University of Reading

Safety Code of Practice 55

1st Edition April 2019

SPILL MANAGEMENT

Contents

1 SCOPE

This Safety Code of Practice (CoP) outlines the procedures and material/equipment requirements for the management of hazardous material spills **inside a building on campus**. The CoP is limited to spills involving chemicals and other hazardous substances (excluding radioactive substances) used in research or teaching and that takes place inside a lab or building. For a spill involving radioactive materials see CoP 19 and for spills outside a building, consult Sustainability Services**.**

The CoP covers:

- Management responsibilities within the University
- Spill prevention and preparedness requirements
- Procedure to deal with a spill

2 INTRODUCTION

A spill is an uncontrolled release of hazardous material(s), in a solid, liquid or gaseous/ aerosol/ mist/ fume form. Spills at the University of Reading (UoR) may occur at several locations and may result from research and teaching or related activities. Spills can be minor or major (see Section 6). They can cause serious disruption to the University's operations, bring harm to human health or the environment, and adversely affect the University's reputation. In addition, a spill can lead to loss of valuable materials and affect the research profile of the University. A spill can involve one or more of the following substances:

- Solvents
- Mercury
- Cleaning materials
- Paints and oils
- Laboratory chemicals and chemical waste
- Acids and alkalis
- Sludges
- Pesticides
- Paints and inks
- Soil samples, dust, fume and mist
- Biological material

The risks arising from teaching and research activities involving the above material must be assessed, with consideration given to the possibility of spillage and mitigation measures. The risk assessment must identify the local arrangements required to respond to minor, foreseeable spills. Supervisors must ensure those local arrangements are established, maintained and exercised. These local arrangements must include training to allow staff/students to recognise the limits of the local arrangements. If the spill is beyond the scope of local arrangements staff/students are expected to seek help and alert Security of the potential for a major incident, see Appendix 1.

3 RESPONSIBILITIES

3.1 Heads of Schools (HoS)/Functions

- Ensure that all School/Function staff and students are aware of the requirement to risk assess work activities prior to starting them.
- Ensure an adequate assessment of risk associated with the work activities, including transport and storage of hazardous material and waste in communal areas.
- Ensure Principle Investigators implement the CoP on Spill Management in their area of responsibility.
- Ensure an adequate number of spill kits e.g. one per lab or as appropriate are maintained in the School/Function.
- Provide funds for the spill kits.
- Incorporate major spill planning into School Major Incident Plans.
- Chair the Spill Group (Section 7) when required.
- Exercise a major spill response once a year.

3.2 Principle Investigators (PI)/Managers

- Assess the risk for each work activity encompassing purchase (what volume are we buying?), delivery, transport, storage, decanting, use, waste management, disposal, and clean-up activities.
- Ensure an appropriate COSHH risk assessment form is used and signed by an authorised approver.
- Give due consideration to spill management in the risk assessment.
- Review the risk assessment at least once a year from the date of approval or earlier, e.g. following an incident.
- Establish local arrangements to deal with foreseeable spills, to include a spill response procedure, spill kit, personal protective equipment (PPE), training and an exercise programme.
- Ensure that staff/students/trainees are competent and trained in managing a spill and the use of a spill kit.
- Exercise the use of the spill kit once every 12 months.
- Notify Health and Safety Services about all spills that require the use of a spill kit to manage.

3.3 Staff and Students

- Attend appropriate training to assess risk, work with chemicals/hazardous substances and respond to a spill.
- Read and understand the risk assessment(s) for their work activities and sign to indicate they have done so.
- Understand their role and responsibilities in implementing the spill response procedure, including when to seek help from other University services.
- Be aware of the location, contents of the lab spill kit and be competent in its use.

- Clean up a minor spill as per the training/procedure provided.
- Notify minor chemical spill incidents through the incident system.
- For a spill not manageable via the local arrangements, call Security and cooperate with them by providing the information they may request as accurately as possible, also alert others in the vicinity and inform the PI and the relevant HSC.

3.4 Health and Safety Coordinators (HSC)

- Help and advise the PI's and maintain an up-to-date log of risk assessments.
- Ensure training is in place for staff and students in the use of spill kits and spill response procedures.
- Carry out a weekly (or as appropriate) inspection of the contents of the spill kit.
- Support Schools/Functions by providing Local Rules for spills that are specific to the operations within the School/Function (in particular, Hydrofluoric Acid, Mercury and Formaldehyde).
- Assist in implementing the minor spill response and a clean-up/recovery operation.
- Co-operate with Security, HSS and others during implementation of the Major Incident Plan.
- Be a member of the Spill Group (Section 7) and help the group manage a major spill.

