

February 2017

**HSNO EXEMPT LABORATORY
MANUAL**

WELLINGTON CAMPUS

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Acronyms

AS/NZS	Australian/New Zealand Standards
COP	Code of Practice
CRI	Crown Research Institute
DG	Dangerous Goods
DGS	Dangerous Goods Store
DLM	Departmental Laboratory Manager
EPA	Environmental Protection Authority
ERMA	Environmental Risk Management Authority
GHS	Globally Harmonized System
H&S	Health and Safety
HOD	Head of Department
HSE	Health and Safety in Employment
HSNO	Hazardous Substances and New Organisms
HSRC	Hazardous Substances and Radiation Committee
IATA	International Air Transport Association
IBSC	Institutional Biological Safety Committee
LCO	Laboratory Compliance Officer
LEL	Lower Explosive Limit
LM	Laboratory Manager
LS	Laboratory Supervisor
MSDS	Material Safety Data Sheet
OSH	Occupational Safety and Health
PC	Physical Containment
PPCE	Personal Protection Clothing Equipment
PPE	Personal Protection Equipment
SDS	Safety Data Sheet
SMOU	Safe Method of Use
SOP	Standard Operating Procedure
ULM	University Laboratory Manager
UN	United Nations
UO	University of Otago
UOW	University of Otago, Wellington
WES	Workplace Exposure Standard

Introduction/Preface

The University of Otago, Wellington is involved in activities in numerous areas of research that use hazardous substances. Such activities have the potential to cause harm arising from exposure to hazardous chemicals, and therefore require compliance with strict operational standards.

The Code of Practice has been signed off by EPA as an accepted method of compliance for laboratories under the HSNO Exemption section 33. This Manual describes the University of Otago, Wellington management of HSNO laboratories for compliance with the Approved Code of Practice for Exempt Laboratories. The advantages for the University opting to comply with the COP are:

- Use of unapproved substances in laboratories without application to EPA for approval; and
- Approved handler training is not required for all staff and students working in laboratories with hazardous substances.

However, to operate as a HSNO Exempt Laboratory, the University must:

- Have an approved laboratory and hazardous substances management structure in place;
- Have laboratories designed and operating to the standards in the code;
- Have substances labelled and identified, and stored appropriately; and
- Have processes for safe methods of use of hazardous substances.

The following publications are relevant:

- AS/NZS Standard 2243.1:1997: Safety in laboratories. Part 1: General
- AS/NZS Standard 2243.2:1997: Safety in laboratories. Part 2: Chemical aspects
- AS/NZS Standard 2243.3:2010: Safety in laboratories. Part 3: Microbiology
- AS/NZS Standard 2243.8:2001: Safety in laboratories. Part 8: Fume cupboards
- AS/NZS Standard 2243.10:2001: Safety in laboratories. Part 10: Storage of chemicals
- HSNO Code of Practice for CRI and University Exempt Laboratories 2004
- IATA Dangerous Good Regulations
- Hazardous Substances and New Organisms Act 1996
- Code of Safe Practice for the Use of Unsealed Radioactive Materials in Medical Diagnosis, Therapy and Research 1994
- Radiation Protection Act 1965
- The Radiation Protection Regulations 1982

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1.0 Management of Laboratories

1.1 Definition of HSNO Exempt Laboratories

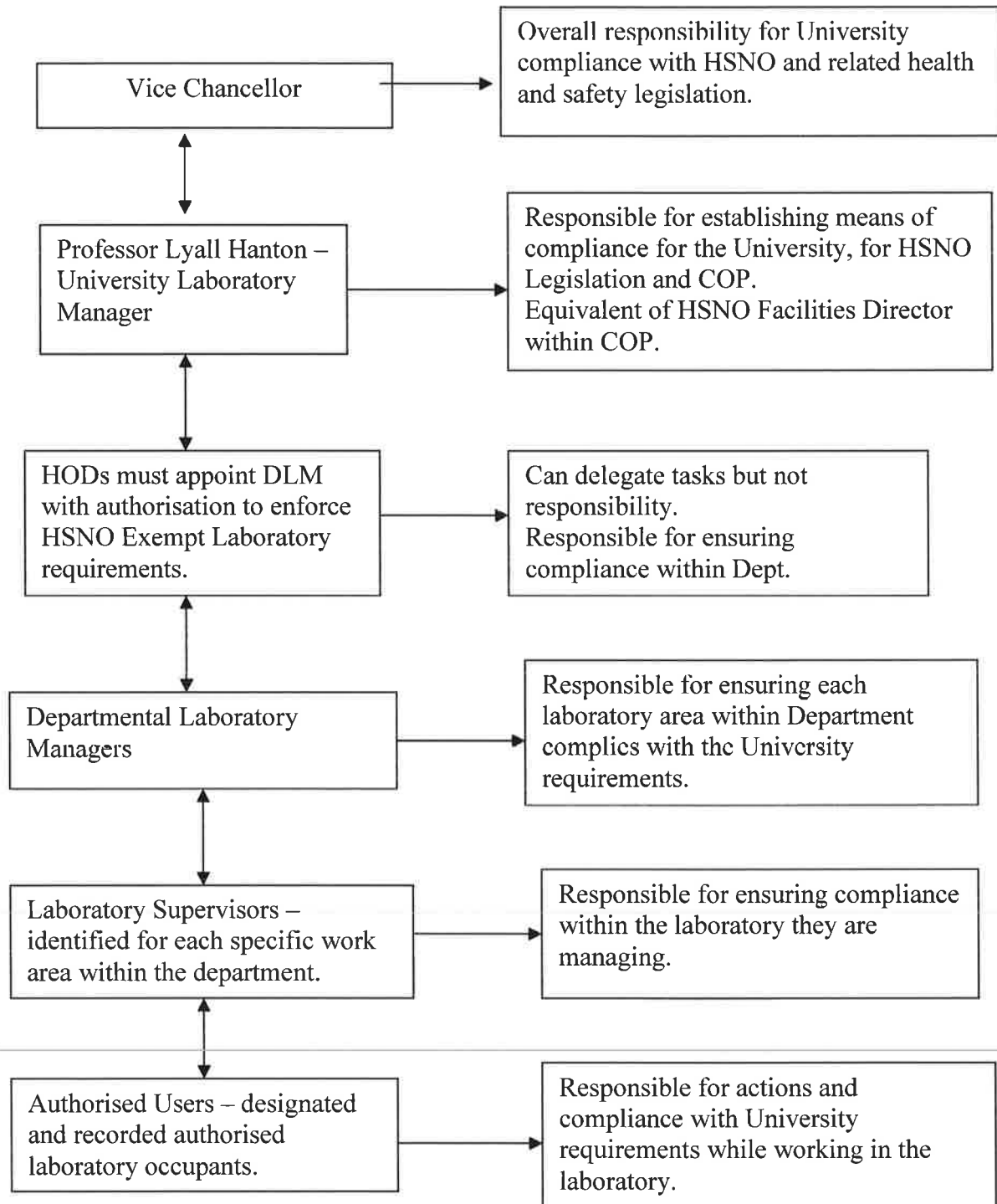
All HSNO Exempt Laboratories within the University of Otago, Wellington are clearly identified, and authorised by the University Laboratory Manager. The listed HSNO Exempt Laboratories can be found in Appendix 1.

