Chemical Risk Management Protocol

3. CHEMICALS LIFECYCLE MANAGEMENT

Record of Amendments to Version 1.0

Date	Page number	Nature of amendment

Table of Contents

1. Who are these guidelines for?

These guidelines are intended for principal investigators (PIs), laboratory managers, designated laboratory person (DLPs), other staff and students who direct or participate in use of chemicals.

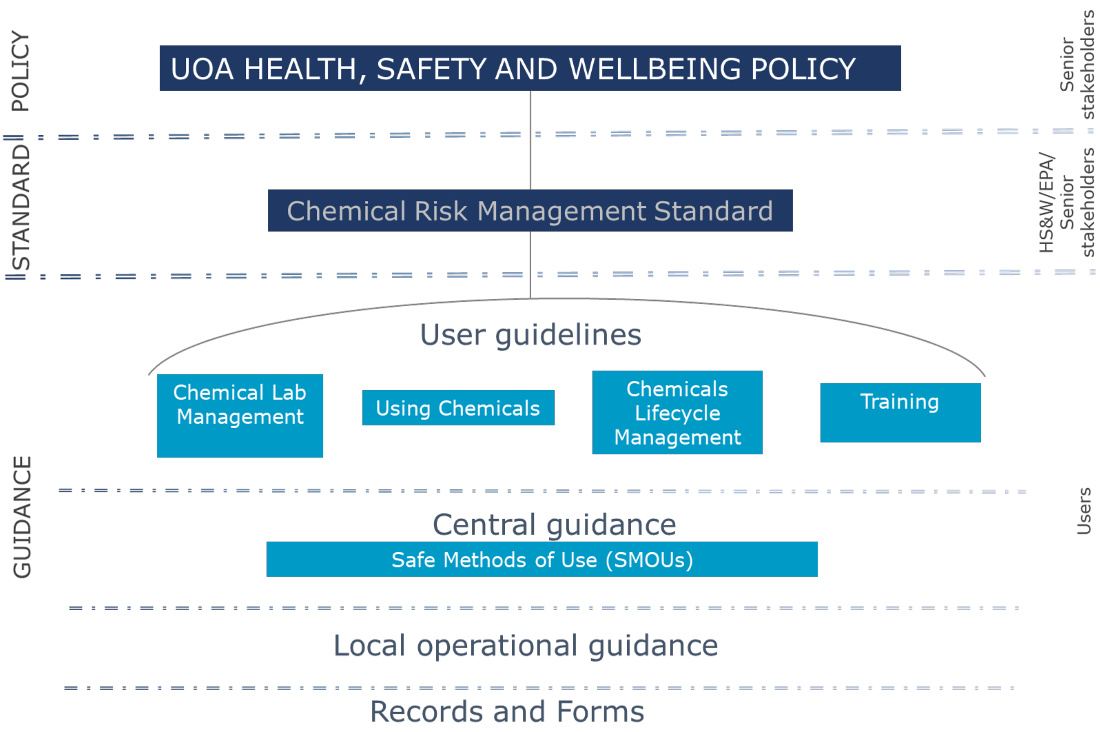
2. What is the purpose of these guidelines?

The purpose of these guidelines is to describe how to:

1. purchase chemicals and maintain the SciTrack inventory.
2. describe how to safely and correctly store and label laboratory chemicals.
3. describe the legislative and best practice requirements for transport of chemicals.
4. provide advice on improving sustainability for the life cycle of chemicals

3. Documentation hierarchy

The present document is part of a series of document with the following hierarchy:



4. SciTrack purchasing

All Laboratory Chemicals must be purchased through SciTrack. SciTrack is the University's purchasing and inventory management system for chemicals, restricted biologicals, and some lab consumables. SciTrack suppliers are a subset of university-approved suppliers that sell hazardous chemicals and/or restricted biologicals. For more information about SciTrack including access forms and guides, please visit http://auckland.ac.nz/scitrack

4.1 SciTrack order approv*al*

4.1.1 DLP approval

The SciTrack system ensures all chemicals brought into the university have undergone an approval process. A Designated Lab Person (DLP) must approve all SciTrack carts before they can be processed into purchase orders. A DLP is an approved staff member with technical knowledge about the item's laboratory users need to purchase through SciTrack. Note that this approval process is not automatic; the purchaser needs to ask their DLP to approve their specific cart.