3.5 Security Services

- Be first point of contact in case of a major spill.
- Ensure Security staff are trained in dealing with initial contacts (including the use of prompt sheet and contact details).
- Make contact with the Gold, Silver and Bronze team(s) of the Major Incident Plan, as appropriate.
- Be part of the Spill Group (Section 7).
- Provide resources to secure a building and liaise to provide access to the specialist contractor as required.

3.6 Estates and Property Services

- Maintain a list of specialist contractors competent for responding to major spills.
- Be part of the Spill Group (Section 7).
- Liaise with Security Services and HSS in case of major spills.
- Facilitate clean-up via a specialist contractor and provide a project manager for the operation, if necessary.
- Ensure tenants and other third-party operators managed by Property Services are aware of this CoP and relevant University policies and procedures (see Section 3.8).

3.7 Health and Safety Services (HSS)

- Provide a CoP for spill management.
- Provide advice relating to the prevention, management and cleaning-up of spills.
- Advise Estates on the selection of specialist contractors for responding to major spills.
- Provide a member for, and where appropriate chair, the Spill Group (Section 7).
- Advise on dealing with major spills, lead the initial decision-making process and approve method statements, if required.

3.8 Responsibilities of University Tenants and Contractors

Where risk assessment indicates it necessary, third parties working on UoR campus must:

- Establish their own spill management plan, if working with hazardous substances.
- Inform UoR Security of any major spill resulting from their work activities.
- Where the working space is shared with University staff and students, tenants and contractors shall share information on their COSHH risk assessments with the School/Function/department or Estates and Property Services.
- Comply with relevant policies and codes of practice issued by the University

3.9 Corporate Communications

- Liaise with the School and HSS in the event of spills and support communications as required, particularly in the case of major spills where the University's Major Incident Plan is activated.

3.10 Business Continuity

- Include consideration of spills when reviewing the Major Incident Plan.
- Provide a member of the Spill Group (Section 7) where possible.

4 RISK ASSESSMENTS

All students and staff members involved in the use, transport, receipt and disposal of chemicals must be trained and competent, shall attend appropriate training in COSHH Risk Assessments and be able to risk assess a spill.

All PIs and Managers supervising work involving chemicals shall assess the risks for each activity as per the advice/guidance provide in COSHH CoP 28 and sign it the risk assessment. This Risk

Assessment must also be signed (either on paper or electronically) by each member of staff and student involved in the activity.

5 SPILL MANAGEMENT

5.1 Spill Prevention

Purchase of chemicals

- Only quantities enough for the purpose for short and medium term work shall be purchased.
- Where possible chemicals should be bought in break-resistant packaging e.g. plastic or double-contained.
- Where larger volumes are required, efforts should be made to buy multiple small packs rather than a large one to avoid a large spill.

Storage of Chemicals

Hazardous substances should be stored safely and securely inside a building in a dedicated area, taking all reasonable precautions to prevent uncontrolled releases, leaks, spills or cross-contaminations. These precautions should include drip trays, bunding, double containment or secure lids, as appropriate to the nature and volumes of the substances. Further relevant information on storage can be found in HSS Hazardous Waste CoP 48 – whilst this relates to waste substances most of the principles are applicable to storage of stock chemicals as advised below:

- Chemicals must be stored at a designated and appropriate place, inside access-controlled areas, in accordance with the advice provided in the Material Safety Data Sheet and incompatible chemicals must not be stored together.
- Sturdy shelves and properly designed storage areas shall be used to minimize collapse, breakage and tipping.
- All large containers shall be stored as close to the floor as possible.
- Shelves storing chemicals must not be overcrowded and storage on the edge must be avoided.
- If possible, 'lipped' storage shelves shall be used to reduce the risk of a bottle falling.
- Regular inspection of the integrity of containers shall be carried out by the users.
- Highly hazardous chemicals such as poisons and highly toxic chemicals shall be kept under lock and key.

Transport of Chemicals

- Transport of chemicals outside the University should be minimised and be carried out only after seeking appropriate advice from the HSC.
- All bulk transport of chemicals within and between University buildings shall take place in bunded trolleys suitable for the chemical being transported.
- Large containers shall be strapped to the trolley to avoid a fall.
- Individual glass bottles shall be carried in an appropriate bottle carrier and, where possible, inside a secondary container.

