College/Unit:	**Safety Resources**
Procedure Title:	**Biological Material Spill Response**

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Revision History

Revisions to this procedure are to be documented in Table 1, Revision History.

Table 1: Revision History

Document Section	Details of Amendments	Date	Author (Initials)
	New Spill SOP	**October 23, 2019**	**AS**

1 Purpose

To describe the process on how to assess and clean-up spills with biological and/or biohazardous materials.

2 Applicable To

This SOP applies to all individuals working with biological materials.

3 Scope

Many different types of biologicals are used, transported, and stored on the University Campus. It is important that individuals working with biological materials are prepared to respond to any type of biological spill while minimizing the risk of exposure that is encountered in doing so. Personnel working with biologicals must be trained to clean up a spill in their area, but they may require assistance from Safety Resources (SR).

4 Definitions

Biological Material: Pathogenic and non-pathogenic microorganisms, proteins, and nucleic acids, as well as any biological matter that may contain microorganisms, proteins, nucleic acids, or parts thereof. Examples include, but are not limited to, bacteria, viruses, fungi, prions, toxins, genetically modified organisms, nuclei acids, tissue samples, diagnostic specimens, live vaccines, material derived synthetically, and isolates of a pathogen (e.g. pure culture, suspension, purified spores).

BSC: Biological Safety Cabinets

Decontamination: The process by which materials and surfaces are rendered safe to handle and reasonably free of microorganisms, toxins, or prions; this may be accomplished through disinfection, inactivation, or sterilization.

ERP: Emergency Response Plan

Minor Spills: Biological materials spill of less than or equal to 5L

PPE: Personal Protective Equipment

PSDS: Pathogen Safety Data Sheets

SHARPs: any device or object used to puncture or lacerate the skin. Sharps waste is classified as biohazardous waste and must be carefully handled. Common medical materials treated as sharps waste are hypodermic needles, disposable scalpels and blades, contaminated glass and certain plastics, and guidewires used in surgery.

SOP: Standard Operating Procedure

WMF: Waste Management Facility.

5 Training

The theory component of biological material(s) spill response is covered in the SR Biosafety online course. The practical scenario training of spill response should be provided as part of the site-specific orientation and annual ERP training. All training must be documented.

6 Safety

- In order to clean up a biological spill properly, the individual must know what type of material has been spilled. Once identified, the responder can determine which appropriate decontamination method to use to neutralize the biological material as part of the spill response.
- Decontamination method used is dependent on where the spill occurred and its size, or volume.
- The biosafety plan and/or PSDS for the identified biological material can be used to identify the appropriate decontamination method and define the risks associated with exposure to the biological materials.
- Individuals utilizing a N95 respirator must be fit tested through SR. Contact SR to schedule times available for fit testing.

7 Equipment and Materials

- PPE required for spill response:
    - Lab coat;
    - Disposable non-latex gloves (double gloved);
    - Closed toe and heeled shoes;
    - Disposable shoe covers (if required);
    - Safety glasses or goggles; and
    - N95 respirator (if required).

- Materials required for Biological Spill kit (equipment placed into a plastic storage container):
    - Spare PPE (as described above);
    - Effective disinfecting agent (e.g. Spray bottle with bleach (and marked line to make a 10% solution (1 part bleach and 9 parts water)), made fresh, change bleach every six months);
    - Absorbent material, such as paper towels;
    - Tongs, or forceps, broom/brush and dust pan for cleaning broken glass and/or SHARPs;
    - Waste bags (e.g. biohazard autoclave bags);
    - Signage (e.g. laminated sign stating Spill Clea-up In Prgress, Do Not Enter); and

- Copy of biological material spill response SOP (recommend to make it waterproof).

8 Procedure

8.1 General Spill Response – Minor Spills

In case of minor biological spill, refer to the following:

8.1.1 Assess the spill

- Attend to individuals injured as a result of a biological material spill, if safe to do so, **prior to dealing with the spill**.
- If the individual has spilt biological material on themselves, remove contaminated clothing and material from the individual and place it into an autoclave bag for decontamination.
- The individual must proceed to wash any other potentially contaminated parts of their body with water. For instance, if splashed in the face or eyes, go to an emergency eye-wash station and flush the area for 15 minutes. Initiate first aid measures, if required.
- If the individual is contaminated with biohazardous materials, ensure you are wearing appropriate personal protective equipment.
- Individuals that have potentially been exposed to a biohazardous agent as a result of a biological spill, must seek medical attention as soon as possible. Refer to the biosafety plan and/or PSDS for the hazard assessment to provide to the medical practitioner.
- Once the risk of injury has been controlled, contact SR (306-966-4675) or WMF (306-966-8497) if you feel you are unable to deal with the spill yourself. After hours, if necessary, contact Protective Services at 306-966-5555.

