Major Projects

Facilities Management

PRELIMINARY OPERATIONAL WASTE MANAGEMENT PLAN

for the

BIOLOGICAL SCIENCES PROJECT

UNSW Kensington Campus

26 November 2014

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1. Introduction

The new Biological Sciences Project (BSP) is to be constructed on the UNSW Kensington Upper Campus. Development approval for the BSP is to being sought under State Significant Development Application No. SSD 6674. UNSW has obtained the Secretary's Environmental Assessment Requirements (SEAR's) for this project which includes the need to address Service and Waste issues both during construction and in building operation. Construction Waste Management is addressed within the Preliminary Construction Management Plan (PCMP) for the BSP. The Contractor, once appointed is required to formalise the Construction Management Plan (CMP) addressing the construction waste management requirements of the PCMP and the SSD Conditions of Consent.

This Preliminary Operational Waste Management Plan (POWMP) has been prepared to address the proposed operational waste management of the new facility.

2. UNSW Interim Waste Plan

This Waste Minimisation Plan describes UNSW's current waste management procedures and achievements and outlines targets and actions to achieve sustainable outcomes and to meet its legislative requirements and financial goals.

UNSW's Sustainability has set an objective of increasing recycling across campus to 80% (decreasing landfill waste to 20%) and to ensure that all waste capable of being re-used or recycled is re-used and recycled. The plans include discussion on how separation of waste streams are managed and recycled and identified future waste management options for the campus. The Waste Minimisation Plan covers all facilities within the UNSW Kensington Campus and will be the basis for Operational Waste Management within the new BSP.

3. Proposed New Building

The BSP is to be located at campus grid reference E26. It lies to the north of the Samuels Building (F25) and to the south of the Biological Sciences Building (D26).

The new BSP facility will consist 21,600 m^2 GFA in a multi-storey building that will house a variety of teaching and research laboratories. The building must be designed to be flexible enough to contain a range of other potential uses with a focus on sciences.

Figure 1: Location of proposed BSP in relation to UNSW Kensington Campus.

4. Existing Management of Waste

Access to the existing Bioscience Precinct is located off Botany Street at Gate 11. Formal waste storage rooms are provided to the existing loading dock.

Waste is separated into general, chemical and biological waste streams as follows:

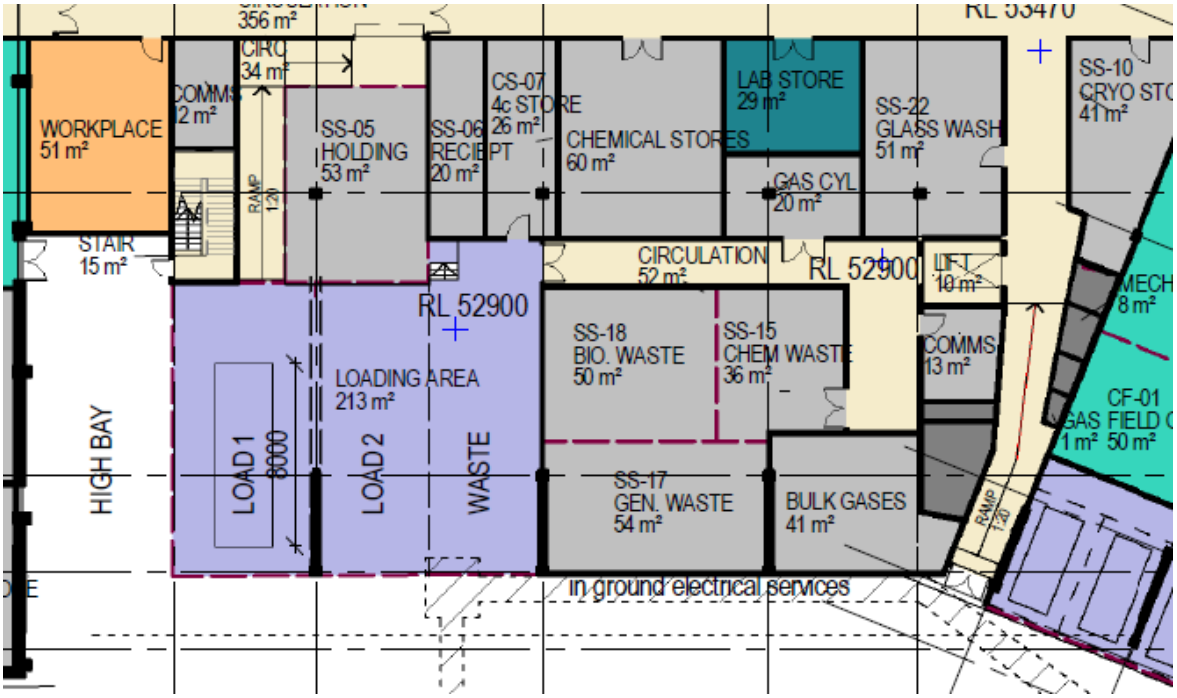
- general waste (collected daily);
- paper and cardboard (collected daily);
- chemical waste (collected weekly);
- biological waste (collected daily); and
- hard waste (collected on demand).

All waste is collected and held at the loading dock collection point for collection by UNSW Waste Contractors.

5. Proposed Management of Waste

Waste pick-up from the new building will be through Gate 11 from Botany Street., as shown in the figure below.

The BSP will provide secure storage rooms for waste on the Lower Ground Floor of the new building (refer Figure below). These storage rooms will include storage of general, chemical and biological waste. Chemical waste will continue to be stored securely, local to laboratory areas and disposed of on regular basis in accordance with UNSW Laboratory Hazardous Waste Disposal Guideline (OHS321) – Refer Attachment B.



Waste generation for the existing Biosciences Precinct has been used to extrapolate the potential waste generation of the proposed BSP.

Based on the waste collection figures received from UNSW, current projected waste generation based on average and high utilisation factors is estimated as follows:

Waste Type	*Quantity*	*Waste generation*	*Average Utilisation*	*High Utilisation*	*Current Ltr/week*
General					
	Kitchens/Labs	*25 x 55L x 5d*	*50%*	*80%*	*3440-5500*
	Offices	*110 x 10L x 5d*	*25%*	*80%*	*1380-4400*
	Subtotal				***4820-9900L***
Recyclable Paper					
	Copy Rooms	*240L x2/wk*	*-*	*100%*	*480*
	External	*660L x 5/wk*	*-*	*100%*	*3300*
	Subtotal				***2460L***

Based on current usage estimated above, the future usage is expected to in the order of:

- General Waste: 5,800 litres/week (average), 12,000 litres/week (high)
- Recyclable Waste: 3,000 litres/week

Given that general waste is expected to continue to be collected daily, the number of general waste bins in the bin storage room will range from 5 to 10 240 litre bins or 4 to 6 x 660 litre skips.

Recyclable waste is collected weekly and will require 13 x 240L bins or alternatively 5 x 660 litre skips to be located in the bin storage room.

The size of the storage room has been designed to suit storage of up to 25 x 240 litre bins and 6 x 660L bins with manoeuvring space and is therefore considered adequate for the facility and future building population.

In accordance with UNSW Waste Minimisation Strategies, it is intended that the new facility will feature initiatives to improve overall recyclable waste targets in line with current policies and recommendation. Some of these initiatives may include:

- the use of separate bins to assist Alternative Waste Technology (AWT). to process source separated food waste, and other waste streams from general waste; and

- provision of separate, collection boxes for recycling printer toners and batteries;

The incorporation and location of waste minimisation initiatives will be developed in further stages of the BSP design.