4.1.2 Hazard approval

Purchases of certain especially hazardous classes of chemicals undergo an additional automatic hazard approval process. After such a cart is processed by the Shared Transaction Centre, a request for approval is sent to the hazard approvers team. The hazard approver(s) assigned to your Faculty/School/LSRI will contact you for more information about how the chemical will be safely stored, used, and managed through its lifecycle. The UN chemical hazard classes (please see sections 6.1 and 6.2 in 'Using Chemicals Guidelines') that undergo this approval are:

1. 2.3 Toxic Gas
2. 4.1 PG I Flammable Solids
3. 4.2 PG I Spontaneously combustible
4. 4.3 PG I Substances which upon contact with water emit flammable gas
5. 6.1 PG I Highly toxic (acute)

5. Chemical Inventory Management

The university has a legal obligation as per Part 18.6 of the Health and Safety at Work (Hazardous Substances) Regulations 2017 to ensure the hazardous chemical inventory is up to date. The responsibility for ensuring the inventory is correct lies with the Lab Manager, who is the Chemical Owner.

SciTrack is the university's chemical inventory management system. In order to maintain the inventory it is crucial to:

1. Update purchased chemical containers in SciTrack with the correct barcode, location and owner within 1 week of receipt.
2. Update SciTrack with any changes in location or ownership of chemical containers.
3. Mark as disposed on SciTrack any chemicals that are finished or disposed of.
4. Contact scitrack@auckland.ac.nz if you receive gifted or transferred chemicals that have not been purchased through SciTrack, for help with adding them to the inventory.
5. Perform regular chemical stocktakes (see section 5.2).

5.1 How to maintain the SciTrack inventory

Please refer to the SciTrack website, Quick guides - The University of Auckland, for quick guides that explain how to use SciTrack. Quick Guides #9 "Receipting and transferring orders" and #10 "Container search and operations" cover receipting, transferring and disposal in SciTrack. Stocktake

Mistakes or oversights in inventory management can quickly reduce the accuracy of the inventory. Therefore, a stocktake must be performed annually in order to correct any errors (See section 5.2). However, if a stocktake demonstrates that the inventory is being well managed, the stocktake can be performed once every two years at the Lab Manager's discretion. Once the Chemical Safety Advisor processes the stocktake data, the reconciliation report can show how well the inventory has been managed since the last stocktake.

6.2 How to perform a stocktake

A stocktake involves scanning the barcode of each chemical in the laboratory into a spreadsheet, while also identifying its location. The location may either be typed in, or the sublocation barcode sticker may be scanned. This exercise requires 1-2 people, a scanner, a laptop and the stocktake template which can be downloaded from the SciTrack website. Scanners may be loaned from Health, Safety and Wellbeing if required.

Once your template is filled in, send it to scitrack@auckland.ac.nz. Once the data is processed you will receive a reconciliation report that lists the chemicals that were not scanned but are showing in that lab's inventory. From that you can determine whether the unscanned chemicals should be marked as disposed.

6. Chemical Storage

6.1 Why is correct storage of chemicals important?

Using suitable, well-sealed containers prevents leaks and vapours from escaping into the lab.

Correct segregation of chemicals mitigates the risk of incompatible chemicals coming in contact during storage and causing an unwanted reaction. In the case of a flammable substances fire, we want to ensure that substances likely to intensify a fire or produce toxic/corrosive smoke are kept well away.

The Laboratory Manager has a legal obligation to correctly segregate, secure and label chemicals under the Health and Safety at Work (Hazardous Substances) Regulations 2017, Part 18.

