Animals Administered a Hazardous Substance Requiring Containment

Last Updated 1 November 2017

1. Purpose

Research activities may involve the administration of hazardous substances to laboratory animals. If not contained properly, these activities can negatively impact the health of research and animal care personnel as well as other animals. This document outlines procedures to be utilized by personnel working with animals exposed to hazardous substances in ABSL2 containment rooms (not including radioactive materials, see related documents section). Some procedures described in this SOP may not be applicable for non-rodent species, contact ULAM husbandry supervisors for further information. Extra precautions must be taken at the time of agent administration due to the increased potential for human exposure. Individuals who may be at an increased risk or susceptibility to a hazardous substance must be identified through Environmental Health & Safety’s (EHS) medical surveillance process (e.g., pregnant women, immune compromised individuals). This SOP has been reviewed and approved by EHS with full consideration of all regulations. If further information is needed that is not found in this SOP, contact EHS. Any deviations from this SOP will need to be approved by EHS.

2. Responsibilities

1. ULAM Containment Coordinator: Has oversight over ULAM animal containment rooms and the use of hazardous substances in animal research.
2. Institutional Biosafety Committee (IBC): The U of M committee that oversees and approves recombinant DNA and infectious disease research conducted at the University.
3. Investigative personnel and ULAM Personnel: Must be familiar with and follow the procedures outlined in this SOP and perform safety measures to minimize the risk of exposure to hazardous substances.
4. Principal Investigator (PI): Must identify all hazardous substances and the potential hazards associated with each in the animal use protocol, and other responsibilities outlined in this SOP.
5. EHS Personnel: Review all protocols involving the administration or exposure of a hazardous substance to an animal and determines whether containment housing is necessary.

3. Definitions and Abbreviations
1. Animal housing cubicule: A small, self-contained animal housing room constructed within a larger room. All statements within this SOP for “rooms” will apply to cubicules unless otherwise specified in this SOP.

2. Biological Safety Cabinet (BSC): A biological safety cabinet is used to provide containment of splashes or aerosols that may be generated while working with hazardous substances or animals exposed to such substances. All direct manipulation of animals within a containment room must be conducted within a BSC. When used correctly, BSC’s provide personnel, product and environmental protection.

3. Containment Room: A room in which animals administered a hazardous substance (as determined through EHS review) are contained utilizing special practices and procedures to minimize risk of exposure to personnel.

4. Containment Room Entry Sign: Generic sign that includes both the chemical and infectious hazard symbols, contact information for ULAM, and the appropriate PPE required to enter the room (see Appendix A).

5. Environment, Health & Safety (EHS): The U of M department responsible for ensuring safe work environments and practices for U of M employees.

6. Hazardous chemical: A chemical for which there is evidence that acute or chronic health effects may occur in exposed employees. Examples include carcinogens, teratogens, and corrosives.

7. HEPA filter: High Efficiency Particulate Air filters remove 99.97% of all particles 0.3 um in size.

8. Infectious agent, or biologic agent: A live organism (e.g. virus, bacteria, rickettsia, fungi, parasite) capable of causing disease in humans/animals, human/animal tissue (normal or diseased) including all human derived substances.

9. Infectious/Chemical Agent Form:

10. Personal Protective Equipment (PPE): Personal protective equipment is worn by people and provides a physical barrier to hazardous substances.


12. Toxin: An antigenic poison or venom of plant or animal origin, especially one produced by or derived from microorganisms and causing disease when present at low concentration in the body.

4. General Containment Housing Communication and Procedures

1. Requesting Animal Containment Housing
   1. Prior to handling animals, caging, or equipment in a containment room, all personnel (ULAM and non-ULAM personnel) must attend the IACUC/ULAM-required “Hazard Containment” courses.
   2. Investigative personnel complete the Containment Housing Request Form (CHR) (Level 1 Logon required to access).
   3. The ULAM husbandry supervisors responsible for the requested containment housing area will receive an electronic copy of the CHR form.
   4. Requests for containment housing must be made before the animal order is submitted or at least 3 business days before animals are placed in the containment room.
   5. ULAM Husbandry Supervisor Actions:
      1. Reviews EHS’s recommendations within the eRAM protocol when a laboratory requests to initiate a study in ULAM containment housing and direct any questions or discrepancies to EHS.
      2. Confirm all investigative personnel needing access to containment housing have completed all required training classes.
      3. Notify investigative personnel of containment room space availability including room number and combination for the housing containment room.
   6. Access to containment rooms is limited to personnel who have completed the required training through the Training Core, facility orientation with ULAM husbandry personnel, and are required to conduct study or husbandry related functions.

