Harvard University

Hazardous Waste Program Overview
Outline

• Cradle-to-grave approach
• Hazardous Waste related laws
• RCRA inspections at Universities
• Roles and Responsibilities
• Sink Disposal
• Labelling requirements
• Identification of hazardous waste
• EHS Website tools
• Managing and Inspecting SAAs
• Transportation of Hazardous Waste
“Cradle to Grave”

A main component of the hazardous waste program is managing hazardous (chemical) waste from the point that it is generated (Cradle) to the point that it is destroyed (grave).

Harvard’s Hazardous waste program seeks to safely manage and track, the generation, collection, transportation and disposal of hazardous waste.

Most regulations around hazardous waste were promulgated between 1965 and 1996. Can anyone name the catastrophe’s below that helped to fuel this change?
The Solid Waste Disposal Act (1965)

The Resource Recovery Act (1970)

The Resource Conservation And Recovery Act (RCRA - 1976)

Used Oil Recycling Act (1980)

Solid Waste Disposal Act Amendments (1980)

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA - 1980)

Additional Amendments (80s – 90s)
- Hazardous and Solid Waste Amendments, or HSWA (1984)
- Pollution Prevention Act (1990)
- Federal Facility Compliance Act (1992)
- Land Disposal Flexibility Act (1996)
RCRA goes to College

- RCRA was designed for industry and often does not fit with the university setting.

Recent University EPA Inspections:
- 1998 MIT enforcement settlement with US EPA: Agreed to fund more than $400,000 of innovative environmental projects and pay a civil penalty of $150,000
- 1995 Yale: $250,000 fine/penalties
- 1994 Stanford: $1,000,000 fine/penalties
- 2008 – RCRA subpart K amendment designed to be more applicable to the colleges and university setting – still has not yet been adopted by MassDEP
Program Responsibilities

- **Labs – Generate Waste**
  - Manage, label waste for disposal in compliance with regulations
  - Weekly inspections of SAAs (undocumented)
  - Coordinate clean-outs and unknown identification w/EH&S

- **Hazardous Waste Vendors/Transporters/Disposal Facilities**
  - Pickup, Package, transport hazardous waste to an approved disposal facility.

- **EHS – LSAs**
  - Support clients for specific questions, contact EHS Env Programs for assistance as needed.

- **EHS - Environmental Programs**
  - Maintain overall program, coordinate and manage hazardous waste disposal, university audit ready documentation, guidance, vendor contracts, conduct weekly inspections of Main Accumulation Areas.
Sink Disposal: DON’T DO IT!

PROTECT OUR WATER

To meet MWRA and DEP hazardous waste requirements, we need your cooperation. Laboratory chemicals must not be disposed of in lab sinks. Reduce pollution in the environment by keeping the following materials from entering your sinks or drains.

- **Strong Acids and Bases**  
  (Solutions with a pH < 5.5 or > 12.0)

- **Mercury and other Heavy Metals**  
  (All Mercury-containing products)

- **Volatile Organic Compounds**  
  (Common laboratory solvents)

For additional sink disposal information, refer to EH&S at:
http://www.uos.harvard.edu/ehs/ehs/environmental/wastewater.shtml
Labeling

- No abbreviations
- Must say “hazardous waste”
- Must have hazards using specific DEP language.
- When full mark the date and must be moved to an MAA within 3 days.
- Only during that time is a duplicate waste stream allowed.
Identification of Hazardous (Chemical) Waste

Hazardous (chemical) waste is specifically defined in accordance with detailed regulatory criteria. Hazardous (chemical) wastes can consist of liquids, solids, or gases. Waste can be characterized as "hazardous" in two ways:

- Wastes may appear on specific chemical lists issued by the DEP (the F, K, U, P lists); or
- Wastes may exhibit certain characteristics defined by the DEP.
- Also includes state regulated waste – used oil (MA01), PCBs (MA02)

Hazardous (chemical) waste characteristics include the following:

- **Ignitability** - materials having flash points less than 140°F.
- **Corrosivity** - materials having a pH less than or equal to 2 or greater than 12.5.
- **Reactivity** - materials that tend to be unstable at normal temperatures and pressures or materials that may react violently when mixed with water.
- **Toxicity** - materials that contain one or more of 39 specific contaminants at concentrations greater than those set forth by the regulation.
Peroxide Forming Chemicals

- Peroxide-forming chemicals can become shock sensitive and explosive over time.
- Examples include: ethers, dioxane, tetrahydrofuran
- Make sure that these chemicals are tested for peroxides or disposed of prior to expiration date.

