

Intent

This document forms a part of the laboratory safety series and outlines the base guidelines for spill management in laboratories and workshops to assist laboratory and workshop users in chemical and biological spill management in James Cook University (JCU) facilities.

Scope

The requirements of this guideline are mandatory for safe spill management and to ensure the safety of persons, JCU facilities and the environment when stored in a general space identified as:

- A laboratory;
- Associated storerooms or spaces which are support areas to the laboratory; and
- Should be applied where other locations that are not laboratories have equipment or processes mentioned within this guideline. Such examples would be fuel storage.

This guideline applies to all JCU employees, adjuncts, students, visitors, volunteers and contractors conducting activities associated with laboratories for the purpose of:

- Research;
- Teaching;
- Study;
- Maintenance or construction and/or
- Cleaning.

This guideline does not apply to JCU Controlled Entities. The Controlled Entities must ensure appropriate procedures and controls are in place for laboratory safety under their control.

Definitions

Term	Definition
Container	Means anything in or by which a hazardous chemical is, or has been, wholly or partly covered, enclosed or packed, including anything necessary for the container to perform its function as a container.
Corrosive Substances	Substances that, by chemical action, will cause severe damage when in contact with living tissue, or in the case of leakage, will materially damage, or even destroy, other goods or the means of transport. Such substances are listed as Class 8 corrosive substances in the ADG Code as per AS 3780-2008.
Laboratory	Space identified by JCU Estate Directorate and the relevant Division as a laboratory.
Laboratory Supervisor	Person nominated as in control of the laboratory by the Division, or College management. This will be a member of staff.
Risk	The likelihood that harm will occur when exposed to a hazard and consequence of that harm (death, injury or illness).
Risk Assessment	A systematic process of evaluating the potential risks that may be involved in a projected activity or undertaking.
Risk Analysis	Process to understand the nature of the work health and safety risk and determine the level of risk.
Supervisor	Any person who is responsible for Workers, the allocation of tasks to Workers and / or the oversight of all JCU students during teaching and / or learning activities including field trips.

Worker	A person who carries out work in any capacity for JCU, and includes working as: an employee a volunteer an apprentice or trainee a student gaining work experience (paid or unpaid) a contractor or subcontractor and their employees labour hire company employees assigned to work for JCU.
Workplace	A workplace is the place where work is carried out for JCU and includes any place where a Worker goes, or is likely to be, while at work.
Workshop	Space identified by JCU Estate Directorate and the relevant Division as a Workshop.

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1 Duty Obligations and Responsibilities

1.1 James Cook University

JCU is responsible for:

- Maintaining laboratories to the minimum standard that is outlined in the relevant Australian Standards and managing spills.

1.2 College Managers / Directors / Managers / Operations Managers of Divisions

To ensure the requirements of this procedure are being met;

- To ensure that the ChemWatch manifest is maintained;
- Provide training to staff in regard to their obligations and duties for chemical spills, including:
 - Accessing ChemWatch search function at induction;
 - ChemWatch user training for any person responsible for maintaining a ChemWatch database;
 - Risk assessment training;
 - Training in the use, maintenance and storage of any personal protective equipment provided to control an exposure to a Spill.
- Approve establishment and increase in manifest quantity storages;
- Approve initial purchase of items.

1.3 Workers

Workers must take reasonable care for their own health and safety when undertaking JCU activities. In relation to spill safety, this means:

- Complying with procedure;
- Not accessing any laboratory, storage space unless appropriately inducted;
- Complying with all laboratory rules and reasonable direction from Laboratory Supervisors, including spill kit locations and methods specific to the area;
- Reporting any medical conditions or allergies that may place the person at increased risk;
- Wearing enclosed footwear and any mandatory PPE for the laboratory or activity being undertaken;
- Reporting all hazards, incidents and defective equipment to the Laboratory Supervisor immediately;
- Label all substances in accordance with *Schedule 9 of the Work Health and Safety Regulation 2011 (Qld)*.

1.4 Research Students

- Ensure compliance with this procedure;
- Comply with the requirements of “Workers” under this procedure.

1.5 Laboratory and Academic Supervisors

Laboratory Supervisors are required to ensure the requirements outlined in this procedure are being met, by ensuring:

- Laboratories under their control have a spill management risk assessment in place for the activities conducted within that laboratory;
- Regular inspections are conducted of the laboratory space, spill kit compliance, appropriateness and that all contents are in date;
- Emergency equipment (such as first aid kits, fire extinguishers) are available and evacuation plans are known to all laboratory users;
- Ensure the laboratory safety manual is up to date and appropriate for the location;
- Hazards and incidents, including spills, are recorded in JCU’s hazard and incident register (Riskware).