Transferring Chemicals

- Mechanical devices such as pumps, funnels, dispensers and tilt measures shall be used for work requiring regular transfer of material from large packaging to working solutions.
- Spill prevention measures such as trays and bunding shall be used to capture leaks and splashes where appropriate.

Use of Chemicals

- High standards of housekeeping help reduce spills.
- The smallest practicable volumes shall be used for chemical reactions.
- Appropriately-sized glassware shall be used for chemical reactions to avoid splash-spills.
- The glassware, particularly round-bottom flasks, shall be appropriately clamped.
- All reactions requiring external energy e.g. heat, microwaves or stirring etc. shall be appropriately clamped.
- All work involving hazardous chemicals, where practical, shall be carried out inside a fume cupboard.

5.2 Spill Preparedness

5.2.1 Hazard Awareness

The risk assessment carried out under Section 4 should disclose the reaction volumes and identify the resultant hazards associated with the proposed work, storage, transport or disposal of chemicals in the research or teaching activity. This information shall be used to assess and plan for the size and possible difficulties in responding to a spill if one occurs.

5.2.2 Spill Response Procedure

All Schools and Functions using hazardous chemicals shall develop local rules and spill response procedure(s) (e.g. Appendix 2), which shall include elements such as (not an exclusive or exhaustive list):

- Identify the PPE required during a spill response.
- Identify and mark evacuation zones, if necessary.
- Control access and, if possible, ventilation.
- Identify and mark the available fire equipment.
- Identify and mark the available spill kits.
- Identify and mark the containers needed for disposal after a clean-up.
- A training programme for staff and students in the spill response procedure.
- A schedule of exercises to practice the procedure(s).

5.2.3 Training

The PI must ensure that their staff and students are adequately trained in the spill procedure. This training shall be mandatory and arranged before starting the work, where possible, and training records must be retained.

5.2.4 Spill Kits

A suitable number of spill kits proportionate to the risk, type of chemicals and volumes being used shall be provided in each School/Function/Building. The kit shall be placed in full view of the staff and students and in an easy-to-access area of the lab/floor/building. Commercially available spill kits may be purchased, or the Schools may assemble bespoke ones as long as they meet the following criteria. The composition of the spill kit shall be based on the risk assessment (see Section 4). A suggested composition of a spill kit:

- Absorbent material, pads and rolls.
- Acid/alkali neutraliser.
- Chemical-resistant safety gloves (appropriate for the kind of chemicals in use).
- PPE: Safety goggles, laboratory coat/corrosive apron/overalls, enclosed footwear or shoe covers, respiratory protective equipment/dust mask (RPE) if appropriate. (All personnel must be properly face-fit-tested before using a respirator.)
- Brooms, plastic dustpan and square mouth shovel to collect the absorbent material.
- Paper towels for minor spills.
- Plastic tongs/scoops to pick up contaminated absorbent material.
- A chemical resistant bin 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.

6 MAJOR VS MINOR SPILL

6.1 Minor Spill

A minor spill is one in which all the following conditions are met:

- A risk assessment for managing the spill exists (Section 4).
- The identity of the chemical(s)/hazardous substances in the spill is/are known to the people dealing with the spill.
- Appropriate spill kit is readily available and appropriate for the size of the spill.
- The individual(s) at the site of the spill is/are trained to use the spill kit and are confident to respond to the spill.
- Local arrangements require special user training, or PI/HSC expertise and these are available.

6.2 Major Spill

A major spill is one in which any of the following apply:

- Someone has been seriously hurt and requires immediate medical attention.
- The composition of the spill is unknown.
- The local arrangements are deemed insufficient to deal with the spill.
- A fire or explosion has occurred, or is possible e.g. spill involving flammable substances, pyrophores or oxidants.
- The spill presents an immediate threat to human health or the environment e.g. substantial quantities of corrosives or environmentally hazardous substances.
- The spill is in a communal area (e.g. hallway or stairwell) and is of such a size/nature (e.g. see Appendix 3) that the person(s) responding judge they require significant assistance to manage the scene.
- The material spilled is listed in Appendix 3 and is greater than 2.5L and/or the person involved in the spill thinks they need help from Security.