![Image of peroxidizable material]

GENERAL STORAGE GUIDELINES

- Container Storage Time Limit
  - Unopened: No more than 1 year from receipt
  - Opened: No more than 6 months after opening

Note: Chemical-specific storage recommendations are contained in the Harvard University Chemical Hygiene Plan.
Harvard University – HW Program

EHS Tools on our website

- Drain disposal guidance for non hazardous chemicals
- Compatibility and storage tips
- Signs and postings

Lab Safety Waste Guide
Satellite Accumulation Area (SAA) Set-up

- Must be near the point of generation of hazardous waste.
- If space allows it is a best management practice to set-up laboratory SAAs in chemical fume hoods.
- Should be enclosed or indoors and secure to prevent public access.
- Harvard policy is to use the SAA posting (green sign) to designate waste area.
- SAA must have secondary containment devices to facilitate control and clean-up in the event of an accidental release (bins or pallets).
- SAAs may be set-up by Haz-waste vendors or EH&S personnel – if you set up a SAA for a lab please notify Lance so that we can add to our database.
Managing our SAAs – Types of SAA Inspections

There are four types of Satellite Accumulation Area inspections conducted across Harvard University; weekly, monthly, quarterly, and during non compliant pick-up requests.

1. Weekly SAA inspections are conducted by Lab personnel; although these inspections are not required to be documented, they are required to be conducted per regulation.
   - For supplemental information on SAA inspection questions, please visit this page.

2. Monthly SAA inspections are conducted by EH&S at certain labs based on their Compliance Score;

3. Quarterly SAA inspections are conducted by Harvard’s third party waste vendors. All SAA locations are inspected during the first month of the quarter (e.g. January, April, July, and October).

4. Pick-up requests; if the SAA is not in compliance during the time of a pick-up any observations will be documented in the SAA assessment program.
Harvard Quarterly/Monthly SAA Assessments

1. Do containers have an affixed Harvard Hazardous Waste Tag?
2. Do containers have a hazard box checked?
3. Do containers have the correct hazard box checked?
4. Are containers labeled with words and not formulas or abbreviations? (no abbreviations, nomenclature or structures)
5. Are containers in secondary containment? (i.e. a plastic tub)
6. Are containers in adequate condition for transport?
7. Are containers properly closed, no funnels left in place or caps left off?
8. Are containers with incompatible materials separated?
9. Are containers of virgin chemicals stored separately from waste, are research chemicals not stored in same plastic tub with waste chemicals?
10. Ensure there are no duplicate undated waste containers.
11. Ensure there are no containers past the MA three day rule. The waste label should be dated when the container becomes filled or otherwise ready for disposal. The container must be removed from the satellite area within 3 days of this date.
CHEMICAL WASTE COMPLIANCE TIPS FOR LABORATORIES

TIP #1: Set up Satellite Accumulation Areas (SAA's) at or near the point of generation

SAA's may only receive hazardous waste from near or at generating processes or activities. Hazardous waste may not be transported across hallways or through public access areas.

TIP #2: Do not have Satellite Accumulation Areas located in sinks

Hazardous waste must be accumulated in an area free of cracks and gaps ensuring containment and preventing release into the environment. Locating SAA's in a sink does not satisfy these criteria. To set up a proper SAA obtain a secondary containment bin in Cambridge visit the VWR Stockrooms - basement of Naio and Biological Laboratories. In Longwood call 2-1720. Set up SAA at or near point of generation (NOT IN SINK).

