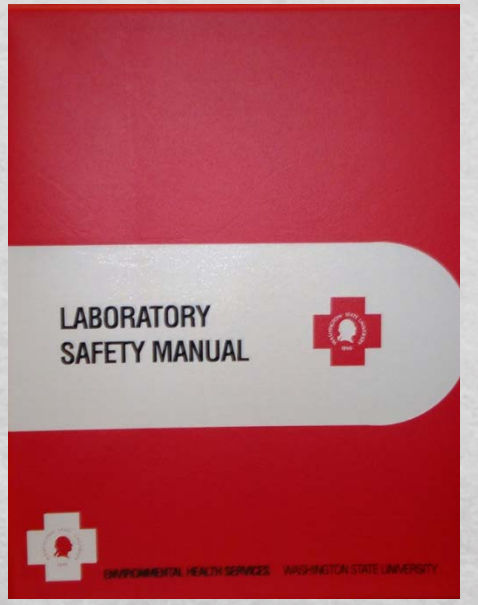
LABORATORY SAFETY SEMINAR

WASHINGTON STATE UNIVERSITY

World Class. Face to Face.

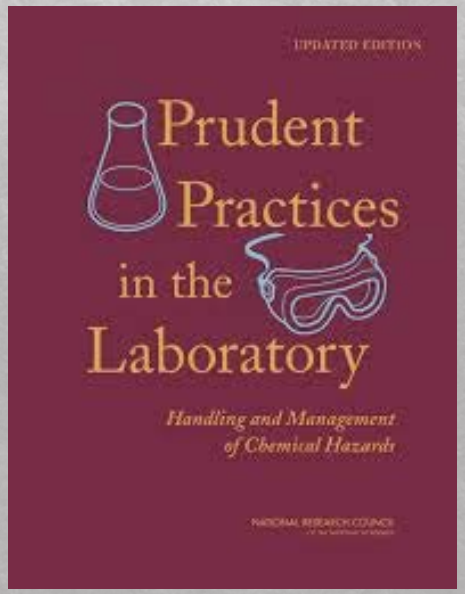
Lab Safety Resources

- Laboratory Safety Manual:
  - Basic rules, SOP's, housekeeping, PPE, signage and labeling, inspections, safety equipment, etc.
  - http://ehs.wsu.edu/labsafety



- Safety Policies and Procedures Manual (SPPM):
  - Lab safety, fire safety, general workplace safety, etc.
  - http://public.wsu.edu/~forms/manuals.html

- Other resources:
  - Prudent Practices in the Laboratory
  - Consensus documents (ANSI standards, NFPA)
  - Actual safety regulations!



WASHINGTON STATE UNIVERSITY

Environmental Health & Safety

Laboratory Safety Manual

Washington State University's Laboratory Safety Manual is a tool to assist responsible parties with developing their laboratory specific Chemical Hygiene Plan and related laboratory safety programs. Implementation of the Laboratory Safety Manual/Chemical Hygiene Plan is a critical element in achieving a safe and healthful laboratory environment.

WSU's Laboratory Safety Manual coupled with the Chemical Hygiene Plan completed by each laboratory establishes laboratory specific policies and procedures. A Laboratory Safety Manual/Chemical Hygiene Plan Guide provides additional information for developing and implementing a plan.

Table of Contents

Section I – Introduction

Section II – Policies and Recommendations

Section III – Laboratory Facilities

Section IV – Standard Operating Procedures

Section V – Additional Information

Resources

Laboratory Safety Manual/Chemical Hygiene Plan Guide

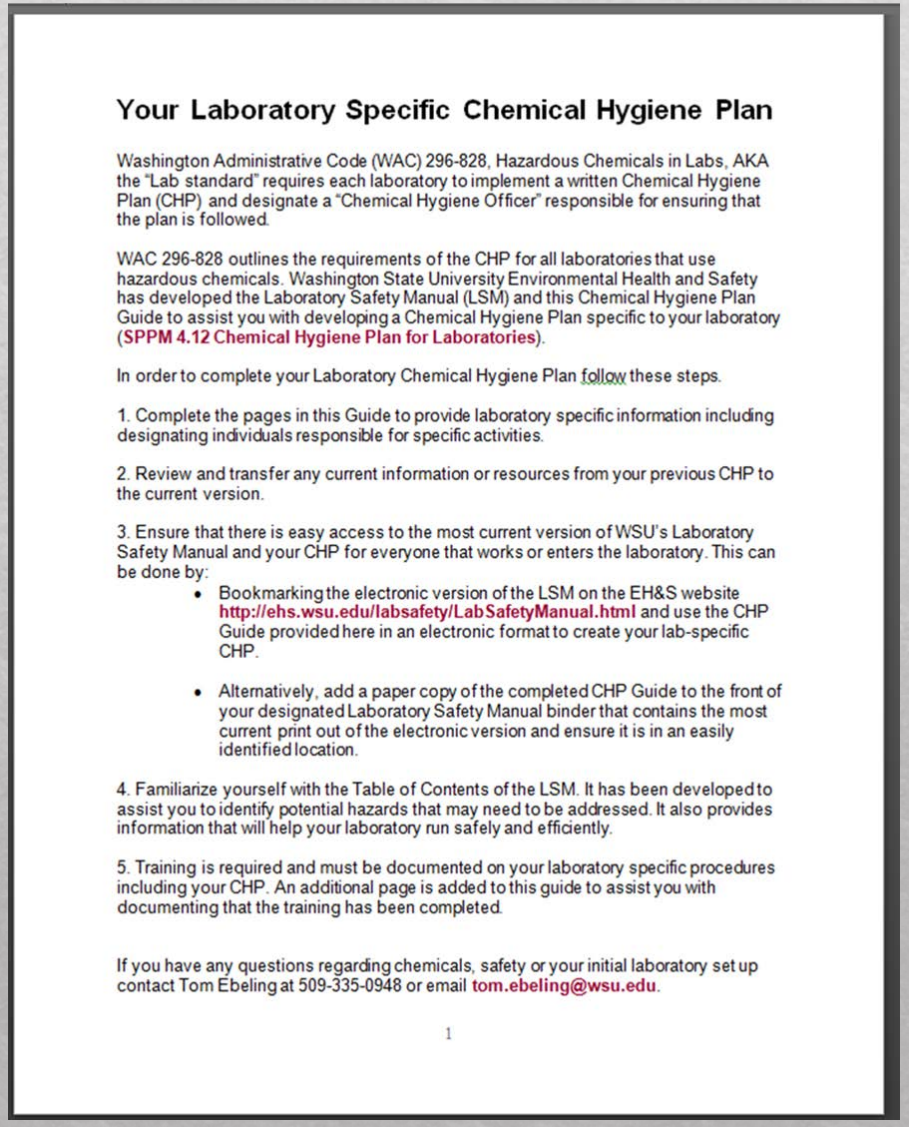
Standard Operating Procedure (SOP) Templates for Hazardous and Particularly Hazardous Chemicals

Secondary Container (Workplace) Label Templates

Environmental Health & Safety, PO Box 641172, Washington State University, Pullman WA 99164-1172, 509-335-3041, Contact Us

Chemical Hygiene Plan (CHP)

- "**Written program** developed and implemented by the employer that establishes **procedures, equipment, personal protective equipment, and work practices** to protect employees from the health hazards of the chemicals used in the laboratory."
- Lab Specific
- Must be available to all lab personnel
- PI reviews and updates annually
- EHS website has CHP template



Your Laboratory Specific Chemical Hygiene Plan

Washington Administrative Code (WAC) 296-828, Hazardous Chemicals in Labs, AKA the "Lab standard" requires each laboratory to implement a written Chemical Hygiene Plan (CHP) and designate a "Chemical Hygiene Officer" responsible for ensuring that the plan is followed.

WAC 296-828 outlines the requirements of the CHP for all laboratories that use hazardous chemicals. Washington State University Environmental Health and Safety has developed the Laboratory Safety Manual (LSM) and this Chemical Hygiene Plan Guide to assist you with developing a Chemical Hygiene Plan specific to your laboratory (**SPPM 4.12 Chemical Hygiene Plan for Laboratories**).

In order to complete your Laboratory Chemical Hygiene Plan follow these steps.

1. Complete the pages in this Guide to provide laboratory specific information including designating individuals responsible for specific activities.

2. Review and transfer any current information or resources from your previous CHP to the current version.

3. Ensure that there is easy access to the most current version of WSU's Laboratory Safety Manual and your CHP for everyone that works or enters the laboratory. This can be done by:

- Bookmarking the electronic version of the LSM on the EH&S website **http://ehs.wsu.edu/labsafety/LabSafetyManual.html** and use the CHP Guide provided here in an electronic format to create your lab-specific CHP.
- Alternatively, add a paper copy of the completed CHP Guide to the front of your designated Laboratory Safety Manual binder that contains the most current print out of the electronic version and ensure it is in an easily identified location.

4. Familiarize yourself with the Table of Contents of the LSM. It has been developed to assist you to identify potential hazards that may need to be addressed. It also provides information that will help your laboratory run safely and efficiently.

5. Training is required and must be documented on your laboratory specific procedures including your CHP. An additional page is added to this guide to assist you with documenting that the training has been completed.

If you have any questions regarding chemicals, safety or your initial laboratory set up contact Tom Ebeling at 509-335-0948 or email **tom.ebeling@wsu.edu**.

1

- At the time of "initial assignment" AND prior to situations with new exposures
  - Contents of Chemical Hygiene Plan
  - Chemical Properties; Physical & Health Hazards
  - Work practices, emergency procedures, PPE, SOP's
- Provided by PI/Lab Instructor/Supervisor
- Refresher training as needed
- Document It!!