6. Attachment A – UNSW Laboratory Hazardous Waste Disposal Guideline

HS321 Laboratory Hazardous Waste Disposal Guideline

Policy Hierarchy link	NSW WHS Act and Regulations 2011 UNSW WHS Policy
Responsible Officer	Manager, HS Unit
Contact Officer	Manager, HS Unit. Adam Janssen, Ph 93852214 Email: d.janssen@unsw.edu.au
Superseded Documents	Version 3.0
File Number	TRIM 2007/1217.
Associated Forms	UNSW Chemical Waste Request form OHS014a UNSW Biological Waste Request form OHS015 *Chemsal* Radiation Waste Declaration form UNSW Radiation waste transfer form OHS016

Version	Authorised by	Approval Date	Effective Date
3.1	Director Human Resources	9/04/2013	9/04/2013

1. Introduction and Scope

The purpose of this document is to assist the University of New South Wales (UNSW) in meeting its obligations to dispose of hazardous waste items, generated by workshops and research and teaching laboratories, in an environmentally safe manner.

Clear waste streams are needed in order to prevent the inappropriate mixing of incompatible substances and also so the cleaners and waste contractors are not exposed to the risk of unexpected hazards.

During the planning phase of projects, the hazards associated with the storage and disposal of wastes should be addressed and should include waste minimisation strategies.

This procedure applies to all UNSW facilities and operations where hazardous substances are used for research or teaching. It includes chemical waste (solids, liquids and gases), infectious and biological hazardous waste, general laboratory waste, glass, sharps, radioactive wastes and other hazardous liquids and materials.

All wastes from PC3 facilities (physical containment level 3) must be treated as potentially contaminated.

Where UNSW personnel are occupying a facility controlled by another organisation, that organisation's waste disposal procedures will need to be followed.

2. Definitions

Animal carcasses: deceased animals or animal tissue that has been used for research or teaching, and that does not contain other hazardous substances. Carcasses and tissues that have been contaminated with any other hazardous substances are Co-mingled waste.

Biological waste:

- any material from animals (including humans, birds and fish), plants and invertebrates, whether or not the material is recognisable, and including the whole organism (carcass)
- microorganisms (including protozoa & other parasites) fungi, archaea, bacteria, unicellular algae, viruses and viroids,
- anything else that could cause disease in a host (such as prions)
- genetically modified organisms (GMOs) or products from GMOs,
- SSBAs (see definition)
- any material that is contaminated with or potentially contaminated with any of the above, including:
    - disposable laboratory plastic-ware, petri-dishes, culture bottles, pipettes, disposable equipment, gloves, infected bedding, soil and water, left-over feed.

Broken glass: broken laboratory glassware. Considered a sharp and therefore must be disposed of into a rigid, puncture-proof container. Ordinarily, broken glass pieces will be placed into the 15 litre white buckets, particularly pieces that are too large to place in a laboratory sharps bin. Broken glass must be segregated into separate buckets labelled either Contaminated or Non-contaminated broken glass, with the nature of the contamination as described in 3.3 and 3.4.

Chemical waste: all chemicals, or materials that are contaminated with chemicals that are to be disposed. This includes but is not limited to explosive, flammable liquids/solids, poisonous, toxic, ecotoxic, infectious substances, waste oils/water,

hydrocarbons/water mixtures, emulsions; wastes from the production, formulation and use of resins, latex, plasticisers, glues/adhesives; wastes resulting from surface treatment of metals and plastics; residues arising from industrial waste disposal operations; and wastes which contain certain compounds such as: copper, zinc, cadmium, mercury, lead and asbestos.

Co-mingled waste: a combination of two or more waste categories, such as biological and radioactive waste, infectious and chemical wastes, animal tissues containing cytotoxic chemicals, oil-saturated rags (section 3.12).

Cytotoxic waste:

- waste materials that are or may be directly toxic to cells, kills cells, or prevent their reproduction or growth.
- waste material that is, or may be, contaminated with a cytotoxic drug during the preparation, transport or administration of chemotherapy. Cytotoxic drugs are toxic compounds known to have carcinogenic, mutagenic and/or teratogenic potential.
- waste materials that contain or may contain agents which, as a side effect, can damage healthy, noncancerous tissues or organs which have a high proportion of actively dividing cells.

Domestic waste: uncontaminated laboratory waste is similar to household waste, that is, paper, boxes, plastic wrappers, paper towels and any other disposable material that *has not been* in contact with chemical, biological, infectious, GMO, cytotoxic, SSBA, radioactive or other hazardous substances. Much of this waste can be recycled.

> ***Note:*** *Do not dispose of gloves, pipettes, plastic laboratory disposables, tips or tubes, whether or not they have come into contact with any contaminants, into a laboratory domestic waste bin.*

Double containment: any container of viable microorganisms must be transported between laboratories, or to pressure steam sterilizers within the building, within a second unbreakable and closed container. Both containers must be readily decontaminated. All GMOs must be transported according to the OGTR (Office of the Gene Technology Regulator) Guidelines for the Transport, Storage and Disposal of GMOs.

GMO: Genetically modified organism, as defined by the OGTR (Office of the Gene Technology Regulator).

General laboratory waste: potentially or actually contaminated laboratory waste. This includes paper, paper towels, gloves, pipettes, tips, tubes and other general laboratory material, including those that may be contaminated with trace amounts of infectious biological matter or chemical residues (such as absorbent materials that have been used to clean up spills or to disinfectant surfaces are included in general laboratory waste.

Hazardous waste: any laboratory or workshop waste that has the potential to cause harm to people or to the environment. It includes:

- explosive flammable liquids/solids, poisonous, toxic, ecotoxic, infectious substances, chemicals, potentially unstable substances,
- biological, clinical, GMO, Quarantine, SSBA wastes,
- waste oils/water, hydrocarbons/water mixtures and emulsions,
- wastes from the production, formulation and use of resins, latex, plasticizers, glues/adhesives,
- wastes resulting from surface treatment of metals and plastics,
- residues arising from industrial waste disposal operations, and
- wastes containing certain compounds such as: copper, zinc, cadmium, mercury, lead and asbestos.

Human tissue: recognisable human tissue or body parts.

Laboratory: facility where research and/or teaching may be carried out. Includes animal facilities, invertebrate facilities, and associated constant temperature rooms.

OGTR (Office of the Gene Technology Regulator): Federal body governing all aspects of work involving genetically modified organisms.

Plant workshop waste: typical waste includes hydrocarbons such as oil and grease, detergents, batteries, scrap metal, timber off cuts, perspex, fibre-glass, obsolete plant and equipment and building materials.

Safety Data Sheet (SDS): information sheet provided by the manufacturer/producer of a chemical or biological agent, that includes information & advice on safety requirements for the handling of that substance.

Sharps: objects or devices used in the laboratory or workshop, that have sharp points, protruding pieces or cutting edges that are capable of cutting or piercing the skin. This includes (loaded or empty) syringes with needles, suture needles, glass slides and coverslips, broken glass, broken tissue-culture plastic-ware, scalpel blades, box-cutter blades, broken bone edges, and pointy-tipped surgical instruments (eg small drill-bits, fine-nosed scissors and forceps). Sharps waste must be collected in a rigid, puncture-proof container (see AS4031). See also 3.3, and 3.4.

Radioactive waste: material that has a:

- **A.** specific activity greater than 100 becquerels per gram (2.7 nCi/gm or 2.7 μCi/Kg) **AND**
- **B.** total activity of one of the following:
  - **i.** greater than **40 kBq** (~ 1μCi) of Group1 radionuclides, **OR**
  - **ii.** greater than **400 kBq** (~ 10 μCi) of Group2 radionuclides, **OR**
  - **iii.** greater than **4 MBq** (~ 100 μCi) of Group 3 radionuclides, **OR**
  - **iv.** greater than **40 MBq** (~ 1 mCi) of Group 4 radionuclides.

Note : *UNSW cannot **dispose** of radioactive waste. It must be stored until the background level has reached an acceptable level. See section 3.9 Radioactive waste requirements.*

Schedule 4 drugs: those drugs which are listed under Schedule 4 of the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP), and are known as Prescription Only Medicine or Prescription Animal Remedy.

Schedule 8 drugs: those drugs which are listed under Schedule 8 of the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) which is incorporated within the Drugs and Poisons and Controlled Substances (DPCS) Act and are also known as Drugs of Addiction.

