

Liquid Nitrogen (LIN) Supply and Safety Plan

March 16, 2023

- Background
- CM-51, Policy on Weather Related Emergency Procedures for LSUHSC-New Orleans
- Filling and Staging Dewars
- LIN/Dewar Rally Locations
- LIN Vessel Distribution
- LIN Safety
- Elevator Transport Procedures
- Post-Emergency LIN Supply

- Per [CM-51, Policy on Weather Related Emergency Procedures for LSUHSC New Orleans](#), liquid nitrogen dewar containers are used to protect research in the event of power loss in an emergency.
- These dewars are moved to rally locations to facilitate refilling with LIN by emergency teams in the event of a prolonged power outage.
- This presentation provides those responsible for filling and transporting dewars information regarding:
 - Safe handling and transport of dewars to rally points located in the CSRB, Lion's Eye and the School of Dentistry (MEB has been removed from the plan for the duration of Lab Renovation Project).
 - Location of dewar rally points in the event of a hurricane.

- When an emergency is declared, all dewars should be loaded, filled using your existing LIN stock and moved to assigned rally locations. Do not use the LIN stock delivered to the rally areas as it will be used by emergency teams to refill the dewars in the event of a prolonged power outage.
- Securing of elevators at the School of Dentistry begins about 48 hours prior to the announced closing time. At Lions Eye elevators are secured about 37 hours prior to the announced closing time. See the [Hurricane Emergency Shutdown Actions](#) for more information.
- Six hours prior to the announced closing all personnel must vacate campus (except for shutdown team).
- Portable dewars present several safety hazards:
 - **Don't ride in elevators while transporting dewars.**
 - Don't transport dewars in personal vehicles as an evacuation strategy.

- The LIN emergency supply plan is triggered approximately 72 hours prior to the onset of tropical storm force winds when the Chancellor directs emergency preparations to commence.
- After consultation with senior leadership, the Associate Vice Chancellor for Property and Facilities will direct Purchasing to contact AirGas (supplier) to begin LIN delivery to the rally locations. Furthermore, he will direct the Schools of Medicine and Dentistry to have researchers prepare dewars in their labs using their own existing LIN supplies and then move these dewars to the rally locations.
- Clearly label dewars to include researcher's name, building, lab room number, dewar content, and contact phone numbers.

- Dewar preparation and transport must be completed prior to the shut down of elevators. Elevators are shut down at the School of Dentistry about 48 hours prior to the announced closing time. At Lions Eye and CSRB elevators are secured about 37 hours prior to the announced closing time. See the [Hurricane Emergency Shutdown Actions](#) for more information.
- Dewars shall remain in the LIN rally areas until the emergency has passed and normal operations resume.

- Lions Eye – 4th Floor Freezer Farm.
- School of Dentistry Campus – 2nd floor passageway between the Clinic and Administration buildings.



2nd floor passageway between the Clinic and Administration buildings

Building /Vessels:

Lions	12
Dental	6
Total	18

Each vessel contains 160 liters of LIN



Please review [LSUHSC's Cryogenic Liquid Policy](#) which addresses:

- Hazards Associated with Cryogenics and Dry Ice.
- Personal Protective Equipment.
- Special Handling Procedures.
- Storage and Transportation.
- Emergency Procedures.

- Burns and Frostbite. Skin contact with the cryogen or non-insulated equipment parts can cause cold burn or frostbite. Eye contact can cause permanent damage.
- Asphyxiation. Gas can accumulate near the floor and displace air. The potential for oxygen deficiency is an especially serious hazard in enclosed or confined spaces.
- Fire and Explosion. Liquid nitrogen is not flammable, but it can condense oxygen out of the air by evaporation, creating an oxygen-rich environment. Flammable materials can ignite in the presence of condensed oxygen.
- Over-Pressurization. Dewars have an insulating vacuum space between their double walls. If a dewar becomes damaged, air or liquid can leak into the vacuum space. This will reduce its insulating properties and can greatly increase the pressure inside the dewar. Dewars and storage vessels are equipped with pressure-relief devices that prevent high pressure from developing. Air or liquid that leaks into a vacuum space can freeze. If the space is rapidly warmed after starting a transfer, the pressure relief valve will vent gas that is generated, preventing an explosion. Never cover a pressure relief valve that is venting.

- When filling dewars or when removing specimens or samples from dewars, use the following PPE:
 - Cryo Gloves.
 - Face Shield.
 - Safety Goggles.
 - Lab Coat.
 - Long Pants.

- A transfer hose with a phase separator, goggles, face shield, cryogenic gloves and apron will be provided at each rally location. However, the emergency team tasked to refill dewars in the event of a prolonged power outage should bring their own PPE.

- Nitrogen is oxygen-displacing and can present a considerable asphyxiation risk if released within a poorly ventilated confined space such as an elevator.
- Elevator transport of nitrogen containing equipment /vessels shall be accomplished **WITHOUT** human accompaniment - - **equipment ONLY!**
- Use freight elevators to transport dewars.

LSUHSC personnel may transport cryogenics in freight elevators only if no passengers travel in the elevator.

There are two ways to accomplish this:

- Station coworkers at each elevator floor (prior to moving the elevator) to prevent personnel from entering the elevator on an interim floor.
- Contact Facility Services and request the elevator be moved, via the Lift-Net software, from the originating floor to the destination floor without stopping at any interim floor. Load the car with dewars and send to the destination floor where coworkers wait to remove them. Due to operational demands, schedule the move in advance with Facility Services.

- Normal ordering protocol will resume as soon as practical.
- Remaining (on-campus) emergency LIN stock will be used to fill LIN orders post-emergency.
- Normal delivery schedule will resume.

- For questions on LIN supply and delivery, contact Mike Williams, Purchasing, at 568-6261 or mwil34@lsuhsc.edu
- For questions on LIN safety, contact Darren Burkett, Environmental Health and Safety, at 568-2324 or dburk2@lsuhsc.edu