DEPARTMENT OF VETERANS AFFAIRS
South Texas Veterans Health Care System
San Antonio, TX 78229-4404

Research Service Policy Memorandum 12-60

November 26, 2012

RESEARCH STANDARD OPERATING PROCEDURES (SOP)
Handling of Dry Ice

1. **PURPOSE:** This policy establishes procedures for the safe storage, usage, and handling of dry ice in laboratories at the South Texas Veterans Health Care System Research Service. The main hazards of dry ice include burns and asphyxiation. Insulated gloves must be worn when handling dry ice. Use of dry ice in poorly ventilated areas can result in depletion of the oxygen level resulting in asphyxiation.

2. **POLICY:**

a. **Responsibilities:**

(1) All lab personnel must follow the safe storage, usage, and handling of dry ice (see below). Lab employees, responsible for shipping packages containing dry ice, must be properly trained in United States Department of Transportation (USDOT) shipping requirements and authorized by their employer (their department) to ship such packages.

(2) STVHCS personnel, upon discovery of improper storage or handling of dry ice will notify the PI/lab supervisor of the improper action for immediate corrective action. If dry ice was delivered via the warehouse the warehouse supervisor is to be notified so proper actions for corrections and preventive measures can be implemented to alleviate the improper transportation for future shipments.

b. **Personnel Affected:** All lab personnel

c. **Definitions / uses:**

(1) Dry ice is the solid form of carbon dioxide, non-combustible, available in flakes, pellets or block form. Dry ice will sublime (vaporizes directly to the gas state) at a temperature of –78.5C (-109.3 F) or higher.

(2) Dry ice is commonly used to cool reactions or to ship biological specimens.

3. **ACTION:**

a. **Procedures:**

(1) **Storage:**

(a) Dry ice is to be stored in a well-ventilated location and placed in a Styrofoam chest, insulated cooler, or a special cooler designed for the storage of dry ice.

(b) Because of the thermal expansion of dry ice (one pound of dry ice produces about 250 liters of gaseous carbon dioxide), sufficient gaseous carbon dioxide can be released in a sealed container to cause an explosion. Dry ice is NEVER to be stored in any type of tightly sealed devices such as an ultra-low freezer or plastic/glass container.

(c) Dry ice will sublimate about five to ten pounds every 24 hours (blocks last longer) in a typical storage cooler. .

(d) Normal air is composed of 78% nitrogen, 21% oxygen, and only 0.04% carbon dioxide. Concentrations greater than 0.5% (5000 ppm) can become dangerous. Therefore, handle dry ice in well-ventilated locations.

(2) **Hazards/Precautions:**

(a) Burns/frostbite: Dry ice can cause burns to the skin in short periods of times. Thermal gloves are to be used if it is necessary to handle dry ice.

(b) Suffocation: carbon dioxide is a simple asphyxiant. Always store dry ice in a well-ventilated area to minimize the buildup of carbon dioxide. Personnel must use caution should dry ice be stored in a deep cooler. Personnel must never stick one's head into the chest to obtain the dry ice.

(c) Explosions: Placing dry ice into a tightly sealed container can permit sufficient gas build up to cause an explosion. **Never place dry ice inside an ultra-low freezer or other enclosed space!**

(d) Placement of dry ice in rooms with little or no ventilation can result in a build-up of the carbon dioxide in the area. Do not store dry ice in a confined area such as in walk-in coolers, refrigerators, freezers, closets, or cars/vans.

(e) All Material Safety Data Sheet for dry ice or any chemical is available at: http://vaww.ceosh.med.va.gov/ceosh/MSDS.shtml

(f) Medical assistance for dry ice injuries is available by contacting the Emergency Department at 14593. Report injuries from dry ice using the Incident Report Forms available at http://vaww.vasthcs.med.va.gov/ (link ASISTS Automated Safety).

(g) When using dry ice to ship materials, the shipper must abide to all applicable shipping regulations.

(h) Disposal of unneeded dry ice is accomplished by:

(1) Letting the unused portion sublimate (recommended for well-ventilated locations because it will occur over a period of several days and the ventilation will take care of the gas liberated);

(2) **NEVER** dispose of dry ice in a sink, toilet or other drain (such action can destroy the structure because of the temperature difference);

(3) **NEVER** dispose of dry ice in the trash or garbage; and

(4) **NEVER** place unneeded dry ice in corridors (some corridors may not be well ventilated and the oxygen level can be reduced to low levels).

4. **REFERENCES:** MSDS for dry ice: http://vaww.ceosh.med.va.gov/ceosh/MSDS.shtml

5. **RESPONSIBILITY:** ACOS for Research (151)

6. **RECISSION:** None

7. **RECERTIFICATION:** November 2017

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