SSBA (Security Sensitive Biological Agent): Biological agents considered a security concern in Australia, according to the Federal Government's Department of Health and Ageing.

3. Waste disposal requirements

3.1 General requirements

3.1.1 Responsibility

Managers and supervisors must ensure that:

a) staff and students implement the requirements described in this document;

b) hazardous waste is identified and segregated into the appropriate waste streams;
c) hazardous waste is stored, labelled and transported appropriately;
d) staff receive appropriate training that includes waste segregation, storage requirements, transportation requirements, labelling, emergency procedures, spill control and awareness of all associated hazards.

All hazardous waste generated for the purposes of research or teaching shall be:

a) managed as described in Sections 3.2 to 3.14 of this Guideline.
b) segregated into the waste categories identified in Table 1 Hazardous Waste Categories;
c) clearly labelled using the UNSW Hazardous Waste Label. Additional information may be added if required.

There must be ready access to spill kits and appropriate Personal Protective Equipment (PPE) close to the waste storage location.

3.1.2 Waste labels

The UNSW Hazardous Waste Label requires the following information to be included:

- **Waste Category: _____**
- **Specific hazard information: _____**
- **Waste Generator:** person responsible for the waste
- **Date:** date or period over which the waste was generated
- **Building:** Building and building number
- **Room:** where the waste was generated (laboratory or facility, room number)

Table 1: Hazardous Waste Categories

Waste Category & Colour Code	Waste Descriptor (See Section 3 Definitions)	Specific Category Information	Legislation, Australian Standard
Domestic	Paper and plastics	3.2	• AS/NZS 2243.3
Broken glass	Broken glass – non contaminated	3.3	• AS/NZS 2243.1
Sharps	Sharps e.g. scalpel blades, syringe needles	3.4	• AS/NZS 2243.3 • AS 4031
Chemical	Chemical	3.5	• NSW WHS Act and Regulations • POEO Act 1997 • AS/NZS 2243.2
Biological	Infectious, Biological, Clinical, GMO, human blood or body fluids, infectious animal carcases or material, SSBA	3.6	• AS/NZS 2243.3 • AQIS • Gene Technology Act and Regulation • National Security Act and Regulation
Animal Carcasses	Animal carcasses	3.7	• AS/NZS 2243.3 & .4
Cytotoxic	Cytotoxic drugs or materials contaminated with cytotoxic drugs	3.8	• AS/NZS 2243.1
Radioactive	Radioactive waste (Stored at UNSW until decayed)	3.9	• NSW Radiation Control Act and Regulation • AS/NZS 2243.4
Schedule 4 and Schedule 8 Drugs	Prescription only drugs (S4) and Drugs of addiction (S8)	3.10	• NSW Poisons and Therapeutic Goods Act and Regulation
Human Tissue	Recognisable Human Tissues or body part	3.11	• NSW Anatomy Act and Regulation
Co-mingled	Mixed waste categories	3.12	• AS/NZS 2243.3
General Laboratory Waste	General laboratory disposable materials eg. including soft waste (PPE) and tips/tubes contaminated with residues including absorbent materials used with disinfectants.	3.13	• Health Industries Resources, waste management • EMIAA
Plant Workshop Waste	Typical waste includes hydrocarbons such as oil and grease, detergents, batteries, scrap metal, timber off cuts, perspex, fibre glass, obsolete plant and equipment and building materials	3.14	• DECCW

3.1.3 Table 2: UNSW Hazardous Waste Collection Days

Waste Type	Email - must be received by:	Collection Day
Biological	10am, 2 working days before collection needed	Every work day, early
Chemical	Close of business, Mondays	Thursdays 8am – 4pm

Email the Biological (OHS015) and Chemical (OHS014) waste request forms to: fmgeneralservices@unsw.edu.au .
For problems with missed pick-ups, phone FM Assist: 9385 5111, or email.

3.2 Domestic Waste disposal

Domestic waste must only be placed in a bin labelled “Domestic Waste Only”. This may also include uncontaminated and non-GMO plant material. Domestic waste must not be mixed with any other waste category and so bins are lined with black plastic in order to differentiate domestic waste from other types of waste.

If domestic waste is contaminated, it takes on the waste category of the contaminating material.

Any domestic-type waste generated in a PC3 facility must only be removed from the facility following autoclaving in a double-ended autoclave.

Uncontaminated paper and cardboard may be placed into the blue paper recycling wheelie bins.

Labelling

- The bin for collecting non contaminated waste must be labelled as **“Domestic Waste Only”.**

Storage

- Black-plastic lined bin.

Disposal

- Cleaning staff collect Domestic Waste Only bins at least weekly. They will not touch Domestic Waste bins that contain non-domestic type wastes (gloves, pipettes etc). Domestic waste is removed from UNSW by separate waste contractors.

3.3 Broken Laboratory Glass Waste disposal

- Broken glass is considered a Sharp and must be disposed of into a rigid, puncture-proof container that meets Australian Standard requirements (see AS 4031).
- All large pieces of broken glass are to be collected in the white 15L lidded buckets.
- The bucket must be labelled “Uncontaminated broken glass” unless the glass has been contaminated.
- Contaminated broken glass must be segregated from non-contaminated broken glass and labelled as “Contaminated broken glass”, and the nature of the contamination specified.
- *NOTE*: If contaminated glass ends up in the bucket with uncontaminated glass, the bucket must be labelled according to the contamination as “Contaminated broken glass”.
- Small glass items, such as pasteur pipettes, glass slides, cover slips and small glass vials can be disposed of into yellow sharps containers. See also 3.4.

The white 15L buckets are available from:

- Faculty of Science WebStore, Lowy Building LG08 x52007 (link, Section 5.3)
- Chemistry Store, Applied Sciences Building F10 – ext 54695

When disposing of any broken glass, ensure any contamination hazard is taken into account before disposal.

Note: *Only glass "sharps" are to be placed in buckets that are labelled as containing broken glass. Do not mix broken glass with sharps of other materials or with other types of waste.*

Labelling

- The broken glass waste label requires the following information:

Waste Category: (type of) Broken glass

Specific hazard information: Broken Glass – keep lid closed

Waste Generator: person responsible for the waste

Date: date or period over which the waste was generated

Building: Building and building number (grid code)

Room: where the waste was generated (laboratory or facility, room number)

Storage

- All broken glass must be stored in a white 15L broken glass bucket with the lid closed.

Disposal

- When the glass bucket is full, close the lid and fill out a chemical waste request form identifying the number of glass buckets to be removed. All waste request forms should be to fmgeneralservices@unsw.edu.au.

3.4 Sharps Waste disposal

All sharps are to be collected in a rigid, puncture-proof container that meets Australian Standard requirements (see AS 4031).
Large broken glass pieces are collected in the *white buckets* (described in 3.3).

Small items with sharp edges are collected in the *yellow* sharps bins, unless they contain cytotoxic contamination and must therefore be discarded into a purple cytotoxic sharps bin. Fill the bins up to the level indicated on the front label. Overfilling the bins can result in sharps injuries, so do not overfill them. Do not force items into the container.

No sharp is to be discarded into anything other than a designated sharps bin (see figure 1) or a designated white bucket as described in 3.3.

The sharps bins are to remain in the area where the sharps are generated until the container is full or the container is no longer required. The bins are to be locked closed and removed from the area to the relevant (biological/cytotoxic) waste collection point

- The bins **must not be used** unless properly assembled, as this can increase the risk of a sharps injury.
- The bins **must not be used** for any other purpose than for the disposal of sharps, **including** (where present) the use of half an unassembled bin for ANY other purpose, as this can lead to confusion and possible sharps injuries.

