

Policy and Procedure for Recombinant DNA/Biohazardous Material Spills

Originator: Department of Environmental Health and Safety

Vice Presidents: Business Affairs and Research

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SUMMARY:

The University of Louisville is required to report incidents involving recombinant DNA (rDNA) and/or biohazardous research to the National Institutes of Health (NIH) Office of Biotechnology Activities (OBA) and other regulatory agencies. This policy outlines the information necessary to determine the nature and extent of the release and appropriate spill management and reporting requirements according to the *NIH Guidelines for Research Involving Recombinant DNA Molecules* (*NIH Guidelines*; http://oba.od.nih.gov/rdna/nih_guidelines_oba.html).

Advance preparation for spill management is essential. Use these procedures to help you preplan your response to spills of recombinant DNA/biohazardous material in the laboratory or clinic. These procedures address minor spills involving small quantities of recombinant DNA biological materials. In the case of a large spill or a spill involving a highly infectious agent, contact the Department of Environmental Health and Safety (852-6670) for assistance with decontamination and cleanup. More detailed spill management information is available.

SCOPE:

This policy applies to any individual, including a Principal Investigator, researcher, instructor, laboratory/clinical manager, student or other personnel who work in a laboratory or clinic utilizing recombinant DNA.

DEFINITIONS:

Recombinant DNA molecules are defined in the context of the *NIH Guidelines* as:

- Molecules that are constructed outside of living cells by joining natural or synthetic DNA segments to DNA molecules that can replicate in a living cell,
- Molecules that result from the replication of those described above, or
- Synthetic DNA segments which are likely to yield a potentially harmful polynucleotide or polypeptide (e.g., a toxin or a pharmacologically active agent) are considered as equivalent to their natural DNA counterpart.

RESPONSIBILITIES/PROCEDURES:

Deans, Directors and Department Heads

Responsible for the overall implementation of this policy.

Ensure that all Principal Investigators, researchers, instructors, laboratory/clinical managers, students and other personnel are aware of, understand and follow the procedures outlined in this policy.

Principal Investigator, Researcher, Instructor, Laboratory/Clinical Manager, Student or Other Personnel

The Principal Investigator is responsible for ensuring that all personnel are knowledgeable of the spill response procedures in this policy and that spills are addressed in a prompt manner.

The Principal Investigator is responsible for ensuring these procedures are used to tailor spill response plans specific to their laboratory/clinic (See the template Emergency SOP for Biohazardous Spills form available at: <https://louisville.edu/dehs/forms>. These procedures address minor spills involving small quantities of recombinant DNA/biohazardous materials. In the event of a large spill or a spill involving a highly infectious agent, contact the Department of Environmental Health and Safety at 852-6670.

The Principal Investigator is ultimately responsible for immediately reporting spills to the Institutional Biological Safety Officer in the Department of Environmental Health and Safety (852-6670; biosafe@louisville.edu) if they involve recombinant DNA/biohazardous materials, are large, occur outside of containment and/or if personnel are exposed.

The Principal Investigator is responsible for maintaining an adequate supply of an appropriate chemical disinfectant suitable to decontaminate/inactivate the recombinant DNA/biohazardous materials.

1. Spill in a Biological Safety Cabinet

A spill that is small and confined within a biological safety cabinet generally presents little or no hazard to personnel in the area. However, chemical disinfection procedures are to be initiated at once while the cabinet continues to operate. The disinfectant shall be one that is active against the biohazardous material. Use of flammable liquids, such as ethanol or isopropanol, should be avoided even if effective, because of the fire hazard of generating dangerous vapor concentrations within the cabinet that could be ignited by an electrical spark or other source.

Minimize the generation of aerosols as the walls, work surfaces, and equipment are sprayed or wiped with the chosen disinfectant. Allow the disinfectant to remain on the surface for the appropriate contact time.

- Maintain cabinet ventilation.
- Warn others in the laboratory.
- Notify the Principal Investigator.
- Wear protective gloves, a lab coat or gown, and eye protection during the procedure.

- Spray or wipe walls, work surfaces, and equipment with appropriate disinfectant. A disinfectant with detergent has the advantage of detergent activity that will help clean the surfaces by removing both dirt and microorganisms.
- If the spill entered the front exhaust grill, use sufficient disinfectant to ensure the catch basin below the work surface contain the disinfectant. Lift the front exhaust grill and tray and wipe all surfaces.
- Observe the recommended contact time for the disinfectant.
- Dispose of spill clean-up materials as biohazardous waste.

This procedure will not disinfect the filters, fans, air ducts, and other interior parts of the biosafety cabinet and will require professional decontamination services.

