Temple University
Environmental Health and Radiation Safety

Standard Operating Procedure

Chemical Transportation

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Movement or transportation of chemical can occur for many purposes and to various destination. They include the transportation of chemicals:

- Between laboratories or within a building (intra-building)
- Between building or departments (inter-building)
- Between Temple University (TU) 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

Due to safety and regulatory requirements, limitations exist for transporting chemicals by vehicle, which apply to inter-building and inter-campus move for any type of operation. For laboratory moves, contractors hired to move equipment and furniture are typically not licensed, trained, or equipped to handle or move chemicals. In addition, ***University personnel are prohibited from transporting chemicals in a personal vehicle.***

PROCEDURES

1. Notify EHRS immediately.

1.1. Relocations (Non-Lab)

Inform EHRS (via ehrs@temple.edu) as soon as you know your operation is relocating. Provide EHRS with key information about the move such as the primary contact and department; the starting location and destination by campus, building name(s), and room number(s); the move date(s); the types of chemicals being moves, and any other factors involved.

Inform EHRS if you will require assistance or contractor assistance due to lack of resources (including trained employees), large or highly hazardous inventories, multiple move locations, etc. A fee may be charged to recover costs and is discussed prior to the move.

Once notified, a representative from EHRS will contact you to schedule a firm date, review preparation procedures, and answer any questions. EHRS requires a 30-day advanced notice for chemical moves. This allows enough time to ensure adequate EHRS resources are available or to choose and schedule an appropriate contractor. It is strongly recommended that the chemical portion of the move is scheduled on a different date than equipment and furniture.

Request a chemical waste pickup for any materials that will not be moving to the new location prior to the day of the move. Any chemicals that are left at the old location after the date of the move will be considered abandoned and EHRS may charge the responsible department for their disposal.

1.2. Laboratory Decommissioning, Closures or Relocations

Complete the online Laboratory Vacancy or Relocation Form as soon as you know:

- The lab is shutting down, or
- A researcher is departing the University and will be leaving behind chemicals.

This form provides EHRS with key information about the closing laboratory. Refer to Laboratory & Equipment Decommissioning for important information about procedures for properly decommissioning laboratory facilities and equipment as well as chemical managements and waste disposal.

2. Evaluate the chemical inventory

For chemical moves, ensure that all containers for relocation are in sound condition, with fitting lids.

NOTE: *Parafilm® and duct tape are not acceptable substitutes for lids.*

If a container does not have a lid or the lid cannot be secured, the material must be repackaged prior to the move. In addition, pay attention to materials (such as unstable chemicals) that need special evaluation and removal by EHRS or a contractor. Refer to the Chemicals if Concern List ((below) for examples.

Chemical moves and closure of any operation with chemicals require the clean out of fold, outdates and unwanted materials, and waste containers. It is highly recommended that a central location is identified to place waste items so that they can be inventories for disposal. All waste materials must be disposed in accordance with the Chemical Waste Management Program (CWMP).

Request a waste pickup for any material they will not be moving to the new location prior to the day of the move. Any chemicals that are left at the old location after the date of the move will be considered abandoned and EHRS may charge the responsible department for their disposal.

Chemicals of Concern

Contact EHRS is there are nay potentially explosive or unstable materials. These include but are not limited to:

- Expired peroxide formers with visible signs of peroxide formation (needle like structures or crystals around lid or inside the container)
- Explosives or flammable solids that are explosive when dry including picric acid and 2, -4 dinitrophenyl hydrazine.
- Nitrocellulose.
- Corrosive gases.
- Any compound that is considered reactive or explosive due to exposure to air, light, shock, friction, or heat; and
- Leaking containers of any material.

3. Transporting Chemicals

3.1. Intra-Building Moves by Cart

Intra-building transport takes place within the same building, or between bridges or other means that eliminate the need to go outside with the chemical.

Intra-building moves do not typically require assistance from EHRS. However, for unusual circumstances, assistance can be provided. A fee may be charged to recover costs and is discussed prior to the move.

3.1.1. Any TU employee that transports chemicals within the same building must have either TU *Hazard Communication training* or *Initial Safety Training for Researchers*

and be familiar with spill reporting and response procedures.

3.1.2. Segregate incompatible materials according to hazard (See Appendix A of this SOP)

- Ensure all containers are closed, in sound condition and properly labeled to fully identify their contents.

- Use secondary containment such as a box, deep tray, or other means of cushioning to stabilize containers and prevent chemical release.

3.1.3. Use a wheeled cart with containment lip for transporting chemicals through hallways.

- Up to four (total) containers may be hand carried in safety totes, chemical carrying carriers, plastic buckets or a 5 -gallon pail plastic bucket only within the same building.

- Use a freight elevator where available for moving chemicals within buildings. Avoid the use of stairs to transport chemicals throughout a building.

- When transporting compressed gas cylinders, always use a proper gas cylinder hand truck with the cylinder strapped to the cart and keep the cap in place. Never roll or drag a compressed gas cylinder.

3.2. Inter-Building Moves by Cart

Inter-building transport takes place from one building to another building on campus for relocation or transfer of chemicals.