6.2 Basic principles of chemical storage

1. Chemicals must be stored in appropriate containers that are adequately labelled.
2. Use spill trays or other means of secondary containment where liquids are stored, to contain spills or leaks.

3. Hazardous chemicals should be separated according to hazard class, rather than alphabetically.
4. Do not store hazardous or heavy chemicals above eye level.
5. Ensure there is a lip or restraint at the edges of shelves to prevent containers from sliding off.

6.3 Suitable Containers

Containers for hazardous chemicals must:

1. be chemically resistant and must not leak. Must be checked regularly by the lab manager (at least annually – see the guideline 'Chemical Laboratory Management, 15. Monitoring of chemicals in storage')
2. be able to contain the hazardous substance within the range of conditions in which it will be used and stored.

7. Labelling

7.1 Chemical storage containers

Chemical containers must have clearly readable labels that won't deteriorate. This includes any hazardous chemicals decanted out of their original container. Labels must include (as far as reasonably practical):

1. The identity of the substance.
2. The concentration of the hazardous substance (if in a mixture).
3. A warning of its hazardous nature if it has a HSNO hazard classification of 2.1.1, 2.1.2, 3.1A, 3.2A, 4.1.2A, 4.1.2B, 4.1.3A, 4.2A, 4.3A, 5.1.1A, 5.1.2A, 5.2A, 5.2B, 6.1A, 6.1B, 6.1C, 8.2A, or 8.3A. Some examples of common chemicals included in these classifications are diethyl ether, methanol, acetonitrile, and most acids/alkalis/corrosives (e.g. 10% hydrochloric acid, 2% sodium hydroxide, 3% sodium hypochlorite).
4. Preparation date
5. Expiry date

In addition, all containers for storage must have a SciTrack barcode. The barcode number, identity of chemical, owner and location of storage must be entered accurately into SciTrack. For assistance with this, please refer to the SciTrack Quick Guide "11. Creating materials and containers" or contact scitrack@auckland.ac.nz.

7.2 Working containers

If hazardous chemicals in temporary working containers are left unattended (i.e., the person using the chemicals is off-site), the contents and hazards must be readily identifiable. This includes reaction vessels. Ways to do this include:

Use an unattended experiment form that clearly describes the contents and hazards associated with an experiment. See an example form below.

UNATTENDED/OVERNIGHT EXPERIMENT PERMISSION FORM

Reaction Scheme including Reagents, Solvents and Scale (μg, mg, g)

SPECIFIC HAZARDS AND EMERGENCY PROCEDURES:

Name:				**Lab Book Ref:**	**Fumehood/Bench No.**	**Date:**
IN USE	**Electricity**	**Nitrogen**	**Water**	**Heating**	**Other relevant information**	
TICK OR FILL				**Temp:**		

			EXPERIMENT DURATION (date and time)
Has a Take 5 Assessment been completed?	**NO**	**YES**	**Start:**
Has the experimental setup been checked?	**NO**	**YES**	**Finish:**

Contact Telephone No. (Experimenter)	**Supervisor/delegated person-in-charge:**	
Contact Telephone No. (Supervisor)	**Sign:**	**Date:**

A code can be put onto small containers that can be cross-referenced to a readily available laboratory notebook.

Labels on the containers (you may use one label per test tube rack if all test tubes have the same contents/hazards).

7.3 Warnings of hazardous nature of chemicals

Warnings (where required) may comprise a hazard statement or pictogram. The following table shows hazard statements and pictograms for the more highly hazardous chemical classes.

