3T/7T MRI FACILITY

SOP Number:	**230-01**
Title	**Emergency Quench**

Revision Chronology		
Version Number	**Date**	**Changes**
230.01	**01 March 2010**	**Quench procedures updated**

Facility Manager Signature: _____

Date: _____

ROBARTS RESEARCH INSTITUTE

**CENTRE FOR FUNCTIONAL AND METABOLIC MAPPING:
3T/7T MRI FACILITY**

Standard Operating Procedure #230-01

Emergency Quench

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, since we cannot otherwise detect it (i.e. magnetic fields cannot be seen or felt).

1.3 Due to the potential for serious injury, access to the 3T/7T MRI Facility is restricted and requires permission. See SOP#100-01: "MRI Facility Access Approval Policy", and SOP#110-01: "MRI Facility Visitor Approval Policy".

1.4 Working within and around high magnetic fields requires specific training on safety issues and an understanding and acceptance of the Standard Operating Procedures, as well as documentation of any other applicable training. See SOP#120-01: "Safety and Operator Training".

1.5 It is imperative that all personnel who work within and around the 3T/7T MRI Facility are mindful of the potential safety risks, and act in accordance with the guidelines set out in the Standard Operating Procedures.

2. Description of a Quench

2.1 A "quench" is an event that occurs only in superconducting magnets. It is caused by a rapid increase in the resistance of the magnet coil windings that causes a loss of superconductivity. This process generates heat, which causes the rapid evaporation, or boil-off, of the magnet's coolant (liquid helium). This evaporated coolant is extremely hazardous and requires an emergency ventilation system, consisting of a bursting disk and quench pipe through the building's roof, in order to protect facility staff and subjects. Note that once initiated, a quench cannot be stopped, and may cause complete magnet failure.

2.2 There are two situations in which a quench may occur:

2.2.1 Spontaneously, due to some force or disruption of the magnet system.
2.2.2 Intentionally, when the emergency quench button is pressed.

3. Spontaneous Quench

3.1 In the event of a spontaneous quench:

3.1.1 Immediately abort the current scan.
3.1.2 Evacuate the magnet room.
3.1.3 Close the door to the magnet room.
3.1.4 Notify the Facility Manager or Director and UWO Emergency Dispatch (x88911) immediately following the incident. The facility staff must file an incident report of the situation.

4. Emergency Quench

4.1 The emergency quench button must be pressed in the following situations:

4.1.1 There is a fire in the magnet room that CANNOT be contained using the non-magnetic fire extinguisher and requires the assistance of the fire department. Refer to SOP#220-01: "Emergency Fire" for emergency fire procedures.
4.1.2 Any individual is pinned to the magnet, trapped, or in a potentially life threatening situation, because of a NON-REMOVABLE ferromagnetic object.

4.2 **Emergency Quench Procedure**

4.2.1 Evacuate the magnet room, if possible, and close the magnet room door.
4.2.2 Press the emergency quench button.
4.2.2.1 There are two emergency quench buttons. These red buttons are labelled "STOP" and are located (1) in the control room, on the wall to the left of the operator station, and (1) in the magnet room, on the wall beside the door.
4.2.3 If the magnet was quenched because someone was pinned or injured, the operator must apply first responder principles. If the victim is not breathing and has no pulse, follow the procedure outlined in SOP#210-01: "Emergency Code Blue". Once the magnet room has been evacuated, close the magnet room door.
4.2.4 Notify the Facility Manager or Director and UWO Emergency Dispatch (x88911) immediately following the incident. The facility staff must file an incident report of the situation.