2. Containment Room Documentation
   1. Post a Containment Room Entry Sign on the outside of each containment housing, cubicle, and designated procedure room.
   2. The ULAM Husbandry Supervisor completes Infectious and/or Chemical Agent Forms for the designated containment procedure and animal housing room.
   3. Each containment housing and designated containment procedure room will have a binder present with the following information included:
      1. Infectious and/or Chemical Agent forms specific to each protocol that contain special instructions for handling, labeling, and waste disposal (see Appendix B and C).
      2. Pathogen Safety Data Sheet (PSDS) provided by EHS with links to information on infectious hazards.
      3. SDS locator sign
      4. EHS Universal Precaution sheet
      5. Copy of this SOP
   4. A Containment Room Entry Sign must remain posted on animal housing and cubicle room doors until the room is emptied of all animals and the room is decontaminated.
      1. See Appendix D if there are non-hazardous studies housed within a containment cubicle suite.

3. Animal Containment Housing Entry Procedures
   1. Personal Protective Equipment (PPE):
      1. The following PPE requirements are for rodents only. See Appendices E and F for PPE requirements for non-rodent species.
      2. Don all protective clothing, except eye protection, before entering the housing or designated containment procedure room. Don eye protection immediately after entering housing or designated containment procedure room.
      3. Minimally required PPE for working in containment rooms/cubicles include:
         1. Disposable blue plastic gown
2. Face mask (surgical or molded) (Not required for rodents / Required for all non-rodents)
3. Shoe covers
4. Hair bonnet (Not required for rodents / Required for all non-rodents)
5. Examination gloves (latex or nitrile)
6. Protective safety glasses, goggles, or face shield. Prescription glasses cannot be used in place of safety glasses (goggles must be placed over prescription glasses).
7. Additional PPE will be available inside the room in the event that any PPE items need to be changed.

4. If an employee is unable to wear PPE as required, departments provide alternate PPE if deemed to be at least as effective as the required equipment. If the employee is unable to wear PPE or an alternate is not acceptable to either party, then the employee will not be able to conduct the work tasks in which PPE is deemed necessary.

5. Standard Husbandry and Substance Administration Practices

1. General Considerations
   1. Unless otherwise directed in this document, animal care procedures should be performed as per ULAM standard operating procedures.
   2. Animals administered hazardous chemicals, toxins, and/or infectious substances can be housed in the same containment room.
   3. Changing PPE between cubicles within a suite is not required when personnel are performing only animal health checks; as long as no potentially contaminated equipment is manipulated and no animal cages are opened.
   4. Disinfect the BSC with Clidox or a freshly prepared bleach/water solution by wetting and then wiping the horizontal work surface as well as side and back walls with gloved hands.
   5. Allow disinfectant a 10 minute contact time before working in the BSC.
   6. Do not mix bleach or Clidox with ammonia or acids.
   7. Open and perform all cage manipulations within the BSC only.
   8. Even within the BSC, two cages containing animals must not be opened at the same time. Exceptions are when uninfected, new arrival animals are unpacked into their caging or separating/weaning animals.
   9. Allow a 10 minute disinfection contact time between different infectious or biological agents (Disinfection between chemical agents is required without the 10 minute contact time).
   10. Change gowns and gloves and disinfect the BSC with Clidox or bleach water, between cubicles, Principal Investigators or different hazardous substances if:
       1. Working with cages from different cubicles.
       2. Working within a cubicule, but animals belong to different Principal Investigators.
       3. Working within a cubicule, but animals are administered different hazardous substances.

