

2024 EHS LAB SAFETY SEMINAR

MATERIALS SCIENCE & ENGINEERING DEPARTMENT

FEBRUARY 2, 2024

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ENVIRONMENTAL HEALTH AND SAFETY

EHS.VIRGINIA.EDU 434-982-4311



AGENDA

- Inspections
 - Top issues & what to do
- Best Practices in Lab Safety
- New Guidelines/Resources
- Incident Reporting
- Incident & Lessons Learned

LAB INSPECTIONS

- Annual Inspections Wilsdorf & Jesser **June 2023**
- Visit Inspection webpage for resources



INSPECTIONS

#1 issue (12 deficient labs): Missing documentation of minimum monthly eyewash check

ANSI standard recommends *weekly!*

Labs responsible

Test all locations

See evidence of sediment?

Flush more often!

Detect low flow, no flow, extreme temp?

Place workorder with FM

EHS provides record tags



5508-C Electromark

**EYE WASH / SHOWER
INSPECTION RECORD**

Equipment ID _____
Location _____
Test _____

Date	Initials	Comments

INSPECTIONS

#2 issue (5 deficient labs) hazardous waste labeling

EPA/DEQ Requirement

MUST check major hazard

State Inspection non-compliance findings can carry ~\$72,000 in fines per bottle per day

We are inspected ~ every 3 years

Hazardous Waste Sticker

HAZARDOUS WASTE

Major Hazard (check one)

KEEP CONTAINER CLOSED AT ALL TIMES
DO NOT FILL WITHIN 2" OF CONTAINER TOP










CONSTITUENT	%
Ethanol	65
Acetone	35

FOR EMERGENCIES OR WASTE PICK UP
CALL EHS @ 982-4911

INSPECTIONS

#3 issue (4 deficient labs), Chemical storage incompatibilities

- Acids cannot be stored with flammables
- Acids cannot be stored with bases

								
Flammable liquid Hazardous liquids that are flammable.	Corrosive Hazardous liquids that are corrosive.	Corrosive Hazardous solids that are corrosive.	Flammable solid Hazardous solids that are flammable.	Toxic Hazardous liquids or solids that are toxic.	Explosive Hazardous liquids or solids that are explosive.	Inhalation Hazard Hazardous gases that are inhaled.	Health Hazard Hazardous liquids or solids that are health hazards.	Compressed Gas Hazardous gases that are compressed.
Examples: Gasoline Ethanol Acetone	Examples: Sulfuric acid Nitric acid Hydrochloric acid	Examples: Sulfur trioxide Phosphorus pentoxide Calcium cyanamide	Examples: TNT Cyanide Sulfur	Examples: Cyanide Sulfur Phosphorus	Examples: TNT Cyanide Sulfur	Examples: Carbon monoxide Nitrogen dioxide Ammonia	Examples: Cyanide Sulfur Phosphorus	Examples: Cyanide Sulfur Phosphorus
Labels and placards: Flammable liquid	Labels and placards: Corrosive	Labels and placards: Corrosive	Labels and placards: Flammable solid	Labels and placards: Toxic	Labels and placards: Explosive	Labels and placards: Inhalation Hazard	Labels and placards: Health Hazard	Labels and placards: Compressed Gas

Refer to our Chemical Storage Guidelines



AND the SDS for most specific details

INSPECTIONS

#4 issue (3 deficient labs) , Improper use of sharps containers

No hazardous waste label

No broken glassware sticker



PROPER SHARPS CONTAINER USE

- Keep label intact, Keep lid in place
- Does not need to be a 'biohazard' to be a sharp.
 - Any needle, scalpel, razor blade
- Common misconception - Glass goes in broken glass boxes

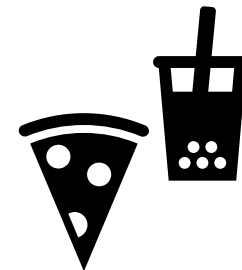
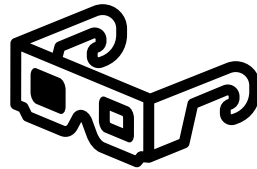


LIABILITY

- Follow University policies, programs and procedures
- EHS supports and advises
- Rare, but non-compliance could lead to personal liability
- Office of Risk Management



BEST PRACTICES



SAFELY STORING GAS CYLINDERS

...they must be secured

No matter the size...



