Ochsner | LSU Health SHREVEPORT	**Policy #: Rad Policy14.13.1**
SUBJECT: Cryogen Safety /Quench	**Effective: 10/1/2018** **Revised: 2/2019**
APPROVED BY Eduardo Gonzalez-Toledo, MD PhD	**Page 1 of 2**

PURPOSE: To describe cryogen safety principles. A superconducting magnet in the MRI scanner uses cryogens to supercool the electrical conductor that creates the magnetic field. Liquid helium and liquid nitrogen represent the most commonly used cryogens in MR environments. If exposed to room air, these cryogenic liquids will rapidly boil off and expand into a gaseous state, known as a quench. This produces several potential safety concerns, including: asphyxiation, frostbite, fire hazards, and pressure considerations. Though contemporary superconducting magnets require cryogen re-fills only infrequently, Trans-fill operations should only be undertaken by appropriately trained personnel. MR facilities must ensure that the vent system is functioning properly.

POLICY:

Quench• In the event of a quench, MR personnel will follow Radiology department policy 14.13.

Cryogen Fills

- Dewars containing cryogenic liquids should never be stored inside an MR facility or an enclosed facility unless it is in a facility specifically designed to obviate the associated pressure, temperature, and asphyxiation risks.
- A cryogen trans-fill should never be attempted by untrained personnel or even with any unnecessary personnel in attendance, including MR personnel staff and patients, within Zone IV.
- Cryogen trans-fills should only be performed with appropriate precautions in place to prevent against pressure entrapment and asphyxiation.

Magnet Room Cryogen Safety

- All magnet rooms/Zone IV regions for superconducting magnets should be provided with an emergency exhaust pathway. The emergency exhaust grille is to be located in the ceiling opposite the entrance into the magnet room (Zone IV) door. At this location, when activated, in the unlikely event of a quench, the exhaust fan is positioned to draw the vaporous cloud of cryogenic gas away from the door exiting from the magnet room.

- Inspect cryogen vent systems at least annually, identifying stress/wear of pipe sections and couplings, loose fittings and supports or signs of condensation/water within the cryogen vent pathway, which may indicate blockage.

- Following any quench, a thorough inspection of the cryogen vent system will be done before returning the magnet to service.

- Because obstructions/occlusions of the cryogen vent can increase the likelihood of rupture in a quench event, the department should verify the following:

    - The discharge point has a appropriate weather-head, which prevents horizontal, wind-driven precipitation from entering, collecting, or freezing in the quench exhaust pipe.
    - The discharge point is high enough off of the roof or ground surface that snow or debris cannot enter or occlude the pipe.

The discharge is covered by a material or sufficiently small openings to prevent birds or other animals from entering the quench pipe, while not occluding cryogenic gaseous egress in a quench situation.