

Laboratory Safety

April 25, 2008

A stylized silhouette of a mountain range in shades of teal, located at the bottom right of the slide.

Environmental Health & Safety

- ◆ Kevin Brady – Director, RM/EHS
- ◆ Jeremiah Diaz – Chemical/Biological Safety Officer
- ◆ Brian Magness – Radiation Safety Officer
- ◆ Todd McIntyre – Health & Safety Coordinator
- ◆ Andrew Wilson Hazardous Materials Technician

Emergency Information

- ◆ Escape Route
- ◆ Fire Extinguisher
- ◆ Fire Alarm Pull Station
- ◆ Safety Shower & Eyewash

Agenda

- ◆ Chemical Safety - (K. Brady)
 - ◆ Chemical Inventory - (A. Wilson)
 - ◆ Laboratory Security - (K. Brady)
 - ◆ Review – (RM/EHS)
- 

**“The frequency of
academic research lab
accidents is 10 to 50
times greater than in
industrial labs.”**

August 4, 2006
Laboratory Safety Institute

A stylized silhouette of a mountain range in shades of teal, located at the bottom right of the slide.

Before you do a laboratory assignment

- ◆ Know the hazards
- ◆ Know the worst things that could happen
- ◆ Know what to do if they should happen
- ◆ Identify & Use prudent practices and protective equipment needed to minimize the risks

SAFETY GOAL

- ◆ Learn to care about your safety and the safety of those around you
- ◆ Use YOUR knowledge about safety in the Laboratory to your ADVANTAGE!
- ◆ Be PROACTIVE **not** reactive
- ◆ In a profession where hazards exist...Live a safer, healthier, longer life!

Complacency & Familiarity = CONCERN

Know the Hazards



The Hazards:

- ◆ Flammable
- ◆ Corrosive
- ◆ Poison
- ◆ Toxic
- ◆ Irritant
- ◆ Carcinogen
- ◆ Oxidizer
- ◆ Pyrophoric (air)
- ◆ Water reactive
- ◆ Cryogenic
- ◆ Radioactive

Chemical Hazard Information:

- ◆ Container Label
- ◆ Material Safety Data Sheets (MSDS)
- ◆ Chemical Handbooks or Internet Resources
- ◆ Lab Supervisor and/or Principal Investigator (PI)

[http://www.calstatela.edu/univ/ehs/
msds.htm](http://www.calstatela.edu/univ/ehs/msds.htm)



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The Worst that Could
Happen?

The background is a solid teal color. At the bottom right corner, there is a silhouette of a mountain range in a slightly darker shade of teal.