A major spill will usually result in University Security initiating the Major Incident Plan and an evacuation of the area and, if appropriate, the building.

7 SPILL RESPONSE PROCEDURE

7.1 Minor Spill Response Procedure

The following steps shall be considered for inclusion in a School level Minor Spill Response Procedure(s) (not an exclusive or exhaustive list)

1. In the event of personal contamination, wash the contaminated part of the body/skin with plenty of running water and remove contaminated clothing as soon as possible.
2. Check the risk assessment (COSHH/Genetic Modification/Biological Agent) for the chemical(s)/hazardous material spilled and follow the prescribed course.
3. Carry out a dynamic risk assessment and decide if it is a minor spill and you can manage the response.
4. Move away from the spillage and alert others.
5. Cordon off the area if it is required to manage the spill or to keep others safe.
6. Re-assess the situation once everyone is in a place of safety, consider calling for help.
7. If all the conditions are met for a minor spill (see above Section 6.1), proceed with the clear-up procedure.

Clearing a minor spill

1. Bring the spill kit to the area and avoid personal contamination.
2. Wear the appropriate PPE – gloves, eye protection, lab coat/overalls, overshoes and RPE if required.

3. Prevent the spread of fumes, dusts and vapours by shutting the doors to other areas and manage ventilation by opening windows or operating the fume cupboard correctly.

Liquids

1. Contain the liquid spill in an area as small as possible by forming a bund by generously sprinkling an absorbent material i.e. granules (e.g. Trivorex®) or carefully placing absorbent socks or pads in the periphery of the spill.
2. Consider neutralising the liquid or cover the spill with a suitable neutralising material (e.g. Trivorex®) and leave for at least 5 minutes or as prescribed by the manufacturer.
3. If using an absorbent powder (e.g. Trivorex®), it should be sprinkled generously from the periphery to the inside, whilst using absorbent pads and socks care should be taken to avoid a splash.
4. Once the liquid has been soaked up and the pH is neutral (often indicated by a colour change or as prescribed by the manufacturer), use a dustpan and brush or something appropriate to collect the absorbent material (e.g. Appendix 2).
5. Allow floors to dry before restarting work.

Solids

1. Refer to the risk assessment and, based on the nature of the chemical, see if it is safe to collect the powder using brush and dustpan (after donning appropriate PPE e.g. a face mask).
2. For hazardous powders, which do not react with water, place wet tissue over the powder, wipe up and transfer to plastic bags or a suitable container.
3. Seal the bags by tying the tops.
4. Wash and wipe down contaminated surfaces with tissues and copious amounts of water to remove all traces of spilt chemicals.
5. Allow floors to dry before restarting work.

Biological Spill

1. Cover the spillage with tissue paper and overlay the area with a suitable biocide disinfectant.
2. Allow enough time for the disinfectant to be effective (30 mins or as prescribed by the manufacturer).
3. Collect the tissues and pack in a clinical waste bags or autoclave bags, as appropriate.
4. Wipe down the affected surface, using tweezers or another effective instrument, with further biocide disinfectant-soaked tissues and dispose into clinical waste bags or autoclave bags as appropriate.
5. Wash any non-disposable protective equipment with water as appropriate and allow PPE to dry before storage.
6. Wash the area with clean water or a soap solution.
7. Allow floors to dry before restarting work.

Recovery

1. Dispose of contaminated waste via appropriate hazardous waste streams. For advice contact the HSC and Sustainability Services.
2. Wash dustpan and brush and any non-disposable protective equipment with water as appropriate and allow to dry before replacing.
3. Ensure that the spill is reported and complete an incident notification form.

