Waste Awareness at Kansas State University

Division of Public Safety
Dept. of Environmental Health & Safety
Hazardous Materials (not waste)

- Usable chemicals
  - Must be labeled at all times with the name of the chemical (do not use Hazardous Waste labels)
  - Keep an inventory
  - Must have MSDSs on hand or immediately available electronically
  - Store by hazard class, keep incompatibles separate, do not store alphabetically
The federal regulations concerning hazardous waste are:

- The EPA, Resource Conservation and Recovery Act of 1976 (RCRA)
- These are the basis for our current state regulations and we must comply with these regulations to avoid contaminating the environment and avoid heavy financial penalties.
What is Hazardous Waste?

- **Solid waste** is defined as “*any liquid, solid or gas that has no commercial value.*” This is our normal trash.

- **Hazardous waste** is a **solid waste that has hazardous characteristics or it is listed as a hazardous waste in the RCRA regulation.**
Hazardous Characteristics

The four Hazardous Characteristics are:

- Ignitable
- Corrosive
- Reactive
- Toxic
Hazardous Characteristics (cont.)

Ignitable Chemicals

- Flash point < 140°F.

- **FP** - lowest temperature at which the vapors of a liquid will ignite.

- Examples include methanol, hexane, and benzene.

- [http://www.youtube.com/watch?feature=player_embedded&v=yE5LdCyN0aE](http://www.youtube.com/watch?feature=player_embedded&v=yE5LdCyN0aE)
Corrosive:

\[ \text{pH} < 2 \quad \text{OR} \quad \text{pH} > 12.5 \]

- strong acids: hydrochloric acid & glacial acetic acid
- strong bases: ammonium hydroxide & sodium hydroxide

Reactive: unstable, may spontaneously and violently react with air or water to generate a toxic, flammable or explosive gas

- sodium cyanide and elemental potassium
Toxic chemicals (TCLP)

- This characteristic identifies a specific set of elements, pesticides and organic solvents.
- The concentration of these chemicals in the waste stream may be high enough to fail a the Toxicity Characteristic Leaching Procedure, or TCLP, test.
- The TCLP mimics conditions found in landfills when groundwater percolates through buried materials.
### Chemicals on the TCLP list

<table>
<thead>
<tr>
<th>8 Heavy Metals</th>
<th>17 Pesticides</th>
<th>12 Organic Solvents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>Chlordane</td>
<td>benzene</td>
</tr>
<tr>
<td>Barium</td>
<td>2, 4-D</td>
<td>carbon tetrachloride</td>
</tr>
<tr>
<td>Cadmium</td>
<td>chlorobenzene</td>
<td>chloroform</td>
</tr>
<tr>
<td>Chromium</td>
<td>1,4-dichlorobenzene</td>
<td>cresol(s)</td>
</tr>
<tr>
<td>Lead</td>
<td>1,2-dichlorethane</td>
<td>2,4-dinitrotoluene</td>
</tr>
<tr>
<td>Mercury</td>
<td>1,1-dichloroethylene</td>
<td>hexachloroethane</td>
</tr>
<tr>
<td>Selenium</td>
<td>Endrin</td>
<td>methyl ethyl ketone</td>
</tr>
<tr>
<td>Silver</td>
<td>Heptachlor</td>
<td>nitrobenzene</td>
</tr>
<tr>
<td></td>
<td>hexachlorobenzene</td>
<td>pyridine</td>
</tr>
<tr>
<td></td>
<td>Lindane</td>
<td>tetrachloroethylene</td>
</tr>
<tr>
<td></td>
<td>hexachlorobutadiene</td>
<td>trichloroethylene</td>
</tr>
<tr>
<td></td>
<td>Methoxychlor</td>
<td>vinyl chloride</td>
</tr>
<tr>
<td></td>
<td>pentachlorophenol</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Toxaphene</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2,4,5-trichlorophenol</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2,4,6-trichlorophenol</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2,4,5-TP (Silvex)</td>
<td></td>
</tr>
</tbody>
</table>
Examples of TCLP waste:
- high performance liquid chromatography waste (HPLC)
- parts washer waste
- organic extractions
- atomic absorption spectrophotometry waste
- gas chromatography injection vials
- photo development waste
P-List and U-List

When these chemicals are discarded or spilled they become hazardous waste.

