***STANDARD OPERATING PROCEDURE – B002***

**Cleanup of biohazard spills**

1. **Objectives**

The objective of this document is to establish standard operating procedures for the cleanup of biohazard spills, ensuring the safety of laboratory personnel by mitigating potential risks associated with hazardous materials, and injuries. Additionally, this SOP aims to enhance the efficiency of experimental workflows.

1. **Personal Protective Equipment**

To ensure safety during the cleanup of biohazard spills, appropriate personal protective equipment (PPE) must be worn. This includes:

* Long pants and closed-toe shoes to protect against spills and sharps.
* A long-sleeved, buttoned lab coat to minimize skin exposure.
* Safety glasses or goggles to prevent splashes or aerosols from contacting the eyes.
* Disposable nitrile or latex gloves to prevent direct contact with biohazardous materials.
* A respirator (e.g., full-face respirator) if aerosol generation is suspected.
* If the user has long hair, it should be tied back.

1. **Potential Hazards**

The cleanup of biohazard spills presents various hazards that must be managed to maintain a safe working environment. These include:

* Biological Hazards: Risk of infection from exposure to pathogens or biohazardous materials.
* Chemical Hazards: Spills may involve toxic, corrosive, flammable, or radioactive chemicals.
* Environmental Hazards: Release of hazardous substances into the environment, including recombinant DNA materials.
* Physical Hazards: Exposure to broken glass or sharps contaminated with biohazardous materials.
* Disinfectant Hazards: Irritation to the eyes or skin from contact with disinfectants.

1. **Procedures**
2. Training

* Ensure that all personnel have received training and safety protocols. Undergo medical surveillance and register as a biohazard worker prior to the start of work if needed.
  + MC06 Biological Safety
  + MC03 Chemical Safety II / Hazardous Waste Management
  + MC07 Chemical Safety I / Chemical Safety for Laboratory Users

1. General Spill Clean-up Procedure (Outside Biosafety Cabinet)

* **Initial Response**:
  + For a large volume or high concentration spill, avoid inhalation, alert surrounding colleagues / students, and immediately evacuate. Contact the Security Control Centre (8999) immediately.
  + Instruct all lab users to evacuate the affected area immediately.
  + Notify the HSEO, the departmental safety officer (DSO), and the Principal Investigator.
  + Close the laboratory door. Wait 30 minutes to allow the aerosols to settle. Turn off the ventilation system if it is feasible.
* **Containment and Access Control**:
  + Cordon off the spill area with hazard tape or other barriers.
  + Post warning signs indicate the nature of the hazard and restrict access.
* **Risk Assessment and PPE Preparation**:
  + Retrieve the Safety Data Sheet (SDS) for spilled biohazardous material to determine its properties, hazards, and recommended response measures.
  + Put on appropriate protective personnel equipment (PPE) for cleaning up the spill.
* **Spill Cleanup**:
  + Collect any broken sharps using a dustpan and/or forceps and dispose of them in a sharps box.
  + Cover the spill with absorbent materials (e.g., paper towels, absorbent pads).
  + Apply freshly prepared disinfectant (e.g., 1:5 bleach solution) from the outer edge toward the center of the spill.
  + Allow the disinfectant to sit for 15-20 minutes (non-viscous spills) or 30 minutes (viscous spills).
* **Waste Disposal**:
  + Collect all cleanup materials, including contaminated PPE, in a Solid with Toxic Chemicals waste container for disposal.
  + Dispose of broken sharps in a sharps box.
  + DO NOT autoclave items treated with bleach.
* **Final Steps**:
  + Remove the “Biological Spill Alert” notice once disinfection is complete.
  + Wash your hands thoroughly with soap and water.