HSNO Hazard Class	Hazardous Property	Hazard Statement (according to subclassification)	GHS Pictogram
2.1.1	Flammable (gas)	A. Extremely flammable gas B. Flammable gas	
3.1	Flammable (liquid)	A. Extremely flammable liquid and vapour B. Highly flammable liquid and vapour	
4.2	Pyrophoric, self-heating substances and mixtures	A. Catches fire spontaneously if exposed to air B. Self-heating: may catch fire	
4.3	Substances and mixtures which, in contact with water, emit flammable gases	A. In contact with water releases flammable gases which may ignite spontaneously B. In contact with water releases flammable gas	
5.1.1	Oxidiser (liquid or solid)	A. May cause fire or explosion; strong oxidiser B and C. May intensify fire; oxidiser	

5.1.2	Oxidiser (gas)	May cause or intensify fire; oxidiser	
5.2	Oxidiser (organic peroxide)	A. Heating may cause an explosion. B. Heating may cause a fire or explosion.	 
6.1A, 6.1B, 6.1C	Acutely toxic	Statement depends on level of toxicity and route of exposure, e.g. 'fatal if swallowed' or 'toxic in contact with skin'	
8.2A	Corrosive	Causes severe skin burns and eye damage	
8.3A		Causes serious eye damage	

8. Segregation of chemicals

Segregation can be achieved by distance and/or device. Generally incompatible substances need to be separated by 5 metres unless both are solids, then 3 metres.

Dedicated class-specific cabinets should be used for storage where practicable. Many cabinets have secondary containment which will prevent mixing with other substances in the same area in case of spills; imagine an earthquake scenario.

Chemicals that may react dangerously must not be stored in the same compound area with the same drainage system. Examples are cyanides and acids.

Remember that class 3, 4, and 5 chemicals must be stored separately

8.1 Storage tips for different chemical classes

8.1.1 Flammable liquids (class 3)

- If >10L is stored in the lab, a flammables cabinet must be used.
  When stored in a fridge, the fridge must be spark-proofed.

8.1.2 Peroxide-forming chemicals (usually class 3)

- Some peroxide-forming chemicals (e.g., diethyl ether and tetrahydrofuran) have an inhibitor such BHT added: these should not be stored in the fridge as it can prevent the inhibitor from working effectively
- Label containers with date received and date opened.
- Test for peroxides in these chemicals annually or dispose of them. Refer to the Guidelines 'Chemical Laboratory Management – 15.2 Peroxide-forming chemicals' for more information.

8.1.3 Flammable solids (class 4)

- Different class 4 chemicals (e.g., class 4.1.1, 4.2 and 4.3) are not compatible and must not be stored together.
- Desensitised explosives (e.g. picric acid) must have their water level checked every 3 months.

8.1.4 Oxidising substances (class 5.1)

- Keep away from organic materials (substances including carbon) as this can cause combustion.
- Keep away from zinc, magnesium, and any other metal in powder form.
- Store in an oxidisers cabinet where possible.

8.1.5 Organic peroxides (class 5.2)

- Keep away from zinc, magnesium, and any other metal in powder form.
- Store in an oxidisers cabinet where possible.

8.1.6 Acutely toxic, high hazard (class 6.1A/B)

- Ensure highly toxic chemicals are secured from unauthorised access, preferably in a locked cabinet.
- Care should be taken to keep these away from acids, bases, strong oxidisers and reactive chemicals.

- Cyanides must always be stored away from acids (5 metres apart and preferably both should have secondary containment).

8.1.7 Corrosives (class 8)

- Store acids and bases separately.
- Keep organic acids and inorganic acids apart. Organic acids (e.g. acetic acid, formic acid) are often flammable and therefore are best stored in a flammables cabinet.
- Make sure you don't have oxidising acids (e.g. nitric acid, perchloric acid) alongside flammable acids (e.g. acetic acid, formic acid).

8.1.8 Perchloric acid storage (class 8)

- Don't store on wooden shelves; a metal corrosives cabinet is best.
- Use glass or ceramic as a secondary containment tray, not plastic.
- May be stored with other inorganic acids including nitric and orthophosphoric (but not sulfuric, hydrochloric or hydriodic).
- Must not be stored with organic acids.
- Segregate from organic matter, flammables, aluminium, combustibles.
- Check for darkening or crystals forming around the bottom of the bottle; dispose of if found.