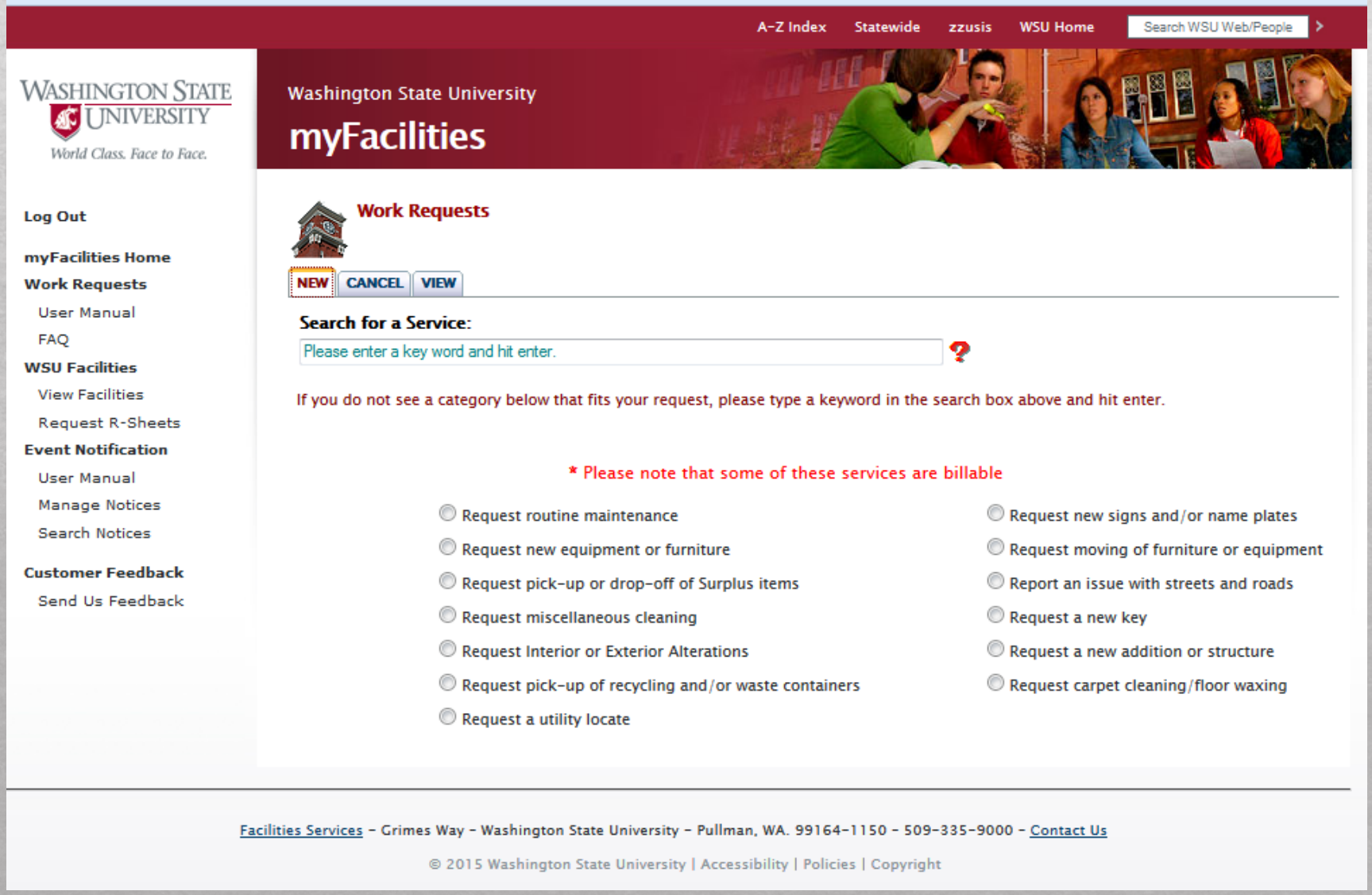
Incident Reporting

- All accidents or injuries, no matter how minor, should be reported to your supervisor.
- An incident report must be completed within 24 hours of the event. The person's supervisor is normally required to complete the report.

- Incident Reports must be filled out online at https://www.hrs.wsu.edu/forms/incident_report.aspx

myFacilities

- https://myfacilities.wsu.edu/

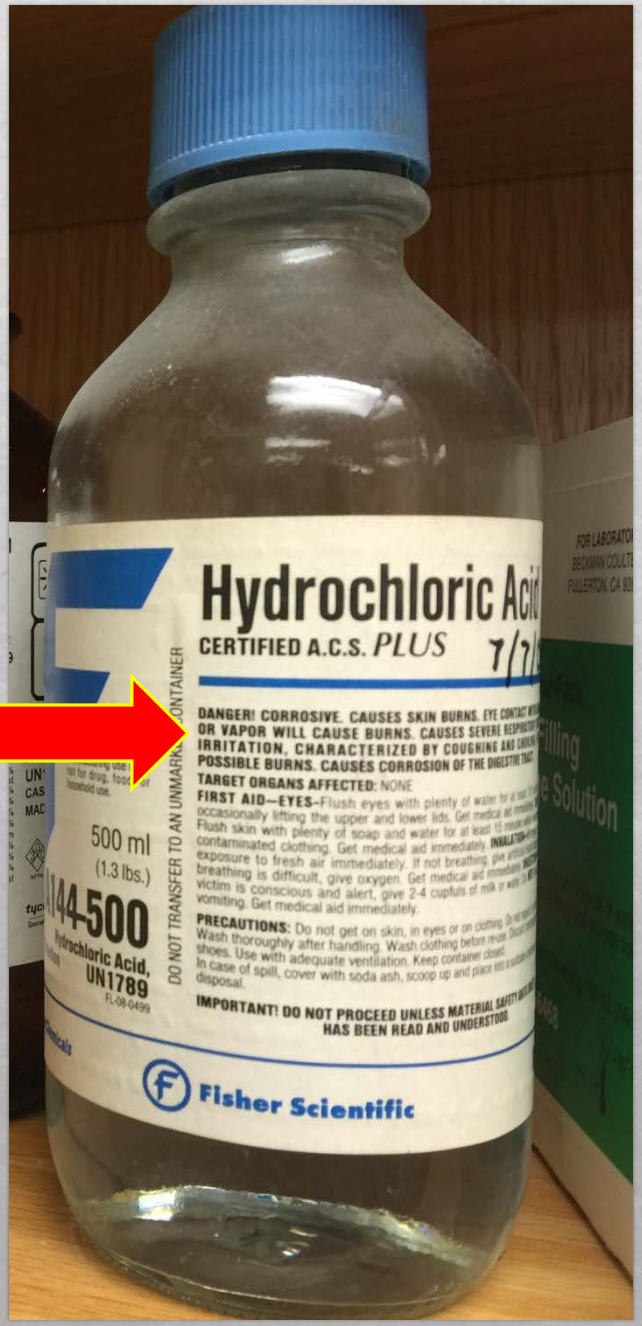


What are the hazardous materials we work with and around?

How can be educate ourselves and be safe?

"Stop Work" Authority

What is Hazardous?



SIGMA-ALDRICH sigma-aldrich.com

SAFETY DATA SHEET

Version 5.6
Revision Date 03/08/2016
Print Date 06/20/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Hydrochloric acid

Product Number : H1758
Brand : Sigma
Index-No. : 017-002-01-X

CAS-No. : 7647-01-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Corrosive to metals (Category 1), H290
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.

Precautionary statement(s)
P234 Keep only in original container.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ protective clothing/ eye protection/ face

- A common and coherent global approach to defining and classifying chemicals

- OSHA adopted many aspects of the GHS
  - Hazard Communication Standard (HCS) of 2012

- WA state adopted too

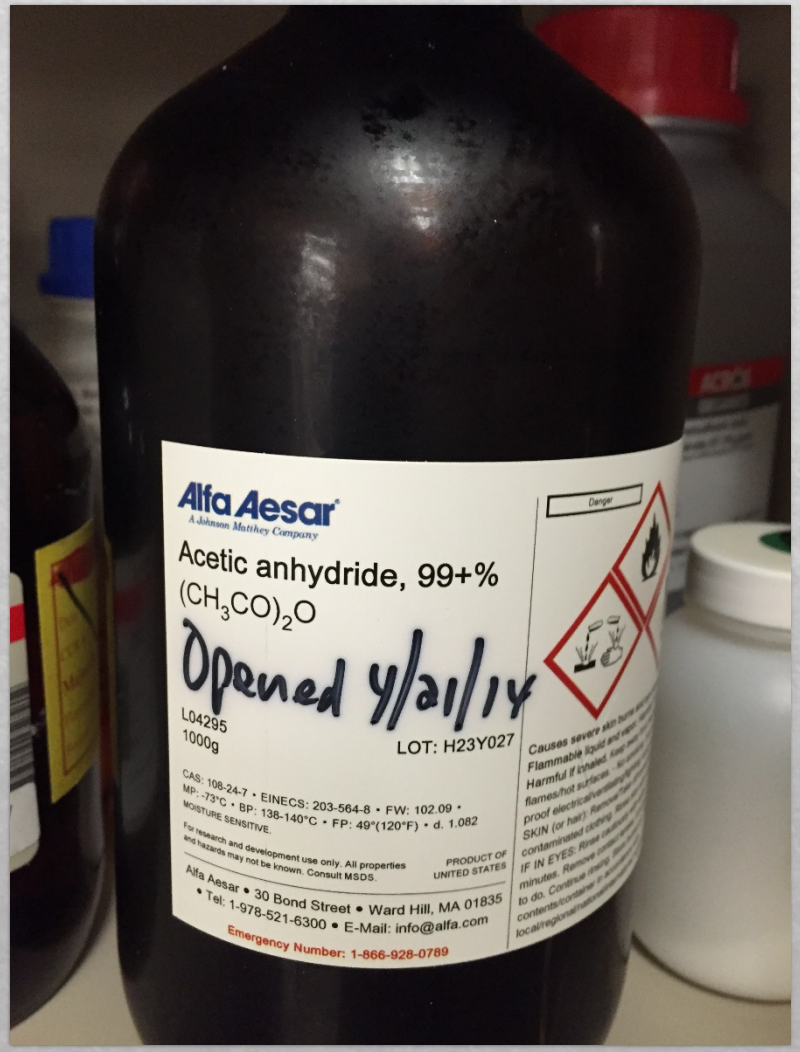
What's Changing???

- Labels
- Safety Data Sheets (SDS)
  - Formerly material safety data sheets (MSDS)

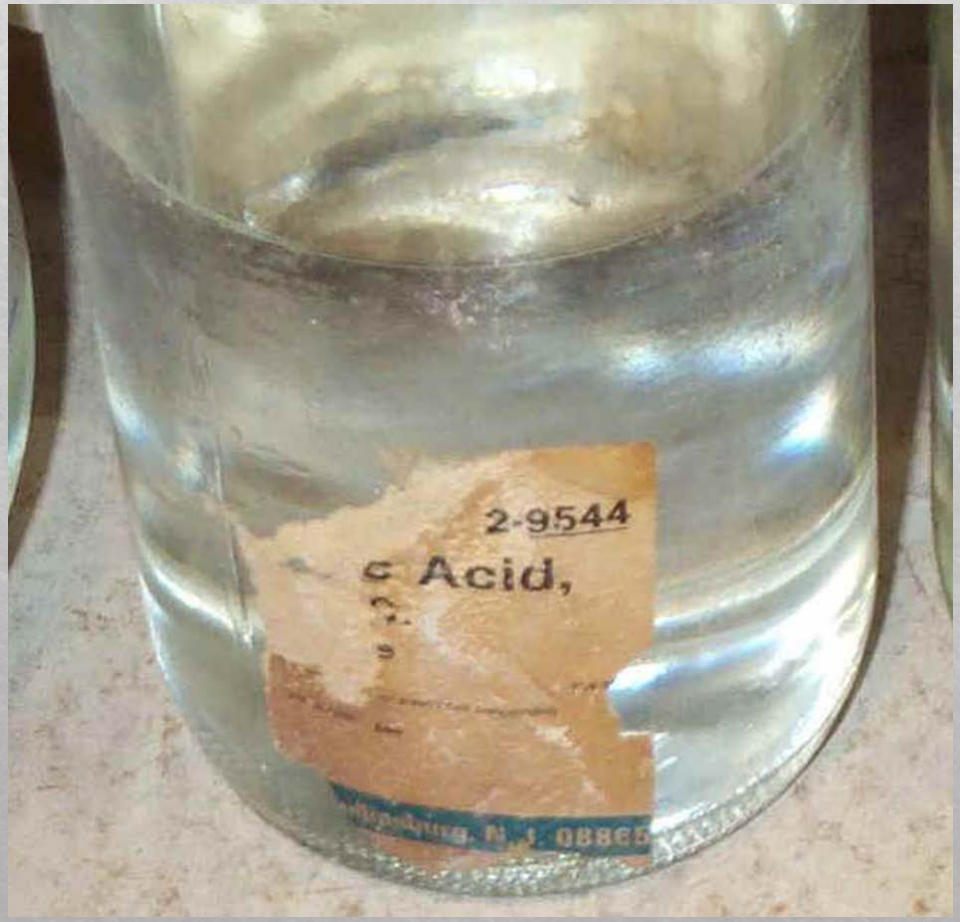
Health Hazard	Flame	Exclamation Mark
		
Gas Cylinder	**Corrosion**	**Exploding Bomb**
		
Flame Over Circle	**Environment** (Non-Mandatory)	**Skull and Crossbones**
		
• Oxidizers	• Aquatic Toxicity	• Acute Toxicity (fatal or toxic)