Any new areas not on this initial schedule must be submitted through the upgrade process for assessment and prioritisation by the ULM.

1.2 Management Structure

The following organisational chart allocates the responsibilities for compliance within the University of Otago.

1.3 University of Otago Management Structure and Responsibilities



Vice-Chancellor

The Vice Chancellor, as the Employer, has overall responsibility for health and safety compliance, including the HSNO legislation which sits within this framework. The University compliance system developed by HSRC (Hazardous Substances and Radiation Committee) is the means of compliance to be implemented throughout the University, with compliance responsibilities delegated through the management structure.

Hazardous Substances and Radiation Committee (HSRC)

The Hazardous Substances and Radiation Committee (HSRC) is the committee responsible for the development of University policies and procedures required for compliance with the HSNO and Radiation legislation. The UOW representative on this committee is the Laboratory Manager.

University Laboratory Manager (ULM)

Professor Lyall Hanton has been appointed to the position of University Laboratory Manager (ULM). Through the Hazardous Substances and Radiation Committee, the ULM establishes the means of compliance through policy development and reporting structures through the Departmental Laboratory Managers. The key responsibilities of the ULM are listed in Appendix 2.

Head of Department (HOD)

Heads of Departments have the line management responsibility to ensure that their department is compliant with the requirements of the HSNO legislation and University system requirements, as they have for health and safety compliance requirements. The HOD may delegate the tasks associated with compliance but not the responsibility. The HOD must appoint a Laboratory Supervisor and authorise this person to have sufficient authority to implement the required controls. Compliance reports and regular meetings with the LS must support this position.

University of Otago, Wellington Laboratory Manager (LM)

The appointed University of Otago, Wellington Laboratory Manager is responsible for compliance at this campus, under the direction of Professor Lyall Hanton. Key tasks are attached as Appendix 3.

University of Otago, Wellington Laboratory Compliance Officer (LCO)

The University of Otago, Wellington Laboratory Compliance Officer is responsible for facilitating compliance at this campus, under the direction of Ann Thornton, the UOW Laboratory Manager. Key responsibilities are attached as Appendix 4.

Laboratory Supervisor (LS)

The laboratory supervisors are the individuals with responsibilities for a specific laboratory room or part of a room, who reports to the LM on compliance in the area of their jurisdiction. When the LS is absent, then a second in command must be identified. If both the LS and the second in command are away, the LM is notified. LSs must keep records of the authorised users for their specific area of responsibility. The key responsibilities are listed in Appendix 5.

Authorised Users

Authorised users are those individuals who have been assessed by the LS as competent and able to work in the Supervisor's laboratory. Authorised users will be identified and recorded. Post-Doctorates and first & second year Masters Students, may be approved by the LS as authorised users, providing they meet the knowledge requirements. Undergraduate students are not required to be recorded, as supervision is required at all times. The responsibilities of authorised users are listed in Appendix 6.

1.4 Management Structure Documentation Requirements

All of the above must be in written documentation, clearly stating who is primarily in charge of the laboratory or a designated area of the laboratory. The second in command must also be identified as the person who will assume responsibility during absences greater than three days by the primary supervisor. The format for documenting the information is attached as Appendix 7. This information is required to be readily available for staff to refer to, and all laboratory staff should be aware of the required delegations. The information is updated annually and passed on to the Laboratory Manager.

All staff and students must have their projects involving hazardous substances approved by the LS and the LM to be an authorised laboratory user. The documentation must include any restrictions on work able to be done outside of normal working hours.

In undergraduate laboratories, there must be a LS in the laboratory at all times. The supervisor may have a second in command to cover periods of absence. This structure must be documented so that the laboratory is not left unsupervised at any time.

2.0 Managing Laboratory Hazards

The Health and Safety in Employment (HSE) Act 1992 and HSE Amendment Act 2002 require the identification and control of actual and potential hazards in a place of work. The hazards identified should be listed in VAULT or the departmental hazard register and the control measures defined. The hazard must be eliminated where practical and where elimination is not practical, the hazard must be isolated, and where it is not practical to eliminate or isolate the hazard, the hazard must be minimised. Every worker shall take all practicable steps to ensure their own safety and the safety of other people.