2. Spill in the Open Laboratory

For a spill in the open laboratory outside a biological safety cabinet, the spill response depends on the size of the spill and hazard of the material. A minimally hazardous material spilled without generating appreciable aerosols can be cleaned with a paper towel soaked in a chemical disinfectant.

A spill of a larger volume of hazardous material with aerosol generation requires evacuating the room, waiting for aerosol reduction, donning personal protective gear (including appropriate respiratory protection if appropriate), selecting a disinfectant effective against the biohazardous materials involved, and cleaning as described above. Following cleanup, response personnel must wash or shower with a disinfectant soap.

For a small spill of recombinant DNA/biohazardous material in the open laboratory, take the following action:

- Warn others in the laboratory.
- Notify the Principal Investigator.
- Wear gloves and protective clothing.
- Decontaminate with an appropriate disinfectant.
- Dispose of as described above.
- If clothing is known to be contaminated, carefully remove it, folding the contaminated area inward. Place the clothing into an autoclavable bag.
- Remove gloves and wash hands before leaving the laboratory.

3. Spill in a Centrifuge

A biological spill in a centrifuge has the potential for producing large volumes of aerosols. On becoming aware that a spill may have occurred within a centrifuge or other piece of equipment,

turn off the equipment, warn others in the area, notify the Principal Investigator, allow aerosols to settle, and decontaminate following the procedures described above.

- Turn off the centrifuge and allow time for the aerosols to settle.
- Warn others in the laboratory.
- Notify the principal investigator.
- Wear gloves and protective clothing.
- Decontaminate with an appropriate disinfectant. Place contaminated equipment in a leakproof bag and move it to a biological safety cabinet, if possible, for decontamination.

3. Spill Involving Radioactive Materials

- Warn others in the laboratory.
- Call the Radiation Safety Office (852-5232)

4. Exposure of Personnel

If a spill of recombinant DNA/biohazardous material involves personnel exposure, emergency response is based on the hazard of the material, the amount of material spilled, the route of exposure and whether significant aerosols were generated.

- If aerosol formation is believed to have been associated with the spill, personnel shall leave the contaminated area immediately to allow sufficient time (generally 30 minutes) for aerosol to settle before attempting to clean the area. If possible, potentially contaminated personnel should go to another laboratory area so that hallways and other public areas do not become contaminated.
- Contaminated clothing is removed and placed in red or orange biohazard bags for disinfecting.
- Contaminated skin shall be flushed with water and thoroughly washed with a disinfectant soap. Showering may be appropriate, depending on the extent of the spill.
- Exposed personnel must follow appropriate response plans for exposure prophylaxis that include seeking medical attention as necessary and completing the First Report of Injury Form at <http://louisville.edu/riskmanagement/forms/wcform.pdf>.
- The University personnel involved must immediately report the incident to the Principal Investigator and the Institutional Biological Safety Officer in the Department of Environmental Health and Safety (852-6670; biosafe@louisville.edu). The Principal Investigator is ultimately responsible for reporting the incident to the Institutional Biological Safety Officer should the personnel involved be unable to do so in a timely manner.
- Subsequent to caring for personnel, spills must be contained and cleaned up appropriately according to procedures outlined above.

Department of Environmental Health and Safety

Facilitate the policy and procedure for response to recombinant DNA/biohazardous material spills.

The Department of Environmental Health and Safety (852-6670) will provide consultation on spill response and will assist with decontamination and cleanup of large spills.

The Institutional Biosafety Officer will notify the Director of Environmental Health and Safety, the Chair of the Institutional Biosafety Committee the Director of Research Resources and the Office of the Executive Vice President for Research as needed.

The Institutional Biological Safety Officer will work with the Principal Investigator to collectively complete the NIH OBA Template for Reporting Incidents Involving Recombinant DNA at http://oba.od.nih.gov/rdna_ibc/ibc_faq.html if the recombinant DNA/biohazardous spill resulted in:

- overt personnel exposure at Biosafety Level 2 (BSL-2, BL2) and/or Animal Biosafety Level 2 (ABSL-2, BL2-N),
- overt or potential exposure in the Biosafety Level 3 (BSL-3, BL3) and/or Animal Biosafety Level 3 (ABSL-3, BL3-N) laboratories outside of a biosafety cabinet,
- a violation of the *NIH Guidelines* containment or biosafety practices, or significant problems leading to a breach of containment (including escape or improper disposal of a transgenic animal) and/or
- a significant-research-related accident or illness.

In conjunction with the IBC Chair, the Institutional Biological Safety Officer will submit the final incident report to the respective federal agency on behalf of the university. The final incident report will be reviewed by the IBC and corrective actions recommended and instituted as necessary. Copies of the incident report will be provided to the Director of Environmental Health and Safety, the Director of Research Resources, the Chair of the Department and the Dean for Research of the College involved with follow-up being conducted as necessary.