**Manchester Institute of Biotechnology - Risk Assessment**



| **Date:** 24/07/17 | **Assessed by**: Matthew Cliff | **Validated by**:Tanya Aspinall | **Location**: MIB | **Review date: 23/07/18** |
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| **Task**: Usage of helium capture system in NMR hall. Components include copper pipework, ball-valves, non-return valves (NRVs), gas bag, pressure monitoring and automation unit, external compressor, pressure regulating board and multiple cylinder pallet (MCP). |
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| **Activity**  | **Hazard**  | **Person(s) in danger**  | **Existing measures to control risk**  | **Risk rating**  | **Result**  |
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| Day-to-day collection of helium gas | Build-up of back-pressure affecting NMR magnets, in extreme cases causing quench | People in NMR room | Pressuring monitoring unit decompresses bag at 0.002 bar. Non-return valves at magnet connection on each machine - Two isolating valves for 800 machine. (to be installed; overpressure valves). Weekly check of compressor function included with usual cryogen checks. | Low | Adequately controlled |
|  | Low oxygen environment | People in NMR room | Low oxygen environment should only be present within bag, which although large, has no large entrance points. If bag should fail, 10.5m3 could be displaced into room, potentially lowering O2 level. Level should only reach 19.5% triggering warning alarms but posing no danger. Helium will disperse quickly. | Low | Adequately controlled |
|  | Aluminium frame in close proximity to 14T magnet. | People in NMR room | This frame MUST NOT to be climbed – it is not designed for access/for people to climb up. Clear signs stating this are present by the frame. | Low | Adequately controlled |
|  | Trip Hazard on high pressure line between compressor panel and MCP | People maintaining LN2 tank, compressor etc. | Keep area around MCP clear, put up barriers to prevent crossing between MCP and compressor hut. | Low | Adequately controlled |
| Capture during helium fill | Build-up of back-pressure affecting NMR magnets, in extreme cases causing quench | People in NMR room | See above. Also ensure gas bag is empty and compressor is switched on before starting fill. | Low | Adequately controlled |
|  | Low oxygen environment | People in NMR room | See above | Low | Adequately controlled |
|  | Extremely cold pipework | Those doing fill | Appropriate thermal protective gloves must be worn at all times. | Low | Adequately controlled |
|  | Condensation near electrical equipment | Those doing fill | Risk to be dynamically assessed by those doing fill and protective sheeting to be applied where necessary. | Low | Adequately controlled |
| Changing of MCPs | High pressure gases | Stores personnel/ SEO/ BOC employee. | Valve system reduces risk of large gas expulsion. Hose is to be detached according to SOP. No untrained personnel to attempt operation. | Medium | Adequately controlled |
|  | Very heavy MCP (3.8 tonne when full) | Stores personnel/ SEO/ BOC employee. | Full MCP only to be manipulated by HighAb arm of BOC truck. Empty MCP may be moved with pallet truck by accompanied, trained personnel. | Low | Adequately controlled |

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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.**

**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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