Hazard identification requires consideration of both the task and also the environment/location.

2.1 Hazard Assessment

Good Laboratory Practice requires that all users of any hazardous substances used for the first time, inform themselves (and when appropriate, their colleagues) of the properties and hazards associated with that substance.

Elimination and Substitution Controls:

The HSE Act 1992 and HSE Amendment Act 2002 requires identified hazards to be assessed for their significance. A significant hazard is one that can cause serious harm as defined by the HSE Act 1992.

The hierarchy of hazard control as per the legislation is:

Elimination, where practicable; or

Isolation, where elimination is not practicable; or

Minimisation, where elimination and isolation are not practical controls.

Elimination Controls:

Elimination is the preferred level of control. Can the research or teaching be achieved without the use of the hazardous substance?

Elimination could involve the substitution of a less hazardous substance. When planning research the first consideration is the type of hazardous substance to be used.

Isolation Controls:

Isolation of the exposure to the hazard may include some of the following:

Exclusion of individuals not involved in the procedures from the immediate environment;

Appropriate cleaning of equipment, management of spills, and use of hazardous waste disposal methods to prevent exposure to other parties; and/or

Automation of laboratory procedures.

Minimisation Controls:

Minimising the exposure to hazardous substances includes the following:

Laboratory design,
Experiment design,
Staff training,
Standard operating procedures,
Safe waste management, and
Personal protective equipment.

These steps minimise but do not eliminate exposure risk. Where exposure is known or suspected to have occurred, the health of the individual must be monitored.

How do I find out a HSNO Classification?

Prior to use of a substance, you must know the hazards associated with the substance. The HSNO classification will provide you with a list of classes and the associated hazards. Access the Chemwatch web site: <http://jr.chemwatch.net/chemgold3/>. This database will provide any HSNO classifications allocated to a substance. Inform your laboratory manager/supervisor of the substance to be used if it is new to the laboratory.

Unclassified Substances/De Novo Substances

If the substance has not been classified by EPA, print the SDS from Chemwatch and attempt to classify the substance yourself. For de novo substances that have not been approved by EPA, classification should be attempted, for example for structural similarity and physical properties to existing classified substances.

Check with your Laboratory Supervisor and LM if you have any concerns or are unsure what to do, or if the substance is potentially high risk.

2.1.1 HSNO Classifications

The following are the HSNO Classifications:

Class 1 Explosive

- 1.1 Mass explosion
- 1.2 Projection
- 1.3 Fire and minor blast
- 1.4 No significant hazard
- 1.5 Very insensitive
- 1.6 Extremely insensitive

Classes 2,3,4 Flammability

- 2.1.1 Gases
- 2.1.2 Aerosols
- 3.1 Liquids
- 3.2 Liquid desensitized explosive
- 4.1.1 Readily combustible
- 4.1.2 Self-reactive
- 4.1.3 Solid desensitized explosive
- 4.2 Spontaneously combustible
- 4.3 Dangerous when wet

Class 5 Capacity to Oxidize

- 5.1.1 Liquid/solids
- 5.1.2 Gases
- 5.2 Organic peroxides

Class 6 Toxicity

- 6.1 Acutely toxic
- 6.3 Skin irritant
- 6.4 Eye irritant
- 6.5 Sensitizer
- 6.6 Mutagen
- 6.7 Carcinogen
- 6.8 Reproductive/developmental
- 6.9 Target organ systemic

Class 8 Corrosive

- 8.1 Metallic corrosive
- 8.2 Skin corrosive
- 8.3 Eye corrosive

Class 9 Eco Toxicity

- 9.1 Aquatic
- 9.2 Soil
- 9.3 Terrestrial vertebrate
- 9.4 Terrestrial invertebrate

2.2 Safe Method of Use

The Safe Method of Use for the HSNO classes and individual high risk substances is located on the H&S web page (<http://www.otago.ac.nz/healthandsafety/>)Health & Safety A - Z/S.

Where the laboratory is using these substances, then the Safe Method of Use must be downloaded and available for staff. **NO WORK IS TO COMMENCE WITHOUT PRIOR REFERENCE TO THE SAFE METHOD OF USE.**

At present there are Safe Methods of Use for the following hazardous substances on the UO Health and Safety website (under Hazard Management Documents - HSNO):

- Class 2: Gases (Cryogenic Liquids, Liquid Nitrogen)
- Class 3: Flammable Liquids
- Class 4: Flammable Solids
- Class 5.1: Oxidising Substance
- Class 6.1: Acutely Toxic (Solids, Liquids)
- Class 6, Subclasses 6.5 – 6.9: Chronic Toxicity
- Class 8: corrosives
- Concentrated Phenol
- Hydrofluoric Acid
- Liquid Nitrogen
- Peroxide Forming Chemicals
- Picric Acid (2,4,6 Trinitrophenol)

The requirements within the safe method of use must be implemented and compliance will be audited. Where these are available, they must be adhered to. In addition to the Safe Method of Use, the Safety Data Sheet for the substances must be readily available.

Where no Safe Method of Use is available, or a hazardous substance has been developed de novo, the LM must be notified for a Safe Method of Use to be developed where the substance is to be held or used for 48 hours or longer.

Where a Safe Method of Use requires additional equipment, such as extraction or ventilation, the substance must not be used until the required equipment is obtained, or alternative resources are identified for use. The LM will complete and authorize a laboratory upgrade request or make arrangements for access to the required equipment. Any foreseeable project should be assessed for additional equipment prior to the start of the project to prevent delays.

