3.7. Reactive Chemicals – Procedures for Safe Handling and Storage

Reactives are substances that have the potential to vigorously polymerize, decompose, condense, or become self-reactive due to shock, pressure, temperature, light, or contact with another material. All reactive hazards involve the release of energy in a quantity or at a rate too great to be dissipated by the immediate environment of the reaction system so that destructive effects occur. Reactive chemicals include: 1) explosives, 2) organic peroxides, 3) water-reactives and 4) pyrophorics. Effective control is essential to minimize the occurrence of reactive chemical hazards.

3.7.1. Explosives

A chemical that causes sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden adverse conditions. Heat, light, mechanical shock, detonation, and certain catalysts can initiate explosive reactions. Compounds containing the functional groups azide, acetylide, diazo, nitroso, haloamine, peroxide, or ozonide are sensitive to shock and heat and can explode violently.

- Appropriate personal protective equipment (e.g., face shield, safety goggles, leather outer gloves, chemical resistant gloves, fire-resistant or all cotton lab coat) must be worn when working with explosives.
- Before working with explosives, understand their chemical properties, know the products of side reactions, know the incompatibility of certain chemicals, and monitor environmental catalysts such as temperature changes.
- Containers should be dated upon receipt and when opened. Expired explosives should be disposed of through IUEHS for your respective campus promptly.
- Explosives should be kept to the minimum necessary for the procedure.
- If there is a chance of explosion, use protective barriers (e.g., fume hood sash and safety shield) or other methods for isolating the material or process.
- Explosives should be stored in a cool, dry, and protected area. Segregate from other material that could create a serious risk to life or property should an accident occur.

3.7.2. Organic Peroxides

These chemicals contain an -O-O- structure bonded to organic groups. These compounds can be considered as structural derivatives of hydrogen peroxide, H-O-O-H, in which one or both of the hydrogen atoms have been replaced by an organic group. Generally, organic peroxides are low-powered explosives that are sensitive to shock, sparks, and heat due to the weak -O-O- bond which can be cleaved easily. Some organic compounds such as ethers, tetrahydrofuran, and p-dioxane can react with oxygen from the air forming unstable peroxides. Peroxide formation can occur under normal storage conditions, when compounds become concentrated by evaporation, or when mixed with other compounds. These accumulated peroxides can violently explode when exposed to shock, friction, or heat.

- Appropriate personal protective equipment (e.g., safety goggles, gloves, fire-resistant or all cotton lab coat) must be worn when working with organic peroxides or peroxide-forming compounds.
- Containers must be labeled with the receiving and opening dates. Unopened material should be discarded within 1 year and opened material should be disposed of through IUEHS for the respective campus within 6 months.
- Containers should be airtight, and stored in a cool, dry place away from direct sunlight and segregated from incompatible chemicals.
- Peroxide-formers, liquid peroxides, or solutions should not be refrigerated below the temperature at which the peroxide freezes or precipitates. Peroxides in these forms are extra sensitive to shock (never store diethyl ether in a refrigerator or freezer).
• Unused peroxides should never be returned to the stock container.
• Metal spatulas should not be used with peroxide-formers. Only ceramic or plastic spatulas should be used. Contamination by metal can cause explosive decomposition.
• Friction, grinding, and all forms of impact, especially with solid organic peroxides should be avoided. Never use glass containers with screw cap lids or glass stoppers. Instead, use plastic bottles and sealers.
• Containers with obvious crystal formation around the lid or viscous liquid at the bottom of the container must NOT be opened or moved. Call IUEHS for your respective campus (see Laboratory Safety Contacts) for guidance and disposal.
• Organic peroxides produce vapors during decomposition. This can result in pressure build-up. The rapid increase in pressure may cause explosive rupture of containers, vessels or other equipment.
• Ignition sources must be avoided.
• Organic Peroxides have a Self-Accelerating Decomposition Temperature (SADT). Never store organic peroxides where they may be exposed to temperatures above the SADT. At or above this temperature an irreversible runaway reaction will take place. The recommended storage temperature is printed on the product label and Safety Data Sheet.

For more information on organic peroxide-forming compounds please refer to SOP 3.17, Peroxide-Forming Chemicals and Other Time-Sensitive Materials, Procedures for Safe Handling and Management and Appendix B of this document, for a list of chemicals that can form peroxides upon aging.

3.7.3. Water-Reactives
A chemical that reacts with water or moisture in the air (humidity) releasing heat or flammable, toxic gas. Examples include alkali metals, alkaline earth metals, carbides, hydrides, inorganic chlorides, nitrides, peroxides, and phosphides.