1.6 Work Health and Safety (WHS) Unit

The JCU WHS unit acts in an advisory role in relation to the way laboratory spill kits are managed at JCU. The WHS unit will schedule and conduct annual audits in collaboration with the Laboratory Supervisor and / or the nominated Laboratory Technician.

2 Spill Kits

2.1 Spillage Containment

A room or space intended for storing or handling liquid chemicals shall be provided with a catchment for the retention of spills. It shall be sufficiently impervious to retain spillage and to enable recovery of any such spillage. Where incompatible chemicals are stored in the same area, the spill catchment system shall prevent these substances from coming into contact with one another in the event of a spill.

Individual trays or other receptacles, of a capacity equal to 100% of the largest container stored, may be used under a shelf, rack, or single package as a catchment device in lieu of a catchment on the floor.

Hazardous chemicals with a significant spillage hazard shall be kept in chemical storage cabinets. Cabinets shall have built-in spillage containment for at least 25% of the storage capacity or the capacity of the largest container likely to be stored in the cabinet, whichever is the greater.

Additional containment for the store should be provided based on the worst reasonably likely spillage scenario.

2.2 Spill Management

Every endeavour shall be made to prevent leaks or spills, and to control them if they occur (e.g. through use of secondary containment). Where a spill occurs, **if safe to do so** clean up should be initiated immediately with the exception where chemicals may become airborne during a spill – if this occurs notify all others in your immediate area, restrict access and allow to settle before re-entering to commence appropriate clean up.

The response for a spill in the laboratory will depend upon the hazard (toxicity, corrosivity, flammability) of the material and the volume. Consideration should be given to the area that may require restriction of access during the clean-up. Possible consequences of the spill such as environmental pollution and cross-contamination shall be included in the assessment of the hazard from the spill. A low hazard, low volatility material may be cleaned up with a paper towel. A spill of a large volume of high hazard material or high volatility material can require clean-up personnel to wear protective clothing and respiratory protection. Each space (this assessment can combine multiple spaces) is to have a risk management plan outlining spill management in the form of a risk assessment stored in the RiskWare system (this can be part of the laboratory risk assessment).

2.3 Spill Kits

Where specific products have been named, they are named as an example only, other products can be substituted.

2.3.1 Absorbents / Neutralisers

All absorbents should be determined by undertaking a risk assessment of the laboratory/space and the potential hazards. Possible absorbents may be:

- Universal Spill Absorbent: 1:1:1 mixture of Flor-Dri (or unscented kitty litter), sodium bicarbonate and sand. This all-purpose absorbent is good for most chemical spills including solvents, bases and acids (with the exception of hydrofluoric acid);
- Absorbent pads and rolls: 'HazMat' absorbent pads;
- Acid Spill Neutraliser: sodium bicarbonate, sodium carbonate or calcium carbonate;
- Alkali (Base) Neutraliser: sodium bisulphate, boric acid, acetic acid or oxalic acid;
- Solvents/Organic Liquid Absorbent: inert absorbents such as vermiculite, clay, sand;
- Fuels and flammables are contained with a boom, and absorbent material.

2.3.2 Personal Protective Equipment (PPE)

All PPE should be determined by undertaking a risk assessment of the laboratory/space and the potential hazards. Possible personal protective equipment may be:

- Hand protection: chemical resistant safety gloves (i.e. disposable neoprene or nitrile gloves);
- Eye protection: Safety chemical goggles;
- Body protection: Laboratory coat / disposable corrosive apron;
- Foot protection: Enclosed footwear & Plastic Vinyl Booties;
- Respiratory protection: P2 Respirator, N95 compliant (personnel must be properly fit tested before using a respirator to clean a spill).

2.3.3 Clean up material

All clean up material should be determined by undertaking a risk assessment of the laboratory/space and the potential hazards. Possible clean up material equipment may be:

- Brooms, plastic dustpan and square mouth shovel to sweep up the absorbent material;
- Disposable, sturdy cardboard scraper and pan;
- Paper towels for minor spills;
- Plastic tongs/ scoops to pick up contaminated absorbent material;
- A chemical resistant bin (i.e. wheelie bin, drum, box) with a close fitting lid to hold the volume of spill and absorbent residues prior to disposal;
- Heavy duty plastic bags for wrapping contaminated PPE;
- Autoclavable /BioHazard /Clinical waste 120L bags;
- Biohazardous spill warning signs;
- With all spills management protocols, it is essential that the affected area is left clean and dry. Disposable items in the spills kit should be replaced after each use of the kit.