Note *: do not dispose of liquids into sharps bins*. *They are not leak-proof.*

UNSW supplies Australian Standard AS 4031 approved sharps containers for free. They are available from (see link 5.3):

- Faculty of Science WebStore, Lowy Building LG08 x52007
- Chemistry Store, Applied Sciences Building F10 – ext 54695

Figure 1: Sharps containers – yellow for biological, purple for cytotoxic, white for broken lab glassware and larger sharps

Labelling

- The sharps bin requires the following additional information to be included:

Waste Generator: person responsible for the waste

Building: Building and building number (grid code)

Room: where the waste was generated (laboratory or facility, room number)

Storage

- Sharps waste must be stored in an appropriate sharps bin (figure 1) which is kept near to where the sharps are generated.

Disposal

- When the sharps bin is full, the lid must be closed and then locked by pressing in the locking mechanism. Yellow sharps bins are discarded into yellow biological waste bins, and purple cytotoxic sharps bins are discarded into the purple cytotoxic bins at a waste collection point (see the Biological Waste Collection Schedule) or to the upper campus biological waste store.

***Note**: Don't autoclave sharps bins:*

- *the plastic will melt, potentially leaving exposed sharps*
- *melted plastic can block the autoclave's vent mechanism*
- *there may be chemical residues which could be explosive, corrosive or produce toxic fumes*

3.5 Chemical Waste disposal

Hazardous substances must, under no circumstances, be allowed to enter storm water drains. **Do not dispose of hazardous substances or dangerous goods down the sink.** In addition, careful consideration shall be given to the location and bunding of chemical waste containers to ensure any potential leaks do not enter drains, including storm water drains.

Chemical wastes must be segregated according to 3.5.4(b).

Spill kits must be available for all types of hazardous waste generated and staff trained and competent in spill clean-up procedures.

Where metal drums are used for waste transport, they must be compatible with the liquids they are intended to contain, and must be placed in spill containment trays at all times to contain the waste in the event of a leak.

Empty glass containers, such as Winchesters, must not be used to collect or store chemical wastes. See 3.5.3 for disposal. Glass containers should be packaged to minimise damage to the container. Glass winchesters should be transported in polypacks, racks, or other suitable non breakable container.

3.5.1 Liquid-waste containers

Liquid-waste containers (available from the upper and lower campus stores) must be kept closed (sealed) at all times except when you are actually adding waste. Sealing closed with cork, rubber, or ground-glass stoppers; aluminum foil; and polyethylene film or parafilm are not considered adequate. Open the container for only as long as you need to add the waste.

A container with a funnel in the opening is not considered closed unless the funnel itself seals to the container and would prevent spillage.

If the waste is likely to generate gases during storage, vented caps should be used. These wastes must be stored so that vented fumes do not pose a hazard.

3.5.2 Secondary containment (bunding) of liquid waste

All liquid waste containers must be bunded i.e. the waste container placed within an embankment or secondary container in order to prevent any spills from travelling, in order to contain any liquid in the event of an emergency spill or leak.

These secondary containers must be compatible with the chemicals they are intended to contain. The height of the bund required will depend on the potential total of the volume of liquid in storage, and the bund volume normally is 120% of the volume. Segregation of incompatible hazardous wastes must be observed.

3.5.3 Empty chemical containers

Containers that are empty, or contain only small residual amounts of liquid, are disposed of as chemical waste and must be identified as 'empty' on the Chemical Waste form.

3.5.4 Specific Hazardous Waste

- **Peroxide forming compounds** (e.g. diethyl ether,) must have a date of receipt and opening written on the container. The maximum storage period must not have expired. This is generally six months. If the storage period has expired, you must contact the HS Unit.
- **Unknown waste** is handled on a case by case basis.
  - Avoid generating unknowns by keeping the chemical register up to date and keeping good records of the waste you produce.
  - Diligently label all waste containers.
  - On completion of research projects, and before leaving the University, research staff and students must decontaminate equipment, and either dispose of their chemicals and samples, or pass them on to their Supervisor.
- **Explosive waste** is handled on a case by case basis.
  - Avoid generating this waste by storing the chemical as recommended on the SDS.
  - Diligently observe the expiration dates on chemical labels.
- **Radioactive liquid wastes** measured **above** background levels are not allowed to be disposed of. See Section 3.9.1 for handling this waste.
- **Tissue samples in fluid**, such as animal or human tissue samples fixed in formalin, are disposed in the following manner:
  - Drain off the fluid into a chemical waste container (no solid pieces are to remain in the fluid). This fluid becomes chemical waste, must be labelled according to it's hazard and is collected by the chemical waste contractor.
  - The solid wastes are wrapped so that they are unidentifiable as tissue, and don't leak. They become solid chemical waste, must be labelled according to the chemical hazard and collected by the chemical waste contractor.

Labelling

- The Chemical Waste label requires the following information:

Waste Category: Chemical Waste

Specific hazard information: Name of substance or, if a mixture, the list of ingredients. Add DG class, if relevant

Waste Generator: person responsible for the waste

Date: date or period over which the waste was generated

Building: Building and building number (grid code)

Room: where the waste was generated (laboratory or facility, room number)

Storage

a) **Collection Point**

Ensure there are defined waste collection points in each area or building and that these areas have restricted access to members of the public. If the waste collection point is inside the laboratory, occupants are to ensure the area is kept clear, is dedicated to waste storage and is labelled accordingly. Bund the waste collection points appropriate to the size of the container(s).

b) **Waste Segregation**

The rule is the same for chemical waste as it is for chemical storage. Waste should be segregated in accordance with chemical compatibility and Dangerous Goods class.

Where many different substances are being used and it is not practicable to have separate containers for each individual substances the following waste categories are acceptable:

- Halogenated Hydrocarbons
- Non-Halogenated Hydrocarbons
- Aqueous Waste – Acid [dilute solutions less than 5M*****]
- Aqueous Waste – Alkali [dilute solutions less than 5M*****]
- Aqueous Waste with Heavy Metal Content
- Aqueous Waste with non-Heavy Metal Content

Note *: *Any acids or alkalis more concentrated than this should not be mixed. They should be stored as their individual constituent (eg. Hydrochloric acid, Nitric acid etc) for pick-up by the chemical waste contractor. Alternatively, they could be diluted or neutralised, following a safe work procedure, and put out for collection.*

Disposal

- For collection of chemical waste, please complete a chemical waste request form.
- All waste request forms should be emailed to: fmgeneralservices@unsw.edu.au

3.5.5 Other Hazardous Waste

- **Polychlorinated biphenyls (PCBs)**

  At no stage should polychlorinated biphenyls (PCBs) or other halogenated compounds be mixed with other waste. These require special disposal through the Health & Safety Unit.

Note: *Refer to OHS301 PCB Spill Response and Disposal Procedure*

- **Asbestos**

  Where asbestos material has been identified or is suspected within the infrastructure of a building i.e. pipe lagging, roof sheeting, wall insulation etc., you must contact your Faculty or Divisional Client Manager.

  Contact the HS Unit if you have ovens, furnaces or other laboratory equipment which you suspect may pose an asbestos risk. The waste contractor currently used by UNSW for Chemical Waste removal is also licensed to accept Asbestos waste.

3.6 Biological Waste disposal

The process selected for the decontamination of biological waste must be periodically validated to ensure ongoing efficacy.

Note: *some biological agents, such as Prions, may require more than one decontamination method to successfully render them non-viable. Refer to AS/NZS2243.3 to check the requirements for your biological agent.*

Note: *All Security Sensitive Biological Agents (**SSBA**) waste disposal must also follow the Department of Health and Ageing requirements, in*

consultation with the UNSW HS Unit, and in addition to Section 3.6 of this guideline.

Biological waste is either liquid, non-liquid waste (solid), or mixed. The following describes the methods for the treatment and disposal of each type.

The yellow biological waste bins and sharps containers, and the purple cytotoxic waste bins and sharps containers, must be locked closed once full, and must be locked for transport.

3.6.1 Liquid biological waste

(a) Chemical decontamination

Liquid biological waste that contains or potentially contains infective agents or GMOs, can be decontaminated by using the appropriate chemical decontaminant, such as identified in AS/NZS2243.3:2010 Appendix F. Once decontaminated, the waste is disposed of as *chemical waste* and collected by the chemical waste contractor.