• Appropriate personal protective equipment (e.g., safety goggles, gloves, fire-resistant or all cotton lab coat) must be worn when working with water-reactives.
• Water-reactives should be stored under mineral oil in a cool, dry place and isolated from other chemicals.
• Water-reactives must not be stored near water, alcohols, and other compounds containing acidic OH.

In case of fire, keep water away. Appropriate fire extinguishers should be available in areas where water-reactives are used (use a Type “D” fire extinguisher to extinguish active metal fires).

3.7.4. Pyrophorics
A chemical that ignites spontaneously in air below 130° F (54° C). Often the flame is invisible. Examples of pyrophoric materials include silane, silicon tetrachloride, white and yellow phosphorus, sodium, tetraethyl lead, potassium, nickel carbonyl, and cesium.

• Appropriate personal protective equipment (e.g., safety goggles, gloves, fire-resistant or all cotton lab coat) must be worn when working with pyrophorics.
• Pyrophorics must be used and stored in inert environments.
• Appropriate fire extinguishers should be available in areas where pyrophorics are used.
3.7.5. Synthesis

Synthesis of any reactive or energetic (explosive) compound is subject to the following requirements:

- The principal investigators written prior approval of the procedure is required. (use Chemical Reaction Hazard Assessment Form, Appendix A, Form LCS-7).
- The procedure must be documented in writing with specific step by step instructions.
- The principal investigator is required to provide documented procedure-specific training and documented daily supervision of the research.
- A written hazard analysis of the procedure is required prior to start up and whenever a change to the procedure is made. Worst case scenarios must be considered (Appendix A, Form LCS-7).
- Appropriate hazard controls, as determined by the hazard analysis, must be in place prior to the experiment.
- The synthesized quantity is limited to 100 milligrams. Synthesis of more than 100 mg of reactive or energetic compounds is prohibited.
3.23.1.4. Chemicals with High Chronic Toxicity

These chemicals include both “highly toxic” and “toxic” chemicals under the OSHA Hazard Communication Standard prior to 2012 with chronic toxic effects. This group may include human carcinogens or reproductive toxins and therefore must be handled as “particularly hazardous substances” also.

<table>
<thead>
<tr>
<th>Route of Entry</th>
<th>Highly Toxic</th>
<th>Toxic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral $LD_{50}$ (albino rats)</td>
<td>$\leq 50$ mg/kg</td>
<td>$&gt;50$-500 mg/kg</td>
</tr>
<tr>
<td>Skin Contact $LD_{50}$ (albino rabbits, 24 hour)</td>
<td>$\leq 200$ mg/kg</td>
<td>$&gt;200$-1000 mg/kg</td>
</tr>
<tr>
<td>Inhalation $LC_{50}$ (albino rats, 1-hour) as vapor</td>
<td>$\leq 200$ ppm</td>
<td>$&gt;200$-2000 ppm</td>
</tr>
<tr>
<td>Inhalation $LC_{50}$ (albino rats, 1-hour) as dust, mist, or fumes</td>
<td>or $\leq 2$ mg/liter</td>
<td>or $&gt;2$-20 mg/liter</td>
</tr>
</tbody>
</table>

The current OSHA definition under the Globally Harmonized System (GHS) of chemical classification and labeling would include GHS acute toxicity ratings of 1 or 2 to account for chemicals with “high acute toxicity”.

For practical purposes, these chemicals may also be identified using the National Fire Protection Associations (NFPA) health hazard classifications found on the bottle label and Safety Data Sheet (SDS). In general, a chemical with a 3 or 4 in the blue diamond of the NFPA label can be considered to be a “particularly hazardous substance” (excluding cryogenics and some corrosives).

<table>
<thead>
<tr>
<th>Route of Entry</th>
<th>NFPA 704 Health Hazard Classifications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Oral $LD_{50}$</td>
<td>0-5 mg/kg</td>
</tr>
<tr>
<td>Skin Contact $LD_{50}$</td>
<td>0-40 mg/kg</td>
</tr>
<tr>
<td>Inhalation $LC_{50}$</td>
<td>0-1000 ppm</td>
</tr>
</tbody>
</table>

3.23.2. General Procedures

- **Access and facilities:** For large scale studies, special facilities with restricted access are preferable. IUEHS conducts annual chemical safety inspections of the facilities and evaluation of safety equipment. Animal facilities must be posted with a sign to indicate that particularly hazardous substances are used in the area and to provide safety instructions. The “Animal Facility Safety Information” sign found in Appendix A is an example that shows the chemicals present, personal protective equipment, and any other special requirements for entry.

