	Policy Title: Practice and Procedures MRI Emergency Procedures - Quench
	Date Created: Dec 19, 2019 Updated:

Objective

The MRI Emergency Quench policy is for all personnel to provide the appropriate response to a quench emergency situation in the MRI Unit.

Quench in the MRI Unit

A “quench” is an event that occurs when the magnetic field is lost due to the cryogen (liquid helium), which creates super conduction, is rapidly boiled off and vented from the room. This can occur by accident (spontaneous) or manually in the case of an emergency (by pressing “Quench” button). Once this is initiated, the process cannot be stopped and may cause significant irreparable damage to the magnet. The helium is vented through the quench pipe to relieve the pressure.

It should only be done for the following situations:

- An uncontrollable fire in the scan room that cannot be suppressed by MRI safe hand-held fire extinguisher or extinguished by fire fighters from outside scan room
- An individual is pinned to the magnet by magnetic object and is in a life threatening situation

Introduction

The Magnetic Resonance (MR) environment presents unique hazards not commonly encountered by most personnel. Anyone entering the MR environment must be conscious of the strong magnetic field, radio frequencies and time varying gradient field. The most important point to remember is that the magnet is **always on**. Entry into the scan room (Zone IV) must only be authorized after successful screening process and completion of the screening form. All metallic objects and pocket contents must be removed.

During a quench in the in the MRI Unit, personnel are to follow designated protocol to ensure safety for all participants, family and personnel.

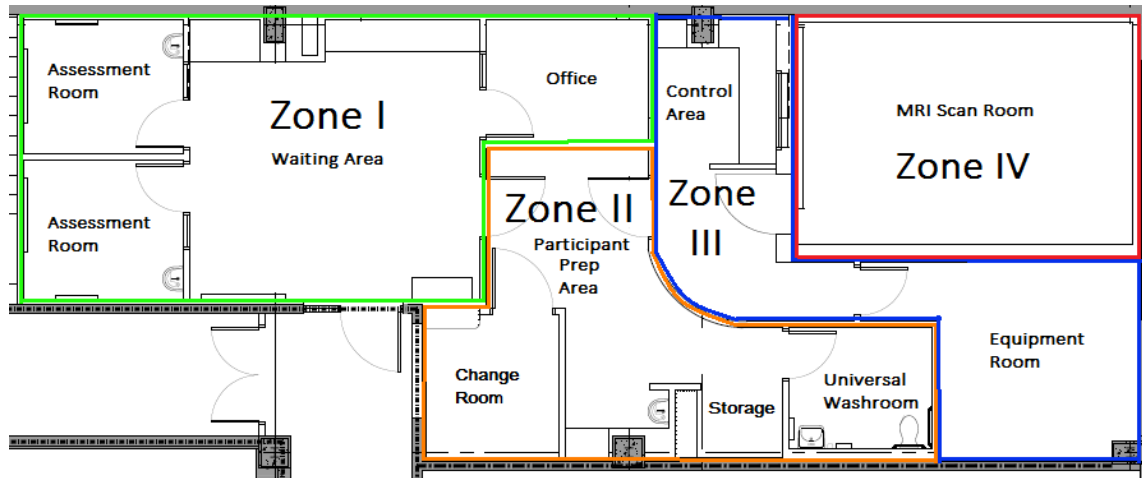
Definitions

Zone I: Readily accessible areas by the general public outside MR environment (waiting room)

Zone II: Area between Zone I and Zone III where individuals are supervised by MR personnel (participant prep area)

Zone III: Restricted transition area between Zone II and Zone IV that is supervised and controlled by MR personnel (control room and restricted waiting area)

Zone IV: Area controlled and strictly supervised by Level Two MR personnel. This is a potentially hazardous area with presence of very strong magnetic fields. (MR Scan Room)



Level Two MR Personnel: Individuals who work in MR environment and have extensive education on MR safety issues that is renewed on a yearly basis (i.e., MRI Technologist, MR Physicist)

Level One MR Personnel: Individuals who work in MR environment that have completed and passed minimum MR safety education (administered by a Senior MRI Technologist certified in MR safety) that is renewed on a yearly basis. (e.g., Clinical Coordinators, Research Assistants, Imaging Analyst)

Authorized non-MR Personnel: Staff that enter the MR environment occasionally and have completed and passed minimum MR safety education (administered by a Senior MRI Technologist certified in MR safety) that is renewed on a yearly basis. (e.g., building-services staff)

Access to MRI Unit: The personnel listed above will be provided with electronic and key access to MRI Unit. The MRI Technologist will also have key access to the MR scan room (Zone IV). For emergency access to the MR scan room, a key will be stored in a breakable glass case located in the MR control room

Emergency Quench Procedure

- All individuals in scan room must be evacuated and the scan room door is to be closed
- The quench button is to be pressed by Level Two MR Personnel or fire captain (after contacting Siemens hotline to guide subsequent actions) when MRI Unit is closed. Located under flip cover on magnet control panel.



- **Siemens Services Hotline : 1-800-359-6709**
Holland Bloorview Site ID # 10628

- If an individual was pinned to the magnet, the door should not be closed until magnet has been quenched. Once quenched, they should be removed and the scan room door should then be closed

Please note that upon a quench it can take 1-2 minutes for the magnetic field to dissipate. Risks associated with the sudden expansion of liquid helium are:

- Venting of helium may not be fully handled by quench pipe
- Asphyxiation may be possible if helium displaces air in the scan room

References

ACR Guidance Document for Safe MR Practices: 2013. JOURNAL OF MAGNETIC RESONANCE IMAGING 37:501–530 (2013)

Shellock, F. G., Magnetic Resonance Procedures: Health Effects and Safety, Pre-Magnetic Resonance Procedure Screening, 2009