2.2.1 Handling Hazardous Substances

Before handling any hazardous substance all laboratory personnel should be aware of the general safety procedures of their use. Relevant SDS sheets should be consulted and Safe Method of Use consulted to ensure all personnel are familiar with hazardous properties of the substance and how these properties affect the following:

- Storage
- Incompatibilities with other substances
- Safe handling and containment within the laboratory facility

- How and where the chemical is to be decanted or weighed
- Whether fume hoods are to be used
- What Personal Protective Equipment is to be used and what types of glove material provide adequate protection
- How to deal with a spill and how to dispose of clean-up material
- How to dispose of the substance

Laboratory personnel must also comply with the requirements of the Code of Practice.

Containers of:

2.1.1A (Flammable Gas); or

3.1A (Flammable Liquid); or

3.2A (Liquid Desensitized Explosive); or

Any Class 6 (Toxic) Category A or B substance, with a high inhalation hazard (i.e. gases, very dusty material and very volatile liquids);

Any Class 8 (Corrosive) volatile Category A or B substance;

Are only to be opened or used in either fume cupboards or other facilities providing protection to the person opening and using the hazardous substance and to others in the laboratory.

Flammable Gases

Flashback arresters are fitted to regulators attached to flammable gas bottles attached to or used near any source of ignition.

Cylinders of flammable gases are only stored in areas provided with adequate ventilation to ensure any leaked gas does not accumulate to levels that are 10% of the Lower Explosive Limit (LEL).

Flammable Liquids

The opening and decanting of all flammable liquids must be carried out in a suitable fume cupboard.

Category A flammable liquids are only opened and poured:

In a suitable fume cupboard; or

At a location where flammable vapours will not accumulate and local ventilation will ensure that the concentration of flammable vapour does not exceed 10% of the LEL at any actual or potential ignition source.

When pouring, decanting, or pumping any flammable liquid from one metal container to another, precautions to prevent the buildup of static should be taken.

Containers are opened for as short a time as possible and never near any source of ignition. In any one place, the duration that any container of flammable liquid is opened will not exceed 10 minutes.

Toxic and Corrosive Gases

Toxic gases such as carbon monoxide, and corrosive gases, should be stored in well-ventilated areas.

The Laboratory Supervisor must ensure that at least one other person is present when work with compressed toxic gas is undertaken.

Toxic and Corrosive Liquids and Solids

The opening and decanting of Class 6 toxic substances or Class 8 corrosive substances that have a Category A or B hazard, to which personnel are likely to be exposed (i.e. gases, dusts, volatile liquids) is carried in a fume cupboard, or other equipment that shall provide protection to the person using the substance.

Note: Additional precautions over and above use of fume hoods that might be considered include minimising the quantity of substance used, having backup/rescue personnel standing by or having antidotes available.

2.3 Safe Method of Use for High Risk Substances

Where a substance is considered high risk there will be an individual Safe Method of Use. If you are using one of these substances, you must advise your Laboratory Manager/Supervisor. If you believe that the substance is high risk and has not been classified or a SMOU prepared, advise your Laboratory Manager/Supervisor who will make arrangements for the substance to be assessed and a SMOU documented by the ULM.

2.4 Application of the Safe Method of Use

The SMOU will stipulate the conditions of use for the substance e.g. use of fume cupboard, PPE, etc. These controls must be applied when you are using the substance. If you are unable to access the required controls, or have any concerns, contact your LM prior to commencing work.

2.5 Duties for Personnel Handling Hazardous Substances

As an authorised user, you are personally responsible to identify the hazards of the substances in use, and apply the required controls. Contact your LM if you are unsure, PRIOR TO COMMENCING WORK. For some high risk substances, you will be limited as to when you may use the substance (e.g. only during work hours 8:30am – 5pm).

2.6 Induction and Training Requirements

All staff and students working in HSNO Exempt Laboratories must have completed the standard induction-training package prior to commencing work. The LS must maintain records of the training provided. The training and induction records must be maintained.

The Laboratory Induction pack contains:

New Staff Form – to be returned to the LM as soon as possible

Training Record Sheet – to be returned to the LM when completed (within 6 weeks)

Staff Orientation – to be retained by staff member

Standard laboratory procedures – to be retained by staff member

University of Otago laboratory rules – to be retained by staff member

PC1 and PC2 laboratory requirements – to be retained by staff member

UOW H&S “Safety Matters” brochure – to be retained by staff member

2.7 General Chemical Safety

Staff and students working in laboratories will encounter a great variety of hazardous substances. It is essential that before working with such materials laboratory workers:

- Understand the hazards associated with particular chemicals used including the hazards of any product or by-product formed and any physical conditions that may develop as a result of the reaction and process concerned.
- Understand what procedures are necessary to ensure hazardous conditions do not develop and to ensure that any likelihood of harm occurring to anyone in the laboratory is minimised.
- Understand procedures for any accident, incident or any emergency situation, including the location of first aid and fire fighting equipment (only if it is safe to do so).
- Ensure that chemical disposal is considered.
- The correct PPE is used for any particular chemical.

3.0 Operational Requirements

3.1 University of Otago Laboratory Rules

University of Otago Laboratory Rules are included in the induction pack and in Appendix 8.

3.2 Entry to Laboratories

Authorised Persons

All laboratories are locked in the absence of the LS, or any other nominated person who is directed (in writing) to be in charge. Only authorised persons are permitted in the laboratory area, and the locking facilities are designed to prevent this entry. All HSNO Exempt Laboratories must be locked when not in use.