2. Appropriate Animal Caging and Bedding
   1. House rodents that have been administered hazardous substances in solid-bottom cages.
   2. See Appendices E and F for contamination procedures for non-rodent species.

3. Hazard Identification on Animal Cages and Cage Cards (infectious agents, hazardous chemicals, and toxins)
   1. Identify hazardous substances using one of the following methods (see Appendix G):
      1. On cage card
      2. On an additional card placed vertically behind the original cage card
      3. On a yellow acetate placed over the cage card
      4. On an appropriate sticker applied to the cage card or acetate indicating biological, infectious or chemical hazard
   2. Place the following information directly on one of the identification methods listed above:
      1. Full name of the substance
      2. Date administered
      3. Concentration (for hazardous chemicals or toxins)
   3. For human derived substances, investigative personnel will record the date and human derived substances (HDS).
   4. Investigative personnel must place a colored, pre-printed, dissolvable sticker on a visible location on the cage bottom indicating the type of hazard (biologic agent or hazardous chemical and toxin) (see Appendix G). 
      1. Orange stickers indicate the presence of a biological (infectious) hazard
      2. Green stickers indicate the presence of a hazardous chemical or toxin

4. Containment Husbandry Practices
   1. Provide food and water and report all animal health issues according to the species specific husbandry SOPs.
   2. Water Bottle Procedures:
      1. From a bottle containing a chemical hazard:
         1. Place a green dissolvable sticker directly on a water bottle containing a hazardous substance (see Appendix G).
         2. Record the full substance name and the date of administration on the dissolvable stick on the water bottle.
         3. Identify and include information about the chemical hazard on the cage card using one of the methods above (see section 5.b)
         4. It is permissible to refill water bottles containing the same hazardous substance between water bottle sanitization periods. Return the bottle to the cage from which it came if bottle is being refilled.
         5. Sanitize water bottles at least once every week.
         6. Collect any hazardous waste water as described in section 5.k.ii.7.
      2. From a chemical hazard cage not containing hazard
         1. Tape ends of draw strings to the top of the laundry bag.
         2. Place a dissolvable green chemical hazard sticker on top of the tape.

1. Place soiled water bottles in a wire bottle basket placed inside a green cloth laundry bag.
   1. Tape ends of draw strings to the top of the laundry bag.
   2. Place a dissolvable orange biological hazard sticker on top of the tape.

3. From infectious hazard cages
   1. Place an orange dissolvable sticker directly on a water bottle containing a hazardous substance (see Appendix G).
   2. Record the full substance name and date of administration on the dissolvable sticker on the water bottle.
   3. Include information about the infectious hazard on the cage card using one of the methods above (see section 5.k).
   4. It is permissible to refill water bottles containing the same hazardous agent between water bottle sanitization periods. Return bottle to the cage from which it came if bottle is being refilled.
   5. Collect and store soiled infectious water bottles, either containing the infectious hazard or from an infectious hazard cage, in a wire bottle basket placed inside a red cloth laundry bag.
   1. Tape ends of draw strings to the top of the laundry bag using autoclave tape.
   2. Place a dissolvable orange biological hazard sticker on top of the autoclave tape.

6. See section 5.k.i.7 for disposal procedures.

3. Special considerations for ventilated housing procedures
   1. Infectious and chemical hazard cages can be housed on ventilated racks with supply and exhaust blower packs only, no building ventilation.
   2. Clean rack filters either in the room with soap and water or by processing through cagewash.
   3. Cover dirty rack with plastic bag and place biohazard sticker on it before taking to cagewash for processing.
   4. Spray rack wheels with bleach water or Clidox before removing rack from room.
   5. Discard blower HEPA filters, if changed, as infectious trash.
   1. Wipe down outside of blower packs with bleach water or Clidox if blower packs are moved to a standard housing room.

6. Water valves
   1. Replace soiled water valves with clean valves when new cages are placed on the rack due to the risk of cross contamination if a new cage is placed into a spot with a soiled water valve.

