

# VISION 2020

## Process Safety: The Journey Continues



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## A Guiding Vision

By the year 2020, leaders in process safety will value and demonstrate actionable commitment to the competencies, communication, awareness and risk preparedness that prevent, minimize and mitigate all process safety incidents.

Vision 2020, developed by the Center for Chemical Process Safety (CCPS), looks into the not-too-distant future to demonstrate what perfect process safety will look like when it is championed by industry; driven by the five tenets of culture, standards, competency, management systems and lessons learned; and enhanced by community passion and global societal themes.

## Five Tenets for Industry

At the heart of Vision 2020 is adherence to five core principles that will help industry target and drive performance improvement and achieve great process safety performance:

- Committed Culture
- Vibrant Management Systems
- Disciplined Adherence to Standards
- Intentional Competency Development
- Enhanced Applications of Lessons Learned

## Four Societal Themes

Vision 2020 is a call to action for all of society — our leaders, our governments; the public at large — to be passionate about protecting people and property and, to accept no less than stakeholder knowledge, responsible collaboration, harmonization of standards and meticulous verification in matters of process safety. The Vision 2020 bridge to that commitment is its four societal themes:

- Enhanced Stakeholder Knowledge
- Responsible Collaboration
- Harmonization of Standards
- Meticulous Verification

## The 2020 Difference

What does perfect process safety look like? CCPS asked top executives to walk us through a typical day in the life of a CEO, a Unit Manager and an Academic, and then imagine what that same day would look like if all industries were guided by Vision 2020 tenets. Look inside to see what they said.



# See What Industry Leaders Are Saying

How will Vision 2020 tenets drive perfect process safety in the year 2020? CCPS interviewed senior executives from ExxonMobil, DuPont, Celanese, Alon USA, The Weir Group and others and asked for their input. Look inside to review their comments.

## Why Vision 2020?

As manufacturing and oil/gas production become more complex, the need to drive continuous improvement in process safety — not just for industry, but for all stakeholders — becomes increasingly urgent.

Vision 2020 harnesses the collective expertise and best practices of the Center for Chemical Process Safety to establish a global framework for perfect process safety, driven by industry tenets and global societal themes that will achieve:

- Significant industry and plant incident reduction
- Consistent overlap of corporate and plant employees, to ensure enhanced process safety understanding and rigorous adherence to standards and practices
- Persistent knowledge, culture, understanding and implementation, which will be utilized by executives, management, technicians, engineers, students, government and the public
- A worldwide vision, guided by CCPS — a leader in state-of-the-art process safety solutions — for managing process safety improvements to fulfill Vision 2020

## Join Us!

Achieving perfect process safety is both a journey and a destination. Become a CCPS member, if you are not one already, and be a part of the process safety vigilance/development teams that will create the guidelines and engagement tools to support Vision 2020.

**For additional information or to become involved in the drive to Vision 2020 Process Safety Excellence, go to [www.aiche.org/ccps/about/vision-2020](http://www.aiche.org/ccps/about/vision-2020).**





# Five Tenets, One Vision, The Collective Challenge

**These five tenets, combined with a passion for perfect process safety, provide a powerful framework for Vision 2020's success. Process safety results will dramatically improve if a company has:**

**1. A Committed Culture** in which the executives are personally involved, managers drive excellent execution every day and all employees maintain a sense of vigilance and vulnerability.

To create a committed culture, leadership must tangibly demonstrate a commitment to process safety, from the senior executive team through its line management, so that all employees embrace it and recognize that "it could happen here."

**2. Vibrant Management Systems** ingrained throughout the organization. For vibrant management systems to be effective, all employees must have a clear understanding of the expectations of senior management, and those expectations must be documented and shared to promote safer design principles in accordance with fit-for-purpose policies and procedures.

**3. Disciplined Adherence to Standards** for new and existing equipment to minimize opportunities for error in design, operation and maintenance.

While new construction may be the primary consideration when evaluating standards, ensuring that existing equipment meets company expectations can be even more important. By the year 2020, companies should have requirements that ensure aging equipment adheres to evolving standards, while working cooperatively with regulators to make standards effective and efficient.

