Assessment Carried out by: Dr Kevin Jones & Dr Varrie Ogilvie Date of Assessment: 20/11/2026 Date of Next Review: 20/11/2028

Risk Assessment: Dispensing Liquid Nitrogen & Liquid Nitrogen Storage Area

Hazard	Who Might be Harmed and How?	Existing Control Measures	Further Actions Required	Responsible Person	Date
Asphyxiation	*Any building user (staff, student or contractor) accessing the liquid nitrogen storage area ("loading bay") located near adjacent the "loading bay entrance" of the Purdie Building.* Liquid nitrogen quickly turns into nitrogen gas upon contact with warmer air. 1 litre of liquid nitrogen can produce ~700 litres of nitrogen gas. Accordingly, rapid vaporisation of liquid nitrogen has the potential to reduce the oxygen concentration in a confined or poorly ventilated space to a dangerously low level. Oxygen levels between 19.5 – 15% can result in poor judgment, reduced coordination and reduced physical and intellectual performance without awareness. Oxygen levels between 15-10% can result in very poor judgment / coordination and possibility of fainting within a few minutes without warning	Building users are made aware of Hazards associated with liquid nitrogen during an in-person induction and introductory H&S courses. Fixed gas sensors (oxygen-depletion) have been installed in the area housing liquid-nitrogen dewars. Fixed gas sensors are connected to audible and visual alarms located inside and outside the loading bay. These measures (i) provide advance warning of oxygen depletion, allowing building users to exit the area in the event of an alarm activation and (ii) deterring building users from entering an oxygen-depleted area. Loading bay doors are opened when dispensing large quantities of liquid nitrogen to provide natural ventilation and help prevent against oxygen depletion. Loading bay doors are opened and dewars are removed from loading bay when being filled by a supplier.	Explore the possibility of adding ventilation grills to the loading bay doors to increase the amount of natural ventilation.	Kevin Jones	01.06.2025

	Oxygen levels <10% can lead to immediate loss of consciousness and death.	Building users are prohibited from travelling in the departmental lift with liquid nitrogen dewars to eliminate the risk of asphyxiation due to oxygen depletion in a confined space. Small dewars can be transported with the dumbwaiter provided. A retractable barrier has been added to the Purdie lift to prevent Building Users accidentally travelling with liquid-nitrogen dewars.			

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Cryogenic Burns and Eye Injuries	*Any building users dispensing liquid nitrogen from a dewar.* Liquid nitrogen is extremely cold (-196 °C). Severe cold burns can be sustained when: • Liquid nitrogen spills / splashes are held against the skin. • Direct contact is made with dewar attachments that have become cold during use. If liquid nitrogen makes direct contact with the eye, it can freeze tissue and risk permanent eye damage.	Loose fitting cryogenic/thermal gloves must be worn when dispensing liquid nitrogen from the tanks to prevent against accidental contact. A face shield must be worn to protect the face and eyes when dispensing liquid nitrogen from the storage tanks. Suitable clothing (long trousers and closed shoes) must be worn when dispensing liquid nitrogen.	Introduce a practical training course for the safe use of liquid-nitrogen dewars to ensure all users are aware of existing safety measures.	Kevin Jones	01.06.2025

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Slips and Trips	*Building users who access loading bay where liquid-nitrogen dewars are stored.* Ice may form on the outside of the liquid nitrogen dewars during use. Puddles can form on the floor when the ice melts and has the potential to cause staff to slip / fall and sustain an injury. If liquid-nitrogen dewars are positioned such that they block emergency escape, this could results in trips and falls and prevent safe exit of the building.	Absorbent towels are tied around the top of the dewar to absorb water and prevent the formation of puddles. Any puddles of water must be cleaned immediately, and warning signs used to alert people to the potential risk. Signage is displayed in the liquid nitrogen storage area reminding users not to block emergency escape routes. Hazard tape is used to demarcate the storage area from the emergency exit route	Explore options for external storage of liquid-nitrogen dewars held in reserve to provide additional storage space for dewars awaiting refill	Kevin Jones	26.08.2024

Hazard	Who Might be Harmed and How?	Existing Control Measures	Further Actions Required	Responsible Person	Date
Falls from Height	Any person dispensing liquid nitrogen from the storage tanks who cannot reach the top of the tank without use of a stepstool. Staff may fall and sustain an injury while standing on a stool or step-ladder.	Building users are asked to consider if alternative arrangements can be made if they are unable to reach dewar controls without use of a step-ladder to eliminate the risk of a fall.	N.A.	N.A.	N.A.

Training Requirements:

Users of liquid nitrogen vessels receive training at research group level following guidelines detailed in departmental H&S handbook and displayed in liquid nitrogen storage area.

Specialised Emergency Response (if required):

In the event the oxygen-depletion alarm activates, users should evacuate the storage area. If a nitrogen / helium leak is considered to pose a risk to other building users, the fire alarm should be activated and the building evacuated.

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Version Control

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