CHEMICAL STORAGE



ACIDS & BASES

Keep in separate cabinets!



Salt formation



How to Identify

Acid:

Usually ends in 'acid'

Base:

-hydroxide

-amide

-amine

GENERATING WASTE AND GETTING RID OF IT

#1



Closed except when filling

#2

(attach label here)

U.Va. Office of Environmental Health And Safety
Chemical Safety Division
WASTE CHEMICAL/BIOHAZARD
IDENTIFICATION LABEL Date: _____
For Pick-up Call 982-4911

Lab Director: _____ Bldg: _____
Department: _____ Rm. #: _____
Your Name: _____ Phone #: _____

Waste Information: Please fill out *one* label (with its copy) for each container of waste. List *all* contents - including water. Indicate each component's percentage in the mixture (if unknown, approximate). Use proper chemical names. **DO NOT** use chemical formulas, structures or uncommon abbreviations. Please print. **DO NOT WRITE IN SHADED AREA.**

Waste Contents	Chemical Name	Percentage (%)

TOTAL PERCENTAGE (%) MUST EQUAL 100%

Total quantity in this container: _____
pH: _____

OFFICE USE ONLY
 SA SA Before pH SEG: _____
Labeling

THIS MATERIAL IS POTENTIALLY HAZARDOUS. FEDERAL AND STATE LAW PROHIBITS IMPROPER DISPOSAL. IF FOUND, CONTACT THE OFFICE OF ENVIRONMENTAL HEALTH AND SAFETY, (804) 982-4911.

UVA-98215

#3

Waste Pickup Request Online

#4 Never pour chemicals down the drain!

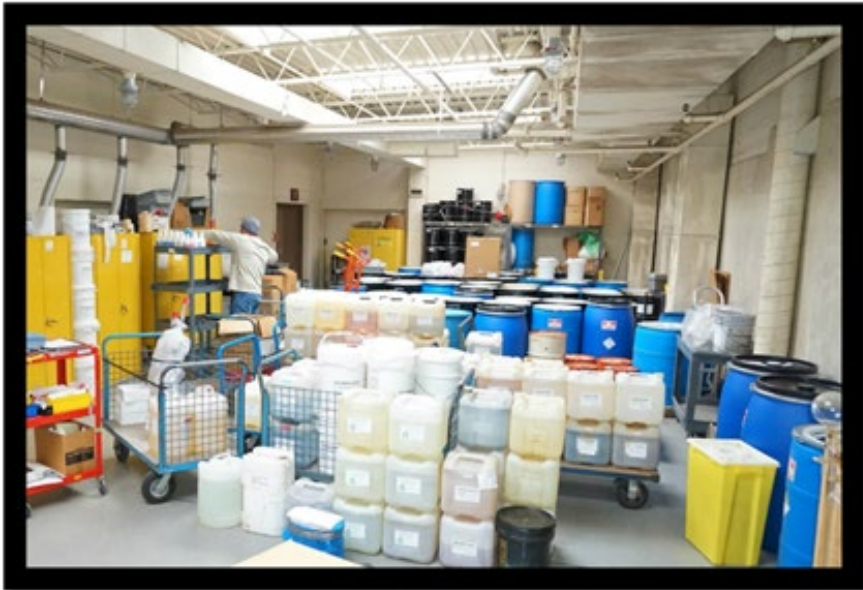
SPECIAL WASTE CONSIDERATIONS

- Do not let **any** solid materials, such as pipette tips, rubber stoppers, kimwipes, etc. enter a liquid waste bottles/carboys!
- If contaminated, these items must go into the EHS provided buckets.
- Solid materials will damage our equipment used to transfer liquid waste from 1 and 5 gallon bottles to 55 gallon drums.

