An AIChE Technology Alliance

CCPS

Center for Chemical Process Safety

VISION 20/20

Process Safety: The Journey Continues

- The CCPS Vision
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- What Industry Leaders Are Saying
- How to Get Involved

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 process safety incidents.

Vision 20/20, developed by the Center for Chemical Process Safety (CCPS), looks into the not-too-distant future to describe how great process safety is delivered when it is collectively and fervently supported by industry, regulators, academia, and the community worldwide; driven by the five industry tenets; and enhanced by the four global societal themes.

Five Tenets for Industry

At the heart of Vision 20/20 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 Application and Sharing of Lessons Learned

Four Societal Themes

Vision 20/20 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 20/20 bridge to that commitment is founded in four societal themes:

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

The 20/20 Difference

What does great process safety look like? CCPS asked top executives to walk us though 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 20/20 tenets. Look inside to see what they said.

See What Industry Leaders Are Saying

How will Vision 20/20 tenets drive great process safety in the year 20/20? 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.

To Drive Improvement

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 20/20 harnesses the collective expertise and best practices of the Center for Chemical Process Safety to establish a global framework for great 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 20/20

Join Us!

Achieving great process safety is both a journey and goal. 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 20/20.

For additional information or to become involved in the drive to Vision 20/20 Process Safety Excellence, go to www.aiche.org/ccps/about/vision-2020.

Five Industry Tenets, One Vision, The Collective Challenge

These five industry tenets, combined with a fervor for great process safety, provide a powerful framework for Vision 20/20's success. Process safety results will dramatically improve if a company has:

1. A Committed Culture in which the executives are personally involved, managers and supervisors 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, which readily adapt to the organization's varying operations and risks. For vibrant management systems to be effective, all employees must have a clear understanding of their role in managing process safety and of the expectations of senior management. The management system is documented, accessible, easily used, and defines expectations and how operations are conducted at the workplace. It promotes safety in design, operations, and maintenance.

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. Companies should have requirements that ensure aging equipment adheres to appropriate standards, while working cooperatively with regulators and industry associations 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 behavioral 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 transform process safety culture, industry and the public need to work together to improve.

Vision 20/20 details how the five tenets of culture, management systems, standards, competency, and lessons learned are enhanced by the community's involvement, and supported by these four societal themes:

1. Enhanced Stakeholder Knowledge for all parties, beginning with the public, and including government and industry leaders. The public must engage in science, technology, engineering and mathematics (STEM) education, and push for risk literacy in high school, so that our students are prepared to absorb more technical concepts in business and engineering schools. This also promotes meaningful two-way conversations with industry and the public on process safety risks.

2. Responsible Collaboration among regulatory and investigative authorities, labor organizations, communities, research institutions, universities, and industries, working together on a common goal of excellent process safety performance.

3. Harmonization of Standards organizations that produce guidelines for the safe design, operation and maintenance of equipment, to streamline practices, eliminate redundancy and cooperatively address emerging issues. Harmonization of Standards leads to simplification and increased likelihood of conformance to applicable standards in local, national, and global commerce.

4. Meticulous Verification from knowledgeable third parties, including public and non-governmental organizations, to help companies evaluate their process safety programs. It will become standard practice for companies to supplement internal audits with competent third-party verification of their engineered systems and process safety management systems.

A Day in the Life

The year 20/20 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 20/20

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.[1] 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.[2]

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.[1,1]

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.[1]

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.[1,5]

Industry Tenet Key

1. Committed Culture
2. Vibrant Management Systems
3. Disciplined Adherence to Standards
4. Intentional Competency Development
5. Enhanced Application and Sharing 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 20/20

Zach arrives at his unit at 0630 every morning. His first stop is always the control room to chat with the night shift.[1] 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.[1] 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.[5]

Arriving in his office, his first order of business is to assign his unit engineer James 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.[2]

Zach starts the 0900 unit meeting with a safety moment about using a ladder at his home.[1] After getting his team into the right frame of mind, his first topic is the incident.[1] 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 James 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.[1]

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.[1] 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 Unit Engineer 2012

Terry sips his first cup of coffee and rereads the email assigning him as investigation lead for the upset and pressure relief incident yesterday. He's already thinking "Great, one more thing on the list. How am I going to fit an investigation into my schedule?"