**4. Intentional Competency Development** to ensure that all employees who impact process safety are fully capable of meeting the technical and cultural requirements for their jobs. The bottom line: no matter how good the culture or management system is, or how well the company adheres to standards, it takes highly competent employees to implement those systems or standards. And that requires intentional competency development.

**5. Enhanced Application and Sharing of Lessons Learned**, including a broad expectation and thirst for learning. To reduce incidents, employers and employees must enthusiastically support a culture that is driven to learn from many sources, including benchmarking, near misses and incidents and jobs done well. The ability to rapidly share lessons learned and use those lessons to drive procedural or mechanical change across companies and industries is key to improving process safety performance.



# Four Societal Themes, One Vision, The Collective Challenge

We've come a long way since Flixborough, Seveso and Bhopal. Yet, in spite of industry's continuing process safety vigilance, catastrophic events still happen. To create and transform a process safety culture, industry and the public need to challenge each other to improve.

Vision 2020 details how the five tenets of culture, standards, competency, management systems and lessons learned are enhanced by the community's passion, and supported by these four societal themes:

**1. Enhanced Stakeholder Knowledge** for all parties, beginning with the public. Just as the public must challenge industry through means of meticulous verification, industry must likewise challenge the public to engage in science, technology, engineering and mathematics (STEM) education, and push for risk literacy in middle or high school, so that our students are prepared to absorb more technical concepts in business and engineering schools.

**2. Responsible Collaboration** between government regulatory and investigative authorities, labor organizations, communities, research institutions, universities and industries work together to remove legal barriers to reporting incidents, develop reporting databases and promote mutual understanding of risks and effective process safety systems.

**3. Harmonization of Standards** by organizations that produce guidelines for the safe design, operation and maintenance of equipment, to streamline practices, eliminate redundancy and cooperatively address emerging issues. If standards-writing organizations work together, in the same spirit that the Center for Chemical Process Safety is working with other global and national organizations to harmonize process safety metrics, the resulting standards will provide significant guidance for improved process safety.

**4. Meticulous Verification** from knowledgeable third parties, including public and non-governmental organizations, to help companies evaluate their process safety programs from the outside in. Today, most companies conduct these audits internally. By 2020, it will be standard practice to bring in an accepted third party to ensure a company's process safety systems are robust and functioning as intended.



# A Day in the Life

**The year 2020 is not so very far away. Trying to imagine what a day in the life of a chemical, petroleum or biological executive, engineer or manager might be like, or how an academic can effect process safety improvement from the classroom and beyond, can help determine how process safety needs to evolve in the coming years. Can you spot the core tenets and global themes that are demonstrated in these Day in the Life scenarios?**

## The CEO 2012

On the ride in to the office in the back of her town car, the CEO reads through background information on the nearby production site she'll be visiting later in the day. She makes a point of reviewing the production numbers and profitability, as well as the worker injury rate. While the business numbers are below expectations, the site worker injury rate is better than the goal.

In the office that morning, she asks the CFO for further analysis on the site financials. She also calls the regional Head of Health, Safety and Environment to see if there's been any change in the worker injury rate. He replies that those numbers are still good but that the site has had a few process incidents lately.

Around noon the CEO arrives at the site. While gathering with the site leadership team for lunch, she overhears some of the managers discussing a process upset incident that occurred overnight. Initially concerned, she relaxes when she hears that, although there was a release of material, there were no injuries and the release was not reportable to public agencies. She commends the team on their good worker injury numbers and then delves into a discussion on production.

During a tour of the units, she once again commends the control room workers for their worker injury rate and then casually chats with them about their ideas on production and operability improvements.