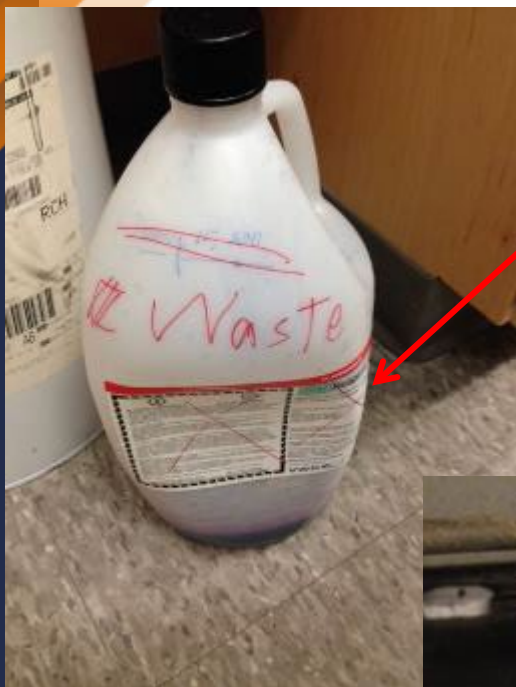


EHS WASTE PROCESSING

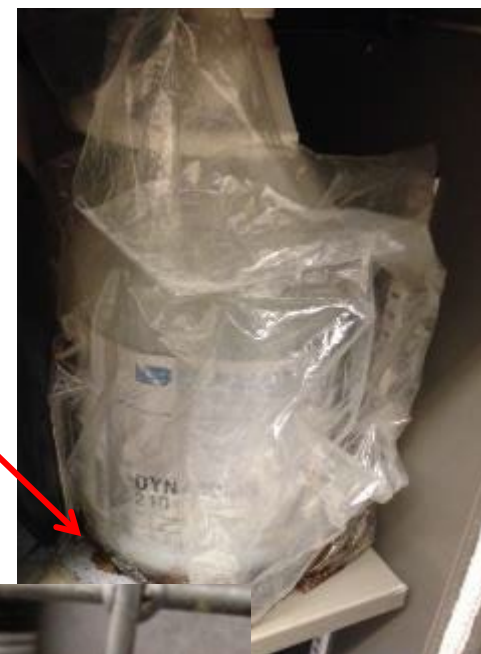
Accurate waste labeling and constituents is important!



WHEN IS IT TIME TO CALL IT IN?

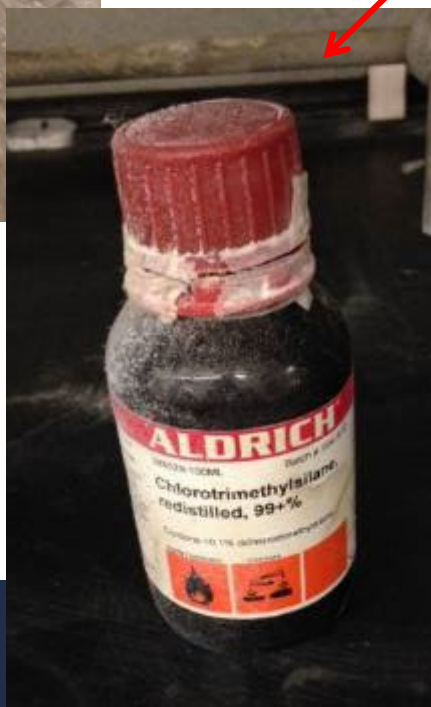


Bulging or collapsed



leaking

crystallization



SPILLS

- Specific guidance on website for small vs large spill response
 - small = volume which does not exceed the capacity of the lab to clean up with materials on hand.
 - Safe to handle (hazard, location, etc.)
 - Assess your potential needs
 - Extensive oil use? Have oil spill pads available
 - Corrosives use? Compatible chemical absorbent pad
- EHS staff – business and after-hours on-call response