Unauthorised Persons

- Children under the age of 16 years are not permitted in laboratories where hazardous substances are in use, unless on an arranged authorised (by LM) and supervised study or tour or during open days.
- The LM is responsible to ensure that maintenance and cleaning contractors are fully inducted prior to working in a laboratory. There are video, information, and presentation packages available for delivery to cleaners.

3.3 Information and Labelling Requirements for Containers

If any hazardous substance is being used in a laboratory, the following information is documented:

- the identity of the substance; and
- the concentration, if applicable; and
- a brief warning of the hazardous properties. This information is provided by use of Globally Harmonized System (GHS) pictogram.

The warning label is not a substitute for information which is provided by a Safety Data Sheet. Laboratory personnel must read and comply with the safety procedures as stated by the Safety Data Sheets.

The identity, concentration and hazardous properties should be a style or form commonly used in science or industry.

Purchased substances should have the correct labelling in place. If not, then a pictogram of the primary hazard must be placed on the bottle.

The Chemwatch database <http://jr.chemwatch.net/chemgold3/> includes the HSNO classifications where substances have been classified by EPA.

As the HSNO classification system includes all hazardous properties, some substances will have a number of labels. The primary hazard (most significant) should be identified by a larger label, and additional classes with the smaller labels. Where substances are tracked, a 'T' label will be required as well.

Containers of substances must be checked regularly (at least annually) to ensure that no cracks or leaks are evident. Substances that have leaked onto shelving or similar will be cleaned immediately. Leaking containers must be disposed of immediately. Any repairs to containers (e.g. specimen containers in pathology museums) must be completed in a HSNO Exempt Laboratory.

3.4 Working Containers

Where working containers of hazardous substance are used to hold hazardous substances for 48 hours or more, a HSNO classification label must be applied. If the container is too small for a label (e.g. eppendorf tubes) then it is placed in a secondary receptacle container and this container is labelled.

The concentration and identity of the hazardous substance will be available on working containers, by permanent marker or printed labels. Where containers are too small, the above applies.

3.5 Personal Protective Clothing and Equipment (PPCE)

PPCE includes lab coats and gowns, safety glasses, face shields and masks, gloves and barrier creams, shoes and boots, respirators, helmets, footwear coverings, ear muffs and plugs, and specialised equipment for cryogenic work or environments with high temperatures.

PPCE requirements as specified by the SMOU and/or SDS should be identified prior to the use of any hazardous substances. This information is required to be accessible to the handler within 10 minutes. Where PPCE is required it shall be readily available and staff trained in the correct use. PPCE must be regularly maintained in working order. Training and maintenance of equipment must be documented.

The Laboratory Supervisor ensures that adequate instruction with regard to appropriate protective clothing and equipment is provided to all laboratory personnel handling hazardous substances.

Safety showers and/or eye wash facilities are available within 10 metres of where corrosive substances and category A toxic substances are used.

- Appropriate PPCE must be available and used at all times by ALL people working in laboratories using any hazardous substances/equipment, potentially infectious material, microorganisms and other risk goods.
- Visitors, contractors and other people present in laboratories/facilities where they may be exposed to hazardous substances/equipment, potentially infectious material, microorganisms and other risk goods must use PPCE, as appropriate, to mitigate the risks of exposure and the likelihood of containment breach. NOTE: Contractors performing work within laboratories/facilities must supply their own PPCE and are responsible for employee training in its use.
- PPCE must not be used as a replacement for good work practices, processes, procedures and controls; rather, it must be used in conjunction with these to ensure the health and safety of people and the containment of organisms is maintained.
- Enclosed footwear must be worn at all times (Refer 3.6 *Footwear Requirements* in this Manual).
- Appropriate eye and face protection equipment (e.g. safety glasses or face shields) must be used when undertaking activities likely to expose the eyes and face to splashes and impacts from objects being used.
- Gloved hands must not touch surfaces that another person may subsequently touch (e.g. door handles, light switches).
- PPCE must be used and maintained in a way intended by the manufacturer, as required by particular job function and appropriate to the hazardous practices being employed.
- Used PPCE must be disposed of or decontaminated in practical ways that prevent further contamination of people, places and equipment and the distribution of organisms beyond their intended place of containment.
- PPCE used when working with potentially infectious material and risk goods (including organisms) that must be contained or hazardous substances, must **NOT** be worn outside facilities/laboratories or into areas within the facility designated as “clean”, such as staff lounges, restrooms, office areas (including embedded offices) or institutional common areas (e.g. cafeteria, hallways, libraries, write-up areas, toilets, etc.).
- PPCE must be removed and stored appropriately, and hands washed before leaving the swipe card-controlled or locked area.

3.6 Footwear Requirements

Feet should be covered with appropriate footwear to provide protection to workers as specified in the relevant AS/NZ standard series Safety in Laboratories.

Footwear should have non-slip soles, and cover the majority of the foot, including the toes, heels and forefoot. Footwear should also be constructed of materials that are resistant to penetration by liquids and which can be easily cleaned if required, e.g. leather, plastic, rubber.

The function of footwear in a laboratory is to:

- Protect the feet from dropped glassware and other sharp objects.
- Prevent liquids such as spilt chemicals or bacterial cultures from soaking into the shoes trapping liquid close to the skin or landing on the top of the foot (i.e. your footwear is the primary barrier to prevent a spill contacting skin causing hot or cold burns, cuts, or contact with chemicals or bacterial cultures).
- Prevent slipping.
- Prevent any part of the foot from contacting the floor during sudden or unusual movement (avoiding contact with spills or broken glass on floor).

Where specific safety footwear is required for a particular hazard, it shall be selected in accordance with AS/NZ 2210.

