

Chemical Spill and Response Guideline

Section 1 - Purpose and Scope

(1) In research and teaching laboratories and other areas at The University of Queensland (UQ), incidents resulting in the release of chemicals may occur. While the risk is generally low, it is essential that all areas that store, decant, use and dispose of chemicals have a chemical spill response plan that includes appropriate procedures and materials to adequately contain and clean up a chemical spill. This Guideline aims to give practical advice on how to respond to a chemical spill in the workplace.

(2) This Guideline should be read alongside the [Chemical Spill and Response Procedure](#) to help UQ workers:

- a. design an effective spill control plan for their area for inclusion in the area emergency planning;
- b. prepare spill kits;
- c. decide when and who to call for assistance in the clean-up; and
- d. determine the first aid response.

Section 2 - Defining Major and Minor Spills

(3) Spills can be either minor or major, depending on the volume, location and hazardous nature of the substance spilled (refer to Safety Data Sheet (SDS)).

Major Spill

(4) A major chemical spill involves the release of a type or quantity of a chemical that poses an immediate risk to health, or involves an uncontrolled fire or explosion. If any of the following apply, the spill is considered major:

- a. if the volume is more than:
 - i. 100 mL/10 grams of highly hazardous chemical (e.g. carcinogen, toxic); or
 - ii. 1 Litre/100 grams of a volatile or flammable solvent, of a reactive or corrosive (acid or base) liquid/solid.

(5) For some chemicals, evacuation should be considered at < 100mL. Always consult the relevant SDS:

- a. if the chemical is a hazard, that is, it presents an immediate threat to human health or safety or the environment, is unknown/uncharacterised or is an immediate fire hazard, such as an uncontrolled gas leak.
- b. if the chemical is located outside of the laboratory or outside of the area where the chemical is normally used or stored, and/or there is no trained person available to clean up the spill.

(6) A major chemical spill will usually require the immediate evacuation of the area, if not the entire building. It is recommended that responses to such scenarios are considered as part of developing risk assessments for work involving highly hazardous chemicals, as prior investigation can assist in understanding variables such as how laboratory ventilation may affect the spread of vapours and therefore what parts of a building need to be evacuated.

Minor Spill

(7) A minor chemical spill is the release of a type or quantity of a chemical which does not pose an immediate risk to health and does not involve chemical contamination to the body. It is one that an individual can clean up with confidence and without support due to the less hazardous nature of the chemical, the small volume and effective containment (e.g. 5mL of concentrated sulphuric acid inside a fume cupboard).

(8) It is recommended that the quantity of spill that can be safely managed is considered when developing risk assessments for work involving highly hazardous chemicals.

Section 3 - Generic Response Table

Substance	Recommended Action
Organic chemicals	<ul style="list-style-type: none">• Use an absorbent material such as vermiculite (if compatible with the chemical).• Place spent vermiculite in a sealed labelled container for waste disposal by the UQ Science Store (336 52345).• Flammable solvents can be cleaned up with absorbent rags and then placed in fully open headed drums that are sealed, suitably labelled. Purposed build solvent rooms with sumps might just need isolation to leave the spill to self-evaporate.
Oxidising acids	<p>WARNING: DO NOT USE PAPER TOWELS OR SAWDUST TO CLEAN OXIDISING ACID SPILLS</p> <ul style="list-style-type: none">• Always consult the safety data sheet 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.
Acids	<ul style="list-style-type: none">• 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. A pH indicator should be used to check that the spill is neutralised.• Spill kits should contain sodium bicarbonate (soda ash) to sprinkle liberally over the spill. If necessary, wear a P1 mask to avoid breathing dust.
Alkalis	<ul style="list-style-type: none">• Contain the alkali spill using dry sand or neutraliser.• Neutralise with boric or citric acid before clean-up.• Residual alkali should be washed with water ensuring no contact.• Spill kits should contain boric or citric acid to sprinkle liberally over the spill. If necessary, wear a P1 mask to avoid breathing dust.
Mercury	<ul style="list-style-type: none">• Small spills should be removed with a mercury sponge, vacuumed up with a suction flask or dusted with sulphur powder (refer to clauses 22 to 26).• Clean up the mercury thoroughly.• Once the mercury is contained, clearly label and submit it for waste disposal by the UQ Science Store (336 52345). <p>NOTE: Mercury vapours are highly toxic - wear appropriate respiratory protection for spills outside a fume cupboard.</p>

Section 4 - Generic Spill Response Flowchart

(9) Please refer to attached [generic spill response flowchart](#).

