News & Views



Neal Langerman *compiles this column, which features items of interest to laboratory, pilot plant, and production area chemical safety. He is the owner of Advanced Chemical Safety, a consulting firm specializing in the prevention of injury, illness, and environmental insult. Contributions are encouraged and can be sent to his attention at neal@chemical-safety.com or (858) 874-8239 (fax).*

HIGH COST OF EDUCATION

A recent breakfast table conversation somewhere in California...

Teenager: *Mom, I am applying to Berkeley in chemistry.*
Mom: *We talked about that – they charge $900 extra per term for science majors. We can't afford it. Be a government major.*
Teenager: *But government doesn't offer high paying careers the way science does.*
Mom: *That is the reason the UC system charges extra – they figure you will be able to repay the debt they forced you to assume.*

The United States is not training sufficient scientists, including chemists, to maintain a technology edge in the foreseeable future. Fortunately, the University of California Regents realized that the fee was an incredibly stupid proposal, and cancelled it before it was implemented. That does not mean it is dead. The UC system, like higher education in general, is suffering from the current economic meltdown. Students are squeezed between increasing costs for college and decreasing family resources. The result must be fewer students enrolling and fewer students trained in science and math. This does not bode well for the U.S. or the global economy.

There are no easy solutions. Government, per se, is not the answer. Poor public policy over many years resulted in this global recession. Current government policy, while necessary and timely, is potentially toxic. The aggressive stimulus spending on a global scale is necessary, but the massive debt incurred by the U.S. in particular, poses a challenge to our policy makers to prevent a ran-away inflation that will further damage our economy and make college education even more difficult to fund.

While the economic solution lies in a balance between free enterprise and government oversight, only a robust, growing global economy can provide the resources to make education affordable. And, a well educated workforce, capable of driving innovation and productivity is necessary to drive a growing global economy. This is a real "Catch 22". The proposed fee for science education from the UC Regents is totally counter-productive, even in a robust economy. This idea should be buried, permanently.

NITRIC ACID REALLY IS REACTIVE



Chemists are supposed to understand chemistry. Yet, the alarming frequency of waste nitric acid bottles bursting from a reaction between the acid and a waste solvent argues to the contrary. One consequence of improved information availability is increased awareness of the frequency of such incidents. These incidents, especially in teaching labs, are 100 percent preventable. The potential consequences of adding a solvent to nitric acid are injury and property damage. Fortunately, the reaction has a significant induction period and the bottles usually burst when the lab is empty. This does not relieve the lab instructors from their obligation to prevent the incident. Prevention does not take much.

- Students must be clearly informed of the reaction and its consequences. Through proper information as part of the lab, student's understanding of their critical role in lab safety must be enhanced.
- Waste nitric acid should be placed in a unique bottle used only for this waste stream. For example, a clear, 4 l plastic coated bottle, properly labeled, might be used throughout an academic institution only for waste nitric acid. In this way, the idea that waste nitric only goes in this bottle will be reinforced in every laboratory which uses nitric acid.
- The waste nitric acid container should be segregated from other waste containers, requiring the student to go to a specific loca-

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tion (chemical fume hood) to dispose of the nitric acid. Other waste containers should be in a different location.

These ideas can be extended, based on the practices of the campus.

We know that a pyramid-like relation exists between the number of fatalities, serious injuries and significant incidents (near misses). The frequency of nitric acid bottle burst incidents is a clear warning. Every lab supervisor must recognize the warning and implement corrective action. Failure to do so; allowing yet another bottle burst, is negligent.

t-Butyl lithium

Spin-off of the UCLA t-butyl lithium incident continues unabated. In a positive sense, research centers are critically examining their practices for handling pyrophoric liquids. The division of Chemical Health and Safety presented a well-attended session on this topic at the Washington National ACS meeting. A symposium on the topic will be presented at the San Francisco National ACS meeting. The symposium will present papers related to current practices for handling highly reactive chemicals. A related session is planned for the Boston National ACS meeting in August, 2010. The ACS itself is evaluating its own policies and guidelines related to safety performance. The prevention of another serious incident with these high risk chemicals comes down to well trained lab staff following very clear procedures with full attention to the implications of doing it wrong. Instilling this behavior requires a clear affirmative attitude of safety awareness on the part of the laboratory's principal investigator (PI). It requires this attitude to become part of every student's and every technician's approach to laboratory work. While safety is everyone's responsibility, the PI must set the standard.

GLOBAL HARMONIZATION OF PRECAUTIONARY WARNINGS

U.S. OSHA has published Proposed Rule (Hazard Communication – Federal Register, 74:50279-50549 30 September 2009) which addresses GHS implementation. The bottom line is that MSDSs and labels will be required to be GHS compliant. The OSHA Proposed Rule specifically addresses:

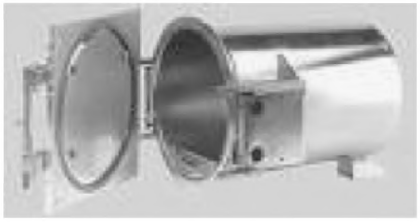
- criteria for classification of chemical hazards,
- revised labeling provisions that include requirements for use of standardized signal words, pictograms, hazard statements, and precautionary statements,
- a specified format for safety data sheets,
- revisions to definitions of terms used in the standard,
- requirements for employee training on labels and safety data sheets.

OSHA is also proposing to modify provisions of a number of other standards, including standards for flammable and combustible liquids, process safety management, and most substance-specific health standards, to ensure consistency with the modified HCS requirements. OSHA is also modifying the U.S. implementation of GHS in several critical ways

All of these changes will and must happen. They will be painful and will require significant amounts of training and re-training of employees, as well as revisions to every safety data sheet and label for every chemical product distributed in the U.S. The end result will be easier training of employees, much clearer information about chemical hazards and improved global market competitiveness for U.S. chemicals.

You need to begin preparing now. I urge you to visit the OSHA GHS web pages and begin familiarizing yourself with GHS. Begin now to plan how you will comply, whether you are a chemical producer or chemical user.

PRESSURE VESSELS



The Chemical Safety and Hazard Investigation Board issued a safety message (9 November 2009) reminding us that pressure vessels can present significant safety issues if not properly maintained. Lab folks forget that autoclaves, Parr hydrogenation bombs, and some test chambers are all pressure vessels and must be fully tested, properly maintained and certified, as required by OSHA. A simple autoclave, operating at about 1 atmosphere gauge pressure, can cause significant injury or damage if a bolt fails or even if a pipe breaks. (See http://www2. umdnj.edu/eohssweb/aiha/accidents/autoclave.htm for details of one such incident.) The message is quite clear; every pressure vessel must be properly managed. This is an institutional responsibility, but everyone using pressure vessels must understand the need for maintenance and must be aware of the implications of misusing these devices.