The UNSW *Guideline for the disinfection of tissue culture waste* (HS324) includes dilution tables for the use of bleach and iodine, to help select the appropriate final concentration of the decontaminant.

Warning:
DO NOT chemically treat the waste AND then autoclave it. This can lead to an explosion due to the creation of a flammable atmosphere, as well as corrosive and toxic atmospheres inside the autoclave. Once chemically treated, the waste is disposed of as *chemical* waste.

(b) Untreated liquid biological waste

Liquid biological waste that contains or potentially contains infective agents or GMOs, can be sealed into 1 litre bottles and placed into the yellow Clinismart bins. A maximum of 3 litres (bottles) per bin is permitted.

(c) Waste containing cytotoxic substances

Liquid cytotoxic waste can be sealed into 1 litre bottles and placed into the purple Cytosmart bins. A maximum of 3 litres (bottles) per bin is permitted. See also, Section 3.8.

3.6.2 Non-liquid (solid) biological waste

Solid biological waste is disposed of in one of two different ways. See 3.6.2 a) and b).

- No animal carcasses are to be placed into any domestic waste bin. All carcasses are to be disposed of as biological waste.
- Carcasses that contain infective agents or viable GMOs should be autoclaved before disposal. They must go out as biowaste, whether or not they've been autoclaved.
- If the waste is likely to putrefy before the day of biowaste collection, it is advised to either freeze it or put it in a cold-room until the afternoon before the day of collection, and then take it to the yellow bin. The waste contractors usually arrive very early in the morning.
- Remember, you must double-contain all of the above waste for transport to the autoclave or yellow bin.
- If using the new 64 litre Clinismart bin system (Figure 3), solid GMO waste and small animal carcasses can be place directly into these bins without autoclaving. The bin liner must be sealed closed and the bin-lid locked for transport.

- To disposal of laboratory-animal waste and bedding, and plant soil and containers:
    - If the waste is ***not*** contaminated with infectious microorganisms, GMOs, radiation or chemicals, it may be disposed of as solid domestic waste. No such waste is to be disposed of to building drainage, storm water or sewerage system. If you need extra regular green wheelie bins for this domestic waste, contact FM Assist on 9385 5111 .

(a) Autoclave method

Note: *You must follow the autoclave process described in* ***Appendix 1: Autoclave Requirements***.

- Waste is contained in autoclave or clinical waste bags that have the biohazard symbol on the outside. The waste is autoclaved according to the requirements in AS/NZS2243.3. *See Appendix 1: Autoclave Requirements for autoclaving biowaste*.
- Once autoclaved, the treated waste is labelled (see 3.1.4) and placed into a yellow biowaste bin for collection by the Biowaste contractor

(b) Non-autoclave method

- In those areas using the yellow, 240L wheelie bins, and where there is no access to an autoclave, biological waste is placed into an autoclave or clinical waste bag with the biohazard symbol on the outside, or wrapped in opaque wrapping with a biohazard symbol applied to the outside. The waste is labelled according to 3.6.5, and placed into a yellow biowaste bin for collection by the Biowaste contractor.
- If using the new 64L Clinismart bin system (Figure 3), the bin itself needs to be lined (available from Stores). Solid biological waste can be placed directly into the bin. The bin liner must be sealed closed, and the bin lid locked, for transport to the biowaste store.

3.6.3 Mixed biological waste

An example of mixed waste would be tissues in a chemical fluid bath, such as when fixed in formalin. These are disposed of as chemical waste in the following manner:

- Drain off the fluid into a chemical waste container (no solid pieces are to remain in the fluid). If the fluid contains viable microorganisms or GMOs, it must be chemically treated (Appendix F in AS/NZS2243.3). This fluid becomes *chemical waste*, must be labelled according to it's hazard and is collected by the chemical waste contractor.
- The solid wastes are wrapped so that they are unidentifiable as tissue, and don't leak. If the tissue contains cytotoxic chemicals it must be disposed of as cytotoxic waste into a purple cytotoxic bin (see 3.8). In all other cases they become solid *chemical waste*, must be labelled according to the chemical hazard and collected by the chemical waste contractor.

3.6.4 Liquid biological waste disposal

If this waste is chemically decontaminated, the liquid become chemical waste and must follow the requirements for the disposal of chemical waste described in 3.5.

3.6.5 Non-liquid (solid) biological waste disposal

Labelling

- All biological waste (that is not contaminated with cytotoxic chemicals or dangerous goods) must be either:

- placed directly into a lined, 64L Clinismart bin or
- collected in a robust plastic bag (autoclave or yellow clinical waste bag) and double-contained for any transport outside of the facility (eg to the autoclave or to the biowaste store). The outside container must display the biohazard symbol (figure 2).
- Solid waste, such as whole or part animal carcasses, or recognisable human tissue, must be wrapped so that contents are not visible or identifiable.

- Biowaste that is disposed of into the yellow 240 L wheelie-bins must have the following label:

Waste Category: eg Biological waste

Specific hazard information: if relevant eg Risk Group 2 or Infectious waste etc. If it is infectious, include DG 6.2.

Waste Generator: person responsible for the waste

Date: date or period over which the waste was generated

Building: Building and building number (grid code)

Room: where the waste was generated (laboratory or facility, room number)

Figure 2: - Hazard symbols for biological waste

Biological Hazard Symbol


Storage

- Biological waste in robust plastic bags must be contained in a solid-based container with a lid. The container is to be labelled “Biological Waste” and must display a biological hazard symbol (see figure 2).
- If the waste is likely to putrefy before the day of biowaste collection, it is advised to either freeze it or put it in a cold-room until the afternoon before the day of collection, and then take it to the yellow wheelie-bin. The waste contractor often arrives very early in the morning.

Disposal

- UNSW provides a biological waste contractor to remove biological waste from all University campuses. For the location of the nearest biological waste collection points (yellow biological bins, figure 3) contact FM Assist by emailing fmgeneralservices@unsw.edu.au.

Figure 3: - biological waste bins

240L Yellow Biological Waste Wheelie Bin	64L Yellow Biological-waste Clinismart Bin

- People in the Lowy, Wallace Wurth and the Biological Sciences buildings take their biological waste to the upper campus Biological Waste store (LG41), where it is collected by the biological waste contractor.
- A number of other laboratories across campus are on a regular biological waste collection schedule.
- Contact fmgeneralservices@unsw.edu.au for further information, to be included on the regular collection schedule or to arrange a one-off collection. For irregular and one-off collections, you will need to complete the biological waste collection form (OHS015) and email to FM general waste services.

3.7 Animal, plant and invertebrate carcasses and related wastes disposal

All animals (including human, birds and fish), plants and insect carcases from all research and teaching areas are to be collected in autoclave or yellow clinical waste bags, displaying the biohazard symbol. These must go out as biological waste. (See also 3.6.5)

Additional *specific* precautions and requirements apply to any carcasses that are contaminated with radioactive material (3.9), chemicals (3.5), cytotoxics (3.8), or that contain infectious agents or GMOs (3.6). See each of the individual hazard categories on how to deal each of these.

Carcasses that contain cytotoxic substances must be put into the purple cytotoxic bins for incineration. (See 3.8)

No carcasses are to be placed into domestic waste bins.

Any *uncontaminated* solid animal waste products and bedding, plant soil and containers and insect wastes (ie that are ***not*** contaminated with infectious microorganisms, GMOs, radioactive material or chemicals) may be disposed of as solid domestic waste. No such waste is to be disposed of to building drainage, storm water or the sewerage system. If you need extra regular green wheelie bins for this domestic waste, email your request to fmgeneralservices@unsw.edu.au.

Labelling (for non-Clinismart bins)

- The Carcass waste label requires the following information:

Waste Category: eg Animal carcass, or, fish carcasses, etc

Specific hazard information: If infectious, add DG 6.2 infectious waste, if also contains a toxic, corrosive or some other DG, that symbol must also appear on the label.