4. Inform the HSC that the spill kit will need to be replenished.

7.2 Major Spill Response Procedure

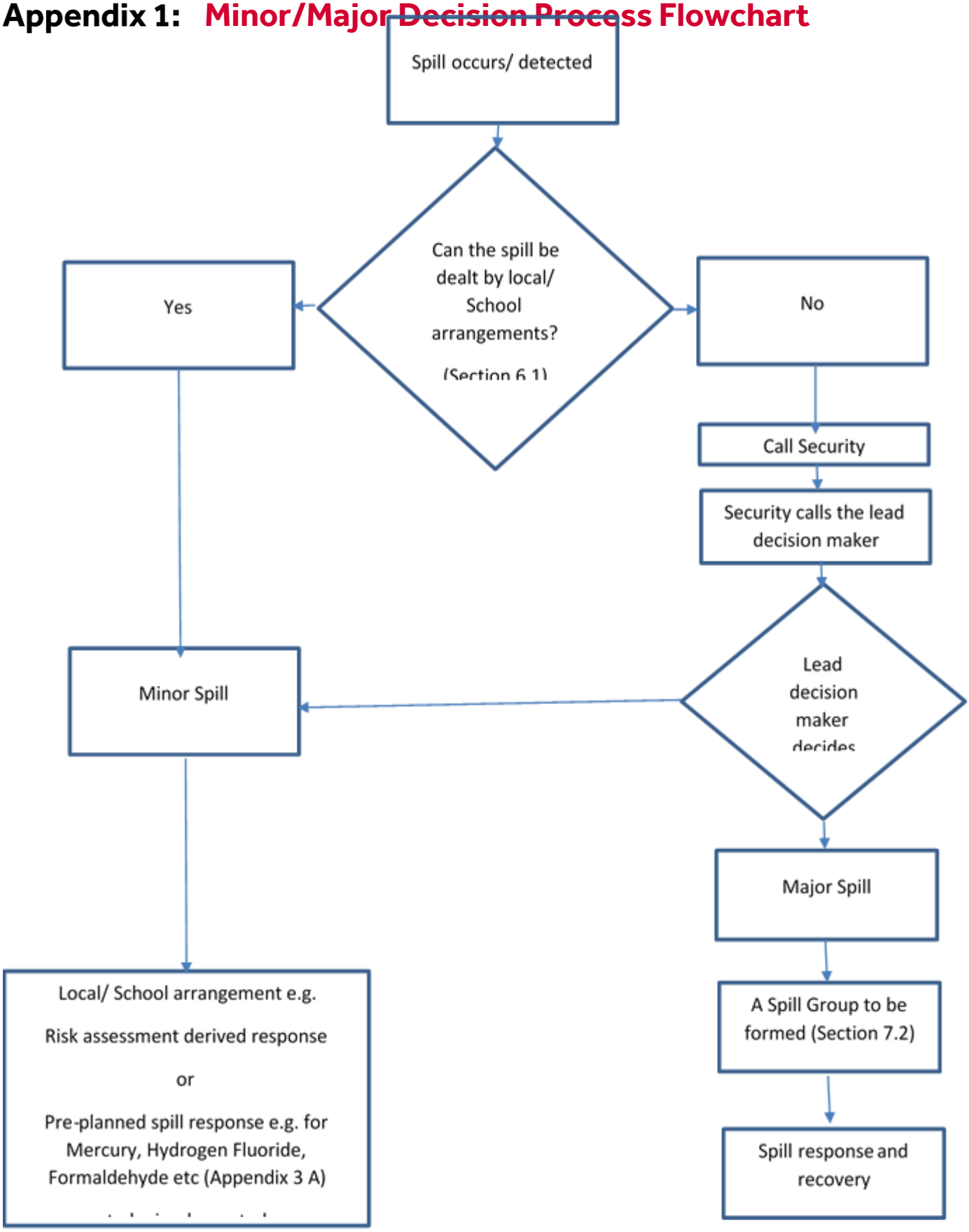
1. Based on the circumstances, local training and arrangements and the details below (Major Spill), the person detecting the spill shall decide whether to manage the spill using the local arrangements or call Security and alert others in the vicinity.
2. The person responsible/first on the scene shall provide details of the site, location and if possible, their mobile phone number so that they can be contacted for further information if necessary.
3. Depending on the circumstances, the person responsible for the spill (if unhurt and able to)/Security shall call ambulance/fire brigade if someone is hurt/in the case of an explosion or fire.
4. Security, along with School staff if available, will implement the measures necessary to protect the people in the immediate vicinity of the spill (see below).

