**Faculty of Environment. School of Earth and Environment.** 

**COSHH Risk Assessment Form:**

It is the responsibility of the person directing the research i.e. the Academic Supervisor / Principal Investigator to ensure that assessments are carried out, that they remain valid and that all the control measures identified are applied.

**Section 1: Primary Evaluation.**

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| --- | --- | --- | --- |
| **Person directing the research.** | | **Person conducting the assessment.** | |
| Name | Simon Bottrell | Name | Andy Connelly |
| Position | PI | Position | Technician |

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| --- | --- | --- | --- | --- |
| **Activity Title** | Cylinder movement from the cage to within the Wing Wing Level 8 and 9 suite | | Activity Reference No |  |
| Brief description of activity  Movement and replacement of compressed gas and liquid cylinders. Also, operation and replacing of regulators | | | | |
| Location / Building / Laboratory | | SEE (Cohen) | | |

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| **Names of personnel involved**  *This list must include the names of all personnel involved in this activity. The undersigned must have read this assessment and agree to abide by the control measures outlined within it and with any safe systems of work and working practices which minimise the identified hazards and risks from activity.* | | | | |
| **Name (Capitals)** | **Status** | **Signature** | **Date started** | **Date ceased** |
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*Legend: Status: A = Academic, RF = Research Fellow, PD = Post Doctoral, T = Technical, PG = Post Graduate, UG = Under Graduate.*

**Section 2: Hazard Evaluation and Risk Determination.**

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| --- | --- | --- |
| **Does the method involve the use of?** | | **Action** |
| Chemicals including rock / sand / silica / plaster / wood etc | No | Continue with section 3 |
| Flammable materials or solvents | No | Continue with section 3 |
| Flammable and oxidising gases | Yes | Continue with section 3 |
| Toxic gases | Yes | Continue with section 3 |
| Asphyxiant gases | Yes | Continue with section 3 |
| Cryogenic materials (solid / liquid / gas) | No | Continue with section 3 |
| Biological agents e.g. bacteria | No | Complete a supplementary Biological Risk Assessment |
| Human or Animal tissue, cells or body fluids | No | Complete a supplementary Biological Risk Assessment |
| Environmental Samples e.g. soil, water, plants | No | Complete a supplementary Biological Risk Assessment |

*N.B. Activities involving the use of ionising radiation must be covered by an appropriate risk assessment and the necessary Permit to Work obtained.*

**Section 3: Hazard Identification (Chemicals).**

Identify and list all chemicals and flammable materials used in this activity and indicate the designated hazard categories (using the matrix in the Guidance Notes).

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Name of Substance** | **Hazard Category**  **(Risk Phrase No)** | **Amount held** | **Route of Entry** | **Chronic Effects** | **WEL**  **(if assigned)** | **Amount handled** | **Hazard Level (L/M/H)** |
| Acetylene (as compressed gas) | EF,  H280, H220 | 2 | In, E, S |  |  |  | H |
| Air (compressed gas) | None |  | N/A | N/A | N/A |  | N/A |
| Argon (as compressed gas) | Asphyxiant,  H280 | 2xW | In, E, S |  |  |  | M |
| CO2 (as compressed gas) | Asphyxiant,  H280 | 2xJ | In, E, S |  | LTEL 5000vpm  STEL15000vpm |  | M |
| He (as compressed gas) | Asphyxiant  H280 | 2xL, BC | In, E, S |  |  |  | M |
| Hydrogen (as compressed gas) | VT, EF  H280, H220 |  | In, E, S |  |  |  | H |
| Methane | EF  H280, H220 | 1xBC | In, E, S |  |  |  | H |
| Nitrogen as compressed gas all grades, | Asphyxiant  H280 | 7xW | In, E, S |  | Long term limit 5000vpm |  | M |
| N2+H2 mix 5% (as compressed gas) | Asphyxiant  H280 | 2xL | In, E, S |  |  |  | M |
| N2O (as compressed gas) | O,  H270, H280 | 1xL | In, E, S |  |  |  | M |
| Oxygen (as compressed gas) | O,  H270, H280 | 2xL | In, E, S |  |  |  | M |
| Xenon | Asphyxiant  H280 |  | In, E, S |  |  |  | M |

