

 Presentation to AIDGC 2008 

Hazardous Substances Risk Assessment

Philip Turner, Occupational Hygienist
WorkPlace Environment Consultants
02 9963 5355

Introduction Philip Turner



- Master of Safety Science
 - UNSW
- AIDGC member
- Certified Occupational Hygienist (COH)
 - AIOH
- Certified Industrial Hygienist (CIH)
 - ABIH


Philip Turner

Hazardous Substances Classification

Hazardous Substances Classification

- Risks to health
 - Immediate such as irritants & toxins
 - Long-term such as carcinogens
- Not other risks
 - Explosives
 - Asphyxiants
 - Reactive
 - Flammables
 - Combustibles
 - Biohazards
 - Radioactives

Hazardous Substances Wide Overlap with DG




- Most Class 3 also hazardous substances
- All Class 2.3, Class 6.1, Class 8 also hazardous substances

Dr Chris Winder

Hazardous Substances Identification

Hazardous Substances Identification


- Suppliers MSDS



safety.1800inet.com

Hazardous Substances Identification


- Australian hazardous label (uncommon)




NOHSC 2012

Hazardous Substances Identification

- Class 3 labels




Directive 67/548/EEC



AS 1216

Hazardous Substances Identification


- EU irritant label




Directive 67/548/EEC

Hazardous Substances Identification

- Class 6.1 labels




Directive 67/548/EEC




AS 1216

Hazardous Substances Identification

- Class 8 labels



Directive 67/548/EEC



AS 1216

Hazardous Substances Identification



hsis.ascc.gov.au

- hsis.ascc.gov.au
- ASCC/NOHSC criteria

Hazardous Substances Sources

Sources Rocks & Minerals



earthday.ning.com

- Rocks & minerals

Sources Farming & Food Production



www.crea.co.uk

- Pesticides & fumigants
- Grain dust
- Powders & granules
 - Flour
 - Coffee

Sources Healthcare & Agvet Products



www.ipc.gov.ps

- Medicines
- Agvet chemicals
- Anaesthetics
- Disinfectants


Sources Consumer & Recreation Products



www.fishingmag.co.nz

- Perfumes & fragrances
- Disinfectants
- Fishing & Shooting
- Art & Craft


Sources Transport & Fuels



- Petroleum products
- Workshop chemicals

www.chm.bris.ac.uk

Sources Construction Materials



- Asbestos
- Wood dust
- Concrete-Silica
- Waterproofing
- Insulation

www.hereandthere.com


Sources Commercial Products



- Hairdressing
- Cleaning/disinfection
- Printing

www.cit.act.edu.au

Sources Industrial Chemicals




- Dyes & pigments
- Plastic production
- Solvents
- Electroplating
- Electronics
- Hazardous Waste

www.troychemical.com

Hazardous Substances Legislation

Hazardous Substances Legislation - WorkCover



- Occupational Health & Safety Regulation 2001
- Part 6

Hazardous Substances Legislation - Style



www.swwarp.net

- Performance-based
- Risk-management approach
 - Identify hazards
 - Assess risks
 - Implement controls
- Advantage
 - Flexibility
- Disadvantage
 - little practical guidance

Hazardous Substances Legislation - Opinion

- Part 6 should be about the **use** of hazardous substances
- Part 6A should be about the **keeping** of dangerous goods
- DG keeping requirements in Part 6A have been obscured by DG use requirements copied from Part 6
- NSW requires a risk assessment for all work anyway, so no need for much of the confusion

Dangerous Goods Risk Assessment

Risk Assessment Dangerous Goods

- My approach is to ensure that a site complies with Australian Standards for the keeping of dangerous goods
 - Most dangerous goods have a specific Australian standard
 - Class 4 an exception - NFPA standards available
- I list the use of dangerous goods as an exclusion in the scope of works

Hazardous Substances Risk Assessment

Risk Assessment Employers – Also Suppliers?




www.csfe.com.sg

- Many employers also supply dangerous goods & hazardous substances
- Recommendations
 - Correct classification
 - Adequate labeling
 - Material safety data sheets (MSDS)
 - Compliant transport

