BERKELEY LAB

MSD Materials Sciences Division

Safety Committee Meeting

January 19, 2016

Michael Wisherop

MSD EH&S Manager

X7404

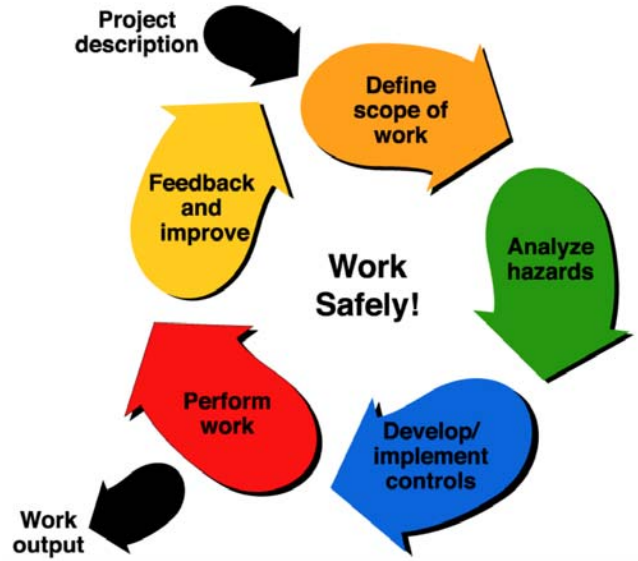
U.S. DEPARTMENT OF ENERGY | Office of Science

Agenda

1.	Intro/MSD EH&S	15 minutes
2.	MSD Incident summary	10 minutes
3.	Pressure Safety Update	10 minutes
4.	ETA Pressure Incident	15 minutes
5.	Campus Chemical Explosion	15 minutes
6.	MSD EH&S Communication Discussion	20 minutes

MSD EH&S

- What is the state of EH&S at MSD?
  - Accidents, spills, near misses…
  - Are we learning from them?
  - Are we communicating what we learn?
  - Are we having recurring incidents?
  - Are we practicing ISM?
  - Are we providing good OJT?
  - Are supervisors/PIs/leads observing work?
  - Are the right people reviewing the work scopes for safety?
  - What challenges lie ahead?
    - Inexperience with new or rarely used methods
    - Recognition of hazardous work
    - More collaboration between disciplines (team approach)

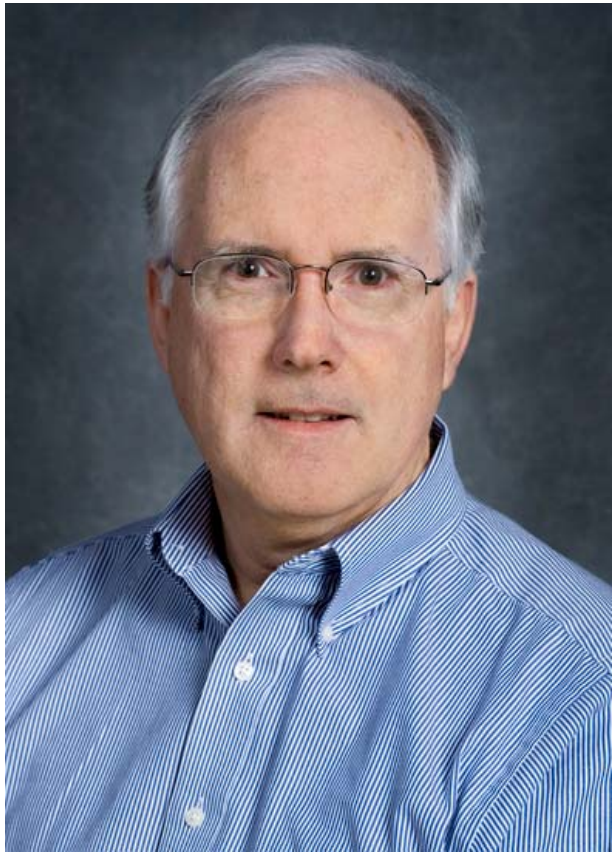


MSD Incidents

- Incubator lid caught finger
- HF spill
- Workstation ergonomic injuries (2)
- Slip and fall in parking lot
- Lab glassware cut finger