*Legend: Hazard Category: VT = Very Toxic, T = Toxic, H = Harmful, Co = Corrosive, I = Irritating, E = Explosive, O = Oxidising, C = Combustible,  
 F = Flammable, HF = Highly Flammable, EF = Extremely Flammable.*

*Legend: Route of Entry: E = Eyes, S = Skin contact or absorption, Ig = Ingestion, In = Inhalation, P = Penetration.*

*Legend: Chronic Effects: R = Reproductive, C = Carcinogenic, T = Teratogenic, Cu = Cumulative, A/S = Allergenic / Sensitising.*

*WEL: Workplace Exposure Limit: If assigned, usually in ppm for vapours or mg/m3 for particulates.*

**Section 4: Risk Identification and Reduction.**

Identification of those at risk of exposure, and the requirement for Occupational Health Surveillance.

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| --- | --- |
| Are there any substances listed that have the Risk Phrases R40, R42, R43, R45, R46, R48 or R49 **or** that have been determined to be in the **high** risk category in Section 3? | No |
| If Yes, a request for Occupational Health Surveillance must be made, accompanied by a copy of this risk assessment before work is carried out.  *Has this been carried out?* | No |
| Are there any substances listed that have the risk phrases R60, R61, R62, R63, R64 or R68 i.e. those affecting women of a child bearing age?  *If Yes, identify the substances.* CO has H360 (R60,R61,R62,R63) See above | No |
| If Yes, a request for Occupational Health Surveillance must be made, accompanied by a copy of this risk assessment before work is carried out.  *Has this been carried out?*  ***N.B. This Risk Assessment must be reviewed for new, expectant or nursing mothers.*** | No |
| Are there any personnel other than those named in this risk assessment who may be at risk from exposure e.g. other laboratory workers, Estate Services Staff, Cleaners, Service Engineers, Maintenance Staff etc.  *If Yes, please give details. Is a Safe System of Work available and is a Permit to Work system in place?*  All persons that are encountered on route may be exposed. | Yes |
| Are cryogenic substances used in the process?  *If Yes, identify the cryogenic material and its state.* | No |
| Are flammable solvents ever stored with, or used in conjunction with, chemicals with which they may react e.g. oxidizers or acids?  *If Yes, please identify.* | No |
| Are any extremely flammable or highly flammable solvents held in quantities in excess of 500ml, stored or used in a refrigerator or freezers?  *If Yes, please identify.* | No |
| Are any flammable solvents used in conjunction with heating processes or electrical apparatus that could generate sparks?  *If Yes, please identify process and apparatus.* | No |

**Section 5: Prevention and Control of Exposure.**

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| Can the method be replaced by one that does not involve the hazardous substance(s)?  *If Yes, please give details.* | No |
| Can any of the substances be eliminated, replaced or substituted by less hazardous alternatives?  *If Yes, please give details.* | No |
| Are the hazardous substances available in a lower practicable concentration?  *If Yes, please give details.* | No |
| Can the quantities of hazardous substances purchased, stored, used and produced as waste be reduced?  *If Yes, please give details.* | No |
| Have all users been trained in the use and transport of cryogenic vessels and the use of cryogenic material? | N/A |
| Are personnel trained in the correct method of securing cylinders for use or transit and in selection and fitting of pressure reduction valves and are leak tests carried out when connecting a gas cylinder?  *If Yes, identify the individuals and details.*  *Please see the SOP and training records.* | Yes |

**Section 6: Storage and Transportation.**

Please indicate how the following substances are stored if relevant:

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| --- | --- | --- |
| Toxic | (and CO2 in 9.131) all stored in fire proof vented cabinets. | |
| Corrosive |  | |
| Flammable / Highly Flammable / Extremely Flammable | Acetylene all stored in fire proof vented cabinets. | |
| Other | N2, Argon, He, N2H2 mix, O2 and N2O all stored at purpose built cylinder racks, or in gas cage. CO2 in 9.131 is stored in fire proof vented cabinet | |
| Will any of these substances need to be transported to other parts of the building or other buildings **on campus**?  *If Yes, please give details on how containment will be achieved.*  *Cylinder gases are transported by trained personnel only on purpose built trolley. The user ensures that the cylinder has been shut down fully and regulator removed. No one travels in the lift with a gas cylinder.* | | Yes |
| Will any of these substances need to be transported to other sites **off campus**?  *If Yes, please give details including a) Name of other site: b) Substance and quantity: c) Method of transportation: d) Containment method.*  THIS RISK ASSESSMENT DOES NOT COVER MOVING CYLINDERS OFF CAMPUS | | No |
| Are any flammable solvents stored outside a fire resistant cabinet?  *If Yes, please explain why?* | | No |
| Are replacement cylinders always kept in the external gas store?  *If No, please explain why?* | | Yes |
| Are all gas cylinders transported to and from the laboratory in a purpose made gas cylinder trolley?  *If No, please explain why?* | | Yes |

**Section 7: Containment and Ventilation.**

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| --- | --- |
| Can some or all parts of the process be carried out on the open bench with good ventilation?  *If Yes, please give details including any additional containment methods e.g. drip trays.* | N/A |
| Is a fume cupboard or any other form of local exhaust ventilation (LEV) required for any part of the process?  *If Yes, please give details including type and location.*  *The toxic and flammable gases are stored in purpose built cabinets.*  *Acetylene is stored in a fire proof vented cabinet near the door into 9.140 and in 8.130*  *H2 is stored in a fire proof vented cabinet outside 8.130.*  These are connected to fume cupboard extraction system that is annually inspected. | Yes |
| Is the fume cupboard or any other form of LEV periodically checked and inspected and subject to insurance inspection?  *If Yes, please give details including date of last insurance inspection.*  *This is significant as this system would provide the extraction in case of a leak.* | Yes |
| Does any part of the process need to be totally enclosed e.g. inside a glove box or anaerobic chamber?  *If Yes, please give details.* | N/A |
| Is a chemical spill containment kit available if required?  *If Yes, please give details including location and name of trained personnel for use and of the personnel responsible for maintenance and replacement of the kit.*  *N.B. Please ensure that the kit available is adequate enough to contain a maximum credible spill of materials involved.* | N/A |
| If liquid cryogens are being used, is the room sufficiently well ventilated to ensure against oxygen depletion / enrichment? | N/A |
| Where gases are being used, is the room sufficiently well ventilated to ensure against oxygen depletion / enrichment?  All the laboratories have had a gas assessment in terms of ensuring oxygen depletion does not become an issue. Each lab is dealt with individually. | Yes |

**Section 8: Personal Protective Equipment (PPE).**

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| Are gloves to be used for any part of the process?  *If Yes, please describe the parts of the procedure and specify the type of glove to be used.*  *Chemical resistant work gloves with close fitting wrist bands should be used.* | Yes |
| Is any form of eye or face protection to be used for any part of the process?  *If Yes, please describe the parts of the procedure and state the type of eye or face protection to be used e.g. visor, goggles or safety glasses and whether they should be impact resistant or chemical resistant.*  Chemical and Impact resistant safety glasses must be worn when transporting cylinders and when changing gas cylinders. | Yes |
| Is any form of respiratory equipment to be used for any part of the process?  *If Yes, please describe the parts of the procedure and state the type of respiratory equipment to be used.*  *N.B. For some cartridge respirator units face fit testing should be considered.* | No |
| Is any other form of protective clothing to be worn in addition to lab coats?  *If Yes, please give details.*  Steel toe capped boots must be worn.  Due to the loose fitting nature a lab coat may not be appropriate when moving gas cylinders. | Yes |

**Section 9: Waste Disposal.**

Enter all substances in the appropriate box next to method of disposal.

|  |  |  |
| --- | --- | --- |
| **Method of Disposal.** | **Substance.** | **Contact details for Waste Disposal if applicable.** |
| Chemical waste collection. |  |  |
| Halogenated solvent waste collection. |  |  |
| Non-halogenated solvent waste collection. |  |  |
| Healthcare Waste (yellow bag). |  |  |
| Drain dilution with excess water. |  | n/a |
| Drain dilution with prior neutralisation. |  | n/a |
| Please describe any neutralisation process used in conjunction with the above method of disposal. | | |

**Section 10: Emergency Procedures.**

**First Aid.**

Describe the First Aid procedures in place for accidental exposure to any substances outlined in this Risk Assessment.