Section 5 - Spill Response Procedures

Major Spill Procedure

(10) Prior to cleaning up chemical spills, consult the SDS for the appropriate personal protective equipment (PPE) to be worn and collection and disposal methods to be followed.

(11) If the spill involves a chemical that poses an immediate risk to health, or may result in an uncontrolled fire or explosion, or impact the environment (refer to clauses 4 to 6), the following procedure applies:

- a. Evacuate the building by activating the nearest fire alarm (if there is a local emergency plan that has assessed the risks and a response is in place, the area specified in the local plan is to be evacuated).
- b. Call (336) 53333 or 000 for a confirmed fire and then security (always consult the emergency procedure card of the area), and provide details of the incident including location, chemical/s involved, approximate quantity and whether there is any injury or harm to a person.
- c. If the incident involves a personal injury or chemical contamination of the body:
 - i. If safe to do so, remove the injured person from the immediate area.
 - ii. Locate the nearest emergency eyewash or safety shower. Remove any contaminated clothing from the injured person and flush all areas of the body contacted by chemicals with copious amounts of water for at least 20 minutes.
 - iii. Administer first aid as appropriate, refer to the relevant SDS, and seek medical attention.
- d. Submit an incident report in [UQSafe](#) as soon as practicable.

(12) Areas that use phenol or hydrofluoric (HF) acid must have specific first aid procedures – see [First Aid Treatment for Burns Guideline](#) for specific information. These must be posted in close proximity to where the chemicals are used and/or stored so UQ workers in these labs can access the information quickly.

Minor Spill Procedure

(13) In the event of a spill involving the release of a chemical or in a quantity which does not pose an immediate risk to health or the environment (refer to clauses 7 and 8):

- a. Notify laboratory/area personnel and occupants in the vicinity of the incident.
- b. Isolate the area. Close laboratory/area doors and evacuate the immediate area, if necessary.
- c. Before re-entering the area, refer to the SDS to confirm whether toxic vapours are likely to be present; if so, do not re-enter the area and seek advice from the local Health, Safety and Wellness Manager, Work Health and Safety Coordinator (WHSC) or the Occupational Hygiene Advisor in the Health, Safety and Wellness Division (HSW Division).
- d. Remove ignition sources and unplug nearby electrical equipment.
- e. Establish exhaust ventilation. Vent vapours to outside of building only (open windows if possible and if not a certified facility or physical containment facility and turn on and/or select boost in available fume hoods).
- f. Locate the spill kit.
- g. Choose appropriate PPE as per the risk assessment and local safe operating procedure.
- h. Confine and contain spill.
 - i. Acid and base spills should be neutralised prior to clean-up. Cover with appropriate absorbent material after neutralisation.
 - j. Sweep solid material into a plastic dustpan and place in a sealed container.
 - k. Wet mop spill area.
 - l. Put all contaminated items (gloves, clothing, etc.) into a sealed container or plastic bag to dispose in the clinical waste.
- m. Decontaminate equipment used (e.g. broom, dustpan).
- n. Return spill kit to storage location (place sign that has been used) and arrange for used contents to be replaced.
- o. Inform the relevant Manager (laboratory, workshop or WHSC) and Supervisor.
- p. Submit an incident report in [UQSafe](#) as soon as practicable.

Special Spills Procedures

(14) Prior to cleaning up chemical spills, consult the SDS for the appropriate PPE to be worn and collection and disposal methods to be followed.

Bromine

(15) Neutralise spill with a 5% solution of sodium thiosulfate.

(16) Absorb with inert absorbent material.

Hydrofluoric Acid (HF)

(17) Do not use water.

(18) See special emergency first aid treatment instructions, always located above the fume hood and in first aid kit for the work area.

(19) For spills of any amount of concentrated HF or buffered HF outside of a fume hood, EVACUATE LABORATORY AND CALL (336) 533333 FOR UQ SECURITY ASSISTANCE (consult the emergency procedure card of the area).

(20) Neutralise with sodium bicarbonate (soda ash) or lime (or absorb spill with special HF spill pillow).

(21) Absorb with inert absorbent material (do not use vermiculite).

Mercury

(22) Use a special mercury spill kit.

(23) Use aspirator bulb or suction device to collect mercury beads (DO NOT USE VACUUM CLEANER).

(24) Mop up mercury with mercury decontaminating powder.

