RISK ASSESSMENT 3D Model

EHS Manual

THE UNIVERSITY OF MELBOURNE

This form is to be used in conjunction with the Environment Health and Safety Manual Procedure 3.2 Hazard Identification, Assessment and Control - Application.

Information of Activity

Activity: Use of Class 2 gases Location: _Chemistry_____

Identified by: ___ G. Papadopetros _____ Date: __4/12/06_____

Identified Hazard / Aspect: Fire or explosion, reaction of escaped gases with other chemicals, asphyxiation or poisoning.

Risk Analysis matrix – level of risk

Identified Hazards	Risk Assessment			Risk Score	Risk Level
	Exposure (E)	Likelihood (L)	Consequence (C)	E x L x C	
Fire or explosion (escape of Class 2.1)	2	0.3	10	6	M
Escaped gases reacting (eg. O_2, Class 2.2, sub 5.1)	3	0.3	10	10	M
Asphyxiation/poisoning (Class 2.2/2.3)	3	0.3	10	10	M

Definitions										
Exposure	E	Likelihood	L	Consequence	C	Risk Score	Hierarchy of Risk Controls
Continuously	10	Almost Certain	1.0	Catastrophic	20	**E** >20 **H** >10	**Elimination** is a permanent solution and should be attempted in the first instance.
Frequently	6	Likely	0.6	Major	10	**M** 3-10	**Substitution** involves replacing the hazard or environmental aspect by one of lower risk.
Occasionally	3	Possible	0.3	Moderate	5		**Engineering** controls involve physical barriers or structural changes to the environment or process.
Infrequently	2	Unlikely	0.1	Minor	2	**L** < 3	**Administrative** controls reduce hazard by altering procedures and providing instructions.
Rarely	1	Rare	0.05	Insignificant	1		**Personal protective equipment** last resort or temporary control.

LEGEND

E: extreme/significant risk; immediate action required; must be managed by senior management with a detailed plan, notify RMO immediately.
H: high risk, senior management attention needed, detailed research and management planning at senior levels
M: moderate risk, management responsibility must be specified; manage by specific monitoring or response procedures
L: low risk, manage by routine procedures; unlikely to need specific allocation of resources

Details of Risk Controls to be Taken

Risk Controls: *(These should be determined by both the person(s) identifying the risk and the responsible manager and HSR or Environmental Representative).* When determining risk controls refer to Hierarchy of Risk Control. Some examples are operating manuals, safe work procedures, licenses, permits to work, training and instruction etc

Gases must only be used in a fume-hood or in a well-ventilated laboratory. Cylinders should only be in the lab if they are in use, such as being hooked up to an instrument. Spare cylinders must not be stored in a lab.

Naked flames or other sources of ignition must be removed from the vicinity when using flammable gases or oxygen.

Gas cylinders, control valves, regulators and gauges should all be used carefully and according to the manufacturer's recommendations. Broken or damaged equipment should not be used. They must be removed from service and a "Danger Tag" attached to them. Only equipment that is appropriate *i.e.* specially designed

for use with toxic, explosive or corrosive gases may be used. Regulators must not be tampered with in any way. Regulators greater than 5 years old must be pressure tested and have a pressure capacity of 30,000kPa.

The smallest cylinder size that is practicable should be used *e.g.* a lecture bottle that can be sited in a fume hood.

There should be a regular check for leaks especially in joints. A flame must never be used when detecting for leaks. Consideration should be given to using a gas sensor to detect leakage. (See EHS Officer)

Receiving containers must be capable of accepting the gas at the required operating pressure.

Prior to introducing a flammable gas into a reaction vessel, the equipment must be purged of oxygen by evacuation or by flushing with inert gas.

Exhaust lines must be properly vented *e.g.* to a fume hood.

Cylinders of Class 2.1 gases must not be used next to oxygen. A physical barrier or at least 3 metres of separation are required.

In case of leak, attempt to close off the cylinder valve but do not endanger yourself. Eliminate all sources of ignition, ventilate and evacuate the laboratory. Be very wary of approaching a possible hydrogen leak since the gas burns with an almost invisible flame. If the leak is large, evacuate the laboratory, warn others in the immediate vicinity and hit a break-glass fire alarm. If there is a large scale leakage of an asphyxiating gas *e.g.* nitrogen or argon, never re-enter a laboratory without receiving clearance. Lack of oxygen may not be apparent but the effect will still be deadly. Be aware that asphyxiating gases may be heavier than air and accumulate at floor or lower levels.

Consult with the MSDS prior to using a gas for the first time. A separate Risk Assessment may need to be conducted for certain gases and special mixtures.

Lab coat and safety glasses must be worn when using gases.

Person assessing the risk: __ G. Papadopetros _____ Date: ___4/12/06_____

Authorised by: _____Prof. K. Ghiggino_____ Planned completion date: _____

Risk Control Measures Completed

Actions by: ____ G. Papadopetros _____ Completed (Initials & date): __4/12/06_____