3.7 Storage in the Laboratory

Hazardous substances are segregated by classification. Incompatible substances must be segregated. Appendix 9 lists the hazard categories legally incompatible under HSNO – this list is not exhaustive.

All substances held in laboratories shall be in the minimum quantities required for the work being undertaken to reduce risk.

Bottles and jars of ready-to-use reagents stored on benches or shelves are not to exceed 1 litre for category A substances and 2.5 litres for all other hazardous substance categories. Storage cabinets should be used where practical. Hazardous substances not in regular use shall be stored in storage cabinets.

Pooling substances and incompatible substances should be provided with secondary containment. Secondary containment may be provided by plastic trays (or buckets) underneath corrosive substances, or metal trays for organic solvents.

Storage shelves must have a lip or other means of preventing containers falling from shelves during minor earthquakes.

Where hazardous substances are stored in refrigeration conditions (fridges and cool stores), the storage temperatures must be maintained and recorded. Electrical safety of the refrigeration unit must be consistent with the storage of flammable substances. Cool stores must also be fitted with emergency egress devices.

3.8 Dedicated Storage Areas

Storage of Compressed Gases

- Quantities of flammable and oxidising gases stored in the laboratory will be kept to a minimum.
- Toxic gases shall not be kept in the laboratory unless in use. While in use, the presence of the gas must be signed at the entrance to the room.
- When toxic/corrosive gases are in use, two authorised users must be present.
- No more than two cylinders of each formulation of gas should be stored adjacent to each instrument. All size G gas cylinders will be double chained or secured to immovable objects such as walls. Smaller cylinders will be restrained or rendered immobile in secure gas bottle stands.
- Large cylinders stored outside the laboratory room (or in areas such as pickup and delivery points) will be stored in well ventilated areas so that in the event of a leak of flammable gas, the concentration will not exceed 10% LEL. All gas cylinders will be securely double chained to immovable objects such as walls.

Storage of Flammable Liquids

Quantities of flammable substance in the laboratory are kept to a minimum. Storage cabinets for flammable substances do not contain any ignition sources.

Flame-proof cabinets are recommended storage for flammable substances.

No more than 100 litres of flammable liquid are stored in any one cabinet and secondary containment is able to retain at least 50% of contents of the cabinet.

Refrigerators used to store open containers of Class 3.1A and Class 3.1B flammable substances, with a flash point less than 15°C, are spark proofed (i.e. thermostats have been externally mounted and light fittings removed). The refrigerator is labelled as suitable for use with these substances.

Storage of HSNO Class 5 Hazardous Substances

Oxidising substances are segregated from most other HSNO substances.

Storage of many organic peroxides requires controlled temperature storage. SDSs are consulted for storage requirements and the recommendations are followed.

Storage/Collection of Waste Hazardous Substances

A dedicated storage area for waste substances to be stored prior to disposal is established in each laboratory.

Storage Cabinets

Cabinets are available for class 3 – flammables, class 4.3 – dangerous when wet, class 5 – oxidizers, class 6 – toxics, and class 8 – corrosives.

The Laboratory Manager will organise purchase when required.

3.9 Import or Purchasing

HSNO Exempt Laboratories are permitted to use unapproved and approved substances and the import and purchasing requirements should not change. If suppliers are refusing to supply substances, please advise the health and safety office. Declined substances under the HSNO Act 1996 cannot be used in Exempt Laboratories.

All orders must be made according to University of Otago, Wellington policy.

When a trackable substance is ordered (see Appendix 10 for a list of trackable substances held at UOW) a copy of the order is forwarded to the LM who will issue a unique number that follows that substance from arrival to disposal.

3.10 Tracked Substances

An inventory of the hazardous substances that are required to be tracked in each area of University of Otago, Wellington, is kept in each area.

Those hazardous substances that are required to be tracked fall under the following classifications:

Classes 3.1A and 3.2A

Classes 4.1.2A and 4.1.2B

Class 4.1.3A

Classes 4.2A and 4.3A

Class 5.1.1A

Classes 5.2A, and 5.2B

Classes 6.1A, 6.1B and 6.1C

Classes 9.1A, 9.2A, 9.3A and 9.4A

A copy of the trackable inventory should be sent to the LM regularly. This inventory is included in the Emergency folder.

Tracked substances will be identified by the “T” label on containers. The process for tracking these substances will be managed by the LS using the unique identifying number issued by the LM at purchase. An annual stocktake will be taken to ensure the recorded levels of tracked substances are not exceeded.

All tracked substances, waste and empty tracked substances containers are disposed of through the central hazardous waste collection system as destruction certificates are required. Advise the LM when tracked substance containers are empty or no longer required so that the container can be ‘disposed’ of through the central system. See SOP Disposal of Chemical Waste for the process involved.

3.11 Waste Disposal

All hazardous substances must be disposed of in an appropriate manner.

On the designated Tuesday of every month the LCO will be at the Dangerous Goods Store from 9.00am to 9.30am (unless otherwise notified) to accept any hazardous substance for disposal. A Safety Data Sheet must accompany each hazardous substance.

Classification specific, dedicated waste containers will be held in the laboratory prior to collection at the DGS.

Containers for collecting and storing hazardous substances waste in laboratories should not exceed 5 litres for category A substances or 20 litres for all other categories. They should be clearly labelled with contents details and meet HSNO labelling requirements.

The LM will forward waste lists disposal through the University HSNO Waste Collection system. Any disposal of waste products other than through the University HSNO Waste Collection system must be discussed and agreed with by the LM.

3.12 Environmental Monitoring

Where environmental monitoring is required as a control step, the LM should be contacted to arrange the monitoring. The SMOU will list the environment levels where required. Where environmental monitoring is indicated, monitoring must be conducted initially to ensure compliance with the requirements, and at least annually.