4. Animal Cage Procedures:
   1. Change bedding in cages using slow and deliberate movements to minimize the creation of aerosols.
   2. Infectious Cages: Cover any cage removed from the BSC with a micro-isolation top or a plastic bag.
      1. A short stack of soiled cages can be maintained inside the BSC.
      2. Cover the stack inside the BSC.
      3. Cover the top cage prior to removal or bag the entire stack immediately upon removal.
      4. Cover all other cage components prior to removal from the BSC (e.g., wires, bowls, enrichment items).

3. Chemical Cages:
   1. Remove bedding from cages using a plastic scraper.
      1. Close waste bag within the BSC between cages that are being scraped.
   2. Bag dirty bedding and place in a secondary labeled EHS approved waste container.
   3. Remove cages and cage components from the BSC (covering these once bedding is removed is not necessary).

4. Remove all soiled cage and cage components from the cubicle during regular business days. Refer to section 5.k for more information.

5. Water valves from infectious hazard cages
   1. Place soiled water bottles in a wire bottle basket placed inside a green cloth laundry bag.
   2. Collect and store soiled infectious water bottles, either containing the infectious hazard or from an infectious hazard cage, in a wire bottle basket placed inside a red cloth laundry bag.
   1. Tape ends of draw strings to the top of the laundry bag using autoclave tape.
   2. Place a dissolvable orange biological hazard sticker on top of the autoclave tape.

6. Decontaminate rooms when emptied. Consult the ULAM document, Room Sanitization SOP. The Containment Room Entry Sign should remain posted after all animals are removed from the room until room decontamination is complete.

5. Biological Safety Cabinet (BSC) Procedures
   1. ULAM husbandry personnel, sweep pre-filters in the BSC weekly and change them as needed. Discard pre-filters into the infectious trash. Lightly mist the pre-filters with a bleach solution or Clidox prior to sweeping. Pre-filters should not be vacuumed unless a specially designed HEPA filtered vacuum is used. Dispose of waste collected from the pre-filters as infectious trash.
   2. HEPA filters within the BSC must not be wetted or swept at any time. HEPA filters will be serviced or removed only by EHS.
   3. EHS performs annual certification of all BSCs. The date of the most recent inspection is indicated on a sticker placed on the cabinet by EHS.
   4. Contact EHS before moving a BSC more than 10 feet and/or through a doorway to determine if recertification of the BSC is necessary.

6. Hazardous Substance Administration and Equipment Disinfection
   1. Administer hazardous substances in the BSC only.
   2. Perform animal perfusions using proper ventilation such as downdraft tables or within the BSC.
   3. Use only hypodermic needles and syringes for injection or aspiration of fluids from laboratory animals and diaphragm bottles.
   4. Use a needle-locking syringes or disposable needle/syringe units (i.e., the needle is integral to the syringe) for injections or aspiration of hazardous substances.
      1. Do not bend, shear or replace needles in the needle cap or guard.
      2. Do not remove the needle from the syringe following use.
      3. Place the uncapped needle and syringe in a puncture-resistant container (sharps container).
5. Disinfect or discard equipment immediately after use and before removal from the containment room. Equipment may include:
   1. Restrainers, glassware, instruments, anesthesia machines, or any equipment utilized during agent administration or handling animals after agent administration.
   2. Disinfect with cidox or bleach solution and allow a 10 minute contact time.
   3. Consult EHS for guidance in choosing appropriate deactivation procedures for equipment exposed to hazardous chemicals.

