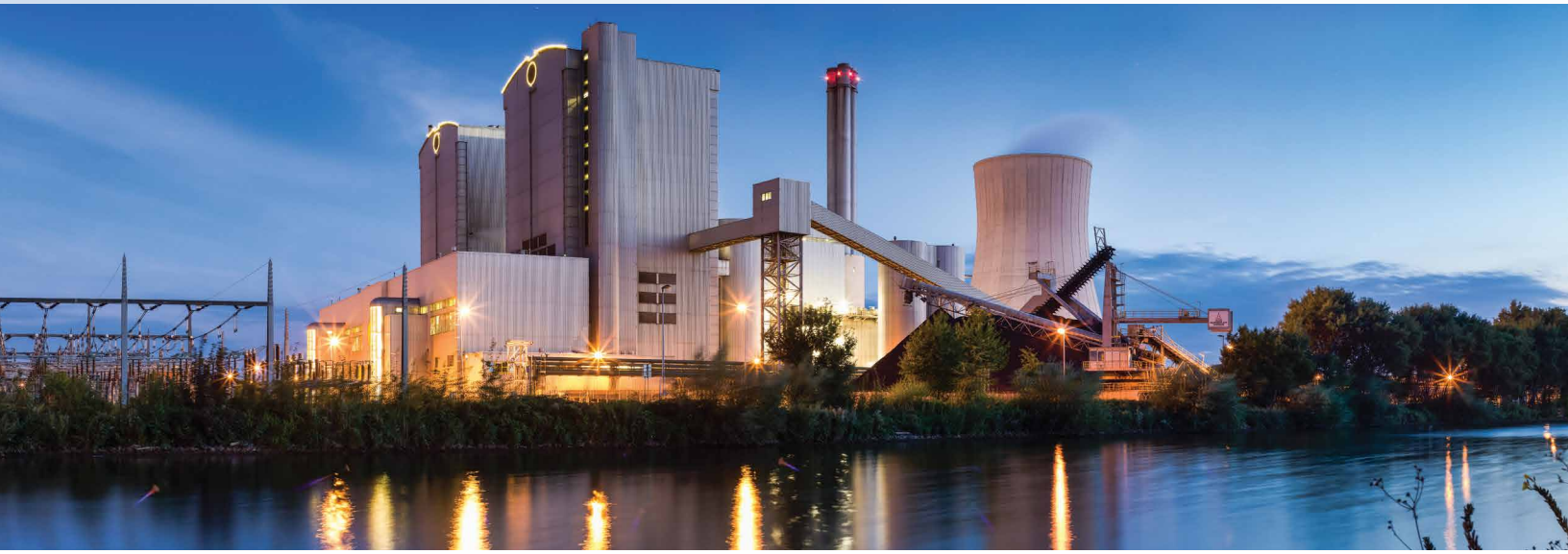

FOCUS ARTICLE

Process Safety Paradigm

Lisa C. Hutto, MBA, SIIRSM, Senior Process Safety Specialist

Every company around the world has a mission to promote safety as second nature with the main objective to prevent future accidents. Minimizing losses within the process safety industry has been at the forefront of priorities with many companies, employees, and governments. The process safety paradigm is a tool that can be used to strengthen processes, management, equipment and procedures. In order to change the current process safety paradigm at a facility, best practices must be developed and disseminated by utilizing consulting and education. Utilizing benchmarking in management systems and researching information can help strengthen and improve the paradigm of process safety. This approach will allow the process safety industry a way to exchange thoughts and ideas to advance process safety and keep the industry safe and competitive.

What is a Process Safety Paradigm?

Two of the most commonly asked questions are "What is a process safety paradigm?" and "How can it benefit my facility?" The process safety paradigm is essentially putting together all of the framework containing the most commonly accepted best practices about process safety, the structure of what direction process safety development should take and how it should be performed. In other words, the process safety paradigm is simply a set of best practices and rules about process safety that help determine what problems are most important and what steps a facility needs to take to solve them.

When the process safety paradigm has been successfully established, it helps the facility study specific elements of process safety for potential improvements. In particular, the process safety paradigm gives the facility a model to follow for solving problems for specific elements within process safety. The paradigm for process safety is considered an "evergreen" process that helps facilities solve process safety related problems.