3 Examples of Specific Spill Kits

3.1 Biohazardous Spill Kit

Kit inclusions:

- P2 Face Mask;
- Apron;
- 2 x Cleaning Cloths;
- Clinical Disinfectant (Ethanol 70%, Trigene, or Virkon) (OGTR and Biosecurity Approved Arrangements should consult the Regulator websites for approved disinfectants and dilution);
- Instructions;
- Biohazardous Absorber / Neutralizer (Biosorb, paper towel or absorbent pads);
- Gloves;
- Scoop & Scraper;
- 2 x Clinical Waste Bags with ties.

3.2 Cytotoxic Spill Kit

Kit inclusions:

- Disposable face mask / eye protection fluid-shield;
- Half face respirator mask and P2 ABE1 cartridge set;
- Chemical safety goggles;
- Single use disposable nitrile gloves, (inner level protection) 2 pairs;
- Single use long cuff heavy-duty nitrile gloves, (outer level protection) 2 pairs;
- Disposable laminated plastic full body overalls, 2 units, 1 x medium & 1 x large;
- Protective over shoe covers (non skid), 2 pairs;
- 1 scooper and scraper, 1 set;
- Absorbent cleaning cloths, 2 units;
- Lilac cytotoxic waste bags with ties, 2 units;
- Unisafe absorbent powder, 2 x 100gm unit, absorbs in excess of 2.5 litres;
- Virkon, Trigene, 70% Ethanol disinfectant;
- Cytotoxic waste bins, well marked, comply to Australian Standards.

3.3 Mercury Spill Kit

Kit inclusions:

- Disposable face mask / eye protection fluid-shield;
- Half face respirator mask and P2 ABE1 cartridge set;
- Chemical safety goggles;
- Single use disposable nitrile gloves, (inner level protection) 2 pairs;
- Single use long cuff heavy-duty nitrile gloves, (outer level protection) 2 pairs;
- Disposable laminated plastic full body overalls, 2 units, 1 x medium & 1 x large;
- Protective over shoe covers (non skid), 2 pairs;
- 1 scooper and scraper, 1 set;
- Absorbent cleaning cloths, 2 units;
- Lilac cytotoxic waste bags with ties, 2 units;
- Unisafe absorbent powder, 2 x 100gm unit, absorbs in excess of 2.5 litres;
- Virkon, Trigene, 70% Ethanol disinfectant;
- Cytotoxic waste bins, well marked, comply to Australian Standards.

It is advisable to buy a commercial kit for Mercury spill kits.

4 Tabulated Spill Kit Neutralisers & Additional Information

GENERAL CONTENTS	
Signage/ Labelling	<ul style="list-style-type: none"> • Spill kit to be sign posted and labelled.
Instructions	<ul style="list-style-type: none"> • Instructions for the type of kit.
PPE	<ul style="list-style-type: none"> • Specific gloves and respiratory protective equipment for the type of kit (flammable, cytotoxic etc) • Apron; • Goggles; • See specific areas below.
Bags/containers	<ul style="list-style-type: none"> • Bags to place the spilled material/absorbents within; • Bin or container to place the spilled material/absorbent within.

Spill Kit Planning Guideline

WHS-PRO-GUI-010f

Cleaning Items	<ul style="list-style-type: none"> • Scooper and scraper. 	
Absorbents/ Neutralisers / Disinfectant	<ul style="list-style-type: none"> • See specific areas below; • Provide appropriate supply for quantity that could be spilled. 	
GENERAL SPILLS		
Absorbents	<ul style="list-style-type: none"> • Universal – pads, booms, pillows, vermiculite, granular, and loose sorbents. 	
Additional Information	<ul style="list-style-type: none"> • These universal/commercial absorbents may be used for most liquid chemical spills; • Check the product label or other manufacturer's information for recommended uses and compatibility. 	
PPE	<ul style="list-style-type: none"> • A P2 dust mask/ABEK chemical cartridges will apply to the majority of acids, bases, organics and aerosol; • HG filter for large quantities of mercury; • P2 for biological spills. 	
CORROSIVES – Acids		
Neutralisers	Weak bases <ul style="list-style-type: none"> • Sodium carbonate (soda ash); • Sodium bicarbonate; • Calcium carbonate. 	Commercial neutralizers <ul style="list-style-type: none"> • Ensure that commercial brought products are suitable for purpose against the SDS.
Additional Information	Okay to neutralize <ul style="list-style-type: none"> • Hydrochloric acid; • Sulfuric acid; • Nitric acid; • Phosphoric acid; • WARNING: DO NOT USE PAPER TOWELS OR SAWDUST TO CLEAN OXIDISING ACID SPILLS; • The safety data sheet must always be consulted when dealing with these types of spills. In particular the hazards of the chemical (including acute and chronic health effects), reactivity information, safety precautions for handling and specific information for dealing with spills. 	Do not neutralize <ul style="list-style-type: none"> • Acids that contain heavy metals; • Oxidizing acids such as chromic acid, perchloric acid, and fuming nitric acid.
PPE	<ul style="list-style-type: none"> • Gloves example PVC, Viton butyl; • P2 respirator. 	
CORROSIVES – Bases		
Neutralisers	Weak acids <ul style="list-style-type: none"> • Citric acid; • Sodium bisulfate; • Dilute acetic acid (vinegar); • For small spillages of acids use dry sand or carbonate to contain spill; • The area should be flushed with water but not to the extent that the spillage is spread unnecessarily; • Neutralise an acid with sodium bicarbonate by sprinkling generously over spill. 	Commercial neutralizers <ul style="list-style-type: none"> • Ensure that commercial brought products are suitable for purpose against the SDS.
PPE	<ul style="list-style-type: none"> • Gloves example PVC, Viton butyl, nitrile; • P2 respirator. 	
FLAMMABLE LIQUIDS and SOLVENTS		
Absorbents	<ul style="list-style-type: none"> • Activated charcoal; • Soda ash (sodium bicarbonate) to sprinkle liberally over the spill. If necessary wear a P1 mask to avoid breathing soda ash dust. 	