- **Administration of the toxic substance:** When possible, administer the substance by injection or gavage instead of in the diet. If administration is in the diet, use a caging system under negative pressure or under laminar air flow directed toward HEPA filters.

- **Aerosol suppression:** Devise procedures, such as lightly spraying bedding with water, which minimize formation and dispersal of contaminated aerosols, including those from food, urine, and feces (e.g., use HEPA filtered vacuum equipment for cleaning, moisten contaminated bedding before removal from the cage, mix diets
in closed containers in a hood).

- **Personal protection:** When working in the animal room, wear plastic or rubber gloves, fully buttoned laboratory coat or jumpsuit and, if needed because of incomplete suppression of aerosols, other apparel and equipment (shoe and head coverings, respirator).

- **Waste disposal:** Package contaminated animal tissues and excreta appropriately for disposal by IUEHS or waste disposal vendor. See “Waste Disposal and Handling” below.

3.23.3. **Chemical Handling**

- These chemicals must be used in a designated area. This includes live animals and open cages with chemically contaminated bedding. Signs must be posted to designate that the entire laboratory or portion of the laboratory such as a specific fume hood, glove box, or adjacent room as the designated area for that chemical use. This may be accomplished by using the emergency door sign and identifying the chemical groups used in the laboratory (i.e., carcinogen, reproductive toxin, highly toxic or toxic chemical).

- The chemical must be handled in a containment (if decanted or exposed to the open air) or within a closed system. This includes live animals and open cages with chemically contaminated bedding. Containment devices include chemical fume hoods, glove boxes, or biosafety cabinets that are vented outside of the building. Closed systems include plumbing within instruments, cannulas, syringes, gavages, etc., as long as the chemical is not exposed to the atmosphere. If no containment is available then personal protective equipment assigned to the protocol during the safety review must be utilized by all personnel in the area.

- Only the minimum quantity of the material should be used.

- Appropriate personal protective equipment (e.g., gloves, lab coat, and eye protection) must be used when handling these hazardous substances.

- Procedures for waste removal must be established prior to use. Follow standard IUEHS chemical disposal procedures. Follow biological waste disposal guidelines below for animals and bedding.

- Decontamination procedures must be developed for the tools and area.

- The principal investigator listed on the protocol is responsible for establishing the experimental procedure, determining the hazard controls to be utilized, and providing protocol-specific training for the staff. Prior approval from the principal investigator or supervisor is required for the experiment to begin (see Laboratory Safety and Chemical Hygiene Plan Section 2.1.1 Prior Approval of Hazardous Operations).

- The University Environmental Health and Safety (IUEHS) will provide the OSHA compliant laboratory chemical safety training. All personnel that handle any chemicals in the laboratory must attend chemical safety training required by the OSHA Laboratory Standard from IUEHS. Only laboratory personnel that have received IUEHS laboratory chemical safety training and protocol specific training from the principal investigator may work with these substances, and only within the designated area. These chemicals may not be decanted or exposed to the atmosphere outside a containment or closed system.
3.23.4. Chemical Storage and Labeling

- Acutely toxic chemicals, carcinogens and reproductive toxins must be stored designated areas for “particularly hazardous substances.”
- Storage areas should be clearly marked with the appropriate hazard warning signs.
- All containers of these substances (even in small quantities such as 0.1%) must be clearly labeled with the chemical name or components of the mixture and should be labeled with hazard information.
- Chemical storage areas should be secure to avoid spills or broken containers.
- Storage areas or laboratory rooms must be locked when laboratory personnel are not present.
- For more information, refer to Section 3.2, Procedures for Proper Labeling, Storage, and Management of Chemicals.

