

Health Safety & Wellbeing Alert

Incident – Liquid nitrogen storage tanks

PURPOSE

The purpose of this Safety Alert is to provide information regarding a recent incident at Monash University. This alert is provided to highlight lessons learned that may be relevant to other areas to improve health safety and wellbeing.

BACKGROUND

Liquid nitrogen is commonly used across Monash for the purposes of snap-freezing and long-term storage of biological samples and in cold traps on vacuum lines/equipment. Two workers were using a 1 metre plastic measuring device (dipstick) for testing the depth of liquid nitrogen present within the storage tank. This task is part of the manufacturer's instructions and is required to be conducted weekly, using a dipstick provided by the manufacturer.

At the time of the incident, the dipstick unexpectedly dropped into the liquid nitrogen storage tank and was unable to be retrieved until approximately 60 hours later. Upon retrieval of the dipstick, it spontaneously fragmented whilst a worker was holding it in their hands. This resulted in a serious eye injury.



CONTRIBUTING FACTORS

- **Safety in Design:** the manufacturer of the tanks provided the dipstick without any specifications regarding the limitations of usage, potential dangers of immersion for periods longer than 5-10 seconds and maintenance requirements.
- **Equipment:** the dipstick in use was 1 metre long, shorter than the height of the tank (1.2 metres), hence; when dropped, it was unable to be retrieved, without a specialist tool which led to the delay. Additionally, a fault with a sensor on the tank, meant that the manual measurement using the dipstick was required more regularly e.g. several times a week.
- **Personal Protective Equipment (PPE):** workers were not wearing face or eye protection at the time of the incident.
- **Written procedures:** whilst there was a safe work instruction in place for works in this room, it did not include use of the dipstick.

LEARNINGS

- **Procedures & Training:** ensure procedures are in place for each step of a hazardous task. Work teams must understand, and regularly discuss hazards associated with their work. Controls should be reviewed for relevance and adequacy.
- **Equipment:** ensure the right tool for the job is available. Consider if the products you are using are appropriate for the conditions e.g. plastic items in cryogenics. All equipment used around liquid nitrogen e.g. storage items (boxes and tubes), must be able to withstand cryogenic temperatures.
- **Preventative maintenance:** ensure equipment is subject to planned preventative maintenance and that appropriate recommendations are followed up where possible. Plan ahead for replacement of end of life equipment before failure.
- **Appropriate risk controls:** administrative controls and PPE rely on human behaviour. Used on their own, these lower order controls tend to be least effective in minimising risks. They should be coupled with higher order controls such as elimination, substitution and engineering controls, as well as supervision and safety positive role modelling.
- **Safety Behaviours:** employees can get overly accustomed to the repetitive nature of how things are done. The routine involved in a task may cause them to underestimate the risk involved with dangerous tasks that are carried out on a regular basis. All persons should role model safety positive behaviours and hold others to account if they are not. Managers and Supervisors are in a particularly influential position and should encourage others to focus on HSW.

KEY MESSAGES

- Everyone is responsible for Health Safety & Wellbeing at Monash! We role model safety positive behaviours. We empower our people to speak up, proactively identify hazards and to hold others to account for compliance with safety directions.
- PPE limits exposure to the harmful effects of a hazard but only if employees wear and use the PPE correctly, each and every time they conduct a hazardous task.

ADDITIONAL RESOURCES / CONTACTS

[Monash HSW Website](#) [Handling & storage of liquid nitrogen](#) [WorkSafe Victoria: Hierarchy of Control](#)
HSW / Buildings & Property - hsw@monash.edu / B&P Helpdesk – 9022 0222