Waste Generator: person responsible for the waste

Date: date or period over which the waste was generated

Building: Building and building number (grid code)

Room: where the waste was generated (laboratory or facility, room number)

Storage

- Carcasses must be contained in a robust plastic bag and preferably stored in a **minus 20 ^{0}C** freezer, or at least in a cold room.
- For buildings that regularly generate carcasses and use the upper campus BioSciences biological waste store (LG41), carcasses are to be stored in the freezer or cold room until the evening before collection, when they are to be moved to the waste store.
  Note: biological waste is collected on a regular work day morning. There is no pick-up on weekends, public holidays or over the Christmas shutdown so avoid taking waste to the store if it won't be collected for several days.
- Carcasses are either biological waste or cytotoxic waste. They must go into either a yellow or purple bin with the respective yellow biohazard or purple cytotoxic symbol on it, as appropriate.
- For other areas that are either not regular generators of carcasses or do not have access to the upper campus biowaste store, their freezer or cold room needs to be listed as one of the Biological waste Contractor's waste collection points and the contractor will go to this area (on request) to collect the carcasses. Any specific hazard must be noted on the carcass label.

Disposal

- The biowaste contractor visits campus daily, in the mornings, and will attend to carcass waste in the upper campus biowaste store, any of the regular carcass collection points and any of the sporadic collection points that have indicated they have carcass waste to collect.
- Due to the irregular demand for the collection of carcases in some areas, these areas will need to email the biological waste request form (OHS015) for removal of carcasses on each occasion to fmgeneralservices@unsw.edu.au.
- To find out the location of your nearest collection point, or to have your carcass freezer or cold room added to the collection schedule, email fmgeneralservices@unsw.edu.au

3.8 Cytotoxic Waste disposal

All cytotoxic drugs and related wastes, and any Schedule 4 drug waste, must be placed into the purple cytotoxic bins: Cytosmart bins, purple sharps containers, and/or purple lined waste bins, with the white telophase cytotoxic symbol (figure 4). See also 3.6.

The bins should be identified as 'Cytotoxic waste – incinerate at 1100ºC'.

Liquid cytotoxic waste can be sealed into 1 litre bottles and placed into the purple Cytosmart bins. A maximum of 3 litres (bottles) per bin is permitted.

If you are using cytotoxic chemicals please contact the HS Unit on extension 51565 for storage and disposal requirements.

- **Animal, plant and fish carcasses** containing cytotoxic chemicals must be bagged according to 3.8 requirements and *also* CLEARLY labelled with the Cytotoxic Waste symbol, including information about the chemical. These go into purple cytotoxic bins. Do not put these carcasses into the yellow biological waste bins because these carcasses *must* be incinerated (not autoclaved and then incinerated).

Labelling

- Where cytotoxic waste is collected into the purple plastic bags, the cytotoxic hazard symbol must be displayed (figure 4) and the following label affixed:

Waste Category: Cytotoxic Waste – incinerate at 1100ºC

Specific hazard information: Toxic Risk, DG Class 6, name of chemical(s)

Waste Generator: person responsible for the waste

Date: date or period over which the waste was generated

Building: Building and building number (grid code)

Room: where the waste was generated (laboratory or facility, room number)

Figure 4: Hazard symbol for cytotoxic waste

Cytotoxic Hazard Symbol

Figure 5: Purple – cytotoxic waste bins
64L Cytosmart Waste bin; various purple waste bins

Cytotoxic Sharps bin

Storage

- Cytotoxic waste in robust plastic bags must be contained in a solid-based container with a lid and the container labelled “Cytotoxic Waste” and display a Cytotoxic hazard symbol (see figures 4 and 5).

Disposal

- Cytotoxic waste (purple cytotoxic waste bins) is collected from all biological waste collection points by a clinical waste contractor. Contact FM general services, fmgeneralservices@unsw.edu.au for any enquiries.

3.9 Radioactive Waste Requirements

Radioactive Waste cannot be disposed unless there has been special permission from the Office of Environment and Heritage (OEH).

Only material having less than the following activity may be disposed of as waste:

a) a concentration activity of less than 100 Bq per gm [2.7 mCi/kg] (ie not radioactive according to the legal definition) **OR**

b) Total activity of a given quantity of waste is <1 where Total Activity = A1/40 + A2/400 +A3/4000 + A4/40000 **AND**

- A1 represents the total activity (kBq) of group 1 radionuclides
- A2 represents the total activity (kBq) of group 2 radionuclides
- A3 represents the total activity (kBq) of group 3 radionuclides
- A4 represents the total activity (kBq) of group 4 radionuclides

Radioactive waste must be stored until the activity has reduced to the described, acceptable level. Once the levels have reduced to less than **a)** or **b)** above, it can be disposed of as hazardous waste by faxing to the HS Unit (x52365) with a Radiation Declaration form.

The Radioactivity Decay Reckoner calculates when radioactive waste will decay to levels determined by the OEH, which will allow its removal by contractors as chemical waste."

- **Carcasses** containing **ionising radiation** must be bagged and labelled according to 3.7 Carcass Waste requirements and stored frozen. It must be appropriately shielded until the radiation activity meets the requirements in points **a)** or **b)**.
    - They must not be autoclaved until the activity meets points **a)** or **b)**.
    - Carcasses must also be labelled with the Radiation Hazard symbol.
    - This waste could include associated bedding, soil and containers.
    - The freezer must show the Radiation Hazard symbol.

Please contact the UNSW Radiation Safety Officer on ext 52912 for advice regarding your radioactive waste disposal requirements.

3.9.1 Liquids

Liquid Radioactive Waste

1. Radioactive liquid waste should be kept in a container labelled ’Radioactive Waste’ until it is suitable for disposal. Labelling needs to include the following information:
    a) Type of Radioisotope;
    b) Calculated Activity at date of Radioactive Waste Disposal Request (Bq/gram);
    c) Contact name of waste generator and phone number;
    d) Originating School.

2. Radioactive organic solvent waste and water solutions should also be kept separate even if they are of the same radioisotope.
3. Radioisotopes which have short half lives,(eg. P^{32}) should be kept for a period of time depending on volume and activity (see 3.9 b) until the radioisotopes have decayed to below OEH disposal levels. This waste can then be disposed of as normal chemical waste (provide **former** radioactive details on the chemical waste form and fax to HS Unit).

Mixed radioactive liquid wastes with short-lived isotopes [e.g., <30-day half-life (^{32}P)] should be segregated from isotopes with half-lives between 30 and 90 days (^{35}S, ^{125}I) and from long-lived isotopes (^{3}H, ^{14}C).

You must maintain an inventory of all activity added to waste containers, in order to ensure that the activity limit of 100 Bq/gm is not exceeded. They are usually measured quantities and should not be difficult to add up. Where total activity may exceed the limit, there are a number of alternatives:

a) Short half life radionuclides, can be aklowed decay in storage until appropriate levels are reached.
b) For long half life radionuclides, it may be possible to mix differing levels of waste activities of the same radionuclides, to ensure that the total activity for that radionuclide remains below 100 Bq/gm.

Note: *Do not mix different radionuclides*

c) If this is not possible, carefully decant ONLY the high level scintillation liquid into a suitable vessel for long term storage. Label this as above and send a signed Radiation Waste Transfer form to the HS Unit.

Scintillation Waste and Scintillation Vials

To dispose of scintillation vials and their contents:

1. Collect sealed vials into a metal or fibreboard drum (available from HS Unit) which has been lined with a strong plastic bag.
2. Seal the inner liner.
3. Seal the drum.
4. Label the drum with:-
    a) your name
    b) your laboratory
    c) a description of the contents
    d) the radionuclide
    e) activity (Bq) of isotope at current date
    f) weight (kg) of waste
    g) the date
5. Send a signed Chemical Waste form *including* the above information to HS Unit.

