We better watch out: Prevention beats reparation

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The UCLA Incident

- Continuing widespread interest in this incident because a lab employee died as a result.
- Principal Investigator (PI), UCLA, and the University of California System (UC) were all held liable. The PI faced criminal prosecution.
- Emphasized that research has serious hazards and risks, although incidents with such serious consequences are rare.

The Cal/OSHA Report-December 2009

- “Laboratory safety policies and practices. . . were so defective as to render the University’s required Chemical Hygiene Plan and Injury and Illness Prevention Program essentially non-existent.”
- Employee training in the use of tBuLi was inadequate.
- PI failed to provide a lab coat and neglected to enforce general use of personal protective equipment in his lab.
- “If Harran had utilized a standard operating procedure as required and would have properly trained Sangji. . . [her] death would have been prevented.”

UC Settlement Agreement

- Training – Lab Safety Training and training covering University policy (PIs concerning their responsibilities for lab safety; lab personnel concerning individual's rights and responsibilities relative to lab safety).
- SOPs for chemicals listed in Exhibit 1. PI and all lab personnel using the chemical must sign acknowledging contents, requirements, and responsibilities in SOP.
- SOP has SDS information and relevant procedures; scale limit of reactions is noted.
- PPE – cover all skin; gloves and eye protection must be worn while utilizing any hazardous chemical, biological or unsealed radiological material.

Lab Coats per Agreement

- Required to be worn while working on, or adjacent to, all hazardous chemicals. Must be appropriately sized and buttoned to their full length. Sleeves should prevent skin exposure while wearing gloves.
- Flame resistant coats must be worn while working with pyrophoric materials or flammable liquids. Cotton (or other non-synthetic material) clothing must also be worn to minimize injury in case of a fire emergency.

Lab Coat Cleaning

Each department or research unit shall be responsible for providing professional laundry services as needed to maintain the hygiene of laboratory coats. They may not be cleaned by staff members at private residences or public laundry facilities.

Chemical Classification List

- Pyrophoric chemicals
- Water reactive
- Potentially explosive
- Acutely toxic
- Acutely toxic gases
- Peroxide-forming chemicals
- Strong corrosives (acids and bases)
- Strong oxidizing agents
- Strong reducing agents
- Regulated carcinogens

The Texas Tech incident

- Students sustained injuries due to an explosion in a chemistry laboratory.
- Lack of adequate PPE.
- No specific safety procedure for scaled up reactions.
- Investigation by Chemical Safety Board – first example of non-industrial investigation.

Changes in Paradigm

- Litigation because of negligence at colleges and universities not an issue in the past.
- Institutions may want to restrict lab course activity, but these incidents are in research activities.
- Colleges and universities are learning about legal compliance issues.
- Institutions are more appreciative of showing good intent (what are other schools doing?).

Part of Doing Business

- Sometimes industry views fines as a part of doing business. Especially relevant in the case of chemical spills, releases, or even accidents during manufacturing, as long as no individual prosecution involved.
- Schools not likely to use this approach or adopt this view.

Research Policies and Procedures

- More of a challenge in research relative to laboratory coursework. How does one regulate research at the frontiers of chemistry?
- Does requiring preapproval and specialized safety training slow down research progress? Maybe initially, until safety components are integrated into planning lab research.
- Safety is part of how we do science!

Safety Training remains an issue

- Specialized (advanced) topics.
- Specific hazardous materials or potential for unknown hazards.
- Standard Operating Procedures
- Safety Data Sheets (formerly MSDS).
- Can we do ongoing graduate/postdoc lab safety training?

Research Group Safety Training

- Covers all project areas in which group members work or assist.
- Specific hazards, emergency response specific to experiments/chemicals, energized equipment, scale-up, storage and ultimate disposal.
- Improves situation with respect to working alone or in small groups (2 or 3).
- Schedule hazardous or new experiments during the workday or early evening.

Take advantage of improved safety concern of graduate students

- Synthetic inorganic chemists with missing fingers.
- Organic chemists with burn scars on hands.
- “It’s not worth getting injured.”

Conclusions and Recommendations

- High visibility laboratory incidents have increased interest in improving lab safety.
- Agency proscriptions are often items easily measured. Examples: SOPs, wearing lab coats.
- Scaling up reactions must be discussed somewhere in the curriculum or in lab safety training.
- Younger chemists want to work safety. Let's help them do it!