**Manchester Institute of Biotechnology - Risk Assessment**



| **Date:**  Feb 2015 | **Assessed by**:  Colin Levy | **Validated by**:  Tanya Aspinall | **Location**:  MIB LG027 | **Review date:**  Feb 2016 |
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| **Task**: Cryofreezing of crystal Samples for X-Ray data collection |
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| **Activity** | **Hazard** | **Person(s) in danger** | **Existing measures to control risk** | **Risk rating** | **Result** |
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| Handling of liquid nitrogen | Release of liquid nitrogen – risk of asphyxiation | Staff and those in close proximity | All staff must be trained in the correct handling and transport of liquid nitrogen. They must have completed COSHH and risk assessments so that they are aware of the hazards associated with the handling of liquid nitrogen, and all identified control measures must be followed.  Oxygen monitors and alarms are present on the room, and are tested regularly to ensure they are functional.  Warning signs and emergency advice are prominently displayed.  Two personnel to be present when large volumes of liquid nitrogen are dispensed.  No personnel to enter room when oxygen alarm sounds. Staff to evacuate room when alarm sounds continuously | L | T |
| Decanting Liquid Nitrogen to small dewars | Release of liquid nitrogen – risk of frostbite / cold burns | Staff and other building users | All staff who handle/use liquid nitrogen must have attended a chemical safety course which details the risks associated with liquid nitrogen, and what to do in case of a burn injury.  The following items of PPE must be worn: Howie-style laboratory coat, BS EN 511 compliant gloves (low temperature protective gauntlets) and BS EN166 compliant eye protection (chemical splash proof safety glasses and full face visor). A selection of safety glasses and goggles are available from MIB Stores; users are advised to visit Stores and select eye protection which fits well and is comfortable to use. Regular lab inspections monitor the wearing of PPE; users found not to be wearing PPE when the risk assessment states that it must be worn will be subject to the MIB compliance policy.  Avoid exposing skin to liquefied gas.  Use suitable lidded storage containers with proper insulation. Do not dispense into or transport in a non-insulated container.  Benchtop foam dewars are used for crystal freezing. These restrict the volume of LN2 in use to a 1L maximum, minimising any asphyxiation risk associated with spillage during this procedure. | M | A |
| Cryo freezing protein crystals | Frostbite / cold burns | Staff | This is a specialist operation and is only undertaken by trained individuals following a period of supervision from an experienced senior crystallographer (Prof D. Leys, Dr C. Levy or Dr M. Dunstan)  Particular care must be taken when chilling pucks, dewar cradles and dry shippers. All of the above activities must be carried out whilst wearing appropriate PPE (detailed above). Chilling these items results in LN2 boiling off rapidly from the vessel and this can produce a small spray of LN2. The risk of injury is minimised through appropriate training and suitable PPE.  For reasons of extreme dexterity PPE is restricted to lab coats whilst freezing the crystals themselves as gloves, glasses or face shields would all preclude the operation. Individuals are isolated from the LN2 by use of a crystal wand, this ensures that fingers and hands remain at a safe distance from the liquid at all times.  Users must be aware of the risks from wands they have previously used as these remain cold and can still pose a burns risk following the transfer of the crystal to the puck. The risk can be minimised by utilising a fresh wand when the one in use becomes uncomfortably cold. | M | A |
| Transfer of crystal positioning pucks between benchtop dewars and storage dewars | Frostbite / cold burns | Staff | PPE (detailed above) must be worn. Avoid exposing skin to liquefied gas or chilled pucks.  Cryo tongs are used to facilitate the transfer and for reasons of dexterity tongs are favoured over gloves.  The cryo tongs are insulated at the grip to prevent thermal transfer during the procedure.  Use suitable lidded storage containers with proper insulation when transferring pucks between the Lab and the wet LN2 store. Do not dispense into or transport in a non-insulated container. A complete set of puck handling tools is available within the facility and training on their safe use is provided where appropriate. | M | A |

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| **Authorisation by PI**  **I confirm that I have considered and understand the experiment and the associated hazards. I am satisfied that all of the hazards have been identified and that the control measures to be followed will reduce the risks to acceptable levels.**  **Print name: Signed:**  **Date:** |

**Declaration by researcher**

**I confirm that I have read this Risk Assessment and that I understand the hazards and risks involved and will follow all of the safety procedures stated. Where PPE has been identified as a control measure, I will ensure that it is worn.**

**Declaration by PI**

**I confirm that the researcher who has signed below is competent to undertake the work. My counter-signature indicates that I am happy for the work to proceed.**

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| **Name (please print)** | **signed** | **PI countersignature** | **date** |
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