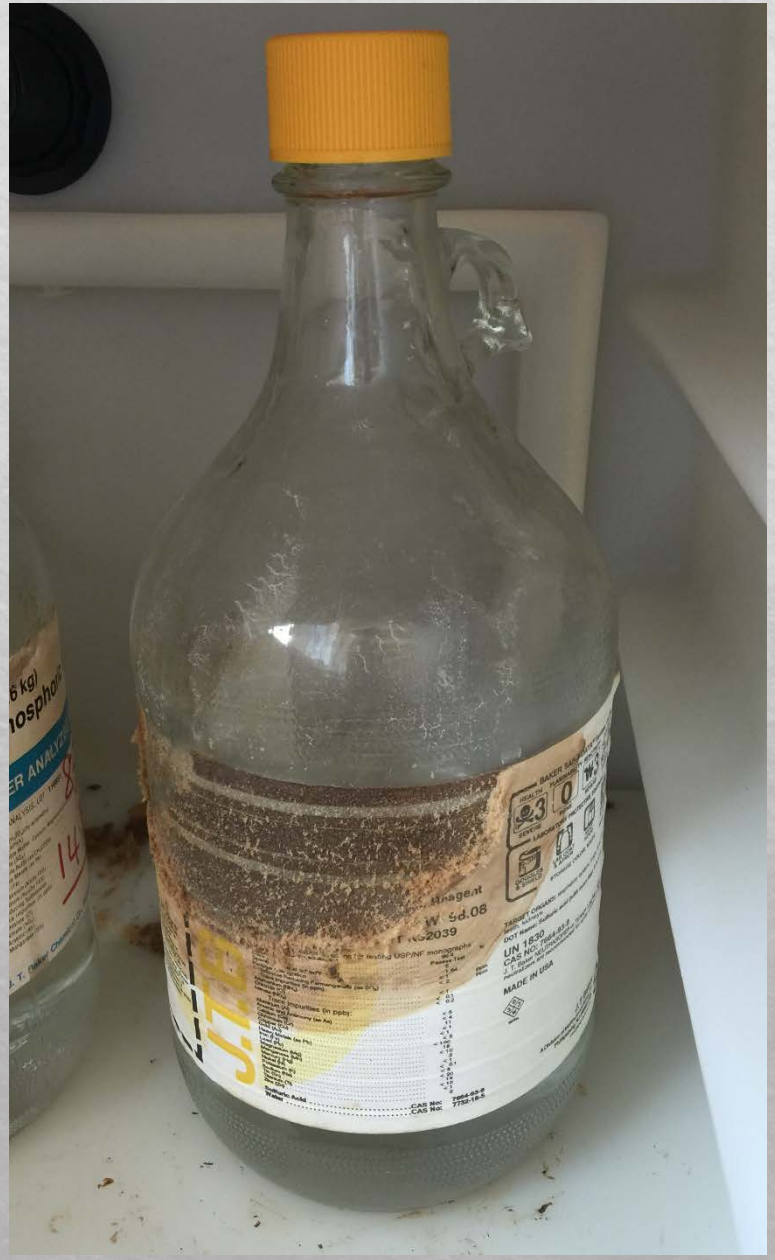
Labeling

- Primary Container (Manufacturer's Label):
  - Don't destroy or deface
  - Date label on receipt
  - If reused (ex: for waste), completely remove or cross out old label