8.1.9 Nitric acid storage (class 8 and class 5.1)

- Best stored in an acid cabinet on its own, but it may be stored alongside certain inorganic acids such as hydrochloric acid but not sulfuric acid.
- Must not be stored with flammable acids (e.g., acetic, formic), organic solvents, or any bases.
- Segregate from all flammables, organic matter, organic solvents, metal powders and combustible material.
- Use a secondary containment tray made of plastic.

8.1.10 Nitric acid waste storage

- Nitric acid waste containers must be clearly identified to prevent accidental contamination with other wastes. Ensure all lab users know not to put other waste in these containers.
- Use plastic containers and don't fill past 90%.

- Use a plastic tray for secondary containment.
- If possible, leave nitric acid waste containers unsealed in a fume hood for 24 hours after adding waste before putting into an acid cabinet. Don't seal caps tightly.
- Arrange for pick-up of waste promptly – don't store full bottles for long periods

9. Transportation of Chemicals

9.1 Use of a chemical courier

It is strongly advised to use a chemical courier to transport chemicals. All chemical transport requests should begin with filling out the "Courier request form New Zealand Mail" form at the bottom of this page:

https://www.staff.auckland.ac.nz/en/central-services/finance-and-purchasing/strategic-procurement/strategic-suppliers/mail-and-couriers.html

When sending the form, include the SDS for each chemical to be transported. UniLogistics will determine the most suitable courier to be used and will provide advice on packaging requirements. Some companies do all the packaging themselves, and some will ask you to do it in a specific way to meet legal requirements.

9.2 Transportation of chemicals as 'tools-of-trade'

Most chemicals are classified as Dangerous Goods and their transport is regulated by the Land Transport Rule: Dangerous Goods 1999. A limited amount of each class of chemicals may be legally transported as 'tools-of-trade' as long as certain requirements are met. This means the chemicals are being transported for business purposes but not for hire or direct reward, and the quantity is within the limits described in section 4.1 below.

9.3 Amounts that may be transported as 'tools-of-trade'

The maximum quantity of each UN class of chemical that may be transported as 'tools-of-trade' are shown in Schedule 1 of the Land Transport Rule: Dangerous Goods 2005 https://www.nzta.govt.nz/driver-licences/getting-a-licence/licences-by-vehicle-type/transporting-dangerous-or-hazardous-goods/schedule-1-of-the-land-transport-rule-dangerous-goods-2005/

NOTE that while these legal limits are large for some chemical classes, it is strongly advised to use a chemical courier company to transport any large quantities.

Class 4.2, 4.2, and 5.2 substances are not permitted to be transported as 'tools of trade' and **must** be transported by a chemical courier.

Other highly hazardous chemicals including class 3.1 PG I, 4.1 PG1, and 6.1 PG1 **should** be transported by a chemical courier.

9.4 Requirements for transporting chemicals as 'tools-of-trade'

1. Packaging must be suitable and sufficiently robust to remain intact and continue to contain the dangerous goods safely and without leaking, during loading, transport and unloading. See section 8 for more detail.
2. Each UN chemical class must be packaged separately
3. Labels must state 'Dangerous Goods: UN Class X' (and refer to the title of the UN Class), the UN Packing Group and the UN Number of the chemical(s). The label must be clear, legible, and properly fixed to the container or the overpack.
4. Emergency response documentation must be carried in the driver's cab in an accessible and prominent position, describing emergency response information for all the dangerous goods on the vehicle. A copy of 'Mini-MSDS' from Gold FFX will suffice.
5. The driver must be aware of the hazards that the dangerous goods present, the procedures for their safe loading, handling and storage on the vehicle and the emergency procedures stated in the emergency response information.
6. The driver must ensure all necessary emergency response resources are present and accessible (e.g., fire extinguisher, spill kits, etc).

9.5 Use of University Vehicles

If a courier is not suitable, the next best option is to use a university vehicle, preferably a Ute or similar with full separation of the driver and occupants from the chemicals being transported. The use of a university vehicle for chemical transport should be checked off by the Technical Manager or their delegated authority, who can assess the risks and ensure the requirements in section 4.2 are met. For advice, please contact the Chemical Safety Adviser.