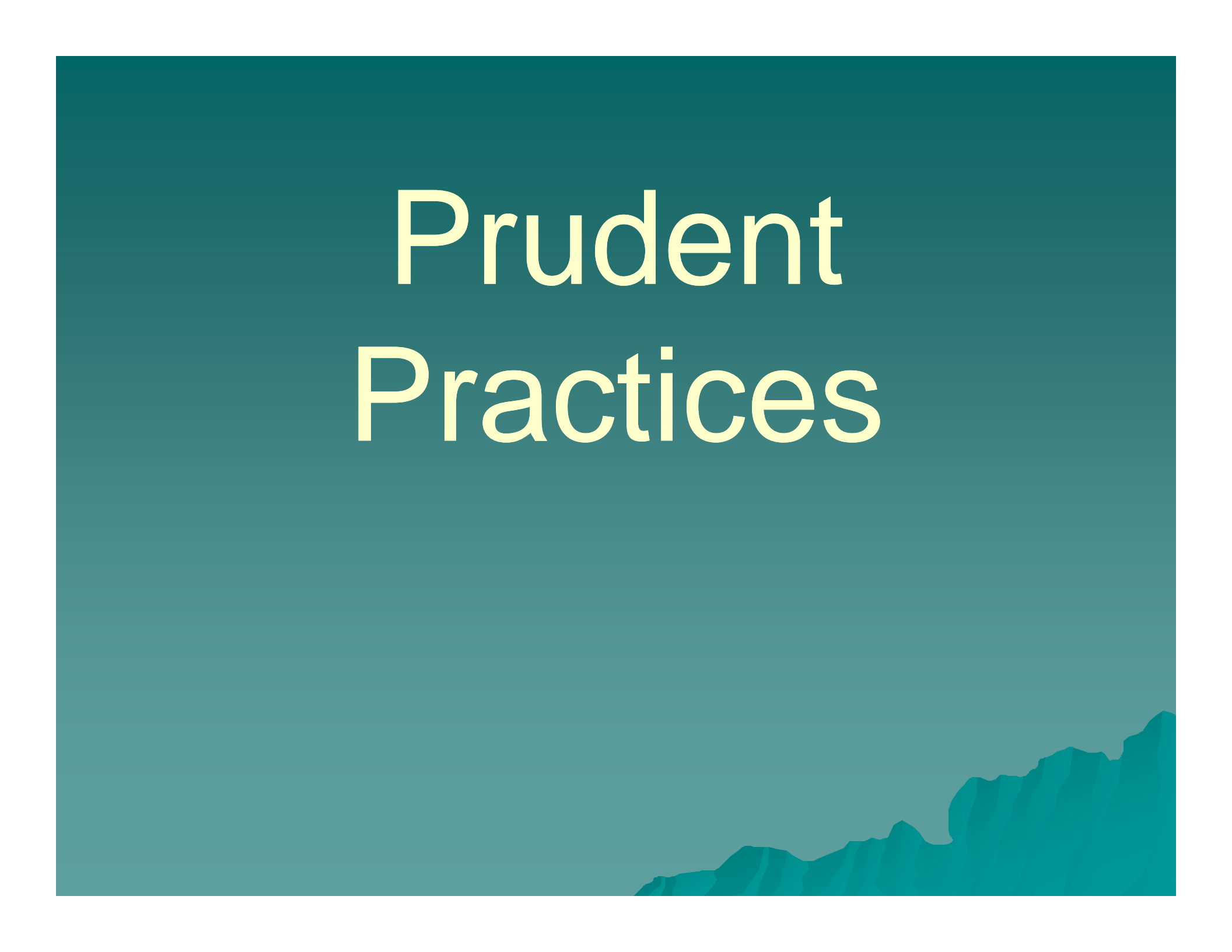
We See It Every Day

- ◆ What is happening regarding Chemical Safety (U.S. Chemical Safety Site):
 - <http://www.chemsafety.gov/index.cfm?folder=circ&page=index>
- ◆ August 1998 CSULA Fire
- ◆ July 2004 CSULA Container Explosion
- ◆ ??????

In Case The Worst Happens:

- ◆ Know where to find fire extinguishers, emergency eyewash/showers, exits and alarm stations
- ◆ Chemical in eye – flush for 15 minutes
- ◆ Emergency shower – remove clothing in the shower and rinse for 15 minutes
- ◆ Call for emergency assistance – 911
- ◆ Sound alarm and clear the area
- ◆ Contain spills if possible...or get assistance
- ◆ Extinguish small fires...Know your limitations
- ◆ Render assistance and first aid
- ◆ Provide emergency personnel with the identity and information on the chemical involved (preferably with a copy of the MSDS)

Prudent Practices

The image features a solid teal background. In the bottom right corner, there is a silhouette of a mountain range, rendered in a slightly darker shade of teal. The text 'Prudent Practices' is centered in the upper half of the image in a light yellow, sans-serif font.

Prudent Laboratory Practices:

- ◆ Good Housekeeping
 - Clean-up and properly store materials
 - Don't block access to emergency equipment
- ◆ No eating, drinking, smoking or applying make-up
- ◆ Remove gloves and wash hands – Don't take hazardous materials home with you
- ◆ Never smell or taste chemicals or pipette by mouth
- ◆ Never work alone – Let someone know where you are (Public Safety 3-3700)

Laboratory Procedures

- ◆ **Chemical Hygiene Plan** – (29 CFR 1910.1450 & CCR, Title 8, Section 5191)
 - Standard operating procedures (performance based)
 - Cal/OSHA Std.: <http://www.dir.ca.gov/Title8/5191.html>
 - CSULA Plan: http://www.calstatela.edu/univ/ehs/chem_lab.htm
- ◆ **Prudent Practices in the Laboratory** (National Research Council)
- ◆ **See your Lab Supervisor or Principal Investigator**

Protective Equipment

- ◆ **Engineering Controls**
 - Fume hoods & glove boxes
- ◆ **Personal Protection Equipment (PPE)**
 - Eye Protection
 - Sturdy Shoes
 - Gloves, Aprons, Lab Coats, etc.
 - Proper Laboratory Attire
 - (See your lab supervisor)

Chemical Storage

- ◆ Keep the amount of chemicals in the lab to a minimum
- ◆ Maintain an accurate chemical inventory
- ◆ Never store chemicals on the floor
- ◆ Chemicals stored in shelves or at height shall be restrained...Keep liquids at the lowest level
- ◆ Provide secondary containment in case a container should break or leak
- ◆ Separate incompatible chemicals
- ◆ Refrigerators must be laboratory safe and labeled for their contents...**Do Not** mix personal and laboratory use!