The paradigm is constantly changing and at some point the facility may eventually run into problems that the current paradigm cannot solve. If that problem occurs, the facility must start looking at their process safety problems from a different aspect and then a new paradigm will develop to handle problems that were previously thought to be unsolvable.

There is not currently a U.S. wide process safety paradigm, nor is it a requirement. The process safety paradigm is meant to be used as an additional tool to prevent process safety incidents. Therefore, companies currently can determine what they want included in their process safety paradigm based on their past incidences as well as best practices in industries that are the same or similar to theirs.

Why the Need for a Process Safety Paradigm?

As with any process, there is a chance that there are hazards within the covered process that may result in bodily harm. Depending on **the hazards of the process**, safety must be managed at the facility level. Most companies have some type of system for safety management. Some examples of **safety management systems** include, safety rules, safety posters, and safety systems that are designed to protect the employee. But the question remains, "Do these examples of safety management provide the level of response needed by a facility to prevent a process safety incident?" How many of these "safety management systems are ignored or never taken seriously?

The process safety paradigm is designed to ensure that people are "safe" at work. When we take a look at a facility's overall process safety management system we tend to see disconnects between information that has been scientifically proven versus what businesses are actually practicing. For example, process safety practices that have been scientifically proven as an improvement to process safety can sometimes be difficult to implement and then the actual improvement may not be implemented as was originally planned. This is due to misunderstandings in what was actually needed. Safety improvements that are based on scientific information do not always allow companies their different options to integrate the new safety practice and the company may instead just implement a program less robust just to meet the company requirement to show that they are always working towards "continuous improvement" within the company.

Process Safety Paradigm Shift

Based on current data, the existing process safety paradigms that companies are using have problems that cannot be solved based on the issues currently being seen. Today, industries that are covered under the process safety management regulation 29 CFR 1910.119 are still having severe injuries, environmental releases and fatalities. All this is still happening although there have been millions of manufacturing jobs eliminated in the U.S. in the last ten years.

Today, experts are noticing a slight shift in the process safety paradigm. Some of the reasons for this is that:

- Lessons learned from previous process safety incidents have not effectively been implemented;
- Facilities are still seeing repeat process safety incidents; and
- Immediate and underlying causes as well as "lessons learned" are not being addressed.

There are two beliefs that put us where we are today with the process safety paradigm:

- The belief that workers are the main cause of accidents; and
- The belief that employees lack the motivation to work safely.

These two ideas may not be taught specifically but they are built into the culture. So the question is, are these two beliefs really true? Were they ever true? Many (if not most) of the PSM elements focus on systems rather than employees. These two beliefs are direct results of poor process safety culture within the organization. Although the two beliefs are not "officially" taught, they have become part of the culture for many companies.

Paradigms do not have to be seen or stated explicitly. They can exist through an unquestioned understanding throughout the organization. Therefore it is essential that a company focus on the actual process safety issues when the paradigm is developed rather than placing the blame entirely on the employees.

Possible Changes to the Process Safety Paradigm

In 2013, industries started to see changes develop in regulations in both a prescriptive and performance manner. These changes started as a way to address some of the underlying causes of the numerous process safety tragedies that have occurred in the past. On August 1, 2013, former President Obama authorized Executive Order (EO) 13650 - Improving Chemical Facility Safety and Security. This EO was issued shortly after the West Texas fertilizer explosion and fire. The EO was developed as an attempt to address the problems in process safety due to the large amount of noteworthy industry incidents over the past decade. The EO was tasked to set up a Working Group involving multiple government departments to develop recommendations and action plans to find ways to improve chemical facility safety and security in coordination with owners and operators.

The four main topics the EO was tasked to address are:

- Improving operational coordination with States, Tribes and local partners
- Enhancing information collection and sharing
- Modernizing regulations, guidance and policies
- Identifying best practices in chemical facility safety and security

Section 6(a) of the EO directed the Working Group to develop options to "improve chemical facility risk management practices through agency programs, private sector initiatives, government guidance, outreach, standards, and regulations." Part of this task included reviewing current programs, past recommendations, and getting feedback from groups involved in safety and security. The comments provided a starting point for discussion of areas that needed to be improved. The stakeholder discussion and comment period focused on the feasibility of the options presented and the effectiveness these options would provide. The June 2014 Status Report stated that the **Occupational Safety and Health Administration's (OSHA)** Process Safety Management (PSM) standard will be "modernized". It is expected that within one year, OSHA will take some of the following actions:

- Clarify confusing and misunderstood policies. This will include revising the current interpretation of the exemption for "retail facilities" to reflect accurately the original intent of the exemption. OSHA will also revise the current interpretation of chemical concen trations by the PSM standard to describe more clearly what is covered and "align with better established practices";
- Clarify the PSM standard to incorporate lessons learned from enforcements, incident investigations, advancements in industry practices, root cause analysis, process safety metrics, enhanced employee involvement, third-party audits, and emergency response practices;
- Expand the scope of the PSM standard by adding substances or classes of substances to the PSM list of **highly hazardous chemicals**;
- Broaden the coverage and requirements for reactive chemical hazards;
- Eliminate the PSM exemption for oil and gas drilling and servicing operations; and
- Require an analysis of safety technology and alternatives.

The OSHA PSM standard is over 20 years old and while it has been effective in improving process safety, major incidents have continued to occur. In just the last 5 years there have been 27 significant incidents that have resulted in over 75 fatalities, multiple injuries, and overwhelming consequences for companies and communities.

The new "shift" in the process safety paradigm should include the items that are being focused on changing in the EO. Companies will need to evaluate their current process safety paradigms and determine which items should be removed and replaced with the new items to focus on.

Conclusion

In summary, it is the responsibility of each company to focus on behaviors and actions that could lead to process safety failures. Management must embrace the theory and techniques of continual improvement that is offered from the changes through time. All paradigms shift at some point and require reevaluation to perfect the new model.

When it comes to managing and editing the process safety paradigm, the first rule is; "We invented it and we can change it". This mindset is essential to improving process safety and building a culture that welcomes changes for safety.

LISA C. HUTTO

Lisa C. Hutto., B.Sc., MBA, SIIRSM is a Senior Process Safety Specialist at DEKRA Process Safety with 20 years of HSE&S experience in manufacturing, chemical and oil and gas industries with 11 of the years specializing in Process Safety Management. She has an extensive background in health, safety, environmental and security, to include the reduction of incident rates, reduced emissions by implementing new projects, facility security development, as well as being the driver for supporting business and HSE objectives. Her PSM experience includes implementing and developing new Process Safety Management programs, PSM Audits and Gap Analysis, establishing management of change programs, developing procedures for all 14 elements of PSM, emergency response plan development and leading Process Hazards Analysis for oil and gas, chemical and manufacturing companies. She also has a strong background of upstream and downstream oil & gas experience, to include work on the North Slope of Alaska, with multiple oil & gas companies.

DEKRA Process Safety

The breadth and depth of expertise in process safety makes us globally recognized specialists and trusted advisors. We help our clients to understand and evaluate their risks, and work together to develop pragmatic solutions. Our value-adding and practical approach integrates specialist process safety management, engineering and testing. We seek to educate and grow client competence to provide sustainable performance improvement. Partnering with our clients we combine technical expertise with a passion for life preservation, harm reduction and asset protection. As a part of the world's leading expert organization DEKRA, we are the global partner for a safe world.

Process Safety Management (PSM) Programs

- Design and creation of relevant PSM programs
- Support the implementation, monitoring, and sustainability of PSM programs
- Audit existing PSM programs, comparing with best practices around the world
- Correct and improve deficient programs

Process Safety Information/Data (Laboratory Testing)

- Flammability/combustibility properties of dusts, gases, vapors, mists, and hybrid atmospheres
- Chemical reaction hazards and chemical process optimization (reaction and adiabatic calorimetry RC1, ARC, VSP, Dewar)
- Thermal instability (DSC, DTA, and powder specific tests)
- Energetic materials, explosives, propellants, pyrotechnics to DOT, UN, etc. protocols
- Regulatory testing: REACH, UN, CLP, ADR, OSHA, DOT
- Electrostatic testing for powders, liquids, process equipment, liners, shoes, FIBCs

Specialist Consulting (Technical/Engineering)

- Dust, gas, and vapor flash fire and explosion hazards
- Electrostatic hazards, problems, and applications
- Reactive chemical, self-heating, and thermal instability hazards
- Hazardous area classification
- Mechanical equipment ignition risk assessment
- Transport & classification of dangerous goods

We have offices throughout North America, Europe, and Asia.
For more information, visit **www.dekra-process-safety.com**
To contact us: **process-safety-usa@dekra.com**

Would you like to get more information?

Contact Us

DEKRA