Inter-building moves do not typically require assistance from EHRS. However, for unusual circumstances, assistance can be provided. A fee may be charged to recover costs and is discussed prior to the move.

3.2.1. Any TU employee that transports chemicals within the same building must have either TU *Hazard Communication training* or *Initial Safety Training for Researchers* and be familiar with spill reporting and response procedures.

3.2.2. Segregate incompatible materials according to hazard (See Appendix A of this

SOP)

- Ensure all containers are closed, in sound condition and properly labeled to fully identify their contents.

- Place segregated, compatible chemicals into boxes with cushioning or divider inserts to keep bottles from tipping or rattling together during transport. Contact EHRS is boxes or tubs are needed. A limited number *may* be available for loan.

3.2.3. Use a wheeled cart with secondary containment for transporting any chemical outside.

- Approved chemical carriers may be utilized to transport chemicals between buildings. A maximum of 2 containers is recommended.

3.2.4. Use a freight elevator where available for moving chemicals in and out of buildings. Avoid the use of stairs to transport chemicals whenever possible

3.2.5. Keep cart transport on paved surfaces such as sidewalks with low vehicular and pedestrian traffic whenever feasible. Do not push carts through grass, gravel, mulch, or other unstable surfaces. Do not push carts up or down steep slopes.

3.2.6. A licensed gas supplier and/or contractor must be utilized to transport compressed gas cylinders outside of a building.

3.3. Shipping Chemicals by Commercial Carriers (UPS, FedEx, etc.)

3.3.1. All shipments of chemicals to non-TU locations must be done by licensed commercial carries subject to the hazardous material's regulatory requirements of 49 CFR Parts 171-180.

3.3.2. All TU employees preparing chemicals for shipment by commercial carrier or signing shipping paperwork must the in-person Shipping of Dangerous Goods Training. Refer to the **Training Program** for additional information or contact EHRS for additional information.

3.3.3. A **Shipping of Dangerous Goods Notification** must be completed for each shipment.

NOTE: *Ensure that the off-campus recipient has all the necessary permits and/or authorizations to receive the material being shipped.*

3.4. Transporting Off-Campus

Contact EHRS if you plan on transporting or shipping any chemical off campus. There are specific procedures, training and other legal requirements that must be followed.

REFERENCES

- Department of Transportation Hazardous Materials Regulations
- TU Chemical Hygiene Program (CHP)
- TU Chemical Waste Management Program (CWMP)

APPENDIX A

CHEMICAL SEGREGATION AND PACKING GUIDELINES

GENERAL REQUIREMENTS

- *Always wear the appropriate personal protective equipment (PPE) when handling chemicals.* For laboratories, the minimum PPE is protective eyewear, lab coat and chemically resistant gloves.
- Materials must be segregated by hazard. Incompatible materials or those posing a higher hazard must be packed separately. Pack all loose materials that are chemical in nature, including bleach and other cleaning products. Pack containers in a manner that prevent breakage. Ensure all lids are tightly sealed, and containers are in sound condition. For cart moves, metal and plastic containers that are in good condition do not need to be put in a box or tub if the cart has an adequate secondary containment lip.
- Boxes and tubs must eb packed in a single layer with cushioning material. Boxes must weigh less than 50 pounds.
- Follow emergency procedures for a chemical spill.

<table>
<tr><th colspan="2">SEGREGATION BY HAZARD</th></tr>
<tr><td colspan="2">Refer to a material's SDS and its label markings to determine its hazard class or general hazards. Contact EHRS if you have questions.</td></tr>
<tr><td colspan="2">Flammable Liquids</td></tr>
<tr><td>
</td><td>• Most flammable liquids can be packed together.
• Do not pack flammable acids and flammable bases in the same box.
• Compartmentalized boxes are ideal for packing flammable liquids</td></tr>
</table>

Reactive Materials	
	• Reactive materials must be separated by hazard and clearly marked. Examples include sodium metal, phosphorous pentoxide, solid paraformaldehyde, sodium borohydride, etc. • Ensure boxes of reactives are clearly marked. • Separate waste reactives, air reactives (pyrophorics), and flammable solids.
Oxidizers & Organic Peroxides	
	• Solid and liquid oxidizers and organic peroxides can be packed in boxes or original shipping containers. • Ensure boxes of oxidizers and organic peroxides are clearly marked. • Separate oxidizers from organic peroxides • Separate oxidizers and organic peroxides from any other organic materials, especially flammable materials. • Separate oxidizers from powdered metals • Separate hydrogen peroxide from metals and metal compounds.
Toxic Materials	
	• Miscellaneous toxic and inert materials can be combined into boxes following the general guidelines of a single layer with cushioning and weighing 50 pounds or less.

Corrosives	
	• Pack corrosive materials according to their compatibility. • Pack acids separately from bases. • Pack organic acids separately from inorganic acids, and oxidizers (including nitric and perchloric acids). • Pack cyanides and sulfides separate from acids. • Separate acids from powdered metals. • Compartmentalized boxes are ideal for packing corrosive liquids.