Security. Robarts Security will pull the fire alarm if it is not already



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sounding.

- 4.5 Evacuate the building and pull the fire alarm if it is not already sounding.
  - 4.6 Meet the fire department at the exterior door:
    - 4.6.1 Explain the details of the incident including the specific location of the fire and whether or not the magnet has been quenched.
    - 4.6.2 If the fire is **OUTSIDE** the magnet room and the magnet has **NOT** been quenched, the fire fighters must be informed that the magnet is still at field. The fire fighters must not enter MRI Zone IV (magnet room) with their gear donned; doing so could cause serious injury to themselves or anyone near the magnet at the time.
    - 4.6.3 If the fire fighters deem it necessary to enter the magnet room with their gear donned, quench the magnet.
  - 4.7 Notify the Director or Senior MRI Technologist immediately following the incident. The facility staff must then file an appropriate UWO incident report of the situation.
5. **Shelter and Call Policy – *For Fire ‘Drills’ ONLY***
- 5.1 In the event of a known/planned fire drill, if an experiment is taking place within the 3T, 7T or 9.4T magnets, essential staff may remain in the facility to complete the examination rather than aborting.
    - 5.1.1 Upon hearing the fire alarm bells, phone campus police at x23300 and inform the operator that you are exercising a shelter and call procedure as well as your current location.
    - 5.1.2 Only essential personnel (ie MRI technologist/operators) may remain in the facility. All others must evacuate the building as per the Emergency Fire Procedure listed above.



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Revision Chronology		
Version Number	Date	Changes
150.01	15 August 2008	First Version
125.02	06 April 2020	Update to new template
125.03	11 May 2020	Revisions to include 9.4T (JG)

CFMM Director Signature:

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