



Expand Process Safety Management

The Hazard Communication Standard has proved to be one of OSHA's best tools for controlling hazards in the workplace. When 29 CFR 1910.1200 was issued in 1983, it quickly established the MSDS as the principle method for communicating hazard information throughout the chain of chemical commerce. Its training requirement forced employers to train employees in hazard recognition and control. It also quickly became apparent that a regulation which worked well in a facility with 10–100 chemicals failed miserably in a laboratory or research setting. Thus, the "Laboratory Standard" was developed. The combination of the two standards is a powerful driver of workplace safety.

The Process Safety Management standard (29 CFR 1910.119) is proving to be a powerful tool for reducing risks in the facilities it covers. While there is no database that can be readily searched to track incident frequency at PSM versus non-PSM facilities, there is a general sense that PSM facilities have better safety performance than non-PSM facilities. It has been argued that PSM can be applied in laboratories,¹ but there is no regulatory impetus to do so. The standard, as it currently is written is much too complex for most laboratories and small facilities to implement.

Chemical incidents happen in many non-PSM locations. We see serious incidents in beer breweries, bio-diesel plants, municipal wastewater plants, and research labs. Upon investigation we find that the site's safety programs go from virtually non-existent to fairly sophisticated. Seldom do we find a safety program that covers the crucial elements of PSM. Even when we look at implementation of California's (Cal/OSHA) Injury and Illness Prevention Plan, we do not see the key PSM elements that we know reduce risks. This is regrettable as we know simplified PSM implementation is feasible.

As good as PSM is, OSHA and the regulated community have recognized areas of improvement. OSHA is considering² revising PSM to include Inherently Safer Practices, among other ideas. This is an excellent opportunity to expand PSM to cover virtually all chemical users.

The regulated community should be any person who processes chemicals. "Processes chemicals" can be defined to include mixing, blending, pouring, physically treating or chemically modifying one or more products for

which you have (or should have) a Safety Data Sheet. A low threshold of several hundred liters or kilograms per year will eliminate *de minimis* locations.

This regulation would have to be readily scalable. The Process Hazard Analysis could be as simple as a "Laboratory Risk Assessment Tool" or as complex as a formal HAZOP. That would be the employer's choice, based in the site's circumstances.

Similarly, Management of Change procedures would reflect the employer's circumstances. An acknowledgement that the change in process has been reviewed and accepted as the simplest case versus a full, formal update of the PHA as the most rigorous case.

Some aspects of PSM, such as employee involvement are already standard in most workplaces and would have minimal impact.

OSHA could package the PSM program into a full "Chemical Management Standard" which included inventory control, Hazard Communication, Airborne Contaminants as well as PSM. This would be a huge undertaking for OSHA, but would not be onerous to the employer, since many elements are already in place. The chemical inventory requirement could be made consistent with the SARA 311/312 reporting requirements. Most employers now use some form of electronic tracking to maintain a list of all chemicals in their workplace. This tracking should suffice for an OSHA inventory control requirement. The goal is to know what you have so you can recognize and mitigate hazards.

OSHA is currently reviewing the PELs and its approach to controlling Airborne Contaminants. This is an excellent time to expand the conversation and really address chemical management. This is an excellent opportunity to expand the benefits of PSM to all chemical handler workplaces. Let's not miss the opportunity.

LESSONS NOT LEARNED

In the '80s, when I was actively working in semiconductor foundries, I regularly attended the Semiconductor Safety Association meetings. These always featured a section titled "Accidents and Incidents". Introduced by a corporate attorney who warned about revealing proprietary information and provided



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guidance to avoid any suggestion of “anti-trust”, speakers from around the industry would give brief accounts of things that went wrong and the lessons to learn. These sessions were remarkably informative. I learned about better ways to handle POCl bubblers and alternatives to vacuum sputtering of arsenic. Even today, when speakers at ACS meetings discuss incidents, there are many lessons learned. Why then is there not a national clearinghouse of chemical incident information?

The CSB says it “*does not maintain comprehensive accident databases or compile national statistics on chemical accidents. At the present time, no such comprehensive databases or statistics exist within the federal government. However the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the National Response Center (NRC), the Agency for Toxic Substances and Disease Registry (ATSDR), and other agencies do maintain certain accident databases that vary in scope, completeness, and level of detail.*”

For the person interested in mining information, this means they must visit each of those agencies and wade through the databases. Reports may be redundant; information may be missing or inconsistent; and the work needed is proportional to the number of databases visited. Not a conducive environment for learning lessons to prevent repeating history.

The ACS is the logical leader for developing such a database. It has the internal experts in CHAS and CCS and has a huge information technology department to provide the IT support. It knows how to raise funds for such a

project. Further, ACS has the institutional contacts with the American Chemistry Council, the Synthetic Organic Chemicals Manufacturing Association, and others to form the consortium needed to gain wide support.

The ACS represents a membership of about 160,000 professionals in chemistry and allied fields. Industry employees represent more than half of this group. Chemists in academia represent about 40%. This diverse group can easily be called upon to provide information on out-of-ordinary incidents in their facilities. The privacy of the employer can easily be protected.

The ACS IT department, working with volunteers from CHAS and CCS could easily import the existing information from the sources listed previously, and quickly seed the database with content. Search tools can be easily developed.

Yes, this will cost money. The ACS and its consortium colleagues can raise the funds. Yes, there is possible liability. We have many attorneys, some of them chemists who are members of the Division of Chemistry and the Law (CHAL) who can provide many layers of liability protection.

What we do not have is buy-in from the ACS (see [Dr. Elston's editorial, in this issue](#)).

The readers of this News & Views can help make this happen. Simply send an email to president@acs.org and urge the ACS to step up and lead the effort to create a Lessons Learned research tool. Write letters to the Editor of C&EN. Become proactive to force our professional home to make chemical safety a priority with parity to fundamental chemical research and development.

CHEMICAL SAFETY AND THE ACS

The ACS has 49 technical divisions. Members of a few of these divisions do not actively handle chemical processes on a regular basis. Members of the other divisions do. Yet, no division of the ACS has a safety sub-committee. The Division of Chemical Education is considering setting up a safety sub-committee. If you are a member of another technical division, PLEASE, go to your division leadership and ask them to set-up a safety subcommittee. CHAS will work with you to develop a Mission and Vision statement. It would be a real step forward to have a sub-division of Organic devoted to organic chemistry safety! It would even be better if every ACS Division has a safety subcommittee. CHAS members are represented in every division of ACS except RUBBER. We have the clout to effect significant change to the ACS. I call upon each member of CHAS to push hard to move ACS forward.

REFERENCES

- (a). Langerman, N. Management of change in laboratories and pilot plants. *Org Process Res Dev*, **2008**, *12*(6), 1305–1306;
- (b). Langerman, N. Lab-Scale Process Safety Management. *J Chem Health Saf*, **2009**, *16*(4), 22–28.
2. The OSHA Unified Agenda published in the 22 Dec 2014 Federal Register lists “Process Safety Management and Prevention of Major Chemical Accidents” as a Pre-rule with a citation URL of <http://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201404&RIN=1218-AC82>.