(25) Contact the HSW Division's Occupational Hygiene Advisors and ask for assistance if you are unable to accomplish adequate clean up.

(26) Label waste with a Hazardous Chemical Waste Tag and inform [UQ Science Store](#) (336 52345) that the sealed waste container requires collection and disposal.

Acid and Caustic Spills (not Hydrofluoric Acid)

(27) Ensure appropriate PPE is worn (goggles, gloves, enclosed shoes and respirator).

(28) Ensure area is well ventilated.

(29) Neutralise and absorb spill e.g. sodium bicarbonate.

(30) Scoop up waste into plastic waste bags.

(31) Mop floors after clean-up with water and detergent.

Alkali Metals (Lithium, Sodium, Magnesium, Potassium)

(32) Smother with dry sand or cover with contents from a Class "D" fire extinguisher. Use of a Class "D" fire extinguisher is the preferred extinguishing/neutralising method.

(33) DO NOT allow contact with water.

(34) Collect waste into appropriate labelled container with a [UQ Science Store](#) (336 52345) supplied waste label and request its disposal.

Section 6 - Spill Kit

(35) The key to an effective spill kit is location and contents. Spill kits can be purchased through most vendors that sell chemicals or safety supplies, including the [UQ Science Store](#) through UniFi.

(36) The following is a list of recommended items that should be contained in a chemical spill kit – however the contents should be adjusted to suit the local area's specific requirements.

Absorbents and Neutralising Material

(37) Appropriate for the type and quantities of the chemicals used in the area. Suggestions include:

- a. 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, acids (not for hydrofluoric acid), and bases.
- b. Vermiculite or other inert absorbent material (e.g. unscented kitty litter, do not use for hydrofluoric acid).
- c. Absorbent mats and/or socks.
- d. Acid Spill Neutraliser - sodium bicarbonate, sodium carbonate or calcium carbonate.
- e. Alkali (Base) Neutraliser - sodium bisulfate, citric acid or boric acid.
- f. Solvents/Organic Liquid Absorbent - inert absorbents such as vermiculite, clay, sand, Flor-Dri and Oil-Dri.
- g. Bromine Neutraliser - 5% solution of sodium thiosulfate and inert absorbent.
- h. Hydrofluoric acid - HF compatible spill pillow or neutralize with lime and transfer to a polyethylene container.

Personal Protective Equipment (PPE)

(38) Goggles and face shield.

(39) Heavy neoprene gloves.

(40) Disposable lab coat or overalls and acid resistant apron (heavy duty PVC).

(41) Plastic vinyl booties or acid resistant shoe covers over enclosed shoes and long pants.

(42) Dust mask/respirator (all lab personnel must be properly fit tested before using a respirator).

Clean-up Material/Equipment

(43) Plastic dustpan and scoop.

(44) Plastic bags (120 L, 3 mm thickness) for contaminated PPE.

(45) One plastic bucket (20 L polyethylene) with lid for spill and absorbent residues.

(46) Mop and bucket.

Other

(47) Spill procedures print out or summary, and list of emergency contact numbers.

(48) A floor warning sign (e.g. [Floor Stands - Danger - Chemical Spill](#)) or similar to warn personnel.

(49) If relevant:

- a. Hydrofluoric acid Antidote Gel - Calcium Gluconate.
- b. Mercury Spill Kit - Aspirator Bulb and Mercury Decontaminating Powder.
- c. Phenol antidote - PEG 300 or 400 glycerol.
- d. Alkali Metals - Dry sand or a Class "D" Fire Extinguisher.
- e. Acid chlorides - Oil Dri, Zorb-All or dry sand.

Section 7 - First aid

Chemical Splashes Involving Corrosive or Toxic Substances to Eyes or Skin

(50) Flood the eyes with water from the emergency eye wash or the skin with water from emergency shower continuously for 20 minutes. While flushing, remove all contaminated clothing as well as jewellery that could trap chemicals.

Delegate Tasks to People

(51) Call UQ Security on 336 53333 (St Lucia, Gatton) or 000 from other sites. Security will call an ambulance or seek medical attention from UQ Health Care (333 63333). Consult the emergency procedure card of the area.

(52) Confirm site and meeting place with UQ Security/emergency team.

(53) Person to stay by the phone and meet UQ Security/emergency team.

(54) Obtain the SDS.

(55) Follow the first aid instructions on SDS. Poisons Information Service (13 11 26) can be consulted if the information contained in the SDS is not clear.