- **P-list chemicals are acutely hazardous.**
  - Empty containers that contained P-listed chemicals are also hazardous waste. List will be on our website soon.
  - *Examples*: carbon disulfide, epinephrine, sodium azide

- **U-list chemicals are hazardous**
  - *Examples*: acetone, toluene
Chemical Disposal

- No matter what chemical you have for disposal, Public Safety will take care of it.
- All spent chemicals must be identified using a hazardous waste label available from Public Safety.
- All unused chemicals must be discarded through Public Safety even if they are not ultimately identified as hazardous waste.
In Kansas, generators are classified by the quantity of hazardous waste they generate (create) per month:

- Small Generator: < 25 kg/mo, < 1 kg/mo of P waste
- Kansas Generator: ≥ 25 kg/mo - < 1,000 kg/mo or <1 kg of P waste
- EPA Generator: > 1,000 kg/mo (2,200 lbs) or > 1 kg/mo of P waste
Generators

- Generators are those businesses or persons that “generate” or create hazardous waste.
- K-State is in the highest category of hazardous waste generators; we are an “EPA Generator.”
  - As such, we are under heavy scrutiny by EPA, KDHE, and other agencies.
Generators (cont.)

- All of the K-State units off of the main campus have “Small Quantity Generator” status.

- Small Quantity Generators have fewer regulations.

- If you are located off campus, we will help you with hazardous waste disposal.
Transporters

- An EPA permit is required to transport hazardous waste on public roads.
- Only EH&S personnel can transport hazardous waste.
- Do not transport hazardous waste yourself, we will pick it up.
Hazardous Waste Route

Satellite Accumulation Point – lab or shop

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EH&S 90-day storage area

TSDF - incinerated, recycled, reused
Identify your hazardous waste. The words “Hazardous Waste” must be on the label.

The chemical’s full name must be marked on the label. Do not use abbreviations or chemical formulas.
Rules (cont.) - Labeling

- Date the container when waste is first added. Do not keep more than 6 months.
- Date the container once it becomes full or ready for disposal. Must be removed within 3 days of the full date.
- Location and PI info

Hazardous Waste

Start Date ______________________
Full Date ______________________
Contents ______________________
____________________________________
____________________________________
____________________________________
PI or Supervisor ______________________
Bldg ______________________
Room #(where waste is located)
____________________________________

HANDLE WITH CARE
Request a pickup at www.k-state.edu/safety/environmental/hazardous-waste
Accurate and complete label information is critical to provide safety, assist with disposal, and prevent inspection noncompliance.

Remember, any liquid, solid, or gas present in an unlabeled container is unsafe and is a violation.
Rules (cont.) - One Container

- Store only one container per waste stream (waste type) per room.
- Don’t pour different wastes into one container: different wastes must be kept separate.

2 containers of chromium oxide – only 1 container is allowed
Different waste types should be placed in separate containers.

Advantages of waste separation:

- Allows more waste space;
- Choice in determining disposal method;
- Disposal is more cost effective;
- Disposal is easier; and
- Disposal is safer.
Place each hazardous waste storage container at or near the point of waste generation.

- Do not take your waste container to a different room other than where the waste was generated (created).
- Do not move the waste container to a storage room.
Rules (cont.)

- Keep containers tightly closed at all times.
  * to prevent contamination,
  * to prevent evaporation,
  * and to prevent spills.

What’s wrong here?
Rules (cont.)

- Keep containers tightly closed at all times.
  - to prevent contamination,
  - to prevent evaporation,
  - and to prevent spills.

- Open container
- Unidentified waste (illegible writing)
- Not marked “hazardous waste”
Rules (cont.)

- Use secondary containment.
  - Bottles break and spills occur. To prevent a spill from creating havoc, put the bottle in a tray or pan for secondary containment.
  - The secondary containment should be large enough to hold 110% of the largest container.
Hazardous Waste Storage

- **Use a chemically compatible container.**
  Make sure that:
  - The waste that goes into the container does not degrade it;
  - The container doesn’t contain any pre-existing chemicals that may react with the hazardous waste.