7. Transport of Animals From Containment Rooms
   1. Outside the Vivarium
      1. The following procedures are for hazardous animals only.
         1. Place the animals in a clean housing cage (provided in each containment room).
         2. Leave all dirty caging in the containment room/cubicle covered with a plastic bag or with a micro-isolation filter lid covering the cage parts.
         3. Secure cages in which animals are being transported (e.g., rubber bands stretched over cage top and bottom).
         4. Place housing cages in a rigid, sealed, secondary transport container and transport it on a cart with sides.
            1. Place a sufficient amount of absorbent material in the secondary transport container prior to movement.
            2. Avoid public passenger elevators when possible.
         5. Wipe secondary containers, cages and carts with an appropriate disinfectant following transport.
         6. Place secondary transport containers in the containment room (or appropriate location in BSRB cagewash) following transport for standard biocontainment decontamination practices.
         7. Autoclave secondary transport containers if a spill has occurred within it.
   2. Decontaminating housing cages
      1. Secure the cage (e.g., placing 2 rubber bands over the top and bottom of the cage) to prevent a loss of contents.
      2. Return empty housing cages to the original containment room for proper processing.
         1. Except in BSRB, these cages should never be placed directly into a cage wash facility. Contact BSRB Husbandry Supervisors for information on the appropriate way to return dirty housing cages.
   2. Inside the Vivarium
      1. Animals may only be transferred to a standard (non-containment) animal room with prior approval given at the time of protocol review, as noted in the EHS recommendations within the eRAM protocol.
         1. Place animals into a clean housing cage (provided in each containment housing room) and wipe the outside of the cage with a suitable disinfectant within the BSC.
         2. A dissolvable sticker does not need to be placed on the cage bottom.
      2. Animals transferred to ULAM designated containment procedure rooms do not need to be placed in a clean housing cage.
         1. Wipe the outside of the cage with a suitable disinfectant within the BSC before removing the cage from the housing room.
      3. For larger and/or non-rodent species, contact the ULAM veterinarian and husbandry supervisor for transportation guidance.

8. Animal Escape Procedures
   1. Attempt to capture animals that have escaped from cages or are observed free within the containment room.
   1. See Program for Controlling Pests for more information.
   2. Keep doors closed during the trapping process.
   3. Place animal in a clean cage with food and water. Indicate animal fell on floor and the cage must be changed last, see Rodent Husbandry SOP for more information.
   4. After animal is captured, mop floor with bleach water.
   5. Call the ULAM husbandry supervisor if animal cannot be captured. ULAM husbandry supervisor sets humane live traps in attempt to capture the animal.
   1. Post a sign on the door stating “Live mouse trap in use, check daily”.
   6. Report incident to EHS at EHS-AnimalSafety@umich.edu if animal cannot be captured or it has caused an injury to personnel. Notify relevant investigative personnel to whom the animal belongs, if identifiable.

9. Disposition of Animals in an Emergency
   1. Follow emergency or disaster response practices outlined in the ULAM document “2017 Continuity of Operations Plan”.
   1. Maintain animals within appropriately controlled environmental conditions to safeguard both animal welfare and research integrity.
   2. In the event that animal housing room conditions cannot be appropriately maintained such as in the event of flood, fire or prolonged power failure:
      1. Do not remove animals from the facility.
      2. Follow euthanasia procedures (refer to section 5.i), if acceptable environmental conditions cannot be maintained.