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| **Area of contact** | **First Aid Procedure** |
| Eyes | Flush with water for 15mins and obtain medical attention. SO2 may cause chemical burns to eyes. |
| Skin | In cause of frost bite spray with water for 15mins and apply sterile dressing and obtain medical attention. |
| Lungs | Remove from affected area with self contained breathing apparatus and obtain medical attention. Apply artificial respiration if breathing has stopped. |
| Mouth |  |
| Outline any First Aid procedures for exposure to Cyanide or Hydrofluoric Acid.  *N.B Both substances are major COSHH hazards and as such require a specific Safe System of Work to be agreed with by the local Health and Safety Co-ordinator which should include the provision of currently recommended antidotes and treatments. To be reviewed annually.* | |

**Fire Fighting Measures.**

Enter all flammable substances used in the box below against the most appropriate fire extinguishing medium.

*N.B. Only enter substances against extinguishers that are both suitable and available.*

|  |  |
| --- | --- |
| Extinguisher | Substance |
| Water | All known extinguishers can be used with all gases.  Turn off cylinder valve.  Gases may produce toxic gases in fire gases that do this are SO2, H2S, N2O, acetylene, CO.  Inform the firebrigade as to which gases are involved and inform BOC (0800 111333).  In the case of acetylene see specific SOP. |
| Chemical foam |
| Fire blanket |
| Carbon dioxide |
| Dry powder |

**Major Spillage.**

Name the substance below that could be involved in a significant spill and indicate the correct method of disposal e.g. chemical waste, solvent waste, dilution to drain etc.

|  |  |
| --- | --- |
| Substance | Method of disposal |
| All gases with the exclusion of acetylene CO and He are all heavier than air. This means that these gases should be prevented from entering work pits drains and gullies.  This should be done by closing off the source of a leak whilst wearing self contained breathing apparatus and with SO2 chemical resistant protective clothing. With the flammables remove ignition sources. | Try to stop leak and ventilation. |
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| Please give details of any additional PPE that may be required whilst dealing with a major spill e.g. self contained breathing apparatus, respirator masks, aprons, gloves, protective footwear etc. Also indicate where this equipment is stored and the name of staff trained to deal with a major spill including their contact details.  Self contained breathing apparatus in all cases and chemical resistant clothing when dealing with SO2. | |

**Section 11: Information, Instruction and Training / Supervision.**

|  |  |
| --- | --- |
| Please indicate the sources of information used in compiling this assessment including Manufacturers Materials Safety Data Sheets (MSDS) and other sources of information e.g. Academic literature, HSE Codes of Practice etc.  BOC MSDS | |
| List any part of the procedure for which training / supervision is required and indicate whether training records are kept or not with a location. Include details of those trained in spill containment procedures.  Movement of cylinders and fitting and use of regulators all require training and training records are kept locally. | |
| Is Lone Working permitted for the activity outlined in this Risk assessment?  *If Yes please give details outlining any specific control measures (Lone Working Risk Assessment available).*  Inidividuals are permitted to undertake the movement of cylinders and the fitting of regulators but only during normal working hours 9am -5pm. | Yes |

**Section 12: Declaration.**

This activity has been assessed and the identified control measures listed are a requirement of the Faculty / School. This assessment must be accessible and signed by all personnel involved in this procedure.

|  |  |
| --- | --- |
| Name of Assessor | Andy Connelly |
| Signature |  |
| Date |  |

|  |  |
| --- | --- |
| Name of Academic Supervisor / Principal Investigator / Line Manager | Simon Bottrell |
| Signature |  |
| Date |  |

Assessment Review

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Review 1 | Reason for review | Review 2 | Reason for review |
| Due Date |  |  |  |  |
| Date Conducted |  |  |
| Conducted by |  |  |