As per the University's Motor Vehicles Accidents and Insurance Policy and Procedures, the university's insurance is invalid, and the driver will be held personally liable if an accident occurs while the approved driver is carrying dangerous goods inappropriately.

9.6 Use of Private Vehicles

Use of private vehicles for chemical transport is strongly discouraged. As per the University's Motor Vehicles Accidents and Insurance Policy and Procedures, generally the use of private vehicles for University business will not be covered by the University's Motor Vehicle Insurance Policy. Use of private vehicles for university purposes may not be covered by personal insurance either.

9.7 Use of Public Transport

Hazardous chemicals (or anything that may be mistaken for a hazardous chemical) must never be carried on public transport.

9.8 Packaging chemicals for any transport outside the building

When using a chemical courier, they will advise you on packaging requirements. For any other transport, best practice is to ensure there is no way the chemicals can leak under any reasonably foreseeable situation. Packaging should consist of:

- Leak-proof inner packaging (primary container).
- Intermediate packaging that protects the inner packaging so it cannot break under normal conditions of transport, and that contain the contents of the inner packaging's in the case of breakage. For liquid dangerous goods, ideally this packaging should be able to absorb the entire contents of the inner packaging. Packaging should also secure the inner container against movement.
- Strong outer packaging.

If transporting on foot on campus be cautious to conceal the contents or labels from view to avoid alarm to passers-by. Use a trolley where possible.

Gases including liquid nitrogen and dry ice should not be transported within the cab of a car due to risk of oxygen displacement. If in a car boot, dry ice should only be transported for less than 1 hour, as the gas may start to penetrate the cab. It is preferable to use a Ute with a self-contained tray compartment instead.

Liquid nitrogen must never be transported in lifts or other small spaces occupied with any person. For more information please visit the following webpage: Rules, guidelines and Safe Methods of Use (SMOU) - The University of Auckland

10. Prevent Waste

It is better to avoid waste than to treat and manage it. Here are some examples of how to minimise waste:

Purchasing – Check SciTrack for existing inventory and use old stock before purchasing more. Only buy what you need; don't buy extra just because it is better value to buy in bulk. The cost (financial and environmental) of storage and disposal of unused chemicals should be considered in the purchase cost.

Inventory Management – Do regular stock-takes and transfer chemicals to new owners when people leave the University, rather than leaving them as 'chemical orphans'. This ensures chemicals are used up before they become too old to be desirable for use.

Sharing - Sharing of chemicals between groups is encouraged to minimise new purchases. Consider centralising stocks of chemicals that are likely to be used by multiple groups, such as acids.

Clear labelling – Make sure all solvents (including waste) are clearly labelled with the contents, an owner and an expiry date (if applicable).

Opt for reusable containers – As examples, try to cut out single-use plastics by replacing with glassware, or recycle solvents or heavy liquids.

Planning – Try to streamline lab operations so that reagents may be used up before expiring, and machines can run larger batches of samples. Make minimum volumes of solutions to prevent them expiring and requiring disposal.

Care with dispensing – Prevent contamination of chemicals by ensuring users only take out of a container what is needed, with a clean utensil. Don't put extra back into the original container.

Substitution – Review your processes to see where greener substitutions can be made. There is a wealth of research in the field of green chemistry that demonstrates where greener alternatives can be used to achieve the same outcome. Even small changes make a difference, and here are some examples to consider:

- Look into using 'green solvents' where possible. These include water, ethanol, isopropanol, n-butanol, acetone, acetic acid, and ethyl acetate. Solvents to avoid include chlorinated solvents, hexane, benzene, and xylenes.
- In the biological sciences there are less hazardous stains, fixatives, preservatives and reactants that can be used in common laboratory methods.
- Reducing the use of hazardous and toxic chemicals also decreases the need for some PPE, specialist training (e.g. radioisotope usage) and equipment / facilities (e.g. fume hoods, hot labs).
- Use the lowest grade chemicals you can, as these have had the least processing. Use denatured rather than high purity ethanol for cleaning.
- Review procedures that use large volumes of solvents (including water) and scale back and/or use lower grade or recycled solvents where possible.
- Research different methods that can achieve the outcome you require, and choose those with lower working volumes and less hazardous chemicals.