Simple Spills

- ◆ You can clean it up if the spill:
 - Is not spreading rapidly
 - Does not endanger people, property or the environment
 - Is small in quantity and/or is minor in hazard
- ◆ Clean up Procedures:
 - Warn others
 - Consult MSDS
 - Contain the spill
 - Neutralize if necessary
 - Absorb liquids
 - Collect residues
 - Dispose wastes (through the RM/EHS Office Ext. 3-3531)
 - Decontaminate area and equipment
 - Always use PPE

Contact RM/EHS for Clean-Up of Large/Complex Spills
at Ext. 3-3531 (Off-Hours 3-3700)

Chemical Inventory

The image features a solid teal background. In the bottom right corner, there is a stylized silhouette of a mountain range in a slightly darker shade of teal. The text 'Chemical Inventory' is centered in the upper half of the image in a light yellow-green color.

Chemical Inventory Management System

- ◆ Computer Database
- ◆ Bar-code labels

Chemical Inventory System

- ◆ Keep the database current
 - Notify EHS when new chemicals arrive
 - Track empty containers and chemical disposals

HAZARDOUS WASTE

The image features a solid teal background. In the upper center, the words "HAZARDOUS" and "WASTE" are stacked vertically in a large, white, sans-serif font. At the bottom right corner, there is a dark teal silhouette of a mountain range.

HAZARDOUS WASTE Regulatory Requirements

- ◆ Cradle-to-Grave Tracking
 - Identification (waste profile)
 - **Labeling** (special requirements)
 - **Storage** (generally limited to 90 days)
 - Transportation (Hazardous Waste Manifest)
 - Disposal/Treatment (Landfill restricted)
 - ◆ Don't throw it in the trash
 - ◆ Don't pour it down the drain or flush it down the toilet
 - ◆ Don't put it into storm drains
 - Training (*annual requirement for anyone who deals with hazardous waste*)

Hazardous Waste Labels

HAZARDOUS WASTE

Hazardous Material (name & concentration): _____

Quantity: _____

Hazardous Properties: ___flammable ___toxic ___reactive
___corrosive ___other-explain_____

Physical State: ___liquid ___solid

Satellite Accumulation Start Date: ____/____/____

Final Accumulation Start Date: (EHS only) ____/____/____

Prepared by: _____ Room #: _____ Ext: _____

California State University, Los Angeles
5151 University Dr., Los Angeles, CA
Environmental Health and Safety Office
(323)343-3546

Hazardous Waste Storage Satellite Accumulation Rule

Allows generators to hold up to 55 gallons of waste **for as long as 1 year** provided:

- ◆ Waste is accumulated near point of generation
- ◆ Accumulation point must be under control of person generating the waste
- ◆ **Waste containers must be fully labeled and dated**
- ◆ Waste must be removed within 3 days after reaching the 55 gallon limit

Laboratory Hazardous Waste

- ◆ Designate a hazardous waste accumulation area
- ◆ Label all waste containers
 - Include date of initial accumulation
 - Eliminate inaccurate/improper labels
- ◆ Do not accumulate for more than 1 year
- ◆ Contact RM/EHS for disposal (Ext. 3-3531 or 3-3527)
- ◆ For Biological Waste Reference Handout

http://www.calstatela.edu/univ/ehs/biosafety/Bulletin_Biosafety_Disposal.pdf

Laboratory Security

"It is Everyone's
Responsibility to Ensure
that Labs Remain Secure."

Department of Homeland Security (DHS) Chemicals of Interest

- ◆ Carbon monoxide
- ◆ Benzilic acid
- ◆ Fluorine
- ◆ Hydrogen bromide (anhydrous)
- ◆ Hydrogen chloride (anhydrous)
- ◆ Methyl bromide
- ◆ Nitric oxide
- ◆ Phosphorus
- ◆ Trimethylamine

And There Are Many More...

http://www.dhs.gov/xprevprot/laws/gc_1166796969417.shtm

Lab Security Considerations...

- ◆ Recognize Lab Security is Related to Lab Safety
- ◆ Develop Lab Specific Security Measures
- ◆ Control Access to Chemical Use and Storage Areas
- ◆ Know Who is in the Lab and Why
- ◆ Secure Your Highly Hazardous Materials
- ◆ Have an Emergency Plan & Reporting Protocol

Be Aware...Be Prepared!

Let's Review

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What's Wrong Here?



Have You Identified Them All?