## The CEO 2020

The CEO sits back in her town car and pulls out her tablet to check the "daily KPIs," as she does every morning on the ride to the office.<sup>1</sup> Among the metrics, she notes that the production site she'll be visiting later that day has business numbers that are below expectations, but that the worker injury rate is doing well. What draws her attention, though, is the steady increase in process upset incidents. Drilling down through the metrics, she sees that the site had yet another overpressure incident the previous day.<sup>2</sup>

In the office that morning, she asks the CFO for further analysis on the site financials. She also calls the regional Head of Process Safety to discuss the disturbing trend in process upset incidents at the site. He replies that he's seen the trend as well, and gives her some points to discuss during her visit.<sup>1,1</sup>

Arriving at the site and gathering with the site leadership team for lunch, the CEO launches into a discussion on the previous day's incident and the trend of process upsets.<sup>1</sup>

During a subsequent tour of the units, she commends the operators on their worker injury rate but also asks for their thoughts about the process safety incidents. She makes a point to seek out some of the front-line supervisors to chat about the importance of proper conduct of operations and to gain their buy-in for improving the process safety.<sup>1,5</sup>

## Tenet Key

1. Committed Culture
2. Vibrant Management Systems
3. Disciplined Adherence to Standards
4. Intentional Competency Development
5. Enhanced Applications of Lessons Learned





# A Day in the Life

## The Unit Manager 2012

Arriving shortly before the overnight shift concludes, Andrew brings up the latest production numbers from the night shift on his monitor. He sees that for once everything seems to be operating smoothly. Small upsets have caused production numbers to be below target, so he's happy to see a shift with no problems. Looks like he won't have to visit the control room.

He observes, however, that he still needs to act on the incident that occurred at the end of yesterday's day shift. With a few clicks of his mouse, he assigns it to his engineer Cameron. He allows a small sigh of relief... at least that's done.

Andrew begins the 0900 unit meeting with the usual review of production and quality numbers. Following this, he asks Cameron if he saw that he'd been assigned the investigation lead. He follows with "Good, address it quickly." Then going around the table, he asks each of his team if they have any issues; when it's Cameron's turn, he begins to ask those present about potential safety and environmental impacts from the MOCs he has to coordinate. As some of the team members begin to respond, Andrew interjects "Folks, this isn't a safety review meeting. Schedule a separate meeting."

At a site management lunch with the CEO, the plant manager and plant safety manager approach Andrew and ask about yesterday's incident. He observes the CEO eavesdropping on the conversation and makes it clear that it's being investigated and that there were no safety or environmental impacts.

That afternoon, he smiles inwardly as the CEO compliments his unit on their worker injury numbers. Andrew has made sure that his employees always wear PPE and take their time doing maintenance tasks and similar physical activities. Although he stresses over meeting production goals, he does emphasize worker safety.



## The Unit Manager 2020

Zach arrives at his unit at 0630 every morning. His first stop is always the control room to chat with the night shift.<sup>1</sup> Looking at the shift log and chatting with his operators gives him a much better feel for what's really going on; it's also allowed his operators to talk openly with him about any issues.<sup>1</sup> He's glad to hear that everything went smoothly last night; his production numbers have been below target; any shift without an upset is an improvement. He also asks the shift supervisor for any insight on yesterday's overpressure incident.<sup>5</sup>

Arriving in his office, his first order of business is to assign his unit engineer Neil as the investigation lead for yesterday's incident. Zach observes that this is just one of several similar incidents; he decides he's going to keep close tabs on this investigation through the online incident system.<sup>2</sup>

Zach starts the 0900 unit meeting with a safety moment about using a ladder at his home.<sup>1</sup> After getting his team into the right frame of mind, his first topic is the incident.<sup>1</sup> He's pleased that Neil already has scheduled the first investigation meeting and he passes along the input from the night shift. Later, he's pleased that Neil wants to address the MOCs right now in the meeting. Zach knows it won't take too much more time but these changes should smooth out some of the upsets; Zach readily supports the review at that time.<sup>1</sup>

During lunch with the CEO, Zach is a bit surprised to hear the CEO dive directly into a discussion on his unit's incidents. Nevertheless, he calmly contributes that he's similarly concerned about the repeat nature of the events, has received some insight from his night shift, and is personally monitoring this investigation.

As the CEO tours his unit, Zach stays in the background as she chats with his operators. He's impressed with her knowledge of process safety and her effort to emphasize it, especially to the supervisors.<sup>1</sup> He's sure her efforts will help improve process safety and production.