INSPECT EQUIPMENT



LAB ATTIRE BEST PRACTICES

- Diverse lab environments – no University policy
- Choose **attire** and **PPE** designed to reduce exposures (Chemical & Physical)



Hazardous Materials/Operations

- Long pants, closed toe shoes, add PPE - Industry Standard, gold standard for Higher Ed¹

¹The National Research Council's publication 'Prudent Practices in the Laboratory' is a set of recommendations (non-mandatory) that is referenced by OSHA

NO FOOD OR DRINK



VPRS-001: Prohibition of Food and Drink in Research Laboratories

Minimize risk of exposure to hazardous research materials

- Don't store in lab fridge/freezer, use lab microwaves, etc.
- Marking not for human consumption
- Personal hygiene practices following lab work

NO GLOVES

Water Fountains



Door Handles



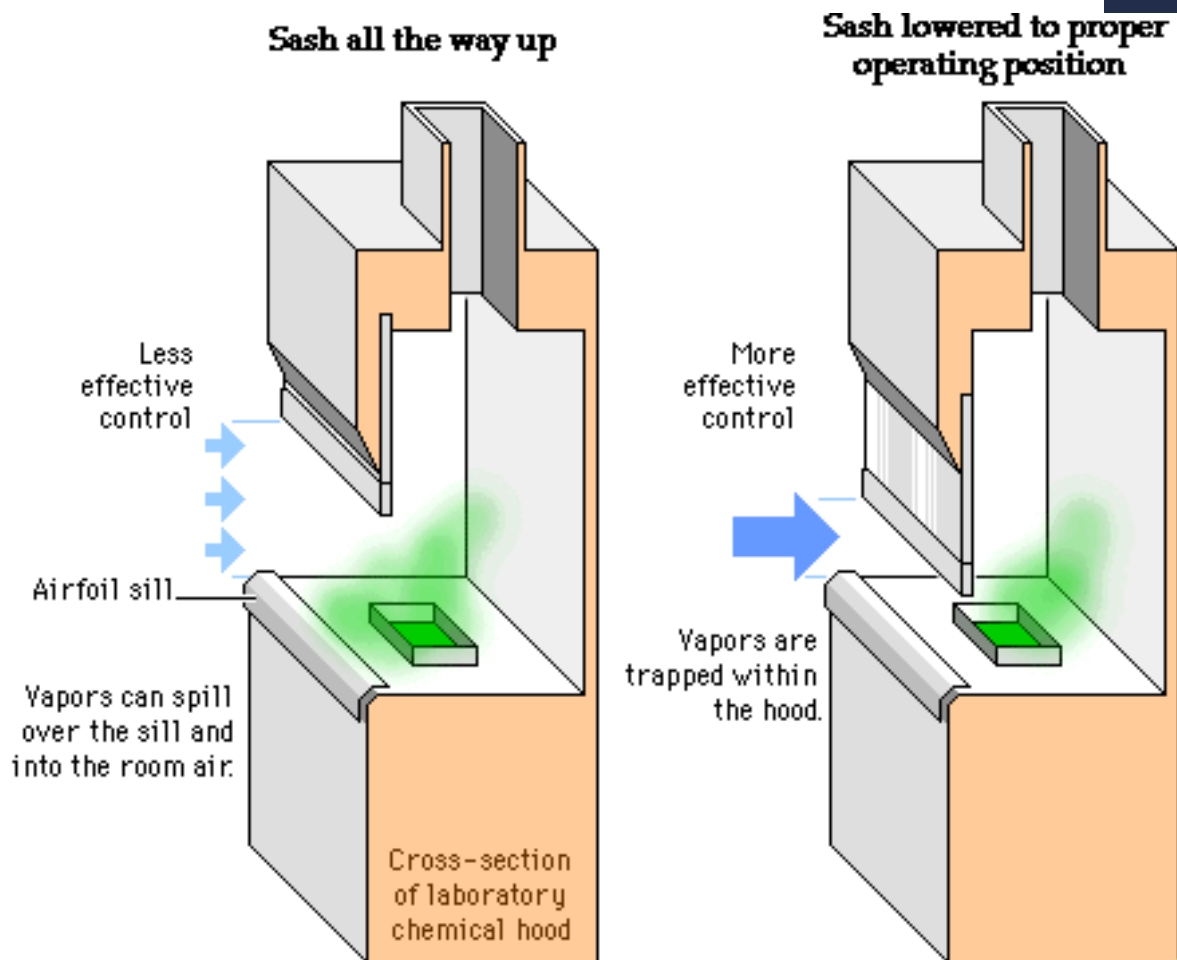