1. General Spill Clean-up Procedure (Inside Biosafety Cabinet)

* **Initial Response:**
  + Notify the HSEO, the departmental safety officer (DSO), and the Principal Investigator.
  + DO NOT turn off the biosafety cabinet (BSC); ensure all caps and lids of biohazardous materials are tightly closed.
* **Containment and Access Control**:
  + Restrict access to the laboratory by posting a “Biological Spill Alert” notice.
* **Risk Assessment and PPE Preparation**:
  + Retrieve the Safety Data Sheet (SDS) for spilled biohazardous material to determine its properties, hazards, and recommended response measures.
  + Put on appropriate protective personnel equipment (PPE) for cleaning up the spill.
  + If spillage on the lab coat has occurred, remove and discard it within the Biosafety Cabinet.
* **Spill Cleanup:**
  + Cover the spill with absorbent materials (e.g., gauze, paper towels).
  + Apply freshly prepared disinfectant (e.g., 1:5 bleach solution) from the outer edge toward the center.
  + Allow the disinfectant to sit for 30 minutes before wiping the spill.
* **BSC Cleaning:**
  + Lift the front exhaust grill and tray; wipe all internal surfaces with disinfectants.
  + Rinse with water to remove residual disinfectants.
* **Waste Disposal:**
  + Collect all cleanup materials, including contaminated PPE, in a Solid with Toxic Chemicals waste container for disposal.
  + Dispose of broken sharps in a sharps box.
  + DO NOT autoclave items treated with bleach.
* **Final Steps:**
  + Remove the “Biological Spill Alert” notice.
  + Wash your hands thoroughly with soap and water.
  + Contact CMO/LS to conduct a fumigation for the BSC.

1. General Spill Clean-up Procedure (Spill in Centrifuge)

* **Initial Response:**
  + If a spill occurs while the centrifuge is operating, turn it off and keep the lid closed for 30 minutes to allow the aerosols to settle.
  + If a spill is detected after the centrifuge has stopped, leave the centrifuge lid closed for 30 minutes before opening.
  + Restrict access to the laboratory by posting a “Biological Spill Alert” notice.
  + Notify the HSEO, the departmental safety officer (DSO), and the Principal Investigator.
* **Containment and Access Control:**
  + Cordon off the centrifuge area with hazard tape or other barriers.
* **Risk Assessment and PPE Preparation:**
  + Retrieve the Safety Data Sheet (SDS) for spilled biohazardous material to determine its properties, hazards, and recommended response measures.
  + Put on appropriate protective personnel equipment (PPE) for cleaning up the spill.
* **Spill Cleanup:**
  + Open the centrifuge lid.
  + Remove the entire bucket and put it into a heavy-duty black trash bag and transport it to the nearest biosafety cabinet for cleaning.
  + Apply freshly prepared disinfectant (e.g., 1:5 bleach solution) to the spilled area.
  + Allow the disinfectant to sit for 30 minutes before wiping the spill.
  + Submerge the rotor, bucket, trunnions, and lid using the disinfectant. The items should be thoroughly disinfected and re-usable items such as rotors, buckets, and trunnions should be rinsed with water and dried thoroughly before re-use.
* **Waste Disposal:**
  + Collect all cleanup materials, including contaminated PPE, in a Solid with Toxic Chemicals waste container for disposal.
  + Dispose of broken sharps in a sharps box.
  + DO NOT autoclave items treated with bleach.
* **Final Steps**:
  + Remove the “Biological Spill Alert” notice once disinfection is complete.
  + Wash your hands thoroughly with soap and water.

**5) Incident Reporting**

* Report any accidents resulting in injuries to HSEO, Principal Investigator and/or the departmental safety officer (DSO) immediately.
* For serious incidents, notify the security unit immediately by calling the 24-hour hotline on **23588999**.

**6) References**

* Campbell, L. (2016). SOP\_SMB004: Cleanup of biohazard spills. Risk Assessment. The University of Sydney.
* Bilic, D., & Coleman, N. (2014). SOP SMB004.2 (DB NC 0614): Cleanup of biohazard spill. Standard Operating Procedure. The University of Sydney.
* HKUST Emergency Procedures – *Hong Kong University of Science and Technology*
* Safety and Environmental Protection Manual *- Chapter 7: General Laboratory Safety | Health, Safety and Environment Office - the Hong Kong University of Science and Technology*
* Safety and Environmental Protection Manual *- Chapter 9: Biological Safety | Health, Safety and Environment Office - the Hong Kong University of Science and Technology*