

9.4T MRI FACILITY
SOP #310-04 MRI SYSTEM STARTUP

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 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.
- 1.3 Equipment in the 9.4T MRI Facility is sensitive to the order used in powering the system up and down. If the proper procedures are not followed, the equipment may be damaged. Only qualified operators are to perform the following procedure.
- 1.4 Training is required before any procedure involving the MRI equipment is attempted. See SOP#200 "Safety and Training of Personnel".

2. STARTUP PROCEDURE

- 2.1 If you are unsure of any of the steps in the following procedure, DO NOT CONTINUE - immediately contact the Head Technician or the Facility Manager.
- 2.2 It is important to ensure first that the system is fully SHUT DOWN. If this is not the case follow the Shutdown Procedure in SOP#315 "MRI System Shutdown".
- 2.3 In the event that there is power loss to the entire MRI system, DO NOT proceed any further. Immediately contact Robarts security and indicate power has been lost to the laboratory. Building Services should respond and assess the problem with the UPS that feeds the laboratory. Also contact the Head Technician and the Facility Manager and advise them of the situation.
- 2.4 Otherwise begin startup procedure as follows (in this order):
 - 2.4.1 Determine whether or not building supplied chilled water is present.
 - 2.4.1.1 If not contact the Head Technician or the Facility Manager.
 - 2.4.2 Turn on the power to the chiller.
 - 2.4.2.1 On the chiller, open the flow control valve slowly until the flow meter reads ≈ 3.5 L/min for xMR-300-150 gradient coil, or 1.7 L/min for the Agilent-115-60 gradient coil.
 - 2.4.2.2 If this cannot be done, contact the Head Technician or Facility Manager.
 - 2.4.3 Put the Heavy Duty Safety switch in the ON position (located on the wall) – For Head Technician or Facility Manager only.
 - 2.4.4 Power up the liner power distribution unit (located on the wall) – For Head Technician or Facility Manager only.

- 2.4.5 To turn ON the MRI instrument from the system control panel (BRUKER SYSTEM PWR), perform the following steps:
 - 2.4.5.1 Turn ON the Paravision workstation and start Paravision.
 - 2.4.5.2 Turn the rotary switch (bottom) at the system control panel into the ON position, wait until the flashlight STAND-BY has turned into a permanent **orange** light. The instrument is now in the STAND-BY mode.
 - 2.4.5.3 Press the ON button once (top) at the system control panel and wait until the flashlight has turned into a permanent **green** light.
 - 2.4.5.4 The instrument is now ready to be used.
 - 2.4.5.5 To switch the MR instrument into the STANDBY mode, press the STAND-BY button (middle) and wait until the flashlight has turned into a permanent **orange** light. The instrument is now in the STAND-BY mode.