TIP #3: Satellite Accumulation Areas can have only one (1) container per waste stream

Only one container per specific waste stream (same chemical constituents) is allowed in the SAA. If a container becomes full, date label call EH&S for pickup Cambridge 617-496-3322, Longwood 617-432-1720 or if you have access, place waste in you groups Main Accumulation Area. Please note: Once a container is dated it must be removed from your SAA in three (3) days. Vendors are coordinated through EH&S to perform pickups as needed.

TIP #4: Ensure your Satellite Accumulation Areas are inspected weekly

Weekly inspections of Satellite Accumulation Areas are a regulatory requirement. Inspections are to be performed by the owner or operator of the waste area (your lab). Inspections include ensuring proper labeling and container management. Inspections conducted by EH&S or a third party does not satisfy this requirement, and serves only as a compliance review for your waste area.

TIP #5: Do not drain disposal hazardous waste (Ignitable, Toxic, Corrosive, Reactive)

Drain disposal of hazardous waste that meets the characteristics of Ignitable, Toxic, Corrosive and Reactive is prohibited. Please note: Alcohol's (ethanol, isopropyl, etc) are hazardous waste due to their ignitability. Dilution of these liquids for purposes of drain disposal is prohibited.

For additional guidelines refer to the EH&S web site at www.els.harvard.edu
This picture guide assists University personnel to understand their hazardous waste responsibilities by providing comparative pictures, showing examples of both good and poor hazardous waste management practices.

**Poor Practice**

Funnels should never be left in container openings when not in use. This is considered an open container subject to non-compliance fines and

**Good Practice**

The containers are properly and securely closed when not in use. Make sure all funnels are taken out and caps or lids securely fastened when hazardous waste containers are not in use.
Hazardous Waste Pickup/supply requests

EH&S coordinates and provides hazardous waste pickup and provides technical assistance. Submit online!

- supply requests
- schedule lab clean outs
- technical assistance
- assistance with unknown chemicals

Notes

- You can submit requests for others.
- Make sure to select the correct campus (Cambridge/Longwood Etc.).
- Note – for Cambridge campus Triumvirate does pickups on Tuesdays/Fridays – keep 3 day rule in mind.
- Facility Pickups – drums of waste are picked up either every Friday or every other Wednesday so need to be called in before they are full.
Next Stop – the MAA (Main Accumulation Area)

Once picked up from the SAA - Chemical Waste is brought to a central MAAs for longer storage and preparation for shipment.

LQGs- inspected weekly EH&S and TEI (documented):
• 37 Cambridge Campus Science Building MAAs
• 2 Outlier Facility MAAs
• 2 Temporary Construction MAAs
• 3 Longwood Campus Science Building MAAs

SQG/VSQGs- inspected weekly (not documented); inspected (documented) quarterly by EH&S:
• Arnold Arboretum, Concord Field Station, Harvard Forest, NERPC, Discovery Park, 60 Garden Street, 160 Concord Avenue, Wyss Institute, Rowland Institute.
Laboratory Clean-outs or Lab Moves

• The cost for hazardous (chemical) waste, which was generated by clean-outs (over 50 containers being disposed of at one time) or lab moves, has historically been the responsibility of the laboratory or department conducting the clean-out/move. SEAS covers this cost in your case.

• Labs requesting a cleanout should contact EHS in advance.
  – If they start labeling and dating bottles without going through the right steps then they are putting the university out of compliance.

• As part of our waste minimization program we encourage labs to find homes for unwanted non-expired chemicals with others in their department or building prior to disposal.
Hazardous Waste Transportation and Disposal

- Track waste generation from “cradle to grave”
  - The Generator must receive a signed copy back from the disposal facility within 45 days of shipment or contact the DEP
  - Harvard University shipped chemical waste on 670 manifests in 2013

*All hazardous chemical waste must be disposed of at a Harvard approved TSDF (Transportation-Storage-Disposal-Facility)*
Thank you.