- **Keep the container closed!!**
Mercury

- Elemental (liquid) mercury is found in thermometers, thermostats, silent switches, barometers, manometers, etc.
- It is all easily recycled.
- Intact or broken mercury devices will be accepted.
- Double-check equipment for mercury before disposal.
Gas Cylinders

- Try to purchase gas in returnable cylinders.
- If cylinders are not returnable, use the entire contents and mark it “empty”.
- If cylinders are not returnable, but not empty, they will be handled as hazardous waste.
- Cylinders cannot be discarded in the trash.
  - Exception - empty aerosol cans can be discarded in the trash.
- All types of cylinders including propane cylinders and aerosol cans are handled by Public Safety.
Universal Waste

- Universal Waste is hazardous waste that can be recycled. Materials at K-State that fall under this category are:
  - Fluorescent and High Intensity Discharge (HID) lamps;
  - Batteries
  - Pesticides
Fluorescent Lamps

- All types of fluorescent and High Intensity Discharge (HID) lamps are recycled.
- Do not purposefully break lamps.
- You may not discard fluorescent and HID lamps in the trash.
- Broken lamps are, and must be, treated as hazardous waste.
All types of batteries are recycled.

Send small, non-leaking, dry cell or sealed batteries inside a mail envelope to Public Safety via campus mail.

Small, leaking dry cell batteries should be placed inside a Ziplock bag inside a mail envelope.

Public Safety will pickup large batteries, such as UPC and lead-acid batteries.

Lead-acid (automobile) batteries must not be stored outside in the weather. Call Public Safety for a pick up.
Pesticides

- Do not purchase or request more pesticide than is necessary and limit the amounts kept in storage.

- Arrange for return of pesticides to the supplier or manufacturer when the research project is completed.

- Old or unwanted pesticides will be recycled by Public Safety, if possible, and the rest must be properly shipped for disposal.
Other Waste

- Remember, hazardous waste is a legal definition under RCRA. None of these fall under RCRA and therefore are not hazardous waste, but they are regulated elsewhere:
  - Used Oil
  - Old Latex Paint
  - Medical Waste
  - Radioactive Waste

Do not label any of these as Hazardous Waste.
Used Oil

- Any kind of oil including motor oil, instrument oil, machine oil, pump oil, and compressor oil is recyclable.

- Mark the container “Used Oil.” Do not mark it as hazardous waste.

- Do not mix any other type of waste with used oil; this may cause the used oil to become a hazardous waste.

- Call us to pick it up.
Paint

- Do not purchase and store large quantities of paint.
- Use up all paint.
- Do not throw latex paint in the trash.
  - Latex paint is not considered hazardous waste, but it must be properly discarded, call for pickup.
- Oil-based and epoxy paints are hazardous waste.
  - Do not simply leave the container open to let the paint dry out.
- Turn in all paints in for disposal.
PCB Ballasts

- Polychlorinated Biphenols
  - Heat transfer oil
- Found in some large transformers, capacitors, and ballasts in old electronic equipment.
- Older fluorescent light fixtures.
- Call Public Safety for a pick-up of old ballasts and capacitors.
Medical Services Waste

- Medical waste includes:
  - Bloodborne Pathogen waste = human blood contaminated materials;
  - Sharps = needles, syringes, razor blades, etc.;
  - Laboratory animal carcasses - must be kept frozen until disposal.

- Do not use sharps containers for broken glass
  - Put broken glass in a box marked “broken glass”
  - We can provide containers for sharp items
Radioactive Waste

- Must be licensed with the Radiation Safety Office to use radioactive materials.
- The waste must be identified with the
  - isotope
  - activity (in millicuries)
  - lab supervisor
  - date of activity
  - lab room #
- A special label is available from Public Safety, free.
- Call us to pick up your radioactive waste.
For Waste Pickup

- **Contact Public Safety**
  - email: [safety@ksu.edu](mailto:safety@ksu.edu)
  - web: [http://www.ksu.edu/safety](http://www.ksu.edu/safety)
Spills

- You may clean up small spills yourself, if you feel comfortable doing so
  - Small spill is less than 9 inches in diameter
- Large spills, call EH&S 2-5856
- Emergencies, call 911
- See Campus Emergency Spill plan on website, under Safety link

Call IMMEDIATELY!
Pollution Prevention

- Reduce “unknowns” by properly labeling all chemical containers.
  - Periodically inspect stored chemicals to assure labels are intact and attached to containers.
  - Replace damaged or missing labels.
- Unlabeled chemicals, even those that are not waste, can result in a fine for the University.
Substitute chemicals with less hazardous materials when possible.