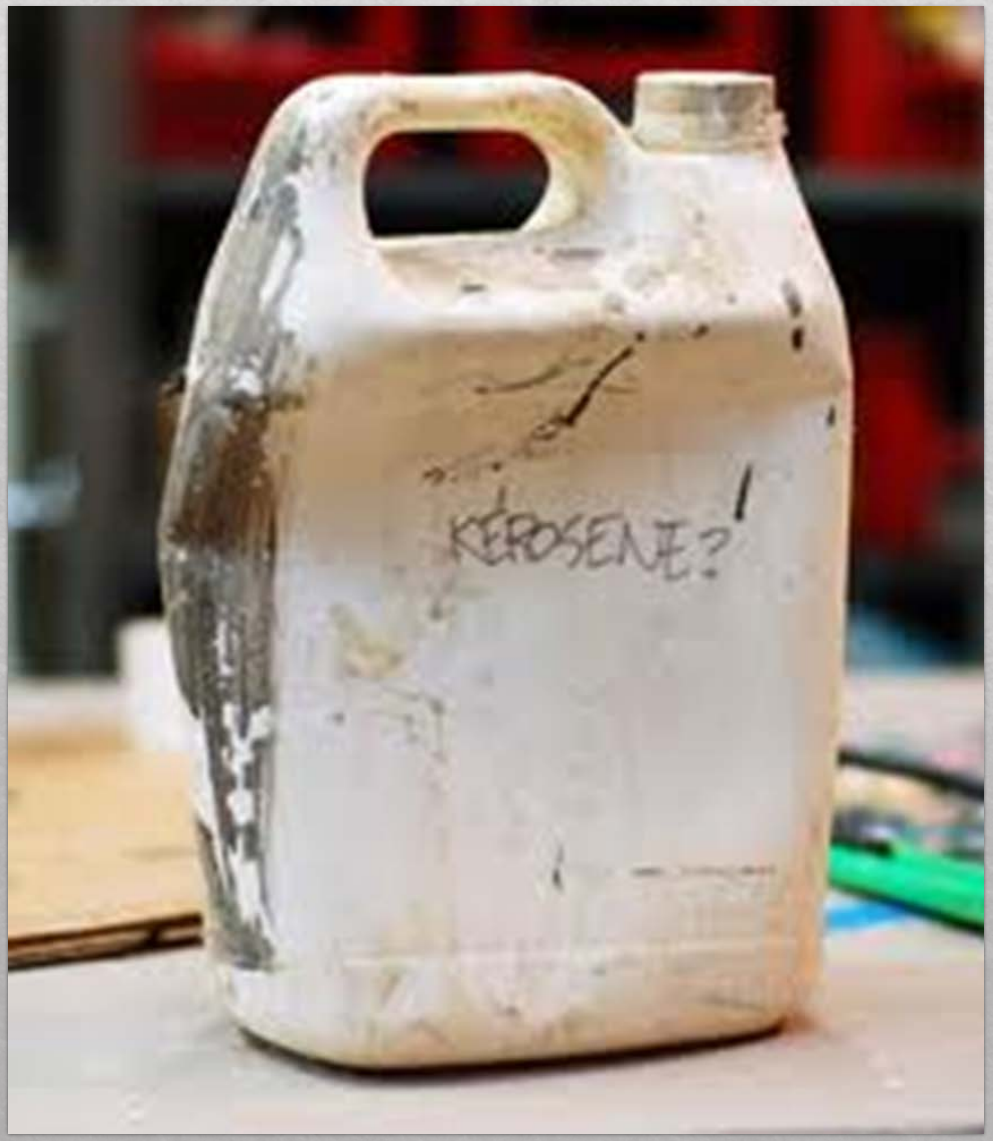


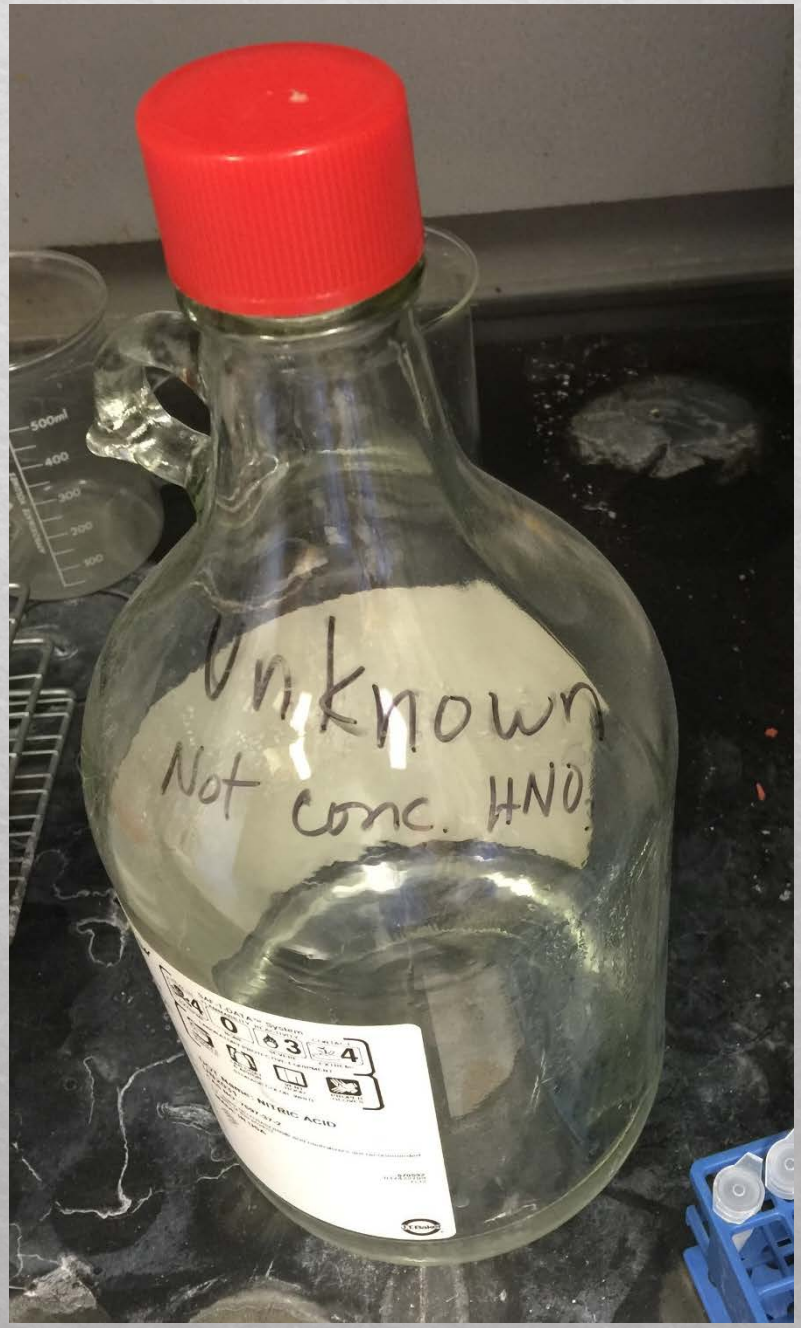
Inadequate Labels – Damaged/Unreadable



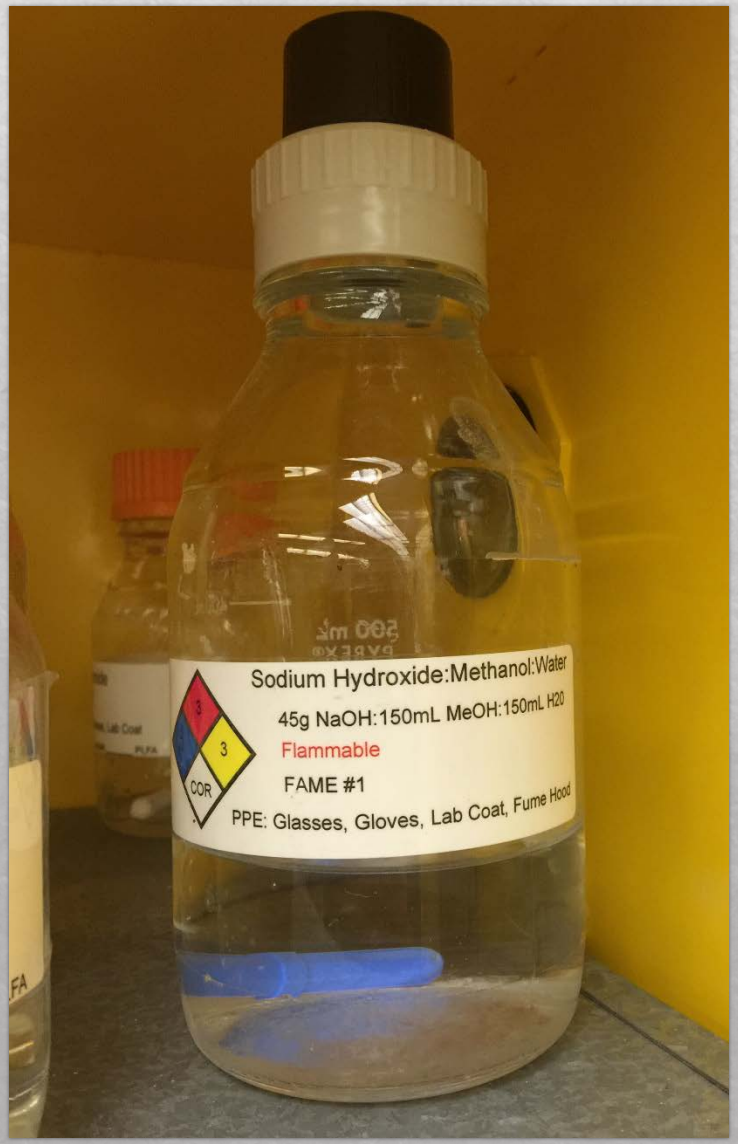


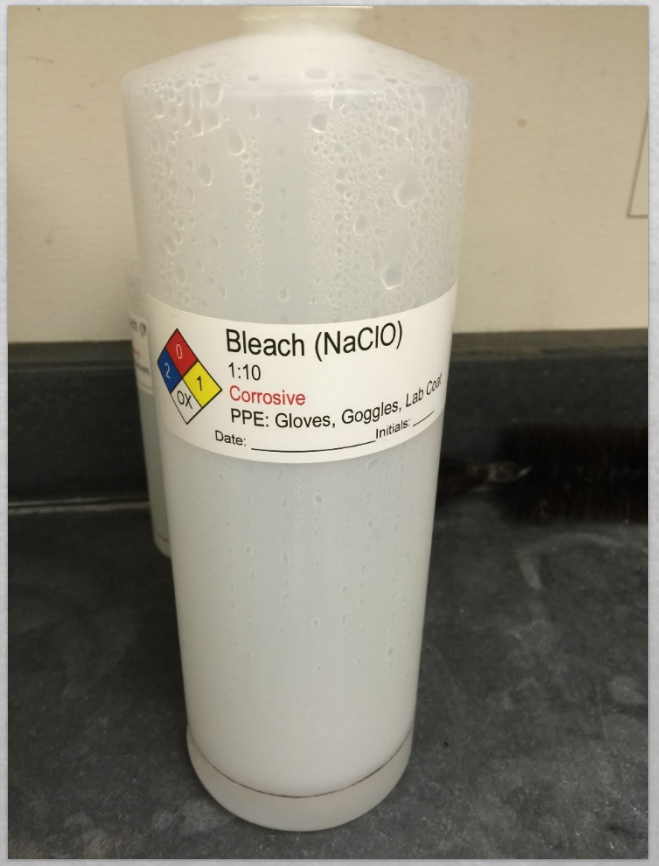
Inadequate Labels – Contents not known





Excellent Secondary Container Labels





Focus Areas

2016

- Mercury thermometer replacement
- Sharps management
- Access to emergency equipment
- Fume hood use
- **Waste management**

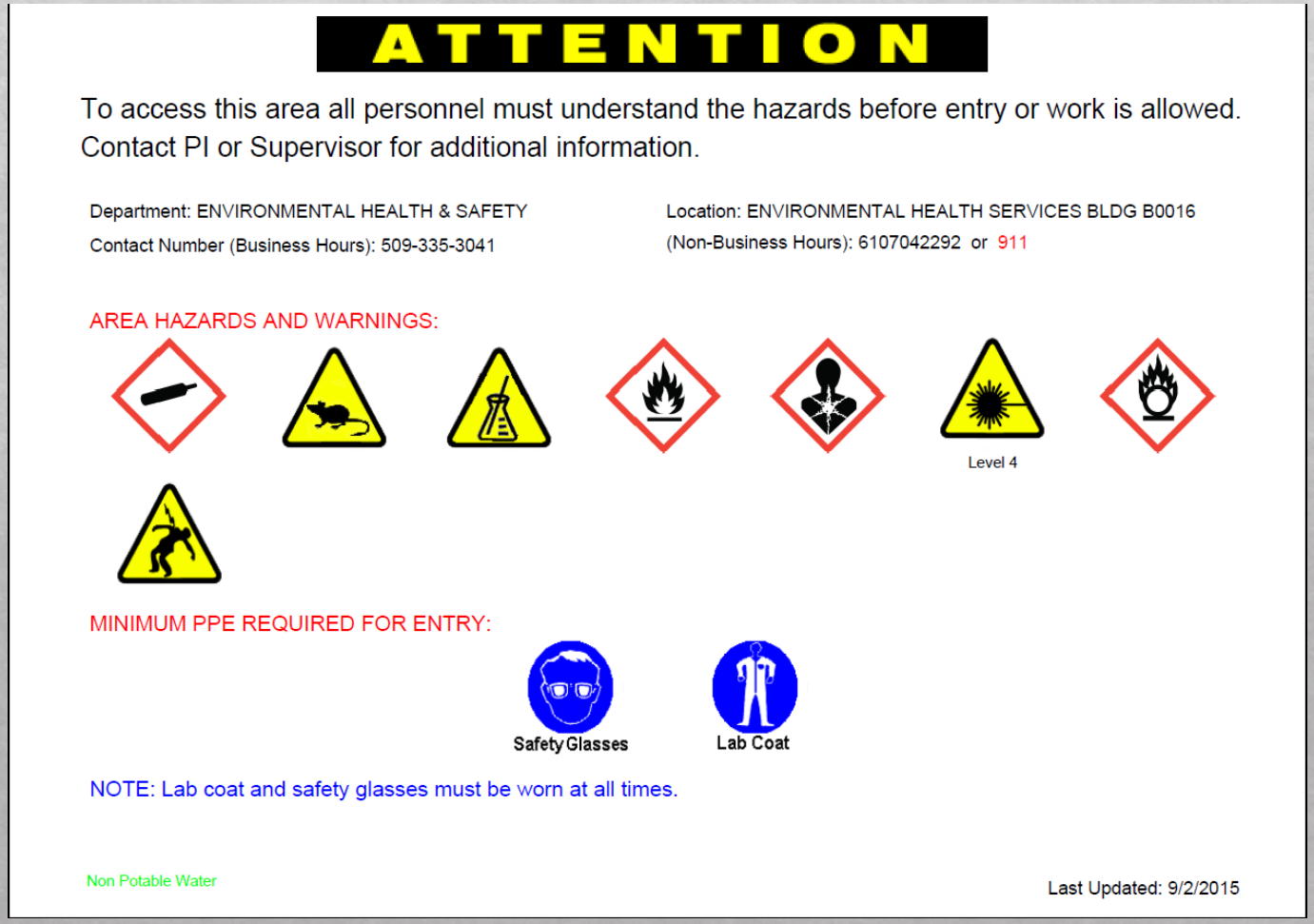
2017

- **Waste management**
- Chemical storage
- Lab signage (in development)

Laboratory Signage Program

Warning signs posted by lab doors:

- Identify hazardous materials inside
- Identify PPE required to enter
- Special research concerns
- Must be reviewed annually
- Emergency numbers



ATTENTION

To access this area all personnel must understand the hazards before entry or work is allowed.
Contact PI or Supervisor for additional information.

Department: ENVIRONMENTAL HEALTH & SAFETY
Contact Number (Business Hours): 509-335-3041

Location: ENVIRONMENTAL HEALTH SERVICES BLDG B0016
(Non-Business Hours): 6107042292 or 911

AREA HAZARDS AND WARNINGS:

Level 4

MINIMUM PPE REQUIRED FOR ENTRY:

Safety Glasses

Lab Coat

NOTE: Lab coat and safety glasses must be worn at all times.

Non Potable Water

Last Updated: 9/2/2015

Chemical Storage

- Common segregation mistakes
  - Organized alphabetical
    - Solid oxidizers next to organic solids
  - Organic acids with oxidizing acids
  - Acids with bases
  - Air and water reactive
  - Using fume hood for routine storage


Carlson
234
Windex


08/03/2011 14:22


Nitric Acid
J.T.Baker
2-Propanol
1 M BaCl2
237

Store chemicals in:

Flammable storage cabinet

Acid/corrosive storage cabinet

Under fume hood cabinet

Do not store solvents/corrosives high on shelves

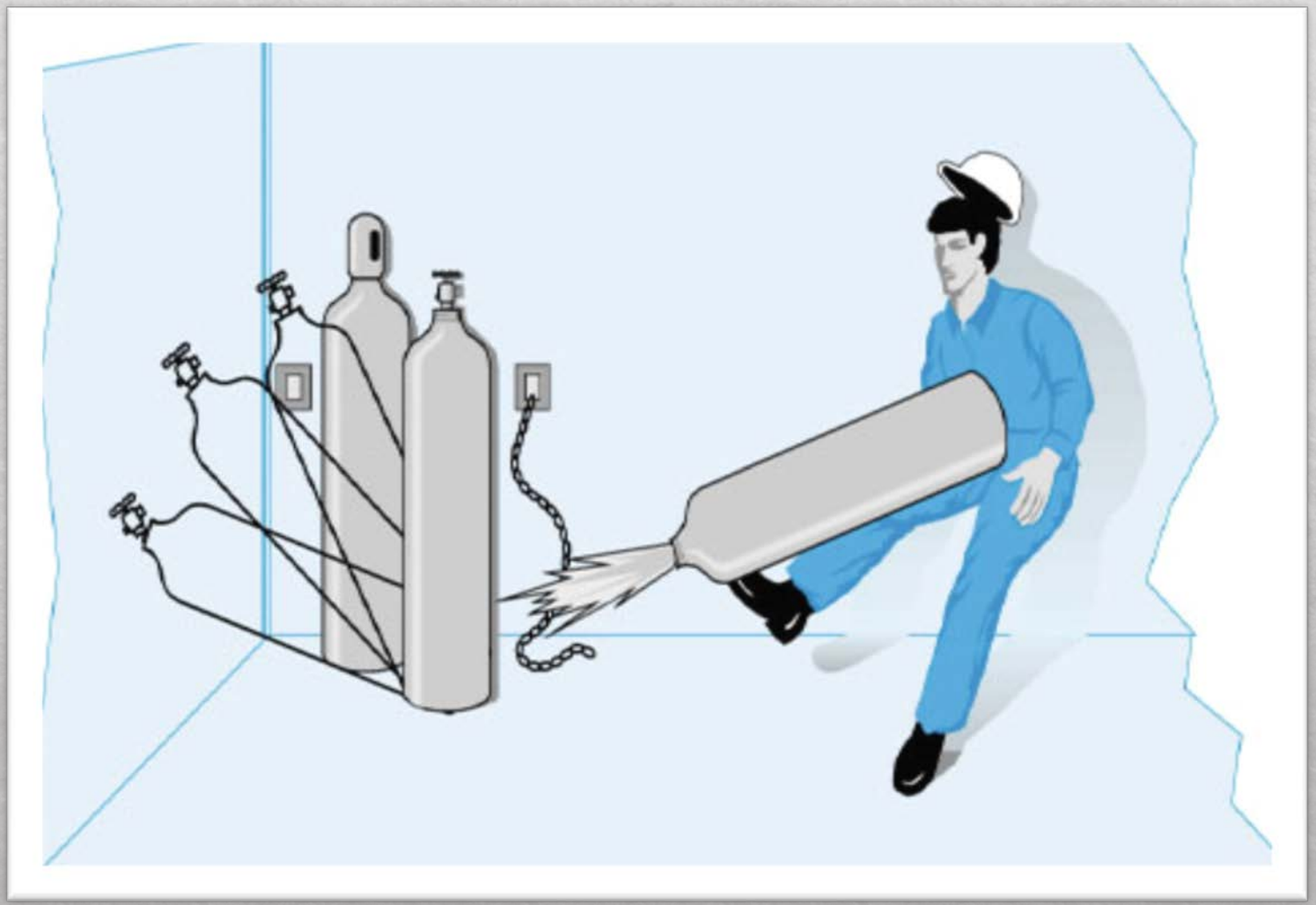
PT

Gas Cylinders

- Chain, racks to ensure safe storage
- Transport using wheeled carts with cylinders strapped in

Don't turn a gas cylinder into a rocket!

