

**STANDARD OPERATING PROCEDURE:**  
**EMERGENCY FIRE PROCEDURES**

**1. INTRODUCTION**

- 1.1 Research involving Magnetic Resonance Imaging (MRI) at high magnetic field strengths presents unique hazards to individuals working within and around the MRI system. The potential for serious personal injury is present due to the sheer size 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 9.4T MRI facility is always present. It is important that all those entering the facility be aware of the presence of the field, as it cannot be detected by our person in any way, i.e. magnetic fields cannot be felt, seen, or smelt.
- 1.3 There exist dangerous and potentially lethal levels of electricity in the 9.4T MRI system. As such, it is important that all individuals working around the MRI system be aware of the dangers and 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 will result in breakage causing electrical arcing, sparking and high heat levels before the system can shut down. There is therefore a high potential for personal injury and the possibility of a fire being ignited.
- 1.4 Working within and around the high field MRI requires in depth training on safety and Standard Operating Procedures and documented proof of other necessary training. See SOP#200-01 "Safety and Training of Personnel".
- 1.5 It is imperative that all personnel who are within and around the 9.4T MRI facility always keep in mind the potential safety risks and act in accordance with the guidelines set out in the Standard Operating Procedures.

**2. SMOKE DETECTION**

- 2.1 There are signs of a potential fire. Operators need to be aware of the signs to prevent injury to the animal and the experimental support personnel during a scan session. The three basic cases are outlined below.
- 2.2 The first sign of a potential fire is often a subtle detection of an odour.
- 2.3 Another sign of a potential fire is a small amount of smoke. There may not be enough smoke to set off the detector so it is important to always be aware of the possibility of the presence of smoke. If anyone in the control room or the magnet room notices smoke, even if the smoke detector alarm is not sounding, the procedure below must be followed.
- 2.4 The final case is one in which the smoke detector has gone off and an alarm is sounding in

the magnet room.

- 2.5 In each of the above circumstances the operator must:
  - 2.5.1 Abort the current acquisition.
  - 2.5.2 Investigate the source of the odour or smoke. Shutdown the piece of equipment responsible for the odour or smoke. Follow the procedure described in SOP#315-01 "MRI System Shutdown".
  - 2.5.3 Close the magnet room door.
  - 2.5.4 Immediately notify the Facility Manager.
- 2.5 It is important to keep in mind that any smoke or odour 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:
  - 3.1.1 Ensure your own safety.
  - 3.1.2 Ensure the safety of the animal in the magnet. If it is unsafe to remove the animal from the magnet, do not attempt to do so.
  - 3.1.3 Contain the fire if possible. If it is not possible to contain the fire, follow the procedure in section 4 "Emergency Fire Procedure for Uncontrollable Fires".
- 3.2 If it is safe to do so, shut off the RF amplifiers, gradient amplifiers, and the console. See SOP#315-01 "MRI System Shutdown".
- 3.3 Unplug the RF coil from the RF Front End and remove the animal from the scanner.
- 3.4 Contain the fire.
  - 3.4.1 The non-magnetic fire extinguisher is located in the magnet room between the console room door and the animal preparation room door.
  - 3.4.2 If it is safe to do so, use the non-magnetic fire extinguisher to put out the fire. If the fire is larger than a soccer ball, DO NOT attempt to put out the fire, instead proceed to section 4 "Emergency Fire Procedure for Uncontrollable Fires".
  - 3.4.3 If it is not possible to contain the fire using the non-magnetic fire extinguisher, proceed to section 4 and follow the steps outlined in "Emergency Fire Procedure for Uncontrollable Fires".
- 3.5 Close the magnet room door.
- 3.6 Have someone call UWO Emergency Dispatch at Ext. 88911 or, if alone, call yourself and explain that there was a small, controllable fire that has been extinguished in the 9.4 T MRI Facility at Robarts.
- 3.7 Notify the Facility Manager or Director immediately following the incident. The facility staff must then file an appropriate UWO incident report of the situation (contact Ron Noseworthy).

#### 4. EMERGENCY FIRE PROCEDURE FOR UNCONTROLLABLE FIRES

- 4.1 Always remember to:
  - 4.1.1 Ensure your own safety.
  - 4.1.2 Ensure the safety of the animal in the magnet.
  - 4.1.3 If it is unsafe to remove the animal from the magnet, do not attempt to do so.
- 4.2 Follow steps 3.2 – 3.5 in section 3 “Emergency Fire Procedure”.
- 4.3 If the fire cannot be contained using the non-magnetic fire extinguisher, and the fire is INSIDE the magnet room, the operator must Quench the magnet following SOP#325-02 “Emergency Quench Procedure”.
- 4.4 From a safe place call the UWO Emergency Dispatch at Ext. 88911 and inform them that there is an uncontrollable fire in the 9.4 T MRI Facility at Robarts.
  - 4.4.1 The UWO 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 nearest fire alarm (across from the RF lab).
- 4.6 Meet the fire department at the exterior door.
  - 4.6.1 Give them details regarding the incident including the specific location of the fire and whether or not the magnet has been quenched.
  - 4.6.2 If the magnet has not been quenched, it is the responsibility of the operator to ensure that the fire department is informed that the magnet is still at field. The fire fighters must not enter the magnet room with any magnetic equipment; 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 wearing their equipment, quench the magnet following SOP#325-02 “Emergency Quench Procedure”.
- 4.7 Notify the Facility Manager or Director immediately following the incident. The facility staff must then file an appropriate UWO incident report of the situation.

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ROBARTS RESEARCH INSTITUTE  
CENTRE FOR FUNCTIONAL AND METABOLIC MAPPING  
9.4T MRI FACILITY

SOP#330-02

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*SOP Approval Signatures*

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Dr. Robert Bartha, Facility Director

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Date

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Dr. Greg Dekaban, RRI Biosafety Officer

\_\_\_\_\_  
Date

\_\_\_\_\_  
Ron Noseworthy, RRI Occupational Health & Safety Officer

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Date