8.1.2 Control the Spill Area

- Notify all individuals within the area that a spill has occurred.
- If the spill involves biohazardous material, ensure all individuals have left the immediate area, and wait for 30 minutes before initiating cleanup to allow aerosols to settle out.
- Cordon off the area around the spill and restrict access to the area.
- Notify the permit holder, laboratory supervisor or responsible authority about the spill without delay.
- Put up appropriate signage, which states spill cleanup in progress and not to enter the area.
- Gather the spill kit.
- As necessary, refer to your biosafety plan (i.e. exposure control plan) and the PSDS for the hazard assessment of the material spilled.
- If you contacted WMF for spill assistance, wait for Safety Resources personnel to arrive to assist with the spill.

8.1.3 Don appropriate PPE

- Individuals engaged in the cleanup of a spill of biological materials must wear fresh, clean, which includes:
    - laboratory coat;
    - closed toe and closed heel shoes (which may be covered with disposable shoe covers);
    - disposable gloves (double gloves); and
    - safety glasses.
- If respiratory protection is required to respond to a biological spill, the respirator must be appropriate for the hazards involved, and the individual wearing the respirator must be appropriately fit tested and trained in the use and maintenance of the respirator. Bi-annual fit testing is required through SR.
- Contact Safety Resources at 306-966-4675 for respiratory protection services.

8.1.4 Clean Up Spill

- Assemble required clean-up materials (e.g., biological spill kit) and bring them to the site of the spill.
- Place absorbent material, such as disposable paper towels, gently from the outer edge of the spill working towards the centre of the spill in order to keep it from spreading.
- Liberally apply an appropriate disinfectant (i.e., sufficient concentration, effective against the pathogen(s) spilled, freshly prepared) to the paper towels from the edges of the spill area toward the centre of the spill. Ensure the entire spill is covered including any glass, petri dishes, lids, tubes, etc.
- Allow the appropriate contact time for the disinfectant to work; refer to product instructions.
- After the appropriate contact time (i.e., for the pathogen and disinfectant), clear away the towels and debris. If there is broken glass or other sharp objects involved, use a dustpan or pieces of stiff cardboard to collect and deposit the material into a puncture resistant container for disposal (e.g. lined cardboard box placed into a biohazard autoclave bag or appropriate biohazard waste container. Glass fragments should be handled with forceps. Dustpans can be autoclaved or placed in an effective disinfectant.
- Use forceps or tongs to place all SHARPs into a sharps disposal container.
- Using appropriate tools, gather the spilled material and paper towels, and place them in an autoclave bag or appropriate biohazard waste container. Always work from the outside of the spill area towards the centre of the spill. Repeat cleanup steps as required.
- Clean and disinfect the area of the spillage. If necessary, repeat the previous steps.

8.1.5 Decontaminate Tools

- Clean the spill area with soap and water.
- Once the spill clean-up is complete, doff the PPE used to clean the spill. For disposable PPE, place into biohazard autoclave bag or appropriate biohazard waste container. Reusable PPE need to be disinfected with appropriate disinfectant or autoclaved.
- Wash hands thoroughly with soap and water for 20 seconds.
- Don clean PPE prior to returning to work in the lab.
- Re-usable tools, such as forceps, tongs, etc., must be decontaminated using an autoclave or appropriate disinfectant.
- As necessary, restock the spill kit.

8.1.6 Report Spill after Clean-up

- Inform personnel in the area that the spill has been cleaned up.
- Remove any barricades or signage.
- Report the spill to your supervisor and the Biosafety group
- Complete an incident report on the Safety Resources website at http://safetyresources.usask.ca .
- If an exposure to the biohazardous material occurred, the incident must be reported to the Biosafety group immediately after medical attention has been administered (if required), who will then report the incident to the Public Health Agency of Canada (PHAC) as required by PHAC Human Pathogen and Toxins Regulations.
- Dispose of the biological and/or biohazardous waste in accordance to the SR *Hazardous Waste Disposal Standard*.
- Contact the Waste Management Facility at 306-966-8497 for assistance.