3.13 Equipment

Every person who handles or uses any hazardous substance ensures:

- That all equipment used to handle, and that comes into contact with a hazardous substance operates correctly, does not leak and is appropriately maintained;
- That the equipment used in conjunction with a hazardous substance is used and maintained as specified in the Laboratory Safety/Procedure Manual or other appropriate documentation; and
- Failure of equipment to comply with any of the above is reported to the LS or the person delegated to be in charge.

Laboratory Supervisors ensure:

- That all equipment used to handle, or that comes into contact with, a hazardous substance operates correctly, does not leak and is appropriately maintained;
- That information regarding correct use of the equipment is documented, readily understandable by laboratory staff and is available to a person using the equipment within 10 minutes.

Information regarding equipment used to handle hazardous substances is included in the Laboratory Safety/Procedures Manual or other documentation.

Maintenance

The LS must maintain a log of the equipment used within their area of responsibility. Maintenance and safety checks on this equipment will be recorded. All portable electrical equipment shall be tested as per the University Testing of Portable Electrical Equipment policy.

Use

Equipment, such as centrifuges, must have documented standard methods of operation. Training must be provided for equipment in use and training records maintained as part of the authorised user requirements. This includes cleaning of equipment to remove hazardous substances post-operation.

Fume Cupboards

Fume cupboards are:

- designed to AS/NZS 2243.8 (1992 or 1996) or NZS 7203 (1987 or 1992);
- operated long enough, after the hazardous substances has been removed from the cupboard, to flush the hazardous substances substantially from the exhaust ducting;
- have a means to indicate they are operating (such as a 'tell-tale');
- NOT used to store closed containers of Hazardous Substances.

Fume cupboards are maintained by Property Services in accordance with AS/NZS 2243.8 and tested annually. If there are any concerns regarding the safe operation of fume cupboards, the LM should be contacted. Any new fume cupboards installed must meet the AS/NZS 2243.8 specifications.

LSs are to ensure that any fume cupboards in their area of supervision are used appropriately:

- Hazardous substances are not to be stored in fume cupboards;
- Where purging of the fume cupboard post-hazardous substance use is required, this shall be documented in the safe method of use and adhered to.

3.14 Fieldwork

Where hazardous substances are required to be taken into the field, the fieldwork risk assessment must include meeting the HSNO requirements and be signed off by the Supervisor and LM. There must be a designated person in charge of hazardous substances at all times during field work where hazardous substances are in use, safety data sheets must be available, as well as a documented emergency/spill management plan. See also transport of substances as tools of trade.

3.15 Transportation of substances

On Site

HSNO classified substances may only be transferred by authorised users and approved handlers between sites within the Campus. The individual transporting the substance must be authorised by the LS. The authorised user is expected to have sufficient knowledge to respond to a spill or emergency during the transportation. Containers must be labelled, and for pooling substances secondary containment must be used. This may be in the form of an approved chemical carrier, or in a trolley that provides secondary containment. No flat-top trolleys should be used.

Planning the transportation of substances should consider the traffic volumes (e.g. avoid end of lecture times) and access. Lifts may be used to transport hazardous substances, however, any individual in the lift has the right to request that the substance is not transported in their presence.

Transporting Substances Off-Site

Tools of Trade:

Quantities of substances can be transported as tools of trade providing the substances are not transported for hire or direct reward (like a courier company). The permitted quantities are listed in Schedule 1 of the Land Transport Rule. These substances must still be loaded, secured, segregated, transported and unloaded safely and must not present any hazards to members of the public or the environment. Packaging requirements must meet the required standards.

Transportation by Courier or similar:

Hazardous Substances to be transported must be packaged, labelled and have a completed Dangerous Goods Declaration sheet as per NZS 5433:1999. The correct shipping name, UN number etc. are listed on the Chemwatch database SDS under Section 14 – Transportation Information.

ChemCouriers will transport chemicals. The LS has copies of the Dangerous Goods Declaration required for these shipments.

3.16 Inventory System

The HSNO requirements are that tracked substances on the University sites must be identifiable by type of substance, location and who is responsible for the management of the substance. OSH may request reports on the amount and location of tracked substances at any time when enforcing the HSNO Act 1996 in a place of work. Audits of the inventory of tracked substances must be completed at least annually.

Any spill of a tracked substance must be reported to the Laboratory Manager within 24 hours.

4.0 Design Requirements

The laboratory is designed and operated to prevent the substance from inadvertently escaping from the laboratory and entering the environment.

Localized secondary containment within storage cabinets, cupboards and on shelves or bench tops minimises the volume and the likelihood of the substance inadvertently escaping the lab.

Absorbent material, booms, and socks should prevent the Hazardous Substances from entering the drain.

The Statutory Budget will provide for the upgrade of laboratories where required to meet the HSNO Exempt standard. The list of required changes to achieve compliance will then be prioritised and worked through over time. The LM will submit requests to the Statutory Budget Committee.

PC1, PC2 and PC3 laboratories approved by the IBSC will automatically meet the design requirements for HSNO Exempt Laboratory status.

Where new items of equipment or facilities are required, the upgrade form must be completed and forwarded to the Health and Safety Office. The University Laboratory Manager will assess the request and make recommendations accordingly for improvements. Where requests are favourably approved, the request will be forwarded to Property Services for inclusion in the Statutory Budget.

4.1 Signage

All HSNO Exempt Laboratories must have the Standard University Signage at the entrance point.