The following step shall be considered for inclusion in a School level Major Spill Response Procedure (not an exclusive or exhaustive list):

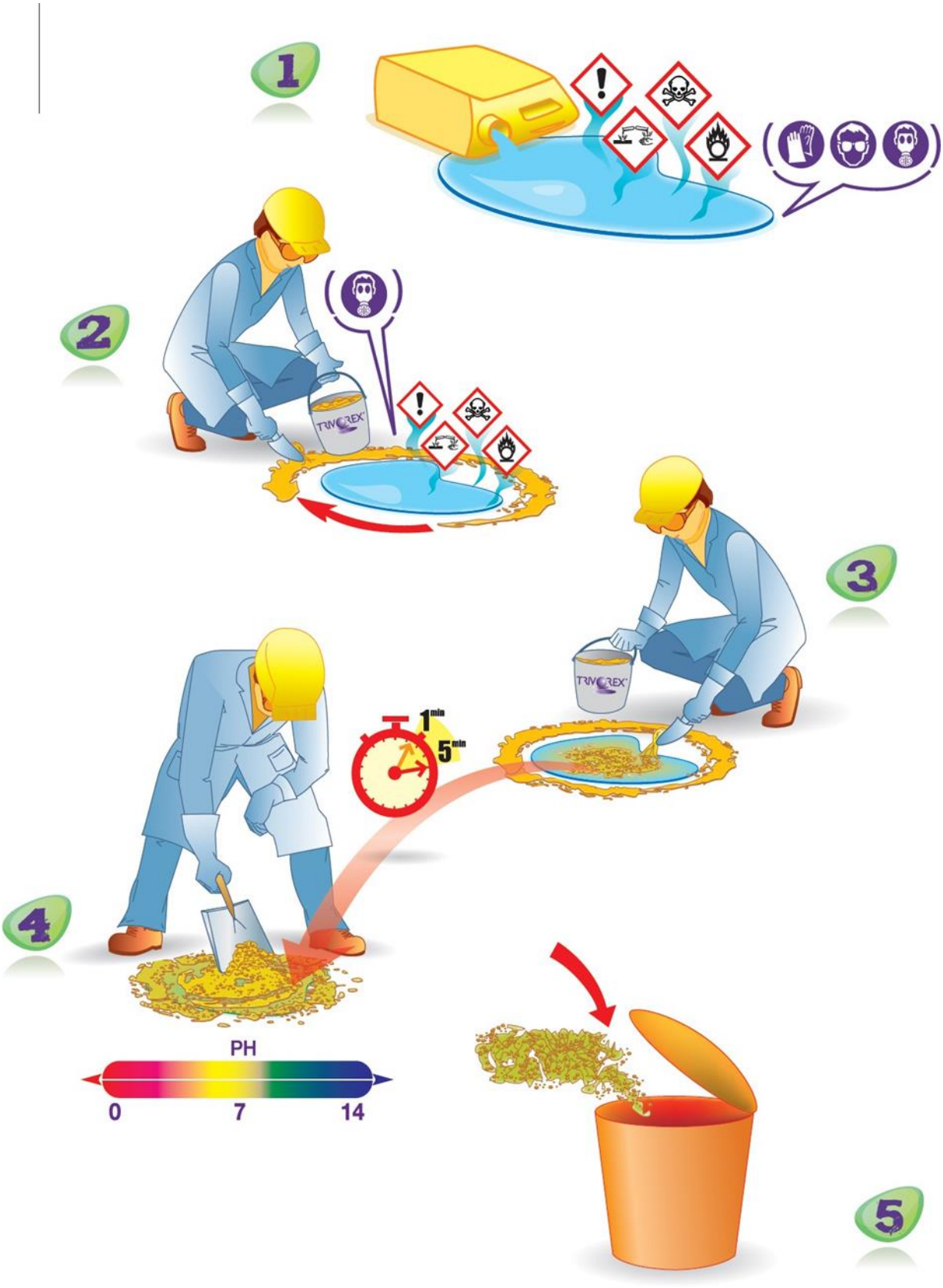
1. All students and staff who could be involved in a major spill shall be trained to co-operate with Security.
2. A Spill Group (SG) should be constituted to deal with the spill and may composed of the following people. This composition may be altered depending on the nature of the spill, availability and circumstance:
    a. Head of School/ Function (Chair)
    b. HSC
    c. Building Support Officer
    d. The PI(s)/ Manager whose staff/ students were involved in the spill
    e. A nominee from Estates
    f. A nominee from Security
    g. A nominee from Sustainability
    h. A nominee from HSS
    i. A nominee from Technical Services
    j. A nominee from Corporate Communication
    k. A nominee from Business Continuity
    l. A nominee of the property services
3. The PI/ HSC to provide a copy of the risk assessment and the details of the people involved.
4. PI to open and maintain communication with the people involved with the spill.
5. SG to gather data on the type of chemicals/ hazardous substances, volumes, location and other details of the spill from the risk assessment and through the people involved in the spill.
6. If circumstances allow, the specialist contractor should provide a method statement for clearing the spill and recovery .
7. Where possible, HoS to liaise with the Biological and Scientific Safety Advisor to validate the method statement for the cleaning process.