Diverting himself momentarily from the incident email, he turns to the two high-priority Management of Change (MOC) forms he's responsible for coordinating. Both changes are relatively simple and nearly identical changes have been made multiple times previously, but he still needs to make sure that the extensive checklists are completed. He wonders if he can just complete them ahead of time… "Do we really need to discuss and answer all of those questions?"

In addition, he's the technical "expert" on a new by-pass system that is being designed. He needs to approve the design today; he feels the design is sound but has begun to wonder if it meets "codes." The company has internal standards but they are rather dated and don't apply to all situations. He hasn't kept up on relevant external recognized codes and the company has never pushed for him or others to learn those codes. He thinks there's an old copy of one of the codes in his filing cabinet. He decides he'll worry about that in the afternoon; he has to find time for those MOCs.

He has a unit meeting coming up at 9:00 a.m. and sighs, "Great, more time wasted."

Thinking back to the incident, he knows that this is just one of several similar incidents…the cause and findings should be the same…that should make the investigation simple and get it out of the way…maybe he'll just quickly meet with the operations supervisor sometime tomorrow.

The Unit Engineer 20/20

James grabs his first cup of coffee and rereads the email assigning him as investigation lead for the upset and pressure relief incident yesterday. He quickly pulls up the incident "screening" methodology in the incident tracking system; the results show that because this was a repeat incident and had the potential to be "really bad" it requires a comprehensive, systematic root cause analysis instead of one of the more streamlined methods.[2]

James thinks, "As if I don't have enough to do. This is going to be more involved than I thought."

Nevertheless, he knows it has to be done right and begins re-planning his day.[1]

He turns to the two high-priority Management of Change (MOC) forms he's responsible for coordinating. He notes that the submitter attached an existing site procedure created specifically for these types of process changes. The site created this procedure because the changes are relatively simple and are performed a few times per year. The site still manages the changes under MOC because there can be minor differences for each change. The site MOC "system," however, has generated streamlined yet applicable safety and environmental review forms.[2] He breathes a sigh of relief—the forms combined with the specific procedure will minimize the review time involved while still forcing the MOC team to answer the right questions. He should be able to address both of these during the 9:00 a.m. unit meeting.

In addition, he's the technical "expert" on a new by-pass system that is being designed.[4] He needs to confirm today that the design meets the recognized industry codes.[3] Having been to refresher training on the relevant codes earlier in the year,[4] he feels he can complete that task after the unit meeting.

Although James still has a lot to do, he realizes he can now devote the afternoon to the incident investigation. He begins identifying investigation team members and drafting an email instructing them to make their afternoon available—the investigation needs to be their priority.[1]

Industry Tenet Key

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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 20/20

Julia 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."[1] 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, Julia drives to a local high school to deliver a required "Introduction to Risk Concepts" secondary education lecture to the sophomore chemistry class.[1] 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.[4] She represents the local chapter of a major conservancy group on the community "verification team." As she reviews the latest online facility data,[5,2] 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.[1]

Societal Theme Key

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

See What Industry Leaders Are Saying About Vision 20/20 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