CAUTION RESTRICTED ENTRY AUTHORISED PERSONS ONLY
For Entry Authorisation please contact: (Name and Number)
HSNO EXEMPT LABORATORY
UN CLASSIFICATION PICTOGRAMS AS APPROPRIATE

5.0 Emergencies and Spills

Laboratories are required to have an Emergency Response Plan regardless of the quantities of hazardous substances present.

The emergency response plan will address:

- Containment of the spill
- Absorption of the spill
- Safe disposal of the absorbed material
- Procedures to notify people at the site that an emergency has occurred

The availability of personnel with key roles identified in the plan shall be recorded in the Emergency Plan. Contact details for all relevant personnel and their specific duties will also be recorded in the Emergency Plan.

The Laboratory Manager will ensure training is given with specific instruction about the use of absorbent material, reinstatement of containment and any other procedures that are necessary.

5.1 Spill Management

The Laboratory Supervisor will ensure that laboratory personnel in charge are able to determine if the laboratory must be evacuated, and how to call for extra assistance. Induction packs include location of spill kits and fire alarms.

All HSNO Exempt Laboratories will have the minimum spill kit consisting of:

- Absorbent material – kitty litter (bentonite clay), vermiculite, or dry sand, paper towels
- Neutralising agents – sodium carbonate, sodium hydrogen sulphate
- Personal Protective Equipment (PPE)
- Disposal containers

Specific spills kits for high risk substances will be available prior to use of the high risk substance e.g. Hydrofluoric acid, Phenol.

Spill kits are clearly labelled and easily accessible in all areas where hazardous substances are used.

For large spills protective gear is available either in your laboratory or with the Laboratory Manager:

- Warn staff adjacent to the area of the spill and evacuate the area if necessary.
- Shut off any source of ignition.
- Treat any personal contact with copious amounts of water. All eyewash stations should dispense a large amount of water, or showers are available in some areas.
- Wear boots, eye protection, and body protection.
- Ventilate the area to reduce vapours.
- Limit the spillage area by using absorbent material to contain the spill.
- For volatile or noxious chemicals, a respirator is worn.
- Sweep up the absorbent material into a bag for disposal.

*****In an emergency contact the Laboratory Manager*****

5.2 Emergency Response Plan

- Some spills are manageable within the laboratory, others will require advice and information, and larger spills will prompt emergency calls.
- The LM shall provide training to all authorised users and the plan will be accessible to all authorised users. Refresher training is to be provided biennially.
- Where advice or information is required or in the event of an emergency call 1-111.

5.3 Evacuation in the Event of Chemical Emergency

Evacuation in the case of chemical emergency shall trigger the same series of events as an alarm in the event of a fire.

The Laboratory Supervisor or person in charge will alert the Fire Service to a chemical emergency and identify those chemicals involved.

The Laboratory Supervisor can access any additional information relevant to the chemical(s) concerned within 5 minutes.

The locations of significant quantities of hazardous substances in the building are noted in the Emergency Response folders held in each laboratory and with the LM. This information assists Emergency Services locate major chemical hazards quickly.

All of the above is tested at the time of trial building evacuation or as a separate exercise.

Testing Plans

The emergency response plan is tested at least once every 12 months.

If there is a change to the building, procedures, or actions specified in the Emergency Response Plan, the Plan is tested within 3 months of the change and the test will demonstrate that each change is workable and effective.

The carrying out and the results of every test are documented; and the documentation is retained for at least 2 years.

Emergency Preparedness

All Dangerous Goods Stores are checked annually to ensure Hazchem or other signage is up-to-date, correct and legible.

All Dangerous Goods Stores are checked annually to ensure inventory matches capacity rating and that incompatible materials are correctly stored.

5.4 First Aid Procedures

Inhalation

If a chemical is inhaled, move to fresh air immediately and consult the chemical's MSDS for specific actions to be taken. If symptoms appear such as severe throat irritation or trouble breathing report to Employee Health or the Emergency Room with the MSDS.

Ingestion

If a chemical is ingested, consult the chemical's MSDS for specific actions to be taken and report to Employee Health or the Emergency Room immediately with the MSDS.

Dermal

Dermal exposures need to be flushed immediately with water for 15 minutes. Consult the chemical's MSDS for other specific actions to be taken. If severe redness or swelling occurs, report to Employee Health or the Emergency Room immediately following the flushing, with the MSDS.

Ocular

Eye exposures need to be flushed immediately with water for 15 minutes. Hold eyelids open and roll eyeballs around so all surfaces are flushed. Consult the chemical's MSDS for other specific actions to be taken. All eye exposures must be reported to the Emergency Room immediately following the flushing, with the MSDS.

6.0 Auditing

Auditing will be conducted within departments every 12 months. Where audits identify high-risk non-compliance a red card will be issued, signed by the LM or HSRC members. This card prohibits any work continuing in the laboratory until the issues raised are addressed to the satisfaction of the issuer. Where non-compliance of a lower risk is identified, a yellow card will be issued. This card will allow work to continue in the area but will be time bound for the corrective actions to be taken.

The LM will conduct the audit in the presence of the LS or a person designated by the LS.

7.0 Dedicated Storage Areas – DG Stores (Hazardous Substances Location Facilities)

Under HSNO these areas require certification and approved handlers for stores holding classes 2, 3, 4, & 5 substances. Only approved handlers are permitted to manage stores under the HSNO requirements; however, approved handlers can provide supervision for others to access stores.

Currently an Approved Handlers Certificate is valid for five years. The trainers for University of Otago, Wellington are EnviroHaz Ltd and Dangerous Goods Compliance Ltd (DGC Ltd).

Each Dangerous Goods Store must have a valid Hazardous Substance Location Test Certificate, which is issued annually.

The list of Approved Handlers for the University of Otago, Wellington is listed in Appendix 11.