CM4120 Safety Orientation

“Spring?” Semester 2015
PAWS Program will provide structure for CM4120 lab safety

- entire class is responsible for safe environment
- everyone will have a turn with a specific safety responsibility
- two safety meetings with entire class
  - 2/20/15
  - 4/17/15
- may have brief, informal safety meetings at end of each run week if needed
What is the same:

2014-15 Safety Manual for CM4110 and CM4120

2 from each team will coordinate safety for the assigned project

Safety meetings will cover:
- New PAWS reports, follow-up on open PAWS
- Review of SIC
- Report on special safety topics

Safety meetings include “Safety Outside the Workplace” topics

Safety meetings on Friday at 9:00 sessions
What is different from CM4110:

Teams can be selected based on “topic-of-interest”

Team size may vary from 3 to 4, based on project scope

Lab will be inspected by 9:00 AM every week starting 1/27/15

Lab activities are in UO Lab area, B003, B003A
About Control Room (107 Chem Sci) activities:

**Stay engaged in Process Operations:**
- Do not distract others or “hang out”
- Not a time to get Plant Design done
- No music, movies, video games, hangman, etc. in control room
Control rooms can get boring!
Proper apparel reminder!

**UO Lab areas**

- long pants, shirts that cover shoulders and mid-section, no open-toe shoes or sandals
- hardhat in designated areas
- safety glasses w/ side shields
- when working in lab:
  - non-porous, over-the-ankle safety shoes
  - use goggles, gloves, face shield, apron for hazardous chemicals – all areas
NFPA Hazardous Areas in UO Lab

As defined in NEC article 500:

Determine Hazard Class

Class I: “flammable gases or vapors are or may be present in sufficient qty. to produce ignitable mixtures”

Class II: combustible dusts

Class III: ignitable fibers and flyings
Next determine Division of hazard class:

Div. 1, vapors can exist during normal operations, during regular routine maintenance, or due to leakage.

Div. 2, vapors are normally confined in containers or piping; or ignitable mixtures are prevented thru ventilation.
Finally, determine the hazard Group of potentially ignitable vapor:

- Group A, atmospheres containing Acetylene;
- Group B, H₂, fuel and combustible process gas w/ more than 30% H₂, others w/ equivalent hazard;
- Group C, atmospheres containing ethyl ether and equivalent hazards;
- Group D, atmospheres containing butane, ethanol, gasoline and others with equivalent hazard.
Electrical Classification of UO Lab areas:

- **Standard area** – majority of UO Lab
- **Class I, Div. 2, group D** – areas around sample valves, pump and valve seals, and basement floor area around pilot plants
- **Class I, Div. 1, group D** – drain trenches

*See Floor Plans, pgs. 24-26 Safety Manual*
CM4120
Chemical Plant Operations Lab
Safety Program
CM4120
Chemical Plant Operations Lab
Safety Program
Any Non-standard areas:

- no calculators!
- no laptops!
- no cell phones, ipods, etc.!

Any/all electrical/electronic devices must be labeled as suitable for Cl. 1, Div. 2 areas
Specific Hazards: Solvent Recovery Unit

- Ethanol/water/steam
- Process stream sampling
- Flammable/hot material handling
- N₂ safety
- Remote operations – valves moving, motors start/stop from control room, but with personnel on plant floor
Specific Hazards: PDMS Reactor Unit

- Silicone fluids/steam/KOH/toluene
- Process stream sampling
- Hot/silicone/caustic material handling
- N₂ safety
- Remote operations – valves moving, motors start/stop from control room, but w/ personnel on plant floor
Special Safety Project for Cycle 2:

1 team of students with a specific interest in the safety program

Thorough review of the PAWS program:
- Tabulate, analyze, and report on all PAWS reports and safety incidents for ABET
- Conduct a lab safety practical
- Update PAWS tracking website
- Evaluate performance on recommendations from 2013-14 PAWS program
- Recommendations for next year
Specific Hazards: Bioreactor Unit

- HCl/NaOH/O₂/N₂/steam (autoclaving)
- Level 1 Biohazard (p. 10 & 11 Safety Manual)
- Unattended equipment operations (see CM Dept. Safety Manual)