## Societal Theme Key

1. Enhanced Stakeholder Knowledge
2. Responsible Collaboration
3. Harmonization of Standards
4. Meticulous Verification

# A Day in the Life

## The Academic 2012

Julia strides out of the faculty fitness center and heads towards the campus café. Her workout, combined with a good night's sleep, has left her mind clear and refreshed. It's the first day of classes and she'll need to be sharp — as an assistant professor at the university's school of business, one of the top-rated schools in the nation, she'll be facing an MBA class of aggressive “up-and-comers” who'll be full of questions trying to impress her and their classmates.

An hour later, Julia coolly welcomes the students to her Integrated Business Analysis class. She reviews the syllabus, spending a few minutes on each of the topics. She then asks for questions on the overall course content. The first question catches her slightly off guard: “Is risk management limited to financial risk?” Huh? Of course, what other kind of risk.... Recovering, she replies: “Business risk focuses on financial effects; therefore, our focus is on financial risk.” As she fields other questions, something gnaws at the back of her mind.

Serendipity strikes that afternoon when her department head stops by her office and informs her that the chemical engineering department has requested the business school help prepare a lecture on risk management for the process safety element in their design course. He's assigning that task to her. Her momentary annoyance fades as that gnawing in her mind returns with a vengeance.

That evening, she spends a couple hours at the monthly meeting of the local chapter of a major outdoor conservancy organization. Being an avid outdoors person, she's passionate about preserving nature's beauty. Her mind wanders a bit as the officers plod through the standing business items but snaps back when the president mentions the meeting's main topic: “risk” from a local chemical facility. There's that word again...



## The Academic 2020

Katherine strides down the hall towards her first class of the new semester. As a senior faculty member in one of the nation's premier business schools, she's been entrusted with one of the most important classes in the MBA program. She knows she'll be peppered with questions but she also knows she'll be broadening her students' vision of what makes a successful business leader.

Walking purposefully into the classroom, she casually announces “Welcome to Business Risk Management: An Integrated Approach.”<sup>1</sup> Fifty minutes later, she concludes forcefully with “As future business leaders, you'll be confronted with a myriad of risks. Your job will be to manage that risk — all of it. If you focus just on financial risk, at best you will limit your success, at worst you will fail miserably. Apply the principles learned in this course and you will be prepared to make risk decisions competently; ignore these principles not only at your own peril but at the peril of the lives and well-being of your co-workers, neighbors, friends and family.”

After class, Katherine drives to a local high school to deliver a required “Introduction to Risk Concepts” secondary education lecture to the sophomore chemistry class.<sup>1</sup> Risk management has become her passion, propelling her academic career to unforeseen heights. She knows that improving risk literacy among students ultimately promotes more effective risk management for society as a whole. She considers it an honor and a duty to be today's “guest teacher.”

She spends her evening preparing for an upcoming “verification” of the process safety management systems at a local chemical facility.<sup>4</sup> She represents the local chapter of a major conservancy group on the community “verification team.” As she reviews the latest online facility data,<sup>4,2</sup> casually noting an incident just the day before, she ponders the unique connection to her own life: much of her essential outdoor equipment is made with products produced by that facility.<sup>1</sup>



# See What Industry Leaders Are Saying About Vision 2020 Tenets

## On Committed Culture

“To be successful at both sides of safety...requires a workforce that truly believes that all accidents are preventable.... It's got to be in the heads and hearts of people, if you're going to perform well in process safety.”

— *Stephen Pryor, ExxonMobil Chemical*

“If your plant sites and your businesses see [PSM] as an important aspect of what [you] value, then they will take that and make it their values as well and will operate with the highest standards of PSM.”

— *Ellen Kullman, DuPont*

“My advice and guidance to any CEO [is] if you don't demonstrate the leadership in driving process safety and personnel safety in other aspects of your business, it is not going to happen — or it is not going to be sustainable.”