So they won’t become hazardous waste.

For example: If a solvent that has a flashpoint of 100°F can be substituted by a chemical that has a flashpoint >140°F, the waste will no longer be considered hazardous waste.

Do not mix non-hazardous waste with hazardous waste if it can be avoided.
Pollution Prevention (cont.)

- Recycle or reuse chemicals whenever possible;
- Purchase only what you need;
- Purchase in small quantities;
  - There is no need for stocking large quantities. Small amounts at reasonable prices can be shipped within 24 hours.
Pollution Prevention (cont.)

- Use microscale techniques to reduce the quantity of waste.
  - These techniques use small amounts of chemicals.

- Simple neutralization is allowed and encouraged in the laboratory.
  - Acids and bases can be safely disposed down the sink if the pH is between 5 and 9, and if there are no other characteristics that define the material as hazardous waste.
Shipping Hazardous Materials

- You must have DOT training every 3 years to ship any hazardous materials.
- **DO NOT** sign any shipping papers unless you are trained.
- If shipping them by air, you must have IATA training every 2 years.
- Have Central Mail ship your hazardous materials.
- EH&S provides DOT training. See our website for training dates.
Any damaged, broken, or non-working equipment, instrument, or furniture that is not worth repairing is considered waste, should be marked as such and discarded or recycled.

*Just make sure you submit a DA 110, Disposition of Property form.*
Facilities runs a large recycling program.

Some materials that are currently recycled are:

- newspaper, magazines, office paper
- cardboard
- plastic bottles, #1 and #2
- metals
- electronics including computers, televisions, lab equipment
- wood pallets

For more information contact Facilities Recycling, 532-6446.
Recycling

- Public Safety recycles
  - Batteries
  - Light bulbs
  - Mercury
  - Silver

- Some of these are still hazardous waste, but they do get recycled
Household Hazardous Waste

- K-State has partnered with Riley County to assist with the Household Hazardous Waste program.
- A Household Hazardous Waste drop off site is located at Edwards Hall.
- Any K-Stater is allowed to bring chemicals from home for disposal. This includes: pesticides, cleaners, paint, thinners, solvents, etc.
- Please call us at 532-5856 before bringing chemicals over.
Recycling from your home

- Take to Howie’s on 10th street
- Must be separated
- Cannot bring home recyclables to KSU
- HHW is collected 2nd weekend of each month
- Now taking e-waste, $ for CRTs & towers
Environmental Health and Safety

Environmental Health and Safety

K-State Home > Environmental Health and Safety > Home

ENVIRONMENTAL HEALTH AND SAFETY

Kansas State University is a comprehensive, research, land grant institution first serving students and the people of Kansas, and also the nation and the world. We recognize the potential impacts of our activities on the environment, and the safety of individuals, through our mission as a land-grant institution. We value the people, land and natural resources that are part of the campus and surrounding communities, and strive to manage our programs in a manner that protects the global/local human and natural environments.

The mission of the Department of Environmental Health and Safety, within the Division of Public Safety, is to achieve compliance with applicable federal, state and local environmental and safety statutes, regulations, enforceable agreements, and permits, and to strive for continual improvement in environmental performance. We are responsible for the development and implementation of environmental, health and safety policies, procedures and programs. This includes, but is not limited to environmental monitoring, tracking and reporting, hazard analysis, safety training, incident investigation and emergency response.

These services are designed to eliminate, reduce, or control environmental, safety and health risks and impacts, ensure regulatory compliance, and demonstrate environmental excellence through a continuous improvement process. The department works in cooperation with the Emergency Management Coordinator to provide assistance in the event of any emergency. Department personnel work closely with the University Police to provide a safe and secure campus.

With the implementation of the College Environmental Health and Safety Committees, the Department of Environmental Health and Safety acts as consultant and auditor to the Kansas State University colleges.