Sash above
allowed height



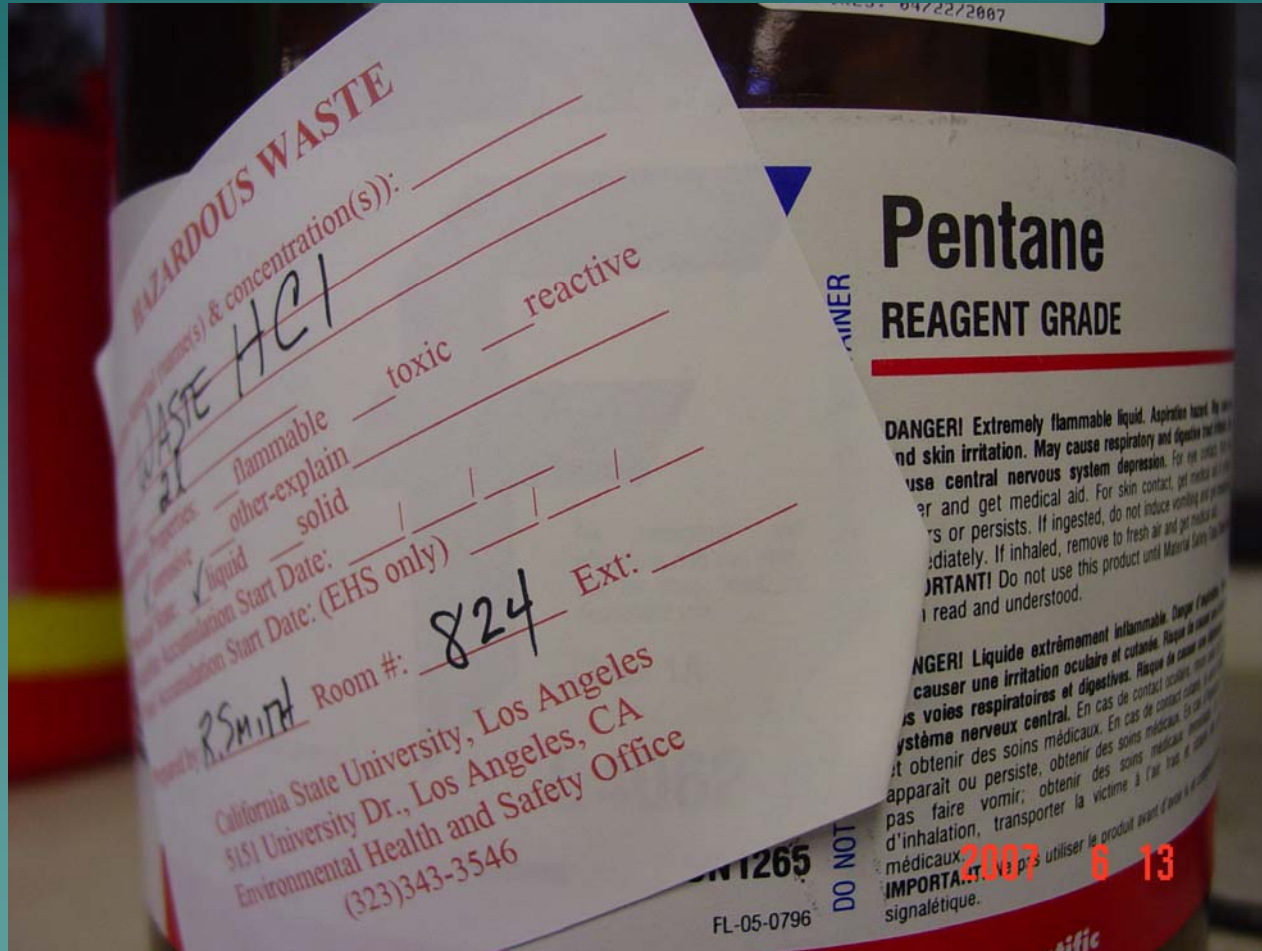
Waste
container
top left open

Failure to
remove old
chemical
label

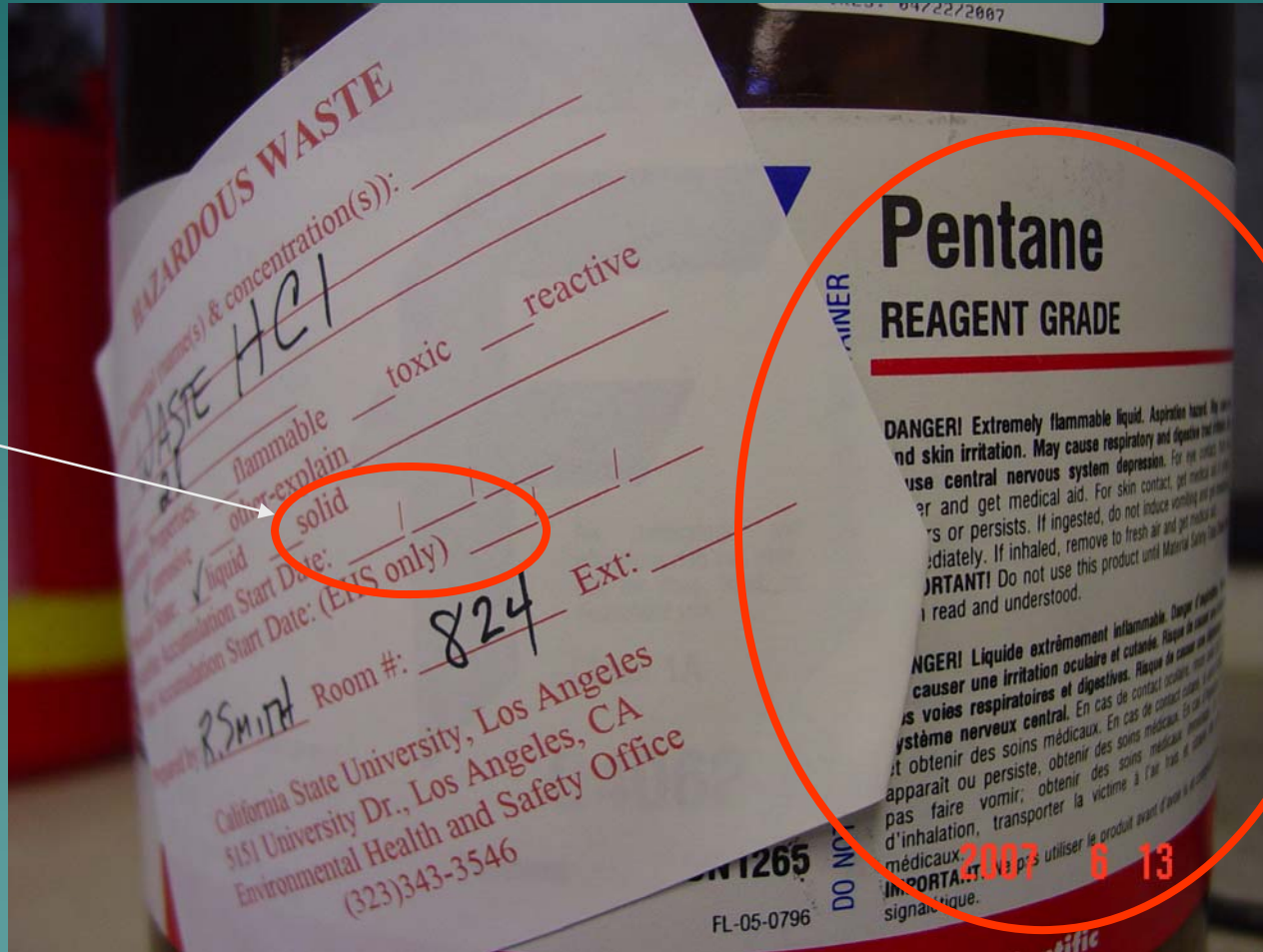
Frayed electrical
cord and/or use of
electrical tape

Are there issues with
secondary containment?

What's Wrong Here?



Have You Identified Them All?



No Start Date

Original label not removed & incompatibility

Go back to previous slide, what else is wrong?

What's Wrong Here?



Have You Identified Them All?

Fire Extinguisher blocked

Safety shower and eyewash are blocked

Glass chemical containers stored on floor

Exit/entrance door blocked

Overall Poor Housekeeping



What's Wrong Here?



Have You Identified Them All?

Fume hoods are above allowable sash height limit.



Ceiling tile is missing.

Overhead storage is a hazard to room occupants.

What's Wrong Here?



Have You Identified Them All?



Containers are not sealed when not in use.

What's Wrong Here?



Have You Identified Them All?



Food and drink consumables are open to cross-contamination in a laboratory environment.

What's Wrong Here?



Have you Identified Them All?

Fire Extinguisher and hose are blocked by chair



Fire rated door blocked open & Lab Security compromised

This Is Why We Do Not Prop Open Fire Rated Doors



During the August 1998 CSULA Physical Sciences fire the lab was completely destroyed, and the inner fire door was burned while the outside was nearly untouched.

Any Questions?

Questions?

Video

[Time Allowing]

http://www.chemsafety.gov/index.cfm?folder=video_archive&page=index