3.23.5. Waste Disposal and Handling

- Waste handlers must wear standard personal protective equipment (PPE) required for laboratory work, lab coat or gown, safety glasses, gloves and closed toe shoes.
- Respiratory protection is not required if procedures do not produce aerosols or if a fume hood, ventilated cage dump station, or biosafety cabinet is utilized but may be used voluntarily to protect against fugitive dust emissions.
- All waste including biological tissues and fluid, chemicals, contaminated materials, sharps, and other items must be properly disposed as detailed in the IU Biosafety Manual.
- Empty containers, with the exception of acutely toxic waste, may be triple rinsed and disposed of as sanitary waste.
- Chemical waste and contaminated materials are disposed of in accordance with the IU Waste Management Program.
- All animal carcasses and tissues are disposed of as medical waste to prevent unacceptable conditions in the sanitary waste containers and to ensure that transgenic animals are disposed of as regulated medical waste.
- Animal use protocols are reviewed by the IUEHS staff to identify any rare or unusual circumstances that would affect waste disposal or occupational safety.
- Animal carcasses must be frozen for disposal. Place materials in a red biohazard bag with a biohazard symbol. Double bag if necessary to prevent perforations. Place the bag in a freezer and contact IUEHS for your respective campus for pickup (except for the IUPUI campus and IUSOM locations where the carcasses are picked up for disposal by an approved vendor).
- Animal bedding is sanitary waste and is disposed of with other sanitary waste from the facility.
- Even though animal bedding is not typically an EPA hazardous waste or biohazardous waste it must be handled carefully for occupational safety purposes. Animal bedding from chemically dosed animals may contain dosed uneaten food or water and shedding or excretions that contain very small amounts of hazardous chemicals or their metabolites.
  a) If the bedding is known to contain small amounts of chemicals in dosed food or otherwise, the bedding must be handled using fully buttoned lab coats or gowns, gloves, safety glasses in a ventilated dump station, biosafety cabinet, fume hood or with respiratory protection.
  b) If it is unknown or inconclusive that the bedding contains these hazardous substances then the bedding must be handled as if it does using fully
buttoned lab coats or gowns, gloves, safety glasses in a ventilated dump station, biosafety cabinet, fume hood or with respiratory protection.

c) If the researcher can demonstrate the bedding or excreta does not contain hazardous amounts of these substances then the waste handling requirements may be modified.

- Empty cage bedding from dosed animals into a waste bag using a ventilated dump station or within a chemical fume hood or biosafety cabinet. Place the cage within the bag. Remove the lid. Empty the cage into the bag and remove the cage from the bag. Close and secure the bag.
3.24. Chemical Transportation Procedures

Movement or transportation of chemicals used in laboratories can occur for many purposes and to various destinations. They include the transportation of chemicals:

- Between laboratories or within a building (intra-building).
- Between buildings or departments (inter-building).
- Between IU campuses and properties.
- Into the field for research.
- To and from other institutions or agencies.
- To commercial waste facilities.
- To and from manufacturers or commercial facilities.
- To and from other institutions or agencies.

The procedures and additional training requirements for transporting chemicals for these purposes can be found in the IU Hazardous Materials Transportation Program.
3.25. Laboratory Closeout Procedures

Proper transfer or disposal of hazardous materials is required whenever a Principal Investigator or researcher with assigned laboratory space leaves the University or transfers to a different laboratory.

Plan the transfer or disposal of hazardous materials carefully. Hazardous materials such as chemicals, microorganisms, tissues, and radioactive materials can injure faculty, students, staff, contractors and visitors if handled inappropriately.

Failure to adhere to these procedures and manage hazardous materials properly during the lab closure may result in sanctions such as the loss of laboratory privileges or the recovery of the cost of disposal of unknown, unlabeled, or poorly managed hazardous chemicals. Any charges for improperly managed waste or excessive cleanouts will be assessed to the responsible department.

The primary responsibility for the proper management of all hazardous materials used in laboratories lies with the principal investigator or researcher assigned to the space. If the principal investigator is not the responsible individual for purposes of these procedures, documentation identifying the responsible individual must be provided on the Laboratory Decommissioning/Closeout Checklist (Appendix A, Form LCS-8). The department or unit is responsible for ensuring that the principal investigator manages and disposes of these materials properly. University Environmental Health and Safety (IUEHS) provides guidance and disposal services for the principal investigator and department or unit. Refer to the IU Waste Management Program for disposal information.

3.25.1. Notification and Inspection Process

3.25.1.1. Notify

Use the Researcher Departure/Lab Closeout Notification to notify IUEHS for the respective campus at least 30 days in advance:

a) That your laboratory is relocating on-campus or off-campus, or
b) That your laboratory is closing down, or

3.25.1.2. Complete Checklist

Print and complete the following checklist to ensure that you have completed all activities required to properly prepare for your departure or move located in Appendix A, Form LCS-8.

3.25.1.3. Schedule Lab Clearance Inspection

Once you have completed all items on the checklist, and all chemical transportation and waste removal has been arranged, sign the checklist, and submit the online Lab Clearance/Closeout Inspection Request to IUEHS.