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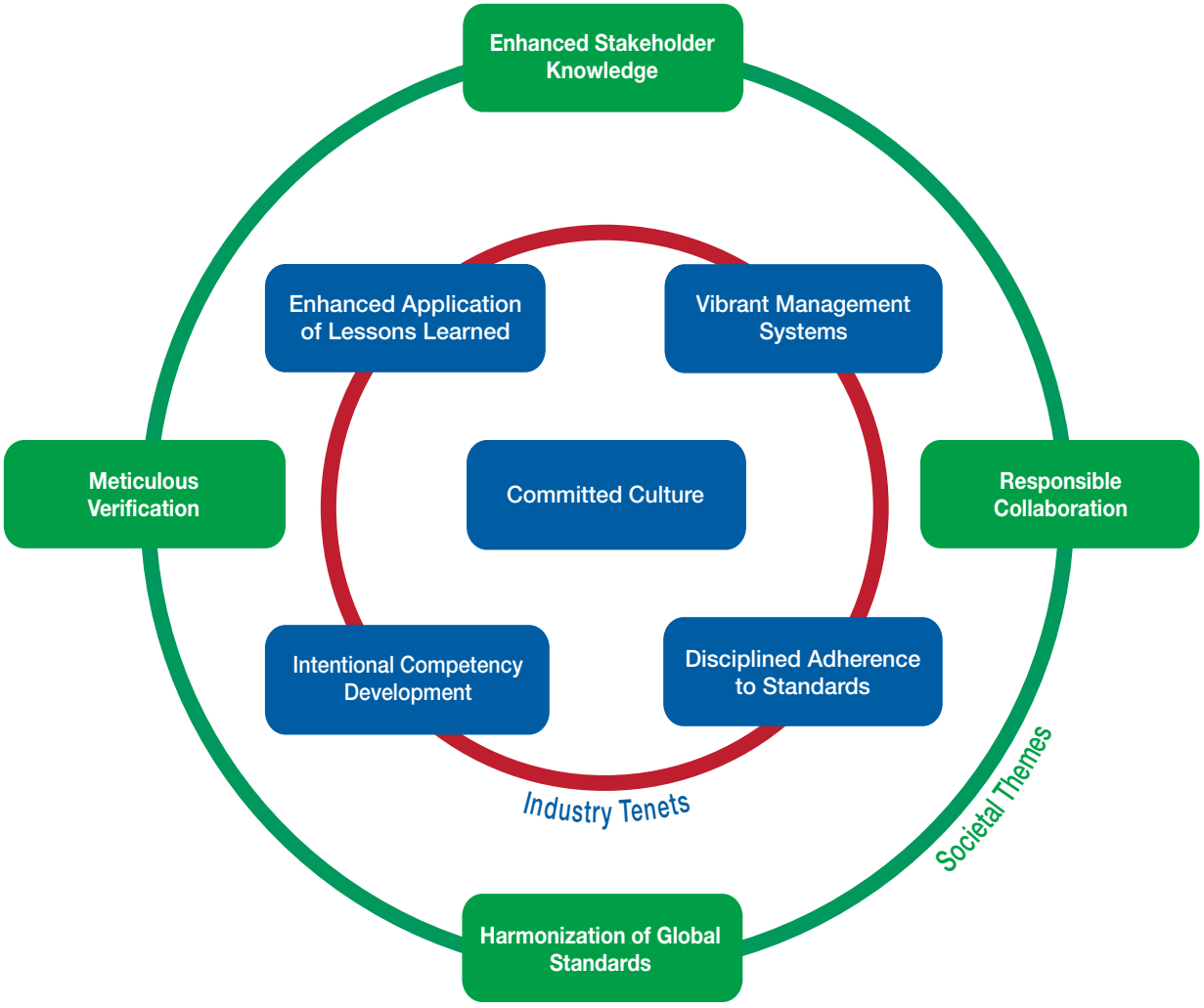
Five Company Tenets and Four Societal Themes



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An AIChE Technology Alliance
CCPS
Center for Chemical Process Safety

Center For Chemical Process Safety
An AIChE Technology Alliance
120 Wall Street, 23rd Floor, New York, NY 10005 USA
Tel: (+1) 646.495.1371 • Fax (+1) 646.495.1504
www.ccpsonline.org • e-mail: ccps@aiche.org