Elevators



Do not touch door handles, elevator buttons, or other common surfaces while wearing gloves.

CHEMICAL FUME HOOD USE

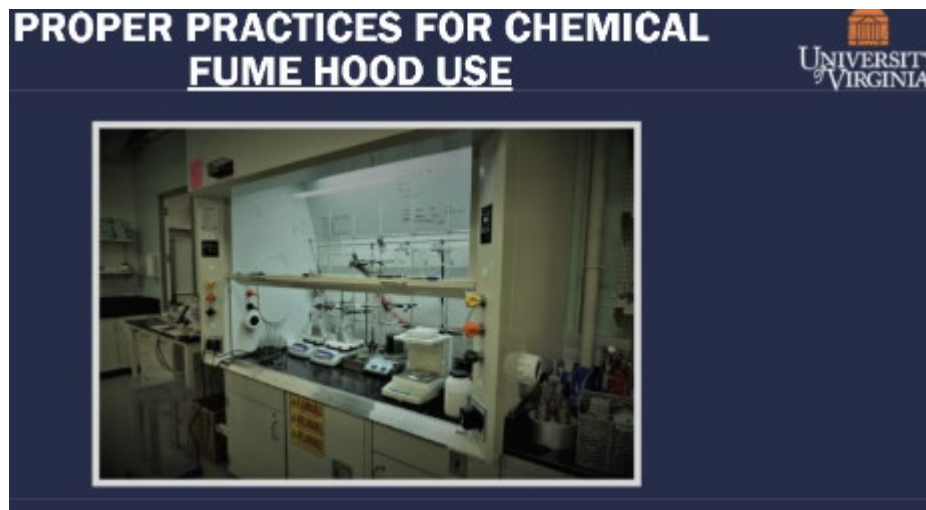
- Use for volatile, toxic, harmful, smelly materials
- Sash at 18" or lower
- Work 6" in from the edge
- Appropriate PPE
- Keep uncluttered for optimal performance, protection AND safety!!
- Sash down when not working





NEW EDUCATIONAL MODULE ONLINE – CHEMICAL FUME HOODS

- How to determine fume hood safe to use
- What to do if you think it's unsafe or past survey date
- Implementing safe work practices
- How proper airflow is tested & visualized



Access video here



RECYCLING CHEMICAL CONTAINERS

Container Type:

- NO Glass or Aluminum
- Plastics 1-7
 - Only tissue culture media bottles
 - Alcohol bottles

Preparation:

- Triple rinse, no standing liquid, labeled EMPTY

Place in designated bins

recycling@virginia.edu for ?'s on what can be recycled

NON-HAZARDOUS

RECYCLE LAB PLASTICS

NO ALUMINUM, NO GLASS



TIP BOXES



PLASTIC PACKAGING



***TISSUE CULTURE
MEDIA BOTTLES**



***ALCOHOL BOTTLES**

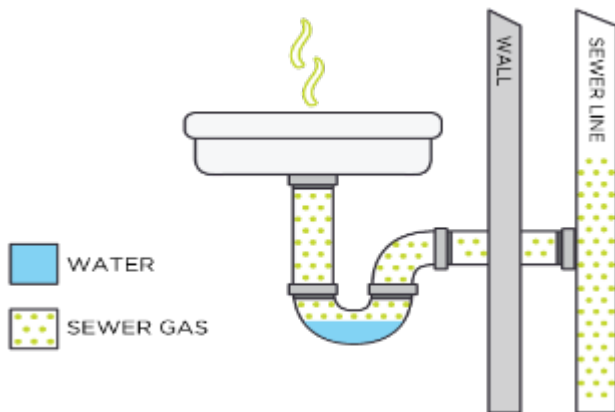
***TRIPLE-RINSED, LABELED "EMPTY"**

EHS.VIRGINIA.EDU 434.982.4911

GREENLABS@VIRGINIA.EDU

FUNKY SMELL?

IT MIGHT BE DRY DRAIN



For other persistent odors, contact EHS.

WHAT IS DRY DRAIN?

This occurs when the sink and drains have not been used, and the trap dries out allowing odors to migrate up into the room.

IT'S AN EASY FIX!

Periodically run water in all sinks and pour water down floor drains if not being used regularly.

This will keep the traps wet and prevent odors from escaping.



Environmental Health & Safety

ehs.virginia.edu

434.982.4911



INCIDENT REPORTING

Report a near miss, incident, safety concern or hazardous situation!



ENVIRONMENTAL HEALTH & SAFETY

PROGRAMS

SERVICES

RESOURCES

ABOUT

NEWS

HELP

HOME

REPORT AN ACCIDENT, SAFETY CONCERN, NEAR-MISS OR HAZARDOUS SITUATION! USE **THIS FORM.**

- EHS follow-up
- Focus on mitigating risk of future events and corrective measures/improvements

SERIOUS EVENT REPORTING

REPORTING AN EMERGENCY? CALL 911 INSTEAD!

REPORTING A SERIOUS EVENT? (work-place fatality, amputation, loss of an eye, inpatient hospitalization of one or more persons, a medical event i.e. heart attack) **GO TO THIS PAGE**
AND FOLLOW THE INSTRUCTIONS!

If you learn about any of the above work-related incidents report it immediately!

LESSONS LEARNED

Sharing real life incidents remind that incidents happen and can happen to you and in your lab.

REUSE OF CHEMICAL BOTTLE

2 DIFFERENT DEPT/LAB OCCURRENCES

ALMOST IDENTICAL SCENARIO

- Alcohol bottle rinsed and reused for acid waste
- Filled and capped, immediately left room to perform task, heard explosion minute later.
- No injuries or property damage

ROOT CAUSE – WHY DID IT HAPPEN?

- Residual alcohol and nitric acid reacted, forming a gas (nitrogen oxides).
- Lid was immediately placed back on (expected!), so bottle pressurized
 - 1) Bottle burst at the bottom
 - 2) Lid burst off



FUTURE INCIDENT PREVENTION & TIPS FOR BOTTLE REUSE

- Only use for same type of waste
 - Ex. Ethanol or IPA – use for non-halogenated solvent wastes
- Rinse with a compatible material
 - Water, solvent
- Deface bottle
 - Write 'MT', 'EMPTY', or mark out with sharpie.

RESPONSE

- Incident promptly reported to supervisor and EHS notified via online form
- Updated Guidance on EHS webpage

EMPTY CONTAINERS

Empty Container Disposal: EHS does not pick up empty chemical reagent bottles, and neither does UVA Recycling.

Triple rinse empty chemical bottles, collect the rinsate as waste, deface the chemical label, and then discard bottles in the trash or reuse for waste collection (labelled appropriately).

If reusing an empty container for waste collection, it is advisable to **ONLY** use the empty container for a similar and compatible material as compared to the original contents! For example, use an empty ethanol bottle for non-halogenated solvent waste collection. Chemical reactions, leading to bottle explosion, have occurred when using empty plastic alcohol bottles for acid waste, even after rinsing!

Q&A

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434-982-4311