  For some ideas you can visit: https://www.mygreenlab.org/ambassador-program.html

Reduce Energy Use - Opt. for less energy-intensive procedures where possible. For example:

- Aim to reduce the use of heating, cooling, pressure and vacuum conditions.
- Lower the fume hood sash when not in use.

- Keep the number of required fridges/freezers to a minimum by ensuring samples are not kept longer than necessary.
- Disconnect equipment and turn off lights when not in use.

Solvent recycling - Before investing in a solvent recycling system, please consult with the Hazards and Containment Manager as this is subject to more stringent rules regarding fire safety.

11. Waste disposal

Separation of waste streams is very important, as some types of waste require more resources to dispose. Please refer to the guideline "Using Chemicals" for more information.

1. Use separate containers to collect halogenated and non-halogenated solvent waste. Halogenated waste must be exported from NZ for treatment and therefore is more expensive to treat.
2. Ensure chemicals remain well-labelled and try to identify any unknown chemicals. When unknown chemicals are sent for disposal they must be treated as if they are extremely hazardous.
3. Where it is safe to do so, collect similar waste in larger containers for disposal. As an example, 2 x 500mL of aqueous waste is generally charged at twice the price of 1 x 1L.
4. Plastic or glass chemical containers that can be thoroughly cleaned and rinsed to remove all trace of chemicals can be recycled. Be sure to remove/deface any labels first.
   Look into the 12 Principles of Green Chemistry for more ideas.
   https://www.mygreenlab.org/ambassador-program.html

12. Definitions

The following definitions apply to this document:

Authorised person means a person who, in the normal course of their work, is required and permitted to enter the laboratory and therefore provided with personal access (i.e., own functioning access card). Additionally, anyone under the direct supervision of an authorised person is deemed authorised.

Chemical is a distinct compound or substance, especially one which has been artificially prepared or purified.

Compound means any chemical combination of chemical elements.

Laboratory Manager Means the designated laboratory manager that meets the requirements of section 33 of the HSNO Act 1996 and Part 18 of the Health and Safety at Work (Hazardous Substances) Regulations 2017.

Chemical Owner Is the term that the UoA use to name the designated *Laboratory manager* (See Laboratory Manager definition)

It defines the person with ownership and responsibility for the chemicals. They may be a *Principal Investigator* (PI) or when a PI cannot be identified, the chemical owner is the person responsible for the facility in which the Hazardous substance is used and may be a senior technician or a technologist. In the case of 'communal' departmental/school chemicals, the academic head may be the chemical owner.

They have the responsibilities stated under responsibilities of a Laboratory Manager under the Health and Safety at Work (Hazardous Substances) Regulations, Part 18. For further details see the Chemical Ownership guidelines.

Designated laboratory person (DLP) means the trained person in each research group who has been given the authority to approve purchase requests made in SciTrack.

Forms are the blank templates to be filled in with information that will become these records.

Gold FFX is a database of safety datasheets (SDSs) that the University subscribes to. This can be accessed through the library database. Please see Annex 1 Guideline Using Chemicals for a description how to gain access to it.

Halogenated Solvents contain a halogen, usually chlorine, bromine or fluorine. Common examples include dichloromethane (methylene chloride), chloroform, and 1,1,1,3,3,3-hexafluoro-2-propanol (HFIP).

Hazard A hazard is a source or a situation with the potential for harm in terms of human injury or ill-health, damage to property, damage to the environment, or a combination of these.