10. Animal Euthanasia and Carcass Disposal
    1. Animals to be euthanized that would otherwise require containment housing, must be euthanized within the containment room or designated space.
2. ULAM will provide carbon dioxide euthanasia stations in containment areas in which animals will be euthanized by this means within the room. CO2 euthanasia must be performed inside the BSC.
3. Clean gross contamination from euthanasia equipment with an appropriate disinfectant after use.
4. Spray/wipe down euthanasia station components with appropriate disinfectant after use or as needed.
5. Carcass and tissue handling and disposal
   1. Unfixed carcasses and tissues
      1. Handling unfixed carcasses and tissues must be in accordance with the housing containment and per EHS recommendations. Refer to the EHS Biosafety Manual for further information.
      2. All animal carcasses removed from containment rooms must be contained within two sealed, leak-proof bags (new, unused gloves are acceptable "bags") prior to removal from the animal room unless the carcass is being brought to the laboratory. In these cases, the carcass must still be contained within two leak-proof containers; however, sealable containers other than bags can be used.
   3. Animals administered infectious agents.
      1. Label the outer bag with a biohazard sticker, PI name, name of infectious agent, and date.
      2. ULAM personnel: label the outer bag with biohazard sticker, PI name, name of infectious agent, room number, date, and individual ID (ear or clinical number), if available...
      3. All labeled, double bagged animal carcasses should then be placed in the designated area within the cooler.
   4. Animals administered hazardous chemicals or toxins prior to death.
      1. Label the outer bag with a hazardous chemical or toxin sticker, PI name, name of chemical agent or toxin, and date.
      2. ULAM personnel: label the outer bag with a hazardous chemical or toxin sticker, PI name, name of chemical agent or toxin, room number, date, and individual ID (ear tag or clinical number), if available.
      3. Within the carcass cooler, carcasses will be placed in barrels designated for chemically-contaminated carcasses.
      4. The hazardous substance must be recorded on the EHS Hazardous Waste sticker that is attached to the barrel and the barrel handled as outlined in section 5.m.vi below.
      5. If an animal is administered both an infectious agent and a hazardous chemical or toxin prior to death, it should be handled and disposed of the same as if it had a hazardous chemical. In addition, a biohazard sticker must be affixed to the carcass barrel.
   2. Fixed carcasses and tissues
      1. Carcasses perfused with a fixative post-mortem (such as paraformaldehyde) must be placed in an EHS-approved carcass container labeled for chemically contaminated carcasses.
      3. Animals administered infectious agents.
      1. Autoclave cages, water bottles, other cage components, and compatible equipment contaminated with an infectious agent prior to release to cagewash personnel for routine cleaning.
      1. Refer to Monitoring Effectiveness of Autoclaves SOP for procedures on autoclaving hazardous waste.
      2. Bag cages and cage components, wall filters or waste with commercially produced biohazard bags or paper bags and add a biohazard label and seal. Paper bags cannot be used if it would be reasonably expected that a liquid may be present that would contact the bag.
      3. Autoclave cages with soiled bedding in place.
      4. Autoclave food with caging.
      1. Do not autoclave high fat chow in cages, wires, or feeders.
      2. Collect any high fat chow in a plastic bag inside the BSC, then place the bag in the infectious hazard trash to be autoclaved.
      5. Transport through the hallways within a facility to reach the autoclave.
      6. Bag cages in a brown paper bag (craft bag), place on a mobile shelving unit and shrink wrap prior to transport between facilities to reach the autoclave, (i.e. via ULAM truck service).
      1. Remove shrink wrap prior to autoclaving.
      7. Transport water bottles in a wired bottle basket placed inside a red cloth laundry bag labeled with a dissolvable biohazard sticker and sealed with autoclave tape (see section 5.c.ii.3).
      1. If transporting on the truck, covered bottle baskets need to be placed inside a container that will collect any water that may spill.
      8. When autoclaving infectious hazard cage components is not feasible (e.g., autoclave not functioning, unable to keep up with processing demands), chemical disinfection can be used.
      1. Non-rodent caging
         1. Cover large equipment (e.g., racks) and label on all sides with biohazard stickers prior to transport through the hallways. Move equipment directly to cagewash for processing.
      2. Rodent caging
         1. Remove food and soiled bedding from cages within the BSC and place in a plastic bag.
2. Hazardous Chemicals or Toxins:
   1. DO NOT autoclave waste from animals administered a hazardous chemical or toxin.
   2. Refer to Appendix K for list of chemical agents that cannot be combined for HazMat disposal
   3. Remove soiled bedding and food gently from cages or pans prior to moving them to the cagewash area.
      1. Use a HEPA filtered bedding dump station or BSC.
      4. Remove wall filters, place in biohazard bags, and autoclave filters after removal.
   5. Collect all solid wastes (bedding, and disposable supplies) from the animal room in EHS approved containers.
   6. Empty chemically contaminated food into EHS approved container in the animal room. Label with EHS hazardous waste sticker indicating accumulation start date, name of chemical, and manifest number on the hazardous waste sticker.
   7. Pour waste water contaminated with a hazardous chemical or toxin into a water-tight EHS approved primary liquid waste container labeled with EHS hazardous waste sticker indicate accumulation start date, name of chemical and manifest number on the hazardous waste sticker.
      1. Place water bottles inside a wire bottle basket placed inside a green cloth laundry bag, labeled with a dissolvable chemical hazard sticker. Transport to cagewash for routine cleaning.
      2. Secondary containment of chemical hazard caging is not required if transporting on the ULAM truck.
   8. Place primary containers into secondary containers, e.g., fiber drum, 5 gallon pail.
   9. Complete a "Waste Manifest" form for collection of solid and liquid waste. The form must accompany or be in close proximity to the container at all times.
10. Indicate the following information on the Hazardous Waste Manifest:
      1. EPA ID no.: The appropriate number for the building generating the waste can be found by contacting EHS HazMat at 763-4568.
      3. Name: Note "ULAM"
      4. Room number
      5. Building
      6. Date that a chemical (or chemically contaminated material) began being collected for the accumulation start date.
      7. Chemical Description: Full chemical name
      8. Contents of the container (solid or liquid).
11. Contact EHS for pick-up 60 days from the accumulation start date.

