Safe Work Practice

Animal Projects with Cryogens

1.0 Hazard Description

Cryogens utilized in projects with animals can have the potential to cause both physical harm and harm to your health. Federal and provincial safety regulations require that Principal Investigators (PIs) conduct a hazard assessment for their project, which includes cryogens.

In general, cryogens include any liquefied gases that are kept in the liquid state at low temperatures. Examples include liquid nitrogen, helium and argon.

If the PI identifies the use of cryogens in their Animal Use Protocol (AUP), they must review this Safe Work Practice (SWP). PIs must incorporate the required controls identified in these documents into their hazard assessment and subsequent project-specific Standard Operating Procedures (SOPs) as detailed in the Animal Research, Teaching and Testing Projects SWP (EHS-SWP-101).

1.1 Hazard Assessment Considerations

1. When conducting a hazard assessment of cryogens, the PI must consider whether project plans or experimental activities will pose a risk to the employees, animals, or environment. Considerations include:
   - **The extreme cold temperatures** – Cryogens are extremely cold and must be handled carefully to prevent injury.
   - **Asphyxiation** – Many cryogens are inert gases, which are typically considered non-toxic. However, due to their expansion rates, if there were a leak or spill, the inert gas can rapidly expand and reduce amount of oxygen in a room.

2.0 Minimum Hazard Controls

In addition to the Minimum Requirements listed in the Animal Research, Teaching and Testing Projects, and Animal Projects with Chemicals (EHS-SWP-140) SWPs, PIs working with pressurized gases must abide by the following:

2.1 Elimination/Substitution

1. Whenever possible, appropriate substitutions or eliminations of a cryogenic substances should be considered to reduce the inherent risks involved.
2.2 *Engineering Controls*

1. Cryogenic substances must be stored in appropriate containers, typically a dewar flask or bottle designed for the purpose.
2. All dewars do release a small amount of the inert gases over time. This is to prevent the pressure from building up. Be sure to store them in a well-ventilated area.
3. When handling cryogenic substance, consider barriers and isolation measures to protect against the cold temperatures.
4. When transporting cryogenic substances, be sure to use an appropriate cart to move the dewar.

2.3 *Administrative Controls*

1. Ensure appropriate procedures are followed for handling materials to protect against the cold temperatures.
2. When transporting cryogens, consideration should be taken into the route to ensure it is safe for the material being handled.
3. Where possible, avoid transporting dewars in passenger elevators. Do not travel with dewars inside an elevator. Should there be a spill or leak, the oxygen levels could deplete very quickly in the small space. Or, during a power outage, you could get stuck inside the elevator with the cryogen. Use the buddy system, and have one person load the elevator, and another ready to unload. Use signage to ensure no one enters the elevator with a dewar containing cryogenic materials.
4. Dewars should be regularly inspected for signs of ice forming. Should ice form and clog the opening, pressure could build up and cause a rupture.

2.4 *Personal Protective Equipment (PPE)*

1. Additional PPE should be used when handling cryogenic substances. This should include items such as insulated gloves and an apron made of leather or similar non-woven material.
2. In certain scenarios, a face shield should be worn in addition to safety glasses/goggles.

3.0 *Emergency Preparedness/Response*

1. No additional emergency preparedness/response requirements beyond those outlined in the Animal Research, Teaching and Testing, and Animal Projects with Chemicals SWPs are required.

4.0 *Applicable Legislation and Regulations*

3. Occupational Health and Safety Regulations, Government of Alberta

5.0 Related Resources

2. Chemical Safety Program, Environment, Health & Safety, University of Alberta
3. Safe Work Practice: How to Use Animal Safe Work Practices (EHS-SWP-100), Environment, Health & Safety, University of Alberta
5. Safe Work Practice: Allergen Protection (EHS-SWP-110), Environment, Health & Safety, University of Alberta
6. Safe Work Practice: Needle Safety (EHS-SWP-120), Environment, Health & Safety, University of Alberta
7. Safe Work Practice: Animal Projects with Chemicals (EHS-SWP-140), Environment, Health & Safety, University of Alberta
8. Safe Work Practice: Animal Projects with Gases Under Pressure (EHS-SWP-143), Environment, Health & Safety, University of Alberta

6.0 Document Management

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