Neck of cylinder is easily broken. →



Secure and cap cylinders when not in use.
Use cylinder cart to move cylinders.

Personal Protective Equipment (PPE)

WASHINGTON STATE UNIVERSITY

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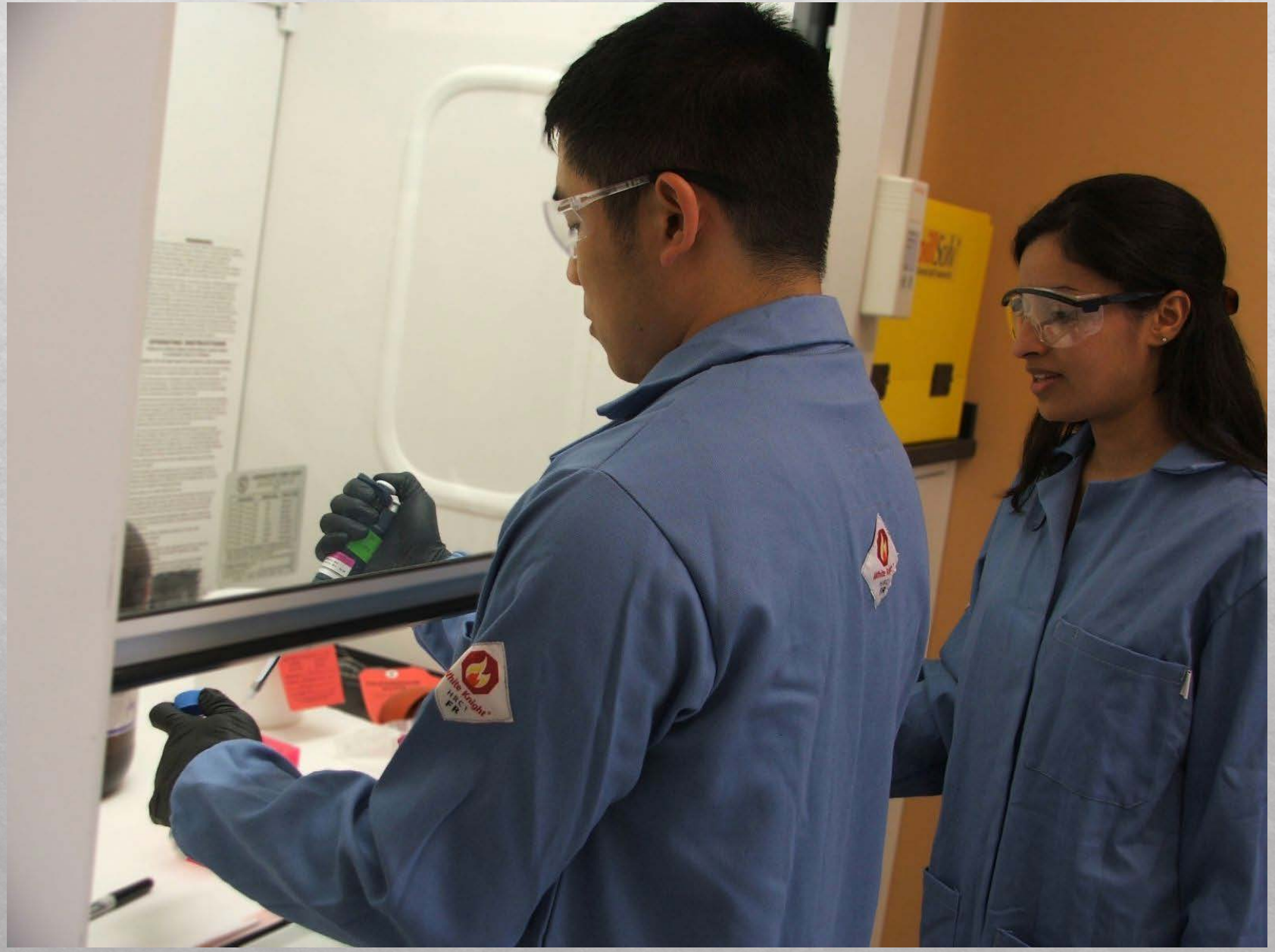
Eye Protection

- Physical hazards (face shield, safety glasses)
- Chemical hazards (splash goggles)
- Light exposure (Optical Density (OD) goggles)



Gloves

Compatibility

- Leather, Nitrile, Latex, Neoprene

Contamination

- Cell Phones, Drawers, Face

Double glove

- Yes or No?

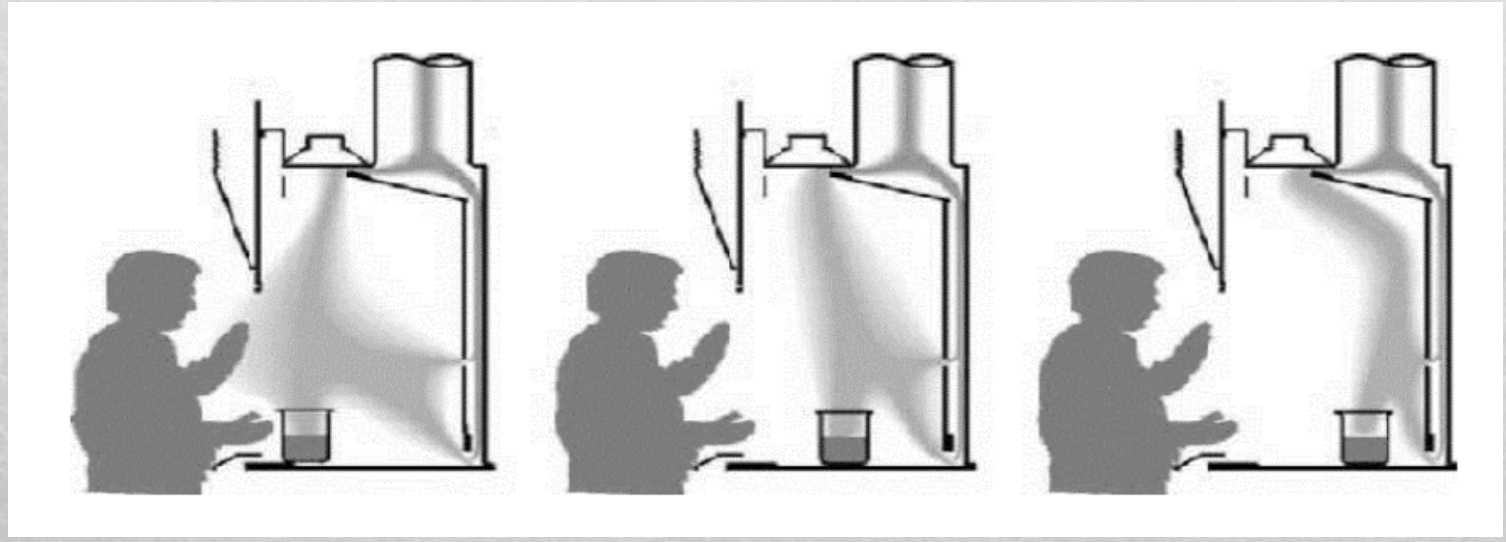
One Glove Rule

When are they not appropriate?

What's Wrong?

Chemical Fume Hoods

- Keep all material at least 6” beyond face (tape helps)
- Working sash height as low as possible (Max = 18 inches)
- Elevate bulky objects with blocks or racks
- Close sash all the way when not in use (energy and safety)
- Do not use hood to evaporate chemical waste or solvents
- Do not use if off because there is NO protection
- DO NOT USE FOR STORAGE

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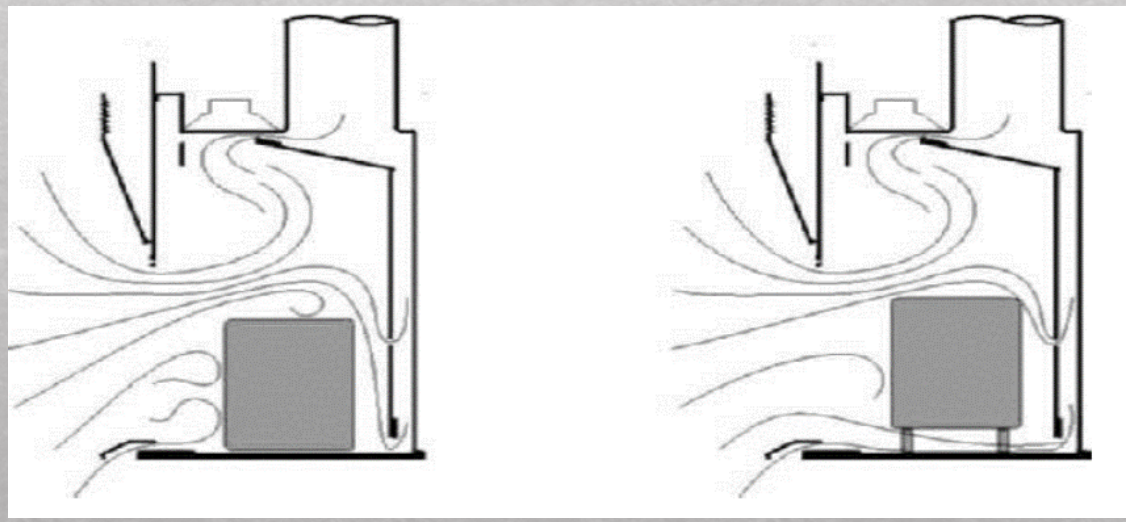