(56) Provide a hard copy of the SDS to the injured person or UQ Security to take to the medical practitioner.

(57) Person to contact the Supervisor and the HSW Manager or WHSC of the area.

(58) Complete an incident report in [UQSafe](#).

Chemical Splashes Involving Non-corrosive, Non-toxic Substances to Eyes or Skin

(59) Flood the eyes with water from the emergency eye wash or the skin with water from emergency shower continuously for 20 minutes. Ensure any contaminated clothing is removed.

(60) Provide first aid as per the SDS and seek further medical attention at the UQ Health Care (333 63333) or other medical facility for always eye splashes, and for the skin if required.

(61) If the injured person is seeking further medical treatment or assessment, provide a hard copy of the SDS for them to take with them.

(62) Complete an incident report in [UQSafe](#).

Special First Aid

Hydrogen Fluoride and Hydrofluoric Acid (HF)

(63) Hydrogen fluoride is a colourless gas or liquid, called hydrofluoric acid as an aqueous solution. Exposure to these

requires application of calcium gluconate gel, therefore areas that use these substances must have a HF specific first aid procedure – see [First Aid Treatment for Burns Guideline](#) and [Working Safely with Hydrofluoric Acid Guideline](#) for more information. These procedures must be provided to all workers who work with these chemicals and they must be easily accessed in the work area.

(64) The first aid kit must contain the appropriate items to treat injuries from these chemicals.

Phenol and Phenolic Compounds (Qiazol or Trizol)

(65) Exposure to these chemicals require application of glycerol, therefore areas that use these substances must have a phenol specific first aid procedure – see [First Aid Treatment for Burns Guideline](#) and [Working Safely with Phenol Guideline](#) for more information. These procedures must be provided to all workers who work with these chemicals and they must be easily accessed in the work area.

(66) The first aid kit must contain the appropriate items to treat injuries from these chemicals.

Cyanide

(67) Call UQ Security on 336 53333 (St Lucia, Gatton) or 000. Internal emergency contact numbers may vary with each campus – refer to the [campus emergency contact card](#) for specific locations. Inform UQ Security that the incident may involve exposure to cyanide as UQ Security carry a Cyanokit for emergency such as an exposure or poisoning.

(68) Request immediate paramedic assistance and supply details such as building number, room number and where the casualty is located.

(69) Cyanide antidote should ONLY be administered by a medical practitioner who is certain cyanide poisoning has occurred. Refer to [Working Safely with Cyanide Guideline](#). UQ Security and UQ Health Care have antidote-kits.

Section 8 - Induction and Training

(70) Supervisors and Managers must ensure that UQ workers are aware or are made aware, by providing adequate information, training and supervision of the health hazards that the use, handling and storage of chemicals may present and be given induction and training (including refresher training) prior to using chemicals, including how to respond to spills and emergencies. The induction and training should include the following:

- a. Nature of the hazards and properties of the chemicals UQ workers will be using.
- b. Safe work practices to be followed when using, handling, storing, transporting, cleaning up and disposing of chemicals, including training in the proper use, fitting and maintenance of personal protective equipment (PPE).
- c. Spill response and clean up procedures, including how to use spill kits.
- d. Emergency procedures, including evacuation, special decontamination procedures and post exposure procedures.
- e. First aid and incident reporting procedures in the case of exposure, injury or illness.

Section 9 - Appendix

Definitions

Term	Definition
Major spill	the release of a type or quantity of a chemical that poses an immediate risk to health; or involves an uncontrolled fire or explosion.

Term	Definition
Minor spill	the release of a type or quantity of a chemical which does not pose an immediate risk to health and does not involve chemical contamination to the body.
SDS (Safety Data Sheets)	provide workers with information such as physical data (melting point, boiling point, flash point, etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill-handling procedures.
Spill kit	provides the equipment and reagents for cleaning up spills and is appropriate to the quantities and types of chemicals in that work area.
UQ workers	<p>for the purposes of this Guideline includes:</p> <ul style="list-style-type: none"> • Staff - continuing, fixed-term, research (contingent funded) and casual staff; • Contractors, subcontractors and consultants working under UQ systems and control (e.g. contingent workers); • Visiting academics and researchers; • Affiliates - academic title holders, visiting academics, emeritus professors, adjunct and honorary title-holders, industry fellows and conjoint appointments; • Higher degree by research students; and • Volunteers and students undertaking work experience.

Status and Details

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