

ROBARTS RESEARCH INSTITUTE

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

Standard Operating Procedure #315-01
Last Updated: August 15, 2008

7T MRI System Startup

1. Introduction

- 1.1 Research involving Magnetic Resonance Imaging (MRI) at high magnetic field strengths present 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 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 both the 3T and 7T MRI systems. As such, it is important that all individuals working around the MRI systems be aware of the dangers and therefore knowledgeable as to the safety issues concerning electricity. Furthermore, 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 therefore becomes a high potential for personal injury and the possibility of a fire being ignited.
- 1.3 Equipment in the 3T/7T 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 to perform any procedure on the system involving equipment in the Equipment Room. The training includes location and function of the equipment in the Equipment Room. See SOP#120-01 "Safety and Operator Training".

2. Startup Procedure

- 2.1 If you are unsure of any of the steps in the following procedure, DO NOT CONTINUE. Immediately contact 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#325-01 "7T MRI System Shutdown".
- 2.3 In the event that there is power loss to the entire MRI system or one of the emergency electrical shutdown buttons has been depressed, DO NOT proceed any further. Immediately contact the Facility Manager.
- 2.4 Otherwise begin startup procedure as follows (in this order):
 - 2.4.1 Determine if Cold Head is running.

- 2.4.1.1 If not contact the Facility Manager.
- 2.4.2 Reset Power distribution breaker panel at the bottom of the Shim Power Supply Unit.
 - 2.4.2.1 Press the green button.
 - 2.4.2.2 Gradient chiller pump should have been activated.
 - 2.4.2.3 Ensure the whole body shim amplifier is powered
 - 2.4.2.4 If not, DO NOT continue. Contact the Facility Manager.
- 2.4.3 Restart the INOVA console.
 - 2.4.3.1 Turn main power on at the back (big switch), wait for fans to start.
 - 2.4.3.2 Press the green button.
 - 2.4.3.3 Toggle the silver switch at front of console to up position.
 - 2.4.3.4 Wait for system to completely boot.
 - 2.4.3.5 If booting doesn't complete in 2 minutes try "resetting" the console.
 - 2.4.3.6 If it doesn't work again, contact the Facility Manager.
- 2.4.4 Turn ON the RF amplifiers.
 - 2.4.4.1 7 kW switch at bottom back (10 minute warmup).
 - 2.4.4.2 4 kW switch at front of unit.
- 2.4.5 Turn on the Sonata gradient power amplifier (GPA).
 - 2.4.5.1 Turn on gradient small signal unit (GSSU) main power (orange switch).
 - 2.4.5.2 Wait a few seconds for fans to kick in.
 - 2.4.5.3 Push S402 on D16 board (should hear power stages kick in).
 - 2.4.5.4 GSSU status lights should be all green and yellow (no RED!).
 - 2.4.5.5 If it isn't, contact the Facility Manager.
- 2.4.6 Ready to go.