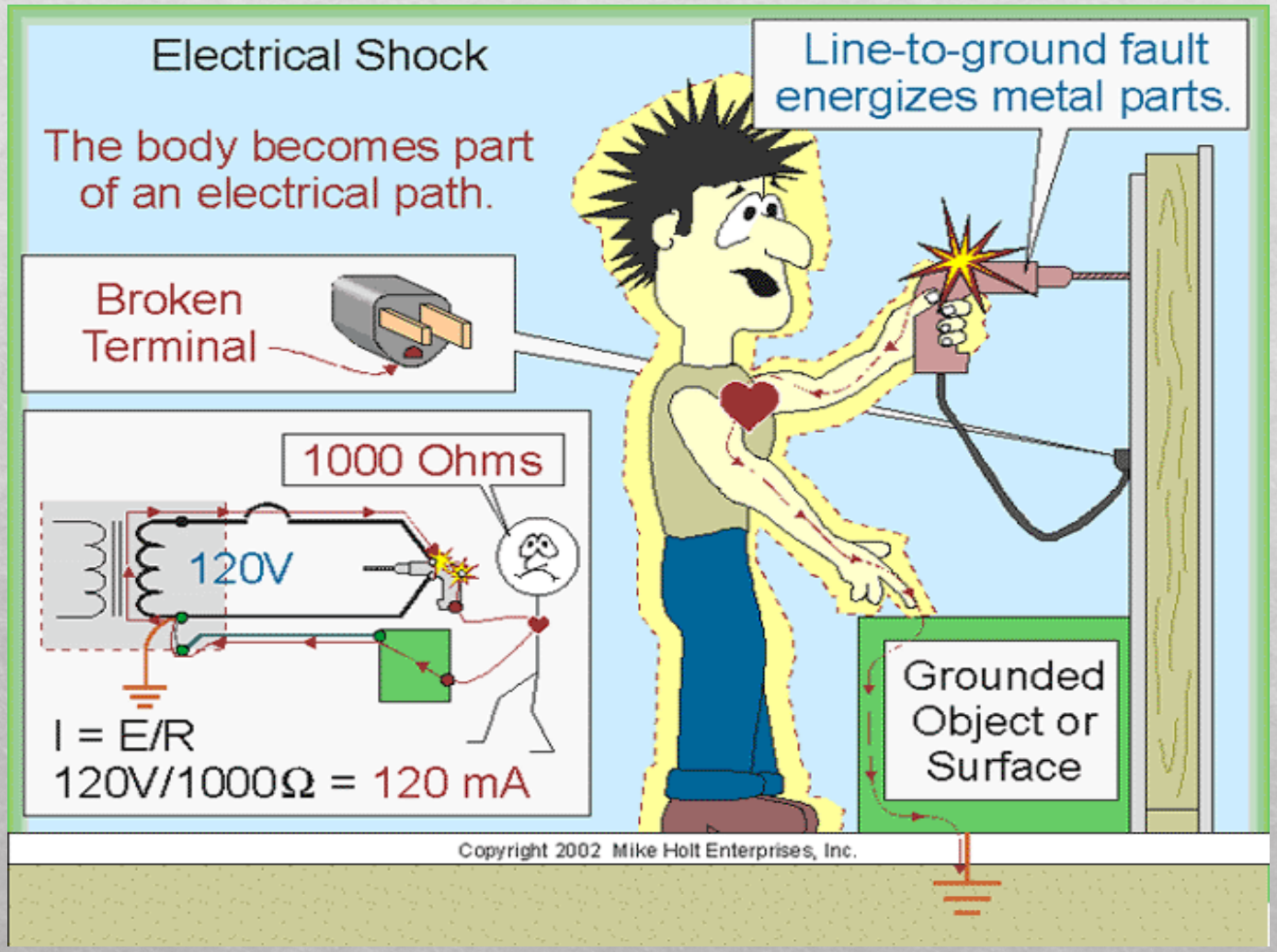

VWR 1410


Organomation Associates
OA-SYS
Heating System
HEAT
LOW


Organomation Associates, Inc.
OA-SYS
N-EVAP 111
HEAT
LOW
POWER


08/03/2011 14:24

Electrical Hazards



Broken ground plugs, bare wires, standing water all increase the risk of shock

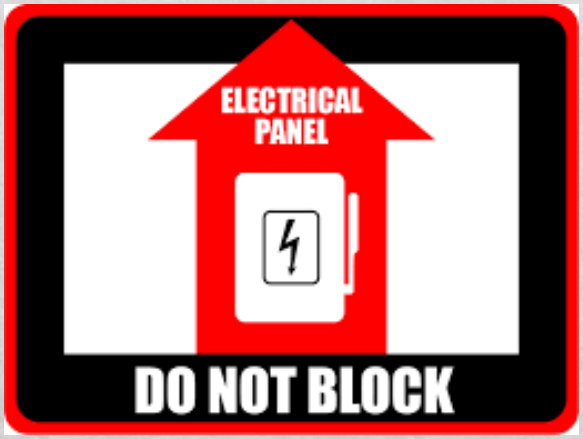
Safe Use of Power Tools

- Don't use unless trained
- Keep tools in good condition
- Use right tool for the job
- Examine tool before use
- Operate per manufacturer's instructions
- Use proper PPE
- Never carry by cord or hose
- And more….

Extension Cords

- Temporary use for portable equipment
- Not permanent wiring

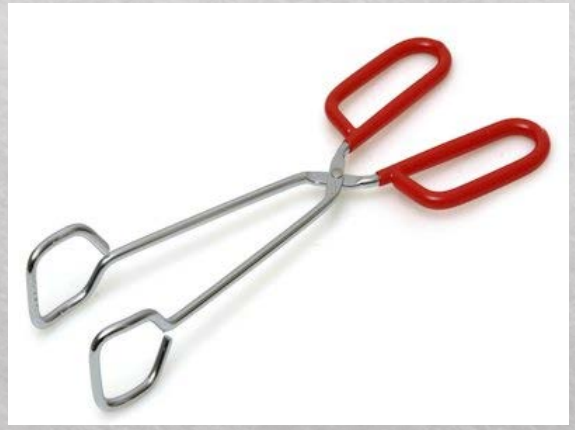
Know where your circuit breakers are:

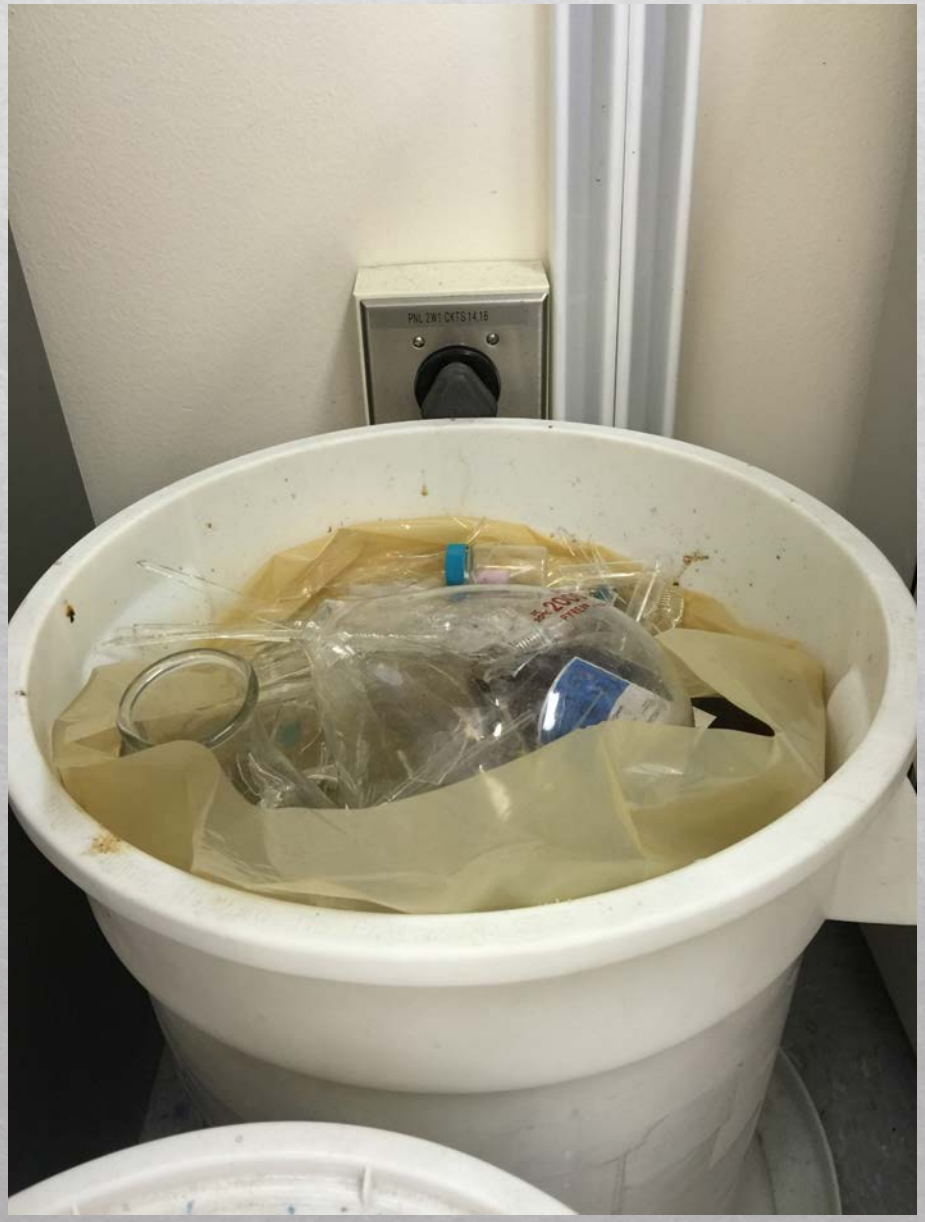


Don’t store combustibles or chemicals near panels

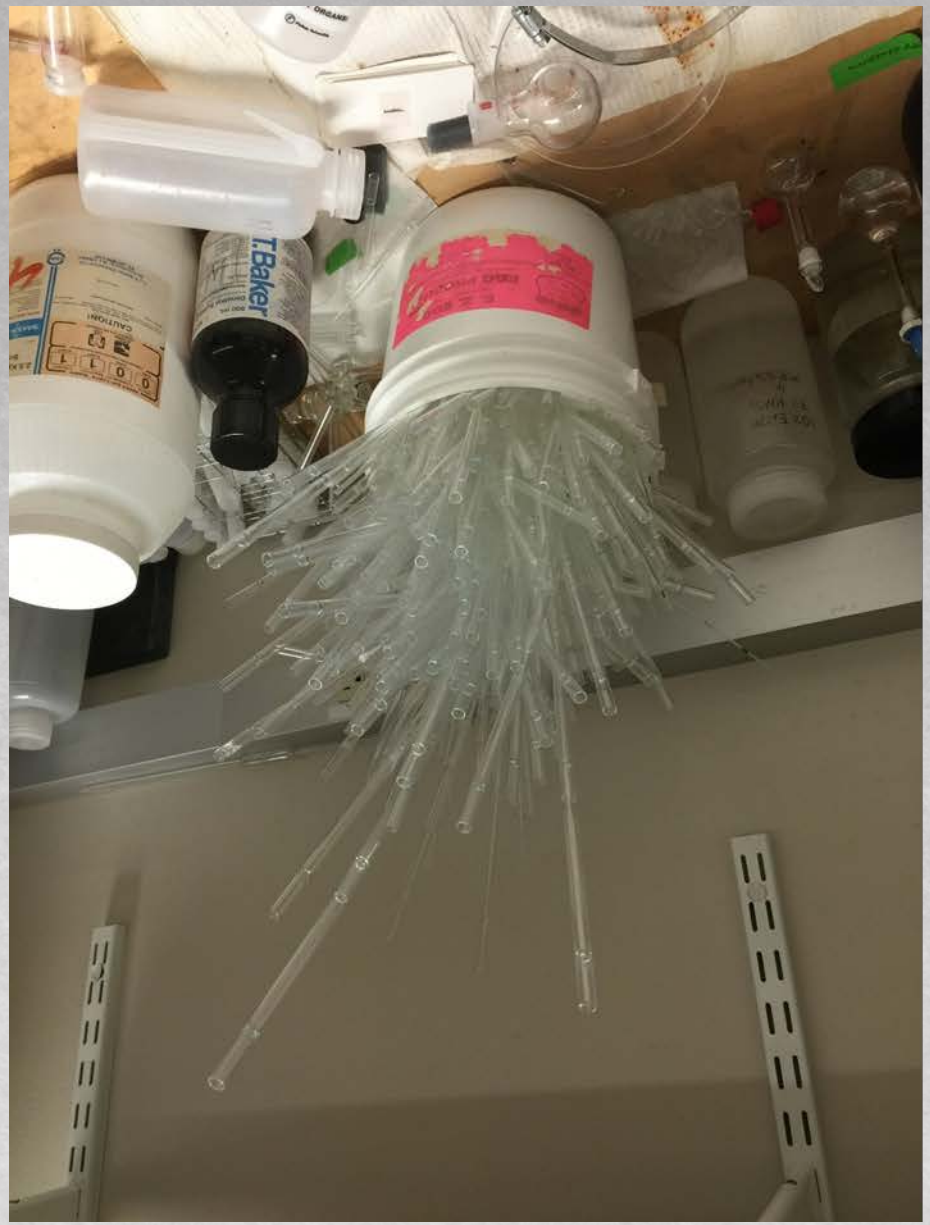
Glass & Sharp Trash

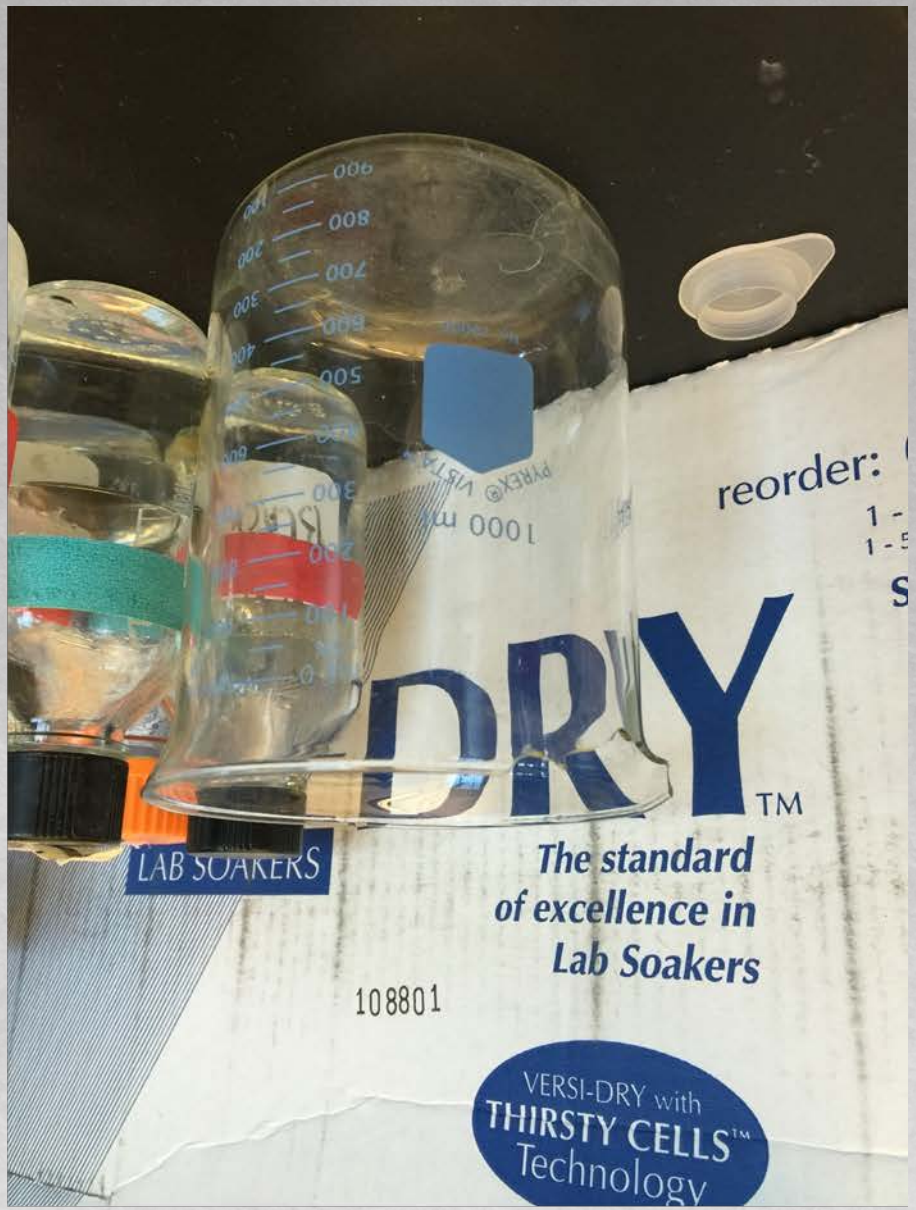
- Glass waste must be placed in "Glass Waste" container
- Don't throw sharp items in the trash!






DEPOSIT BROKEN GLASS HERE
Catalog No.
12-009-7A
GLASS




reorder:
DRY™
The standard
of excellence in
Lab Soakers
LAB SOAKERS
108801
VERSI-DRY with
THIRSTY CELLS™
Technology

Sharps Disposal

- Sharps such as needles, razors and pipettes need to be placed in a "Sharps" container

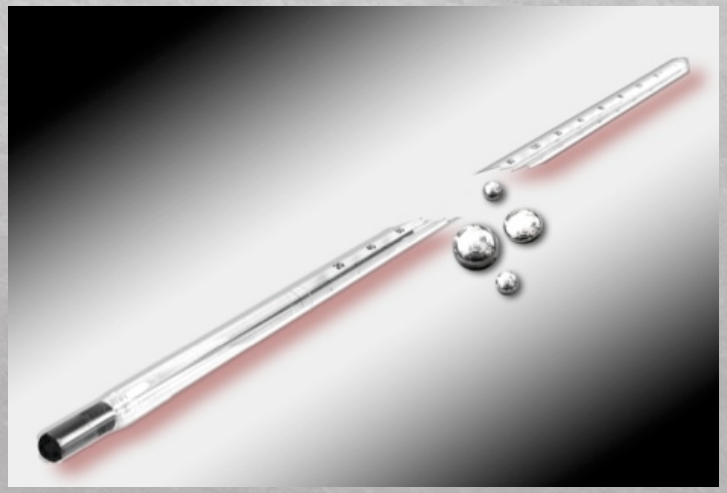
Waste Disposal

- Biohazard waste need to be autoclaved or disposed of in other ways (incineration)

- Mercury: Call EH&S immediately at 335-3041
  - Always considered a "spill"

*If you have any questions ask

Lab Manager, PI, or contact EHS



What is a Dangerous Waste?

- Characteristic waste
  - Corrosive
  - Flammable
  - Reactive

What is a Dangerous Waste?

- Toxicity (Washington State levels)
  - Toxicity for solutions and mixtures
  - State with most stringent waste requirements

What is a Dangerous Waste?

- City of Pullman discharge limits
  - pH must be between 5-9
- Rinsate – Collect or drain discharge

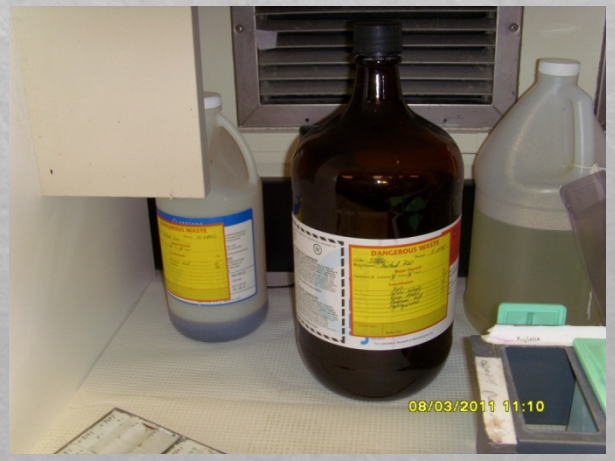
Please do not pour chemicals down the drain without prior approval from Environmental Health and Safety.

Call 335-3041 for more information. Thank you for your cooperation.

Collection & Disposal Procedure

Generator Responsibilities

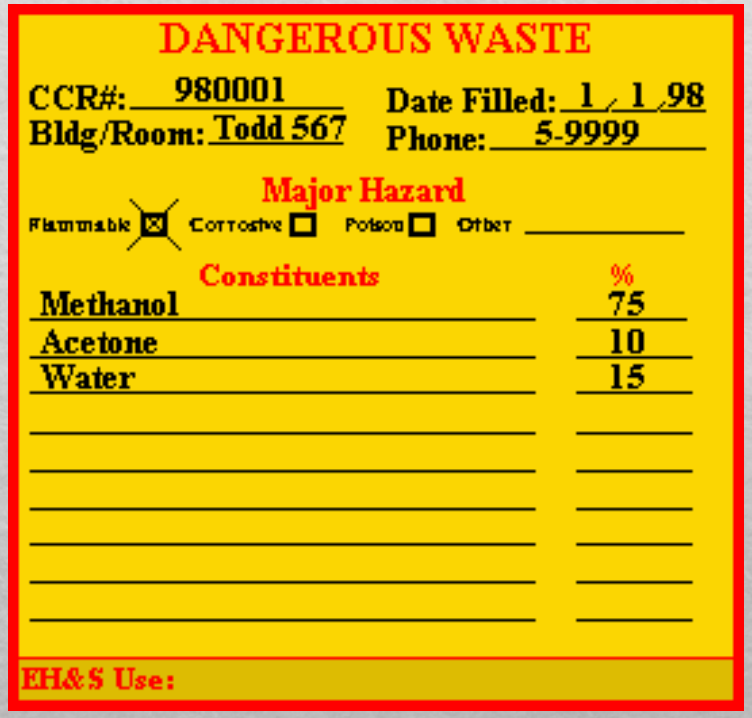
- Waste container
  - Compatibility
  - Correct lid
  - Integrity
  - Close when waste being added
- Don't completely fill
- Secondary containment available
- Security



Collection & Disposal Procedure

Generator Responsibilities

- Proper labeling
  - "Dangerous Waste"
  - Major hazard
  - Constituents
    - No abbreviations
    - Avoid trade names
    - Equal 100%, including water
- Attach label when waste is first added



Collection & Disposal Procedure

Generator Responsibilities

- Fill out an online Chemical Collection Request (CCR) Form www.ehs.wsu.edu/ccr/ccr.asp
  - Name, location (building, room number, mailstop), phone number
  - Constituents (no abbreviations) equaling 100% including water
  - Container size and number of containers

Chemical Collection Request

Name: Jason
Mail Stop: 1172
Phone: 5-9564
Building: ehs
Email: sampsonj@wsu.edu
Room: 72
Location: Pullman

Constituent

Complete names ONLY.
No formulas, abbreviations

Percentage

Do not use a '%' symbol

Constituent:
Percentage: %

Add This Constituent/Percentage

Physical State:

Solid Liquid Gas

Number of Containers:

Weight/Volume: Select Units:

Major Hazard:


Flammable


Poison


Oxidizer


Explosive


Air/Water Reactive


Corrosive

Secondary Hazard(s):


Flammable


Poison


Oxidizer


Explosive


Air/Water Reactive


Corrosive

Additional Information:

Proceed to Data Verification Clear This Form

Recent Compliance Inspections

- Violations Found
  - Labels not properly filled out
  - Not defacing product labels
  - No lids on waste containers
  - Having funnels in waste containers

Recent Compliance Inspections

- Violations Found
  - Housekeeping causing potential safety concerns
  - Improperly labeled waste containers