Spill Kit Planning Guideline

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Additional Information	<ul style="list-style-type: none"> • Absorbents reduce vapour level; • Degree of flash point reduction depends on quantity used. Refer to manufacturer's directions; • Absorbents may also be used for other toxic, noxious liquids such as carbon tetrachloride and chloroform; • Do not use these absorbents with oxidizing liquids.
PPE	<ul style="list-style-type: none"> • ABEK1 chemical filter on respirator if potential for large spills.
FORMALDEHYDE	
Neutralisers	<p>Commercial products</p> <ul style="list-style-type: none"> • Formalex®; • Ensure that commercial brought products are suitable for purpose against the SDS.
Additional Information	<ul style="list-style-type: none"> • Neutralisers reduce vapours; • Reacts with aqueous formaldehyde solutions to form a solid polymer.
PPE	<ul style="list-style-type: none"> • ABEK1 chemical filter on respirator.
MERCURY METAL	
Absorbents	<ul style="list-style-type: none"> • Do not use general/universal absorbents; • Collect liquid with a suction device such as Pasteur pipette.
Neutralisers	<ul style="list-style-type: none"> • Treat residue with amalgamating material such as zinc powder or use a commercial product such as mercurysponges or powder; • Use treatment product <i>only</i> after collecting as much liquid as possible using a suction device.
Additional Information	<ul style="list-style-type: none"> • Amalgamating material will reduce vapour by forming mercury compounds. May need to be activated with water or commercial activator solution.
PPE	<ul style="list-style-type: none"> • Small spills ABEK1 filter on half face respirator; • Larger spills dedicated HG filters on the half face respirator.
ALKALI METALS	
Absorbents	<ul style="list-style-type: none"> • Smother with dry sand or cover with contents from a Class "D" fire extinguisher.
Additional Information	<ul style="list-style-type: none"> • Do not allow water in the vicinity.
PPE	<ul style="list-style-type: none"> • P2 respirator for metal fumes.
BIOHAZARDOUS	
Absorbents	<ul style="list-style-type: none"> • Absorbent pads, paper towel.
Disinfectant	<ul style="list-style-type: none"> • Ethanol 70%; • Virkon; • Trigene; • Bleach; • Quarantine laboratories Vircon Apply the disinfectant for 10 minutes before removing.
PPE	<ul style="list-style-type: none"> • P2 respirator; • Gloves; • Laboratory gown.

Related policy instruments

[WHS-PRO-010 Hazardous Chemicals Procedure](#)

[WHS-PRO-013 Laboratory Safety Procedure](#)

[WHS-PRO-009 Biosafety Procedure](#)

Schedules/Appendices

[Work Health and Safety Act 2011](#)

[Work Health and Safety Regulation 2011](#)

[Managing Risks of Hazardous Chemicals in the Workplace Code of Practice 2013](#)

[How to Manage Work Health and Safety Risks Code of Practice 2011](#)

[AS3780:2008: The storage and handling of corrosive substances](#)

[AS2243.1:2005: Safety in laboratories Part 1: Planning and operational aspects](#)

Administration

NOTE: Printed copies of this procedure are uncontrolled, and currency can only be assured at the time of printing.

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21-1	03/08/2021	03/08/2021	Guideline established	Drew Kleier, WHS Biological, Radiation and Chemicals Safety Advisor

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