— *James Alder, Celanese*

## On Vibrant Management Systems

“You can't look at this as a regulatory effort, you can't look at it as a cost center. I look...first of all, to ensure that we are doing the right things for the employees...the community...the shareholders and the board. Through the proper implementation of the process safety system, we're providing a discipline to the organization. It's going to ensure that we have a better run organization...better reliability, fewer accidents, fewer problems, fewer environmental problems...there are just all kinds of benefits to doing this.”

— *Paul Eisman, Alon USA*

“Committed leadership is not enough, clear policies are not enough, you need a management system to ensure that those policies and that leadership commitment are translated into specific activities, specific measurements, and that the system is robust and ongoing.”

— *Stephen Pryor, ExxonMobil Chemical*

## On Disciplined Adherence to Standards

“The one thing that has to be constant is our adherence to PSM, our discipline around that, because that is really what

gives us the confidence to operate these kinds of facilities, day in day out, in our communities around the world....

There's not a choice in my mind. If you're going to operate safely, if you're going to operate with the consent of the communities in which we operate, you need to do it with the highest regard to process safety management.”

— *Ellen Kullman, DuPont*

## On Intentional Competency Development

“Process safety is not something for the leader...and the safety experts to know; everybody in the workforce has to become more and more knowledgeable about understanding what the risks are, helping us to identify risks, and making sure that they understand and execute all of our procedures properly and consistently to avoid those risks.”

— *Stephen Pryor, ExxonMobil Chemical*

“To be an effective champion for process safety you need two things: you need some appreciation for the technical details and the complexity of the function, and then you need a sustainable, emotional commitment to prevent people from getting hurt.”

— *James Alder, Celanese*

## On Enhanced Applications of Lessons Learned

“A critical element of process safety excellence is...a learning organization. That means we learn at the site from every individual incident, and the front-line people have to understand, really understand, the higher potential consequence.... For those higher potential consequences, we share those learnings worldwide. It's not just sharing internally; it's also sharing those learnings with the industry.”

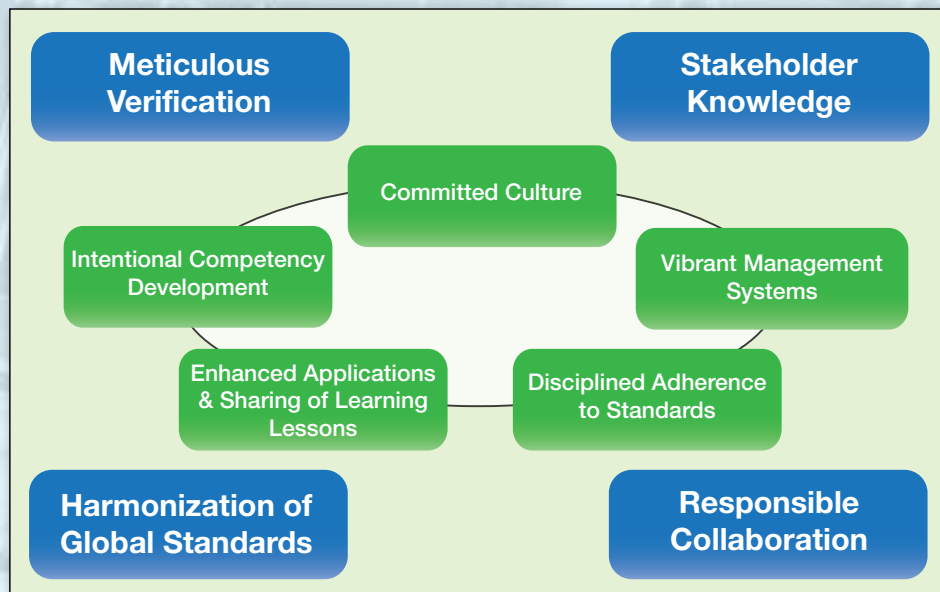
— *Stephen Pryor, ExxonMobil Chemical*

“I think one of the biggest issues that we face is that people become immune to the risks that are around them. There are very serious risks when you go in from the outside, you can see them—they're there; they are pretty obvious, but people tolerate them, because they become used to them.”

— *John Mogford, The Weir Group*

# VISION 2020

## Five Company Tenets and Four Societal Themes



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