DANGEROUS WASTE

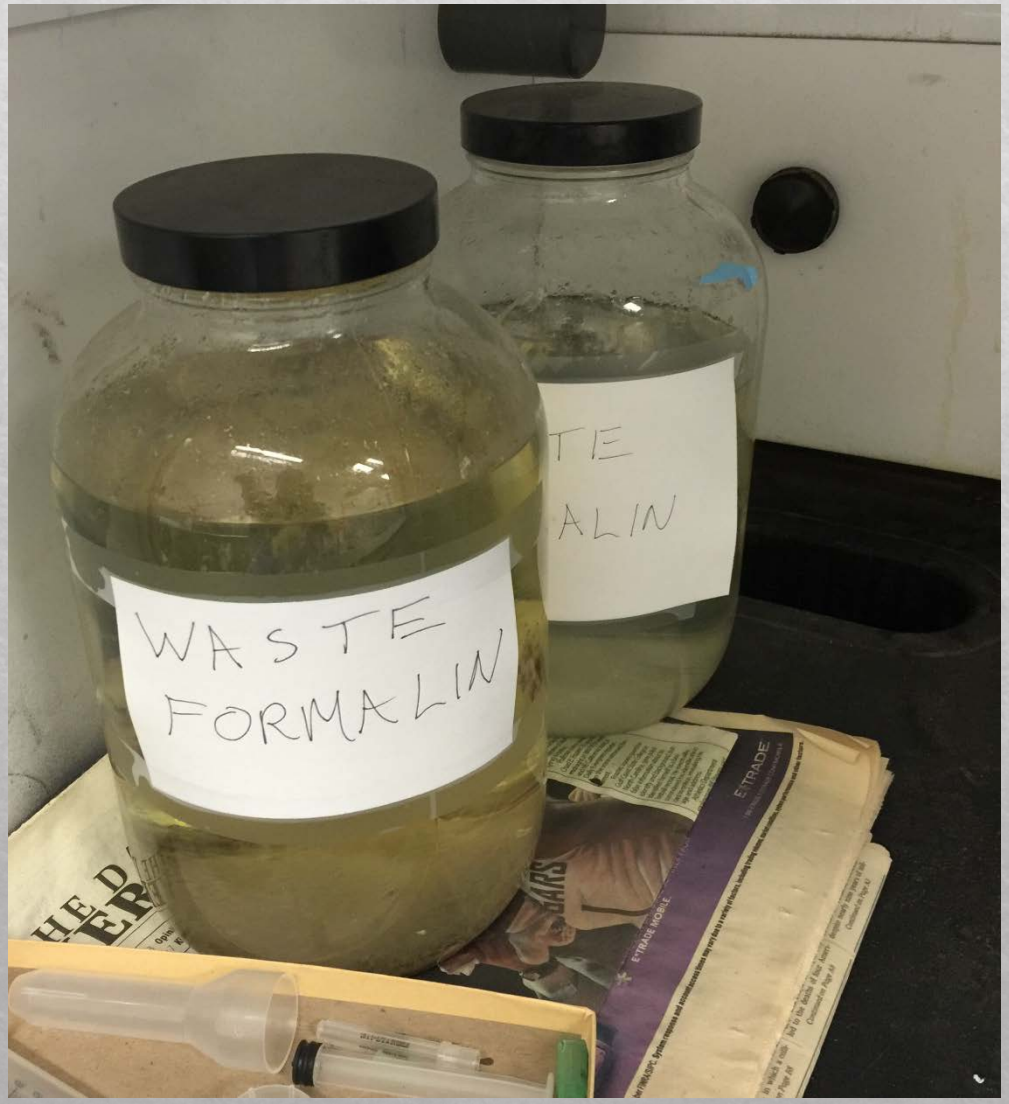

FISHERbrand

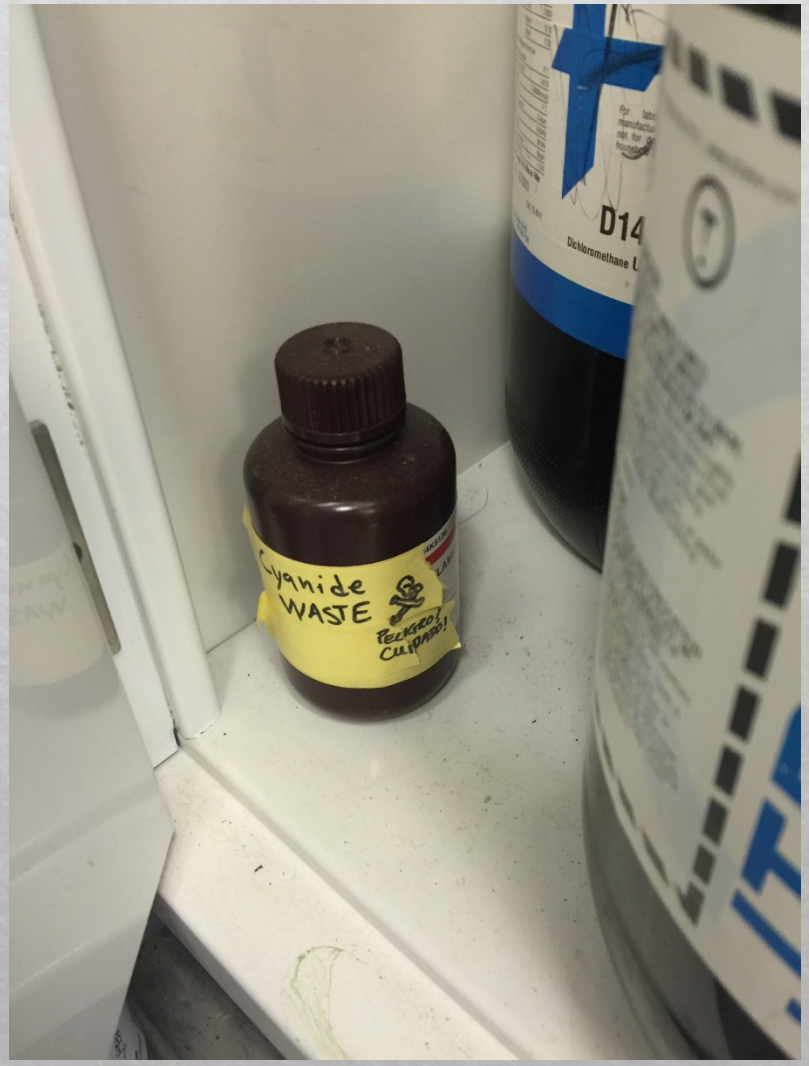

Phenol
Chloroform
WASTE
started
9/9/2018
KIMTECH
TISSUE-TEK II
Xylenes
Xylenes for LCMS
Chloroform


DANGEROUS WASTE
DANGEROUS WASTE
08/03/2011 14:33


08/03/2011 14:34


RAG
HELL
Rags with Mineral Spirits, Acetone, Alcohol,
and very inky/oily rags go in here!
08/03/2011 13:20


WASTE
FORMALIN
TE
ALIN


Cyanide
WASTE
D14


Hydrochloric Acid
Thionyl Chloride
ACID PHOSPHORIC
Phosphoric
ACETIC ACID GLACIAL
J.T.Baker
08/03/2011 14:22

<u>What can happen with incompatible waste chemicals</u>
(An explosion took place here)

Incompatible Waste in Same Bottle

Safety Equipment

- Eye wash stations
  - 0.4 GPM (1.5 Liters) for 15 minutes

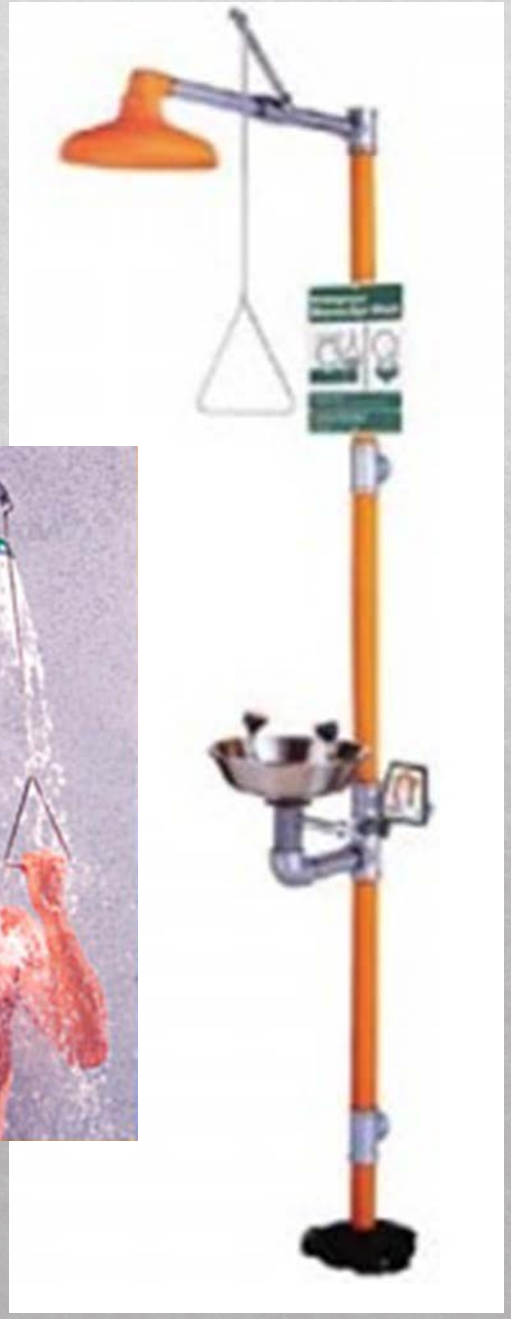
Safety Equipment

- Drench Hose
  - 3.0 GPM for 15 minutes
  - Not an eyewash

- Safety Shower
  - 20 GPM for 15 minutes

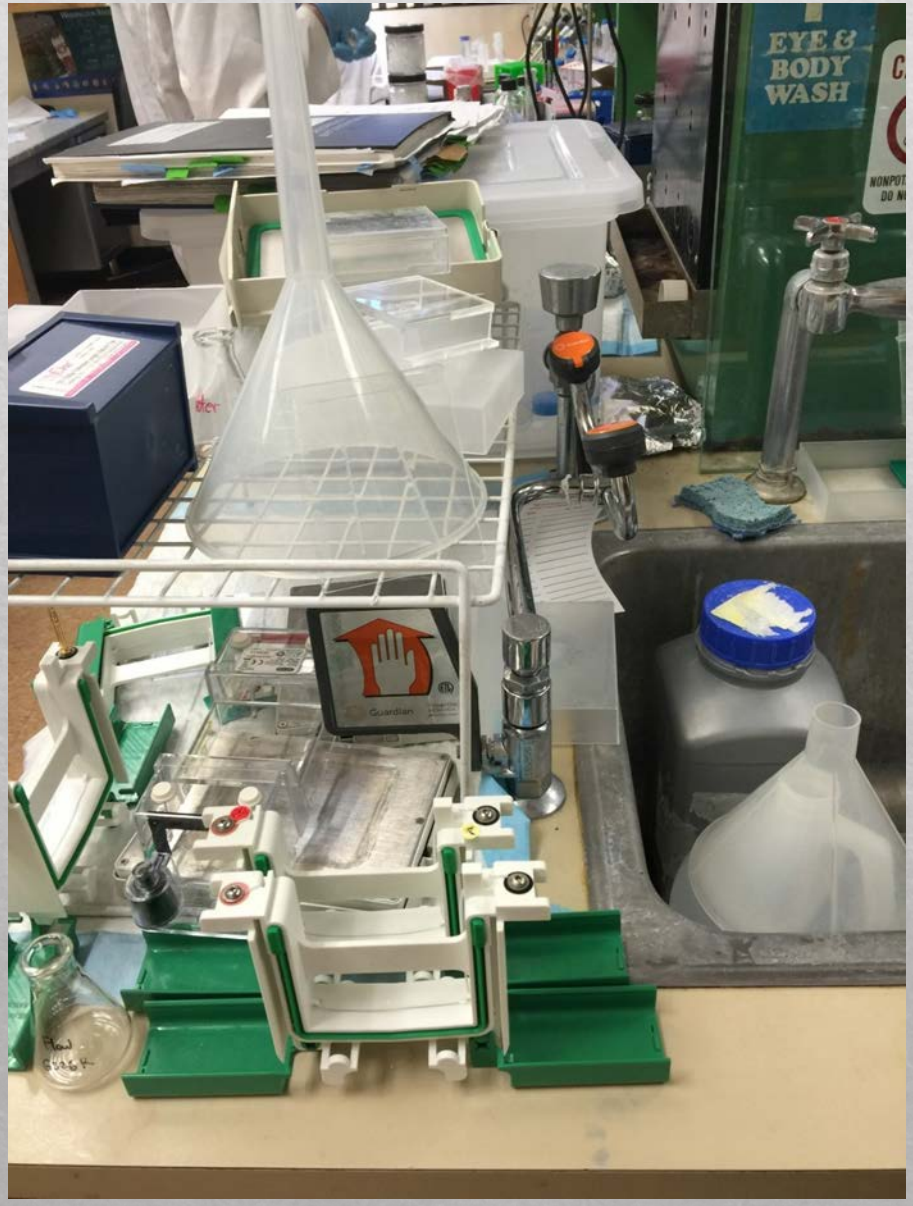
Eyewash & Drench Hoses

- Must be activated weekly
- Use sink or bucket to catch water
- Cleans out debris, ensures it is working
- 10 sec./50 feet to reach
- 15 minute rinse



Showers

- Not to be tested by labs
- Tested Annually by FacOps


EYE &
BODY
WASH
Guardian


Keep Area Clear
Test All Emergency Equipment Weekly
WaterSaver

Questions?

*Contact PI, Lab Manager, or EH&S