Hazardous chemicals or Hazardous substance is any substance with 1 or more of the following intrinsic properties:

- explosiveness
- flammability
- a capacity to oxidise
- corrosiveness
- toxicity (including chronic toxicity)
- ecotoxicity, with or without bioaccumulations; or

Which on contact with air or water (other than air or water where the temperature or pressure has been artificially increased or decreased) generates a substance with any 1 or more or the properties specified above.

A hazardous substance has one or more hazard classifications in its safety data sheet.

Chemical Risk Management Protocol (The 'Protocol'): This protocol falls under the University's Health, Safety and Wellbeing Policy, and includes the Chemical Risk Management Standard and a set of guidelines on Hazardous Substance Risk Management topics.

Laboratory means a vehicle, room, building, or any other structure set aside and equipped for scientific experiments or research, for teaching science, or for the development of chemical or medicinal products

Laboratory Chemicals includes hazardous chemicals used in laboratories and workshops. It does not include commercial cleaning products or chemicals that you can buy from a supermarket or hardware store. Note however that large quantities of industrial chemicals such as isopropanol should be recorded in the laboratory's chemical inventory.

Line Manager refers to anyone working at the University of Auckland and who guides or controls research, teaching, budget, workspace, or people (staff, visiting researchers or contractors)

Local Operational Guidelines. Generated by Schools, Departments, Specific Laboratories, Workshops, or external organizations (Example: Procedures and Operational Instructions based on International Standards or best practices, etc). That have been approved by Line Manager or Academic Leaders to set performance standards for their specific area of responsibility.

Principal Investigator (PI): An academic staff member who is the lead researcher responsible for project(s) such as laboratory study(ies) or clinical trial(s) and is usually the holder of and independent grant administered by the University. The phrase is also often used as a synonym for "head of the laboratory" or "research group leader." The Principal Investigator is responsible for assuring compliance with applicable University standards and procedures, and for the oversight of the research study and the informed consent process. Although the PI may delegate tasks to members of their research team or technical staff (is this is officially agreed), they retain responsibility for the conduct of the study and the Management of the Hazardous Substances under their ownership. PIs are Academic Leaders for the Health, Safety and Wellbeing Policy, and as such must accomplish with the responsibilities stayed in that Policy.

Records is what is chosen by the Line Manager or Academic Leader to demonstrate that the process and activities have been conducted in the way prescribed in the Local Operational Guidelines.

Risk assessment is the process of evaluating the risk(s) arising from the hazard(s), considering the adequacy of any existing or potential controls, deciding whether or not the risk(s) is acceptable, and taking further action as required.

A risk assessment is created in alignment with the University's Health and Safety Risk Management Standard and authorised at the appropriate level.

SciTrack is the University's purchasing and inventory management system for chemicals and restricted biologicals. SciTrack suppliers include all University-approved suppliers of Hazardous laboratory chemicals and/or restricted biologicals. All purchases from SciTrack suppliers (including non-hazardous lab consumables) must go through SciTrack.

Substance means:

- any element, defined mixture of elements, compounds, or defined mixture of compounds, either naturally occurring or produced synthetically, or any mixtures thereof:
- any isotope, allotrope, isomer, congener, radical, or ion of an element or compound which has been declared by the Authority, by notice in the Gazette, to be a different substance from that element or compound:
- any mixtures or combinations of any of the above:
- any manufactured article containing, incorporating, or including any hazardous substance with explosive properties

Staff members refers to individuals employed by the University on a full or part-time basis.

University means the University of Auckland and includes all its subsidiaries.

13. Key relevant documents/References

- The My Green Lab Ambassador Program offers a free online learning programme and access to discussion groups about lab sustainability. https://www.mygreenlab.org/ambassador-program.html
- Kilcoyne J, Bogan Y, Duffy C, Hollowell T (2022) Reducing environmental impacts of marine biotoxin monitoring: A laboratory report. PLOS Sustainability and Transformation 1(3): e0000001
- Doble, M. and A. K. Kruthiventi (2007). CHAPTER 5 - Alternate Solvents. Green Chemistry and Engineering. M. Doble and A. K. Kruthiventi. Burlington, Academic Press: 93-104.