3. Infectious agents AND hazardous chemicals or toxins:
   1. Handle items as described in "Hazardous Chemicals or Toxins" section above with the exception that cages are dumped only within a BSC, not the HEPA filtered bedding dump station.
   2. Remove wall filters, place in a biohazard bag and autoclave after removal.
   3. Affix a biohazard sticker and hazardous waste sticker to EHS approved secondary container.
   4. Complete a Waste Manifest form for the secondary container, include the list of all agents included in receptacle, and contact EHS as described in section above.
   5. Follow procedures for infectious waste disposal as described above for dirty cage components.

13. Spills of Hazardous Substances
   1. Work surfaces must be decontaminated after hazardous agent spills.
   2. Report spills that occur outside of the BSC to the ULAM husbandry supervisor and EHS (734)647-1143. If ULAM husbandry supervisor cannot be reached, contact the ULAM business office 764-0277 during business hours or contact DPS 763-1131 after hours.
   3. For spills that happen within the BSC, wipe up with absorbent towels and dispose of in the appropriate EHS approved waste container for the type of hazard that spilled.
   4. Spills that personnel are not comfortable handling can be referred to EHS for assistance.
   5. Infectious agent spills: All cleaning should be performed using techniques that require minimal force for removal and disruption of the biologic material.
      1. Cover the spill area with paper towels first, then apply freshly mixed bleach and water solution or Clidox solution. Apply the disinfectant from the outside edges of the spill inward.
      2. Allow the disinfectant to soak into biohazardous material for 20 minutes.
      3. Wipe up decontaminated material with paper towels or absorbent pads.
      4. Place cleanup materials in an autoclave bag or an approved EHS waste container.
      5. If possible, autoclave the potentially contaminated materials used to contain and decontaminate the spill. For questions related to spills, including alternate methods of waste disposal, contact EHS HazMat at 3-4568.
   6. Hazardous chemicals agent spills:
      1. Alert people in the immediate area of the spill.
      2. Call EHS HazMat at 3-4568 to report the spill. If after hours, contact the Department of Public Safety and Security (DPSS) at 3-1131 or 911 to report the spill.
      3. Spill kits with instructions, absorbents, reactants, and protective equipment may be available to clean up spills.
      4. Use appropriate spill kits/absorbents to neutralize corrosives and/or absorb spill.
      5. Clean spill area with soap and water.
         1. Use a reasonable amount of soap and water to clean the spill. There is no designated ratio of soap to water.
         2. Place a water receptacle, soap and paper towels near the sink to ease in clean up.
      6. Dispose of absorbents or paper towels used to clean up the spill in an approved EHS waste container for solid chemical waste. Follow hazardous chemical labeling and disposal practices as indicated in section 5.k.ii.
14. Waste Procedures within Containment Rooms

