

3T/7T MRI FACILITY

SOP Number:	150.02
Title	Emergency Fire

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Version Number	Date	Changes
150.01	15 August 2008	New
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Facility Manager Signature: _____

Date: _____

ROBARTS RESEARCH INSTITUTE
CENTRE FOR FUNCTIONAL AND METABOLIC MAPPING:
3T/7T MRI FACILITY

Standard Operating Procedure #150.02

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 The static magnetic field in the 3T/7T MRI Facility 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 both the 3T and 7T MRI systems.
- 1.3 Dangerous and potentially lethal levels of electricity are used by both the 3T and 7T 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. 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.
- 1.4 Due to the inherent hazards associated with the static magnetic field, access to the 3T/7T MRI Facility is restricted to ensure the safety of all patients, subjects, visitors, and staff. The MRI Facility is conceptually divided into four Zones of increasing level of potential risk and access restriction, see SOP#100a: "MRI Facility Safety Zones".
- 1.5 Personnel working within the 3T/7T MRI Facility require extensive training, see SOP#130: "MRI Personnel Training".

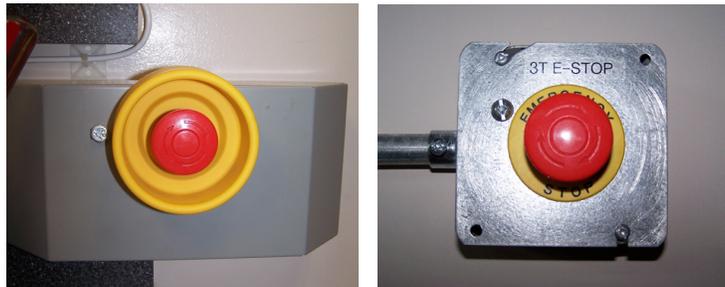
2. Signs of a Potential Fire

- 2.1 Signs of a potential fire are often present before the fire ignites. Level 2 MRI Personnel need to be aware of these signs to prevent injury to patients, volunteers, and other personnel working in the 3T/7T 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 3T Siemens scanner is 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. 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 Zone III or IV of the 3T/7T MRI Facility.
- 2.1.4 The last sign is the smoke detector going off and the fire alarm sounding. Note that the 7T system does not have an early warning alarm so operators must always be aware of the above signs.
- 2.2 When any of the above signs of a fire occur, the operator must:
 - 2.2.1 Abort the current scan.
 - 2.2.2 Put the gradient amplifier into standby mode. See SOP#300: “3T MRI System Start-Up and Shutdown” or SOP#310: “7T MRI System Start-Up and Shutdown” for these procedures.
 - 2.2.3 Remove the volunteer/patient from the scanner.
 - 2.2.4 Investigate the source of the irregular noise, odour, or smoke.
 - 2.2.5 Immediately notify the Facility Manager.
- 2.3 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. **Emergency Fire Procedure**

- 3.1 Remember to use common sense! There are three basic steps to follow, in this order:
 - 3.1.1 Ensure your own safety.
 - 3.1.2 Ensure the safety of others in the facility.
 - 3.1.3 Contain the fire if possible. If it is not possible to contain the fire, follow the procedure in Section 4 below: “Emergency Fire Procedure for Uncontrollable Fires”.
- 3.2 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 are located:
 - 3.2.1 On the walls beside the 3T and 7T operator consoles.
 - 3.2.2 In the 3T and 7T equipment rooms, as you enter the door.
 - 3.2.3 Inside the 3T and 7T magnet rooms, right inside the doors.



Electrical Shutdown Buttons

- 3.3 Remove the volunteer/patient from the scanner.
 - 3.3.1 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.
 - 3.3.2 If the volunteer/patient is not responding, is not breathing, or is in cardiac distress, follow the procedure outlined in SOP#140: “Emergency Code Blue”.
- 3.4 Contain the fire.
 - 3.4.1 There are non-magnetic fire extinguishers located in the corner of the 3T Control Room beside the Animal Prep Room door, and in the fire hose cabinet beside the Patient Prep Area (across from the facility washroom).
 - 3.4.2 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”.
 - 3.4.3 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”.
- 3.5 Close the magnet room door.
- 3.6 Call Campus Police / Emergency Dispatch by dialling 911 and explain that there was a small, controllable fire that has been extinguished in the 3T/7T MRI Facility at Robarts Research Institute.
- 3.7 Evacuate the building if the fire alarm is sounding or if there is smoke.
- 3.8 Notify the Facility Manager immediately following the incident. The facility staff must then file an appropriate UWO incident report of the situation.



*Non-Magnetic MRI
Compatible Fire
Extinguisher*

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 3.2 - 3.5 of Section 3 above: “Emergency Fire Procedure”.
- 4.3 If the fire is uncontrollable and cannot be contained using the non-magnetic fire extinguisher and the fire is INSIDE the magnet room: Quench the magnet as outlined in SOP#160: “Emergency Quench”.
- 4.4 From a safe place call the Campus Police / Emergency Dispatch by dialling 911 and inform them that there is an uncontrollable fire in the 3T/7T MRI Facility at 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 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 the 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 following SOP#160: "Emergency Quench".
- 4.7 Notify the Facility Manager immediately following the incident. The facility staff must then file an appropriate UWO incident report of the situation.