Have the checklist ready to go over with the Laboratory Safety personnel who conduct your clearance inspection. Final clearance will not be given until all decontamination and hazardous material removal is complete.
3.25.2. General Closeout Guidelines

- Package and move items only during normal business hours (8:00 a.m. to 5:00 p.m., Monday through Friday) so IUEHS staff will be available to assist in case of a spill or accident.
- Never transport hazardous materials alone.
- Follow the IU Hazardous Materials Transportation Program for all chemical transportation.
- Wear appropriate personal protective equipment for the materials being handled.
- Review the location of safety glasses, eyewashes, fire extinguishers, and exits if the closeout involves moving to another campus lab.

3.25.3. Departing Student Researchers

- Turn in all waste bottles to IUEHS for disposal prior to departure. See the IU Waste Management Program.
- Dispose of all samples or identify, label, and transfer ownership.
- Turn in their unused chemicals to IUEHS, or
- Transfer the responsibility for the chemicals to someone remaining in the lab (i.e., identify/document who the new Responsible Individual is for the chemicals on the Laboratory Decommissioning/Closeout Checklist, Form LCS-8) and identify substances by chemical name in case of a need for future disposal.

3.25.4. Chemicals

- Determine if any chemicals are usable* and if you or anyone at IU would like to keep them. Document transfer of responsibility for any identified chemicals to a party willing to accept them using the checklist. If you are not going to keep them and a new user cannot be found, dispose of the materials through IUEHS by following the procedures in the IU Waste Management Program.

* Chemicals that cannot be considered usable and transferred to another user include the following:
  - Leaking containers
  - Handwritten labels (Chemicals in primary or secondary containers with handwritten labels can be retained, but cannot be transferred to another user.)
  - Deteriorating or illegible labels
  - Cracked or poorly sealing lids
  - Non-commercial mixtures/solutions
  - Expired chemicals
  - Compressed gases or pressurized liquids (unless specific approval has been given by IUEHS)
  - Mercury in any form
  - Samples (unless they have been identified and labeled with a full
proper chemical name – no abbreviations, acronyms, chemical structures, or reference numbers or initials)

- Waste containers

- Refer to the [IU Waste Management Program](https://iu.edu/waste) for waste disposal procedures. Do NOT evaporate chemicals, flush hazardous chemicals down the drain, or discard them in the trash.
- Characterize any "unknown" substances found in the lab according to standard procedures or knowledge of the substances. IUEHS can provide guidance upon request.
- Label all chemical containers with the proper chemical name. Abbreviations, chemical formulas or structures are not acceptable.
- Ensure that all containers are securely closed. Empty all beakers, flasks, evaporating dishes, etc. into appropriate containers with tight-fitting lids. Parafilm can be used to minimize odors as needed, but is not an acceptable lid.
- Remove all chemicals from refrigerators, freezers, fume hoods, bench tops, shelves and storage cabinets.
- Prepare all chemicals for disposal according to [IU Waste Management Program](https://iu.edu/waste). This process may take quite some time. Start at least one month before planned departure from the laboratory. Complete chemical waste removal before vacating the laboratory. At IUB and IUPUI allow two weeks for waste collection to occur after notifying IUEHS that the waste is properly prepared for pickup.
- Refer to the [IU Hazardous Materials Transportation Program](https://iu.edu/transport) for any chemicals being kept or transferred that need to be moved.
- Clean all areas of chemical use and storage, including benchtops, storage cabinets, fume hoods, incubators, refrigerators, freezers, etc. Soap and water, or surfactant-based cleaners are effective for most contamination.
- Collect broken glass, sharps, and other laboratory waste.

### 3.25.5. Shared Storage Areas

- Shared facilities include storage units such as stock rooms, walk-in refrigerators, constant temperature rooms, shared refrigerators, freezers, flammable liquids cabinets, waste collection areas, etc.
- They are of special concern if more than one person manages the area.
- Carefully inspect any shared facility in order to locate and appropriately dispose of the hazardous materials for which that researcher is responsible.

### 3.25.6. General Laboratory Cleaning

- Wash off fume hood surfaces and clean counter tops.
- Notify your department and IUEHS for the respective campus when laboratory clean-up is complete to arrange a closeout or clearance inspection.
3.25.7. Controlled Substances

- The U.S. Drug Enforcement Agency (DEA) issues controlled substance registrations to individual researchers. Refer to the [IU Controlled Substances Program](#) for additional information.
- Abandonment of a controlled substance is a violation of the DEA permit under which it was held.
- Permission to transfer a registration for a controlled substance to another individual must be approved and documented by the DEA.
- Relocation of controlled substance inventories to any new campus location or to a new research institution is prohibited unless the Indiana Board of Pharmacy and the US DEA are notified first. Contact IUEHS for more information.