1. Place all non-sharp, disposable materials believed to be free of contamination with a hazardous substance in infectious waste containers within the containment room.
2. Separate, covered, waste containers must be maintained and clearly labeled for each type of hazardous substance (e.g., infectious agents or chemical agents and toxins) present within a room or suite.
3. Place waste suspected to be contaminated in the appropriate infectious or hazardous chemical labeled waste containers.
4. Line re-useable waster containers with a water impervious bag (e.g., plastic bag). Biohazard bags can be used to contain infectious contaminated materials; biohazard bags should not be used to contain waste contaminated with a chemical or toxin.
5. Waste containers containing materials used when working with infectious agents:
   1. Seal the biohazard waste bag or other appropriate waste liner when it is three quarters full.
   2. Remove it from the waste container, place it in a brown bag (or clear biohazard bag), affix a biohazard label; and take it to an autoclave for decontamination.
6. Waste containers containing materials used when working with a hazardous chemical:
   1. Seal the waste liner when it is three quarters full.
   2. Label waste container with all chemicals that may be present. Do not record an accumulation start date on the Hazardous Waste sticker on a reusable chemical waste container.
   3. Remove it from the waste container and immediately place it in an EHS approved waste container located within the containment housing or designated procedure room, label it with a hazardous waste label and indicate the type(s) of hazards it contains.
      1. If the EHS approved waste container is located in a different room, place waste liner in a second plastic bag and place a chemical hazard sticker on the outside of the second plastic bag when transporting through the hall.
4. Follow hazardous chemical or toxin disposal procedures in Section 5.k.ii above.
5. Single use plastic barrels can be used in place of reusable waste containers. At the time of use, each barrel must be appropriately labeled with a hazardous waste label and indicate the type of hazard it contains. Once full, these barrels should be sealed and released with documentation (i.e., completed waste manifest) to EHS HazMat for disposal.
6. Place all waste that had contact with infectious and hazardous chemicals in the hazardous chemical or toxin waste container.
7. Remove and decontaminate or dispose of waste from waste containers at least once a week or as needed.
8. Sharps Containers
   1. One infectious and one chemical sharps container with a rotter lid are maintained in each containment housing and designated containment procedure room.
   2. Label these appropriately with the collection start date and room number.
      1. Label sharps containers containing chemicals with a chemical hazard sticker, hazardous waste label and indicate the type(s) of hazards it contains.
3. ULAM husbandry personnel replaces and appropriately disposes of the containers when full or has been in place for 60 days.
4. Contact EHS for sharps container pick-up.

15. Storage of Hazardous Materials

1. Infectious materials must not be stored in ULAM managed areas.
2. Label all items stored in ULAM managed areas with the name of the item, PI name, expiration date, and chemical hazard sticker.
   1. Investigative personnel are responsible for checking expiration dates of any items stored in ULAM managed areas.
3. Secondary containment of diets, water, and other substances containing a chemical hazard is not required in coolers, designated procedure rooms, or housing rooms.
4. Secondary containment of diets, water, and other substances containing a chemical hazard is required if items will be transported to a different location from where it is stored.
5. Diet, water, and other substances containing a chemical hazard may be stored within the food storage coolers located in ULAM managed areas.
   1. Identify the cooler as a place to store items containing a chemical hazard.
   2. Place a chemical hazard sticker or symbol on outside of the cooler door.
   3. Indicate storage only: Procedures must not occur in this space.
6. Storage of diets, water, and other substances containing chemical hazards in the procedure room.
   1. For procedure rooms not approved for use:
      1. Post a chemical sticker or symbol on the refrigerator or room to indicate "storage only".
      2. Procedures must not occur in this space.

6. Related Documents

4. Biohazardous (Medical) Waste Disposal maintained by the University of Michigan EHS (http://ehs.umich.edu/hazardous-waste/biological-waste)
7. Appendices

1. Appendix A: Containment Room Entry Sign
2. Appendix B: Infectious Agent Form
3. Appendix C: Chemical Agent Form
5. Appendix E: Husbandry Procedures for Chickens and Rabbits Requiring Containment Housing
6. Appendix F: Husbandry Procedures for Pigs, Dogs and Sheep Requiring Containment Housing
7. Appendix G: Labeling Cages and Bottles
8. Appendix H: Spor Klenz, Clidox and Bleach Dilutions
9. Appendix I: Cagewash Procedures for Processing Caging from Containment Housing Rooms
10. Appendix J: List of RCRA Regulated Waste
11. Appendix K: Personnel Contact Information