Liquid scintillation vials and contents may be disposed of together ***if*** the activity concentration is below 100 Bq per gm (2.7 mCi per kg). Keep this type of waste separate and place in a hazardous waste drum lined with a strong plastic bag. Identify separately on the Chemical Waste form. Scintillation waste with activity concentration above 100 Bq per gm (2.7 mCi per kg) must be stored. Please contact the UNSW Radiation Safety Officer on ext 52912 for advice.

3.9.2 Solids

Solid radioactive waste (contaminated pipette tips, lab coats, gloves, absorbent materials used to mop up spills etc.) should be placed in a suitable container appropriate to the radioisotope (eg. Fibre drums) and then contact the Radiation Safety Officer on ext x52912. The container should be lined with a thick strong plastic bag and labelled with radioactive hazard signs and completed waste labels.

All Radiation Hazard signs and labels must be removed from items before placing them into the lined container. This container must have the Radiation

Hazard signs and labels on the outside and can be used until full. Contact the HS Unit in order to have the waste transported to the University's radiation store.

All requests for the pick-up & transfer of radioactive waste should be faxed to 9385 2365.

3.10 Scheduled Drugs Waste Requirements (S4 and S8 drugs)

Schedule 4 drug waste is to be discarded into the purple cytotoxic waste bins.

Schedule 8 drug waste must be destroyed in the presence of a duty pharmacist and can be arranged by contacting the HS Unit. For information relating to the Schedule 8 drugs of addiction, see *Schedule 8 Drugs Procedure OHS 331*.

3.11 Human Tissue Waste disposal

If you are disposing of recognisable human tissue, please contact fmgeneralservices@unsw.edu.au to make a special arrangement for collection.

3.12 Co-mingled Waste disposal

When dealing with mixed waste streams, e.g. biological and radioactive, infectious material and animal carcasses, cytotoxic material and animal carcasses, chemicals and solids, you must ensure that you address all hazards associated with the storage and disposal of the waste. This should be done during the planning phase of the project, and should include waste minimisation strategies.

Before combining wastes and prior to storage or disposal, an assessment of each situation shall be conducted by the generator of the waste or their supervisor, and approved by the area supervisor or laboratory manager.

Contact the HS Unit if you need further information regarding co-mingled waste.

3.13 General Laboratory Waste disposal

General laboratory waste is disposed of *either* as Chemical waste *or* as Biological waste, depending on the hazardous nature of the residue. It is not domestic waste.

General Laboratory Waste includes all waste paper, gloves, laboratory plastic-ware (eg plastic pipette tips, plastic tubes, petri-dishes, *whether or not they have been used)* or other general laboratory material that is or may be contaminated with chemical or biological residues.

Absorbent materials and disinfectants that have been used to decontaminate surfaces or spills must be treated as General Laboratory Waste and disposed of as chemical waste. They must not be treated as Domestic Waste.

3.13.1 From chemical and teaching laboratories as well as workshops

This waste is considered to be chemical waste and put out for collection by the Chemical Waste Contractor.

3.13.2 From (micro)-biological and teaching laboratories as well as animal facilities

This waste is considered to be biological waste and put into the yellow bins for collection by the Biological-Waste Contractor (*unless* it has been chemically decontaminated).

Labelling

- The General Laboratory Waste label requires the following information:

Waste Category: General laboratory waste

Specific hazard information: Chemical residue (or Biological residue – depending on the type of lab where the waste was generated). If relevant, add the DG information or the biohazard symbol to the outside of the container.

Waste Generator: person responsible for the waste

Date: date or period over which the waste was generated

Building: Building and building number (grid code)

Room: where the waste was generated (laboratory or facility, room number)

Storage

- All **General Laboratory Waste** must be collected in a robust plastic bag. The robust plastic bag must be contained in a solid-based container with a lid, and labelled "General Laboratory Waste". If it is biological waste it goes into a yellow bin. If it is chemical waste it goes to the chemical waste collection point.

Disposal

- General Laboratory Waste that may contain chemical residues **must not** be autoclaved. It is critical to label and segregate the various waste streams in your laboratory to ensure that no chemical waste is autoclaved. Traces of hazardous chemical substances could result in an explosion, inside the autoclave, and injury and/or release of toxic vapours. All waste collected by the Chemical contractor goes for incineration.
- General Laboratory Waste from biological workplaces can be taken to any Biological Waste collection point and placed directly into a yellow Biological Waste bins. These bins will be collected by the biological waste contractor according to the biowaste collection schedule.
- General Laboratory Waste that contains cytotoxic residues must be disposed of as cytotoxic waste into the purple bins.

3.14 Plant Workshop Waste disposal

Typical plant workshop waste includes hydrocarbons (such as oil and grease), detergents, batteries, scrap metal, timber off cuts, perspex, fibre-glass, obsolete plant and equipment, and building materials.

a) Treat the following workshop waste as chemical waste:
   - hydrocarbons (eg oil or grease),
   - asbestos (you must contact FM General Services for advice on handling asbestos),
   - batteries (some batteries can be recycled, see 3.15),
   - paints
   - other chemicals used in the workshop.

b) All other waste must be placed in suitable waste receptacles before disposal in a skip or other appropriate container for reuse or recycling (eg scrap metal, timber off cuts, perspex, fibre glass, obsolete plant and equipment and building materials).
   - If any of these wastes or materials have been mixed or contaminated with chemicals then they should be discarded as Chemical Waste (section 3.5).

Labelling

- The bin for collecting non contaminated workshop waste must be labelled in order to ensure it is egregated from chemical or other waste streams.

Storage

- A robust container appropriate to the material being stored, eg metal bin for steel waste.

Disposal

- Staff or students must dispose of waste in an appropriate skip or container for reuse, recycling or collection by a contractor.
- Skips will be collected as scheduled or upon demand by contacting FM General Services.
- Facilities cleaning staff will only collect domestic waste and not plant workshop waste.

3.15 Miscellaneous (batteries, mobile phones)

Batteries

Batteries of any description should not be disposed of with general waste. They contain heavy metals and other contaminants that leach from the casing and could contaminate groundwater.

Spent batteries that are C-size and smaller, and all button batteries from your small laboratory devices, can be recycled by depositing them in the specific recycling tubes at various collection points. Many schools and areas have their own battery-recycling tubes. There are also recycling tubes at the following locations:

- FM Assist, Level 2 Mathews Building
- Arc reception, Ground Floor, The Blockhouse
- The Chancellery, Level 1

***Note:** "wet" batteries are not accepted for recycling.*

All other batteries are disposed of as chemical waste (Section 3.5).

Mobile phones

Mobile phones, their batteries and all accessories can be recycled by depositing them in the specific recycling tubes in your school or at the following locations:

- FM Assist, located at Level 2 Mathews Building
- Arc reception, Ground Floor, The Blockhouse

4. Summary of Waste Collection

4.1 Waste for collection by Chemical waste Contractor

1. Have an appropriate, designated area in the laboratory for the storage of hazardous waste until pick-up.
2. Ensure that waste storage is in accordance with chemical compatibility.
3. Containers must be in good condition, not leaking and not over-full. All containers must have fully closable lids. If lids do not adequately seal then containers must be replaced. We have a duty of care to the chemical waste contractor to ensure our waste is in a safe condition for transport.

4. The waste container's material must be compatible with the waste it contains. Appropriate containers can be obtained from stores (See Waste Management link in 5.3):
    - Upper campus – Biosciences Store
    - Lower campus – Chemistry Store
5. Containers should be bunded to accommodate at least the container's contents.
    - Bunds in areas that may be affected by rain must be monitored and water removed following rain in order that they are kept dry. Wherever possible, store chemicals under cover.
6. Containers must remain closed, unless adding or removing waste.
7. Containers must be labelled as **"Chemical Waste"** and the components must be listed. The list of contents **MUST** be updated whenever waste is added. Labels must be waterproof or laminated to make them so.