8. SG to work with Security / Estates to arrange a lock down of the building, use communication channels (mass text messages/ emails) and continue to remain in touch with other occupants of the building.
9. The SG to work with corporate communication and decide on alerting neighbours or corporate messaging.
10. SG to liaise with Governance regarding links with the MIP, business continuity and recovery.
11. SG to work with Property Services to set up a communication link with any affected contractors and tenants.
12. PI/ nominee to complete incident notification form.
13. SG to oversee recovery .
14. SG to be disbanded post recovery.
15. HSC or HSS to investigate the incident and prepare an investigation report.

Appendix 1: Minor/Major Decision Process Flowchart



Appendix 2: How to Manage a Minor Liquid Spill



Appendix 3: Chemicals that may form a major spill if more than 2.5L (not an exhaustive or exclusive list)

A. Hazardous chemicals requiring a pre-planned spill procedure

- Hydrofluoric acid
- Formaldehyde
- Mercury

B. Organic solvents

- Acetone
- Acetonitrile
- Chloroform
- Dichloromehane
- Diethylether
- Ethanol
- Methanol
- Isopropanol
- Ethyl actetate
- Hexane
- Histoclear
- β-Mercaptoethanol*
- Phenol*
- Petroleum ether
- Tetrahydrofluorane
- Toluene
- Turpentine
- Dimethyl sulphoxide
- Dimethyl sulphate
- Dimethylfuran

C. Acids- organic

- Glacial acetic acid

D. Acids – mineral

- Hydrochloric
- Nitric Acid
- Sulphuric acids

E. Alkali

- Sodium Hydroxide solution
- Potassium Hydroxide solution
- Ammonia solution

F. Biological materials

Any material containing or suspected to contain an ACDP[11] Hazard Group 3 or higher, SAPO[12] 2 (Schedule 1) or higher pathogen

*Volumes capable of causing and unbearable stench may be enough to constitute a major spill

Appendix 4: Links to other Codes of Practice/advice on spills

In addition to the CoP on Spill Management, H&S advice on various spill scenarios is available at the following links

1. https://www.reading.ac.uk/web/files/health-and-safety/CoP_14_Biological_Safety_(Part_1)_University_LaboratoriesNov13.pdf Section 20.2
2. https://www.reading.ac.uk/web/files/health-and-safety/CoP_14_Part_6_Micro_Safety_Cabinets_Issue_3_Oct_2012.pdf Section 10
3. https://www.reading.ac.uk/web/files/health-and-safety/CoP_14_Part_7_Biological_and_clinical_waste_Oct_2012.pdf Section 7 on disinfection
4. https://www.reading.ac.uk/web/files/health-and-safety/COP_15_GMv4.pdf Section 14.2
5. https://www.reading.ac.uk/closed/health-and-safety/hs-RadiationSafetySecureArea.aspx Page 19 onwards
6. https://www.reading.ac.uk/web/files/health-and-safety/CoP_46_part_5_cryogenic_gases.pdf Section 8.1
7. https://www.reading.ac.uk/web/files/health-and-safety/NOT36BBodilyFluidsClean-up.pdf
8. https://www.reading.ac.uk/web/files/health-and-safety/SN66_Phlebotomy_facilities.pdf Facilities required section
9. https://www.reading.ac.uk/web/files/health-and-safety/SN71_Petrol.pdf Section 6.3.2
10. https://www.reading.ac.uk/web/files/health-and-safety/20180510_CoP_48_Hazardous_Waste_March18_FINAL_with_Steve_Mithens_Correction.pdf
11. Advisory Committee on Dangerous Pathogens (2013) *The Approved List of Biological Agents* Health and Safety Executive London (3rd Ed) available at http://www.hse.gov.uk/pUbns/misc208.pdf [Visited February 22, 2019]
12. The Specified Animal Pathogen Order 2008, *Schedule 1*, UK available at http://www.legislation.gov.uk/uksi/2008/944/pdfs/uksi_20080944_en.pdf [Visited February 22, 2019]

Appendix 5: Version control

VERSION	KEEPER	REVIEWED	APPROVED BY	APPROVAL DATE
1.0	H&S Services	Every three years	UHSWC	April 2019