8.2 Spill Response Inside a BSC

When a small spill occurs inside a BSC, the worker is not considered contaminated unless a splash or spillage has escaped the BSC; however, the gloves and sleeves may be contaminated.

A large spill in a BSC may result in material escaping the BSC and the worker becoming contaminated. In this case, the outer layer of PPE is considered potentially contaminated and should be removed at the BSC.

The following general procedure is recommended for spills inside a BSC:

8.2.1 Remove gloves and place into the biohazardous waste bag or container within the BSC. If two pairs are worn, remove the outermost layer. If sleeves are potentially contaminated, the lab coat should be removed. Don on fresh gloves and/or lab coat if necessary.

8.2.2 Leave the BSC blower on and the sash at the appropriate height for 5 minutes.
8.2.3 Follow the steps in section 8.1 for general spill clean-up and ensure to keep head outside of the BSC. Ensure to use a non-corrosive disinfectant, such as 70% ethanol or hydrogen peroxide solution (proper disinfectant for biological materials and proper contact time is achieved).
8.2.4 Surface disinfect all objects before removing them from the BSC, or place them into bags for autoclaving. Remove contaminated gloves and dispose of them inside the BSC.
8.2.5 Place disposable PPE into biohazard bag or bin. Surface decontaminate reusable PPE, such as safety glasses.
8.2.6 If material has spilled through the grill of the BSC, pour disinfectant through the grill to flood the catch tray underneath.
8.2.7 Wipe all inside surface with disinfectant. Ensure proper contact time is followed.
8.2.8 Raise the BSC tray to clean the under the grill.
8.2.9 Allow BSC to run for 10 minutes before resuming work or shutting the BSC off.

8.3 Spill Response Inside a Centrifuge

If a breakage occurs or is suspected while a centrifuge is running, the motor should be switched off and the centrifuge left closed (e.g., for 30 minutes) to allow aerosols to settle.

Should a breakage be discovered only after the centrifuge has been opened, the lid should be replaced immediately and left closed (e.g., for 30 minutes).

If a sealed rotor cup is unloaded in the BSC and a spill is discovered within the BSC, close the lid on the sealed rotor cup and allow aerosols to settle out for 30 minutes within the BSC. Spill clean-up must be conducted in the BSC – refer to section 8.1 for general spill clean-up.

The following general procedure is recommended for spills inside a centrifuge:

8.3.1 Inform the supervisor of the spill in a centrifuge.
8.3.2 If the spill occurred in a sealed rotor cup, unload
8.3.3 Follow the steps in section 8.1 for general spill clean-up.
8.3.4 All broken tubes, glass fragments, buckets, trunnions, and the rotor should be placed in a non-corrosive disinfectant (do not use bleach) (forceps to be used to handle and retrieve glass and or other sharp debris).
8.3.5 Unbroken sealed safety cups may be placed in disinfectant and carried to a BSC to be unloaded.
8.3.6 The centrifuge bowl should be wiped with the disinfectant, washed with water, and dried.

8.4 Waste Disposal

Spill debris and waste is decontaminated in accordance to the biosafety plan and the SR *Hazardous Waste Disposal Standard.*

9 Procedure Review

All authorized workers must be trained on the biological material spill response SOP, as part of the ERP training, annually and the training must be documented.

10 Records

Training records to be stored with the Permit Holder for 5 years.

11 References

- Canadian Biosafety Standard (2015, 2nd Ed.) (https://www.canada.ca/en/public-health/services/canadian-biosafety-standards-guidelines/second-edition.html)
- Canadian Biosafety Handbook (2016, 2nd Ed.) (https://www.canada.ca/content/dam/phac-aspc/migration/cbsg-nldcb/cbh-gcb/assets/pdf/cbh-gcb-eng.pdf)
- SR *Hazardous Waste Disposal Standard* (http://safetyresources.usask.ca/procedures_forms/documents/Hazardous%20Waste%20Disposal%20Standard.pdf)
- U of S Building Specific Emergency Response Plan (ERP)