3.25.8. Gas Cylinders

- Remove gas connections, replace cylinder caps, and return cylinders to suppliers or prepare them for transfer if you will be moving them to a new location within IU. Refer to the IU Compressed Gas Cylinder Safety Program for additional guidance on cylinder management and to the [IU Hazardous Materials Transportation Program](#) for information about cylinder transportation.
- If cylinders are non-returnable, please refer to the [IU Waste Management Program](#) for disposal guidance of waste compressed gases and pressurized liquids.
- Refer to [SOP 3.9](#), Compressed Gases, for additional information.

3.25.9. Animal and Human Tissues

- Determine if any biological materials are usable and if you or anyone at IU would like to keep them. Document transfer of responsibility for any identified materials to a party willing to accept them using the checklist (Appendix A, Form LCS-8).
- Refer to the [IU Biosafety Manual](#) for disposal guidance for all biological waste materials that are not being kept or transferred.
- Refer to the [IU Hazardous Materials Transportation Program](#) for any biological materials being kept or transferred that need to be moved.
- If tissue was stored in a refrigerator or freezer - defrost, clean and disinfect the refrigerator and freezer after it has been emptied. Use an appropriate disinfectant.
- Questions or concerns regarding biological materials should be directed to IUEHS Biosafety for your respective campus.

3.25.10. Microorganisms and Cultures

- Notify IUEHS Biosafety for your respective campus of any transfer of NIH Risk Group 2 agents or higher.
- Notify IUEHS Biosafety for your respective campus of the intent to transfer NIH Risk Group 2 agents or higher from the University. Because such transfers may fall under Department of Transportation (DOT) shipping regulations and/or require additional permits, they must be arranged well in advance.
• Refer to the [IU Biosafety Manual](#) for waste decontamination and disposal guidance.

3.25.11. Mixed Hazards

• Occasionally it is necessary to dispose of materials that may contain more than one hazard. Contact IUEHS for information on the disposal of any combination of chemically contaminated, biohazardous materials, and/or radioactive materials.

3.25.12. Sharps

• Refer to the [IU Waste Management Program](#) for guidance on sharps disposal based on the type of contamination on the sharps.

3.25.13. Radioactive Materials

• Contact the Radiation Safety Office to relocate any radioactive materials to another laboratory, to remove these materials from the University or the radioactive material inventory, for decontamination of the work area, and to conduct a final survey of the vacated area.

• Authorized radioactive materials use permit holders are responsible for notifying the Radiation Safety Officer for their authorized location of any changes that would affect their permit, such as departure from the University, change of personnel authorized as users of radioactivity under the permit, and changes in authorized inventory, including purchase, disposal, and transfers.

• Only Radiation Safety personnel can conduct a final radiation clearance on a radioactive materials use area and remove the radioactive materials door sign.

3.25.14. Equipment

• Alert IUEHS and/or Facilities Management if any exhaust or filtration equipment was used with heated perchloric acid digestion.

• Clean and disinfect laboratory equipment that is staying before departing. This includes refrigerators, freezers, drying ovens, incubators, centrifuges, etc. For equipment in which biohazardous material or microbial agents were used or stored, use an effective disinfectant. Cleaned equipment must be marked as clean.

• If moving biological safety cabinets, decontaminate before moving and recertify before use in the new location.

• Deface or cover hazard labels on equipment to be moved or discarded.

• Repair any damaged equipment (i.e. frayed wires, missing guards, etc.) that will remain in service. No damaged equipment should be moved. Use the laboratory downtime to accomplish previously undiscovered or neglected repairs.

• Contact Surplus Stores/Property on your respective campus to arrange disposal of equipment that can be effectively decontaminated and is functional. If equipment cannot be effectively decontaminated, contact IUEHS. All equipment disposed through Surplus must be decontaminated, marked as clean, and have all hazard
warning labels removed prior to transfer to Surplus.

- When discarding laboratory equipment, remove capacitors, transformers, mercury switches, mercury thermometers, radioactive sources, chemicals and biohazards before disposal. Contact IUEHS for your respective campus for any equipment that may contain asbestos or any of these materials.