Risk Assessment Employers - Safety Management

- Recommendations
 - Adequate safety staff, resourcing & budget
 - Adequate training & supervision
 - Consultation with employees
 - Identification, assessment & control of hazards
 - Standard operating procedures
 - Pre-purchase approval then stock control
 - Planning for emergencies
 - Reporting hazards & investigating incidents
 - Record keeping

Risk Assessment Employers - Consultation




- Working with employees always leads to a better risk assessment
- But, employer has ultimate duty for consultation
- Clients advised to consult after issue of report

www.teamtechnology.co.uk


Risk Assessment Hazardous Substances

Assess the process, not the substance. Include ancillary processes & substances.



www.monograms-more.com

- Assess screen printing (not printing ink) - include the clean up, the storage area & any bulk storage areas.



www.firstchoicemarketing.co.uk

- Assess window cleaning (not 2-butoxyethanol) - include the mixing step, the storage area & any bulk storage areas.

Risk Assessment Hazardous Substances

1. Obtain suitable standards and/or guidelines
2. Identify basic information
 - Physical form of substance
 - Exposure pathways
 - Patterns of use
3. Identify regulated substances /& processes
 - Hazardous substances & DG classification
 - Prohibited substances
 - Notifiable substances
 - Health surveillance list
 - Regulated processes

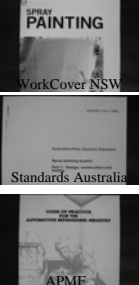
Risk Assessment Hazardous Substances

4. Identify dangerous goods issues
 - Placarding & manifest
 - Keeping & storage
 - Emergency plan
 - Transport
5. Conduct exposure monitoring if required
 - Identify exposure standard/s
 - Select sampling method & strategy
 - Choose laboratory

Risk Assessment Hazardous Substances


6. Assess adequacy of control measures
 - Labels, chemical register, training
 - Ventilation
 - Hazardous areas
7. Assess adequacy of protective equipment
 - Correct gloves & protective clothing
 - Correct eyewear
 - Correct respirators
7. Identify any additional control measures
8. Prepare a report

Risk Assessment Standards & Guidelines



- Scattered widely
 - Australian standards
 - WorkCover & others
 - Industry associations
- Varying quality
- Availability of guidelines
 - Nil
 - One
 - Multiple choice (spray painting for example)


Risk Assessment Physical Forms



- Gases
- Vapours
- Aerosols
 - Inhalable dusts
 - Respirable dusts
 - Mists
 - Fibres

www.cdc.gov/elcosh


Risk Assessment Exposure Pathways



- Inhalation
 - Direct
 - Contaminated cigarettes
- Skin absorption
 - Through the intact skin
- Ingestion
 - Contaminated food & drink
- Inoculation
 - eg needle stick

www.ph.ucla.edu

Risk Assessment Patterns of Use



- Batch/continuous process
- All day/intermittent
- Daily/weekly/monthly
- Infrequent
- Planned/Unplanned

www.salestores.com

Risk Assessment Regulated Substances



- Hazardous Substances
- Dangerous Goods
- Labels
- MSDS
- hsis.ascc.gov.au
- Official criteria

National Transport Commission

Risk Assessment Notifiable Carcinogens

Additional duties for a number of notifiable carcinogens

- Acrylonitrile
- Benzene (feedstock > 50%)
- Chrysotile
- Cyclophosphamide
- 3,3'-dichlorobenzidine & salts
- Diethyl sulphate
- Dimethyl sulphate
- Crystalline silica
- Ethylene dibromide
- 4,4'-methylene bis(2-chloroaniline)
- 2-propiolactone
- o-toluidine
- o-toluidine hydrochloride
- Vinyl chloride monomer

Risk Assessment Prohibited Carcinogens

- Certain carcinogens prohibited
 - 2-acetylaminofluorene
 - Aflatoxins except where permitted in foods
 - Asbestos except in certain circumstances
 - benzidine
 - Bis(chloromethyl) ether & contaminated chloromethyl methyl ether
 - 4-dimethylaminoazobenzene
 - 2-naphthylamine
 - 4-dinitrophenyl