Pressure Safety Program Update

Scott Robinson Pressure Safety Coordinator



Pressure Reactor Incident

Ron Scholtz, ETA EH&S Manager

Pressure Reactor Incident Overview

Ron Scholtz, CHMM
Energy Technologies Area

January 8, 2016

Background

- Small pressure reactor containing water, molybdenium disulfide, ammonium tetrathiomolybdate, and sodium hydroxide
- Heated at 200^0C in Ney furnace inside hood
- Reaction ran overnight (12 hours)
- Researcher discovered significantly damaged furnace and hood the next morning
- No injuries
- Reported to DSC by phone message (no X6999)
- EHS established investigation team

Ney Furnace in Hood

Pressure Reactor

Investigation

Estimated 2,500psi for failure

Main Findings

- The Investigation Team determined the direct cause of the event to be: *The pressure vessel failed due to an over pressurization event caused by steam and/or chemical reaction inside the vessel. Damage to the furnace was secondary, caused by the steam release and/or chemical detonation/deflagration.*
- The Investigation Team also identified the following apparent and contributing causes: *Researcher did not follow established work planning and control procedures to ensure the work was planned, reviewed and approved under a Work Activity.*

Observations

- The researcher did not discuss this synthesis with their supervisor
- The Area Safety Lead for the lab area was unaware of the synthesis
- The vessel did not have a pressure relief device
- The pressure vessel was not authorized for use
- The hazards associated with small pressure vessels are generally under appreciated
- The furnace was known to have a defective time/temperature controller
- The furnace was not appropriate for the desired 200° C reaction temperature (100-1,100^{0}C range)
- The furnace escaped oversight despite malfunctioning state due to lack of assigned ownership. Shared use of space is encouraged.
- The roles and responsibilities of the Area Safety Leads is not identified in Activity Manager although the function is still being performed

ETA Follow-up Actions

- Stop Work- high pressure and temperature activities
- Lab area search for additional pressure reactors
- ETA-wide lab area safety stand-down:
  - All personnel present
  - Top management walkthrough

- Existing Work Activities reviewed and updated:
  - Two new Level 3 Work Activities specific to Pressure Reactors
  - Formalized OJT for pressure reactor work
- Furnace/Oven hazards and controls being placed into Work Activities. Requested new hazards in Activity Manager (pending)
- Area Safety Lead Work Activity and OJT developed (pending implementation)
- Retire/Rehire Principal Investigator status now requires staff PI oversight
- Division management responsibilities re-emphasized to include regular area walkthroughs and Work Activity review

Chemical Explosion Incident

Ingrid Castro Rodriguez

Chemical Hygiene Officer, UC Berkeley EH&S

Dry Scraping Causes Chemical Explosion
Lesson Learned

Ingrid Castro Rodriguez, CHO
Environment, Health and Safety, UC Berkeley

What Happened?

- procedure published in a peer-reviewed journal
- transferring a residual amount of a PEC with a plastic spatula
- shattered glassware caused some minor cuts

What Went Right?

- working behind the sash in a fume hood
- researcher was wearing a flame-resistant (FR) coat, gloves, and safety glasses
- researcher was familiar with the synthesis
- relevant training was completed
- safety debrief was completed before starting the work
- group members in the room dropped to the floor and used the closest exit to crawl out of the laboratory
- emergency protocol was followed
- group members recognized the potential hazards created by the explosion

What Should Have Been Done Differently?

- carefully follow the experiment steps/recommendations
  - material must be thoroughly wet with the appropriate solvent

Corrective Actions

- work with PEC - wear a combination of cut resistant Kevlar® gloves covered with a pair of chemical-resistant disposable gloves
- only use plastic, tape or mesh-coated glassware or plasticware for work involving PECs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MSD EH&S Communications

- Does MSD's culture include safety and environmental stewardship?
  - Do we always consider our, each others', and the environment's safety when planning and executing our work?
  - Do we get complacent with routine work?
- How do we currently communicate this desired culture?
  - MSD Newsletter *Safety Corner*
  - Monthly *Materials Sciences* safety bulletin
  - MSD Websites
  - Safety committee meetings
  - Lessons learned
  - Safety minute at group meetings
  - Group email communications
  - Safety retreats
  - Building video monitors
  - Posters, signs, etc.
- What other ideas do you have to better spread the message?
- How can we ensure that safety is on everyone's minds while working or not?