    The container label must include the name of the person responsible for emailing the chemical waste form to: fmgeneralservices@unsw.edu.au
8. **To get your waste picked up:**
    i. Download the chemical waste form HS Unit website.
    ii. Complete the details accurately especially regarding the chemical substance, the quantity, the exact location of the waste and local contact details for the contractor in case there are specific questions about the nature of the waste etc
    iii. Email the completed form to: fmgeneralservices@unsw.edu.au

    Chemical waste will be picked up on Thursdays, between 8am and 4pm

    iv. On the day of the pick-up ensure access for the contractor. If the waste is located in a locked room, provide details for the person who has a key to this room.

4.2 Waste (including cytotoxic) for collection by Biological waste Contractor

1. Sharps waste must be in appropriate sharps containers
2. If using the 64L Clinismart or Cytosmart bins, non-liquid waste can be place directly into thebin – purple for cytotoxic, yellow for biological.
3. If using the yellow 250 L wheelie bins, biological waste must be in autoclavable bags showing the appropriate biohazard symbol. Infectious waste must be double-contained. .
    a. Bags and containers must be labelled.
    b. Bags and containers must be in good condition, not leaking, not over-full and must be sealed. We have a duty of care to the waste contractor to ensure our waste is in a safe condition for transport.

Biological waste will be picked up from the designated points early in the mornings on weekdays only,

4. To get your waste picked up:
    a) Take the waste to the yellow wheelie bin that is in your designated collection area. OR
    Take the yellow bin to the biological waste store (upper campus)
    b) If the waste is located in a locked room, provide details for the person who has a key to this room.
    c) Those submitting periodic collection requests should email their form to:fmgeneralservices@unsw.edu.au

4.3 Radioactive waste storage

Radioactive waste must be stored on campus until the activity is below the required level described in Section 3.9. To have radioactive waste taken to the UNSW radiation waste store, contact the Radiation Safety Officer on ext 52912.

5. Acknowledgements, References, Appendices

The University of Melbourne's Environment Health and Safety Manual was reviewed and parts utilised, with permission, in the production of this document.

5.1 References

NSW Work Health & Safety Act 2011 and *Regulation 2011*

NSW *Environmentally Hazardous Chemicals Act 1985*

NSW *Waste Avoidance and Resource Recovery Act 2001*

NSW *Protection of the Environment Operations Act 1997* (POEO Act)

Hazardous Waste (Regulation of exports and imports) Act 1989

Health Industries resources - waste management

Office of Environment and Heritage (OEH): Home

OEH: Waste management and resource recovery framework – waste classifications

Radiation Control Act 1990 and *Regulation 2003*

NSW Department of Environment and Heritage

Environment Protection Agency (EPA) NSW

Biological Control Act 1985;

Poisons and Therapeutic Goods Regulation 2008

Code for Transport of Dangerous Goods

Office of the Gene Technology Regulator

Department of Health and Ageing for SSBAs, *National Security Act 2007* and *National Security Regulations 2008*

Australian Standards:

- AS1940 The Storage and Handling of Flammable and Combustible Liquids
- AS/NZS2243.1 Safety in Laboratories Part 1: Planning & operational aspects
- AS/NZS2243.2 Safety in Laboratories Part 2: Chemical aspects
- AS/NZS2243.3 Safety in Laboratories Part 3: Microbiological safety and containment,
- AS2243.4 Safety in Laboratories Part 4: Ionising radiations
- AS/NZS2243.10 Safety in Laboratories Part 10: Chemical Storage
- AS4031 Non-reusable containers for the collection of sharp medical items used in health care areas

5.2 Associated Documents

UNSW WHS Policy
Hazardous Substances and Dangerous Goods Procedure (HS332)
Radiation Safety Procedures
Biosafety Procedure (HS323)
Disinfection of tissue culture waste guideline (HS324)
PCB Spill Response and Disposal Procedure (HS301)
Schedule 8 Drugs Procedure (HS331)
UNSW Hazardous waste disposal pictogram
Protocol for Chemical Waste Store LG41 (HS503)

5.3 UNSW links

Faculty of Science WebStore (upper campus store)
UNSW Waste management and Chemistry store (lower campus)
Radioactivity Decay calculator (ready reckoner)
FM services Archibus - to log a request for bins

5.4 Appendix 1: Autoclave Requirements (AS/NZS2243.3:2010)

1. The effectiveness of the autoclave being used to decontaminate the waste must be **validated monthly** and the results of each month's testing kept for at least 12 months, such as in the autoclave logbook. They must be made available to the HS Unit on request and may be requested by other regulatory bodies (such as the Office of the Gene Technology Regulator [OGTR]).
   (a) The effectiveness of the **autoclave** must be validated each month (OGTR requirement) by the use of:
   - thermocouples or resistance thermometers, to ensure that the required temperature has been achieved; and either
   - chemical indicators which use a combination of moisture, heat and time and which progressively change colour with the time exposed at the specified temperature; or
   - biological indicators such as spore strips; or
   - enzyme indicators.
2. In addition to the **annual boiler inspection**, where GMO waste is being decontaminated, the autoclave must be **calibrated annually** by a qualified person and the results of each year's calibration must be kept for the previous 5 years and made available on request. Autoclave calibration must include the calibration of the thermocouple and safety valves.
3. **Each autoclave load** must be performed using a combination of temperature and time that has been validated as effective in rendering the infectious material or GMO non-viable. Additional consideration is required when autoclaving animal carcasses and soils as longer times may be required to reach the required parameters, and to effectively decontaminate the waste.
   i. Each load must be packed and loaded to allow for the penetration of steam into the material being decontaminated in accordance with AS/NZS2243.3;
   ii. the coldest part of the load must be exposed to a minimum temperature of 121°C and 103 kPa for at least 15 minutes or at 134°C and 203 kPa for at least 3 minutes in accordance with AS/NZS2243.3;
   iii. Methods for monthly validations, and to ensure successful GMO/infectious waste decontamination, include :
      a. chemical indicators which use a combination of moisture, heat and time and which progressively change colour with the time exposed at the specified temperature; or
      b. biological indicators such as spore strips; or
      c. enzyme indicators.
   iv. Measures must be taken to ensure that loads that have been processed can be differentiated from loads that have not (e.g. by use of **autoclave** tape).

   AS/NZS2243.3:2010, Section 12, for autoclave validation.
   AS/NZS2243.3:2010, Section 10.6, for autoclave requirements

4. Once autoclaved, the waste is placed into yellow biowaste bins for collection by the biological waste contractor.

5.5 Appendix 2: History

This procedure will be reviewed to address changes in legislation or any changes within the University that impact on the management of hazardous waste.

Version	Authorised by	Approval Date	Effective Date	Sections modified
1.0	Director Human Resources	09/2003	Sept/2003	New document (ML)
0.1	Director Human Resources	01/11/2006	01/Nov/2006	Consultation draft. Whole document. Focus on laboratory waste. Segregated laboratory wastes into 13 different waste streams with corresponding procedures for each one. (AJ)
2.0	Director Human Resources	22/03/2007	22/March/2007	4.2, 4.3, 4.4, 4.5, 4.7, 6.1 Clarified procedures for biowaste, co-mingled waste, glass waste and chemical waste from stakeholders meeting Changes to biological waste sections due to new waste contractor (AJ)
2.1	Manager OHS&WC	31/7/07	31/July/2007	4.12 Up date of changes to disposal of general laboratory waste (AJ)
2.2	Manager OHS&WC	13/11/07	13/Nov/2007	4.0 Table 1 Change to biowaste collection day (AJ)
2.3	Manager OHS	13/12/2010	13/12/2010	1. Facilities Management looking after waste management administration and HS Unit technical. 2. Weblink's updated from old site to new site
3.0	Director Human Resources	14/04/2011	14/04/2011	Review entire document. Reformat to UNSW Guideline template. Revised Austr Standard2243.3, add references to SSBAs, revised waste collection responsibility (KN)
3.1	Manager OHS	9/4/2013	9/4/2013	Review entire document. Add: SDS definition, reference to S4 drugs, include Clinismart and Cytosmart bin system, reference to disinfection guideline and waste disposal pictogram. Update waste collection times and FM contact details (KN)