Risk Assessment Banned Hazardous Substances

- Arsenic in spray painting
- Asbestos except for limited uses
- Some solvents (5) in spray painting
 - Benzene >1%
 - Carbon disulphide
 - Methanol >1%
 - Tetrachloroethane & tetrachloromethane
- Sand & crystalline silica
 - Abrasive blasting, some foundry tasks

Risk Assessment Required Health Surveillance

Health screening for some substances, unless proven otherwise

- | | |
|----------------------|---|
| – Acrylonitrile | – Inorganic lead |
| – Inorganic arsenic | – Inorganic mercury |
| – Asbestos | – MOCA |
| – Benzene | – Organophosphate pesticides |
| – Cadmium | – Pentachlorophenol |
| – Inorganic chromium | – Polynuclear aromatic hydrocarbons (PAH) |
| – Creosote | – Thallium |
| – Crystalline silica | – Vinyl chloride |
| – Isocyanates | |

Risk Assessment Listed Hazardous Processes

- Spray painting
- Abrasive blasting
- Welding
- Electroplating & related processes
- Molten metal
- Lead risk work

Risk Assessment DG Issues




www.cisco-eagle.com

- Placarding
- Manifest
- Keeping & storage
- Emergency plan
- Transport

Risk Assessment Exposure Standards

- Numerical values assigned to acceptable concentrations of chemical or biological agents
- Standards for airborne exposure the most common
 - 500 ppm over 8 hours for acetone, for example
- Some standards for body fluids
 - Lead in blood for example

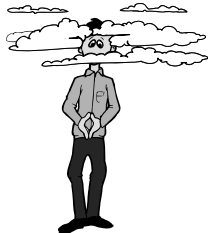
Risk Assessment Exposure Standards



Australian Government
Australian Safety and Compensation Council

- Issued by the ASCC in Australia
- Listed at hsis.ascc.gov.au
- Formerly the National Occupational Health & Safety Commission (NOHSC)


Risk Assessment Breathing-Zone Samples




- breathing zone sampling required
- 30 cm from nose & mouth
- AKA personal samples

Art Explosion

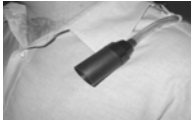
Risk Assessment Dust Monitoring



Vincent (1995)





Philip Turner




Philip Turner

- inhalable dust
- respirable dust
- Respirable fibres

Risk Assessment Gas & Vapour Monitoring


Philip Turner



Philip Turner

- Gas detectors
- Detector tubes
- Sorbent tubes/diffusion badges
- Impingers/coated sorbents

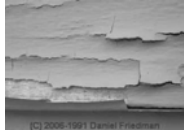
Risk Assessment Biological Monitoring




www.bbc.co.uk

- Blood
 - Lead & other metals
- Urine
 - Organic compounds
- Exhaled air
 - alcohol

Risk Assessment Sampling Bulk Materials




www.inspectNY.com



Philip Turner


- Unknowns
- Lead in paint
- Settled dust

Risk Assessment Surface Monitoring




- Toxic metals
- Dermal hazards
- Generally no official guidelines available

www.skinc.com



Philip Turner


Risk Assessment Control Measures



- Assess adequacy of control measures
 - Ventilation
 - Hazardous areas
 - Static electricity

Philip Turner

Risk Assessment Control Measures - Warnings



- Hazard warnings
- Labeling containers
- Placarding vessels
- Chemical register
- Training employees
- Others

www.infrastructure.com.au


Risk Assessment Protective Equipment



- Assess adequacy of protective equipment
 - Gloves
 - Protective clothing
 - Eyewear
 - Respirators
- Recommend compliant equipment if required

www.medisave.co.uk


Risk Assessment Other Control Measures



- Elimination & Substitution
- Isolation
- Engineering controls
- Administrative controls
 - Management issues
 - Cleaning
 - Hygiene
 - Maintenance
- Additional protective equipment

www.bachmann-forming.ch

Risk Assessment Reporting



- Prepare a written report
- Clearly define the scope of works
- Identify the process, substances & tasks involved
- Spell out if the risks are acceptable or unacceptable
- Identify practical control measures if required

www.aspects.net/~stephenginns

