



2017 Annual Report

# EXPANDING GLOBAL AND REGIONAL ENGAGEMENT

# The CCPS Story

**Just after midnight on December 3, 1984, water contamination of a methyl isocyanate tank in Bhopal, India, initiated a series of events that led to a catastrophic toxic release, killing more than 3,000 residents and injuring over 100,000.**

In February of 1985, industry leaders asked the American Institute of Chemical Engineers (AIChE) to lead a collaborative effort to eliminate catastrophic process incidents. On March 23, 1985, AIChE formed the Center for Chemical Process Safety; CCPS completed *Guidelines for Hazard Evaluation Procedures* a short time later.

As we enter into 2017, we pause to reflect on the progress we've made and recommit ourselves to Vision 20/20, the future of process safety.

## Key milestones have included:

- CCPS Global Conference on Process Safety (Houston, Texas, USA)
- CCPS Global Summit on Process Safety (Dammam, KSA)
- Regional Technical Steering Committee Meetings in China, Peru, Germany, India and Brazil
- Expanded Global Outreach through training, speaking and working with partner organizations
- Enhanced Responsible Collaboration (CSB, OSHA, EPA, SOCMA, SPE, EI, ACS, UEF, API and others)
- CCPS Process Safety Beacon celebrated 15 years of continuous publication (180 issues)
- Reactive Chemistry Worksheet 4.0 created; home transferred from NOAA to CCPS website
- Electronic app for CCPS Glossary published
- Full program for CCPS Credentialing launched
- Five CCPS books published in the guidelines and concept series
- Outreach to students and professors improved through Boot Camp and SAcHE

We continue to honor the memories of those lost in Bhopal by striving for a future where we can eliminate all process safety incidents. Toward this end, we remain committed to learning from incidents, advancing the practice and collaborating broadly to implement safety measures. Vision 20/20 serves as our roadmap. Come join the Global Community Committed to Process Safety—be ready for the future by working to create it.

# Table of Contents

The CCPS Story	2
Executive Director's Message	3
Vision 20/20	4
CCPS Projects in Support of Vision 20/20	6
Completed Book Projects	8
Education	10
2016 Events and Meetings	12
CCPS 2017 Meetings, Destinations and Global Offices	16
2017 Important Dates and Events	18
Organizational Structure	19
Technical Steering Committee (TSC)	19
CCPS Activities Management	19
CCPS Managing Board	19
CCPS Advisory Board	20
Project Planning Committee	20
Projects and Volunteers	21
CCPS Staff and Staff Consultants	29

# Executive Director's Message



**Shakeel Kadri**  
*CCPS Executive Director*

**Traveling around the world** and meeting CCPS members, potential members and key stakeholders, we're heartened by the ways in which CCPS's message and influence continue to grow. During the past year, we had the pleasure of meeting with many of you, and we are so thankful for your engagement and support. One message received loud and clear is that CCPS needs to accelerate its global engagement. I would like to take this opportunity to recap our progress in this area.

The 12th Global Congress in Houston brought nearly 1000 diverse participants together to exchange best practices from many corners of the globe. The 4th China Conference, with nearly 300 delegates, was held in Qingdao in collaboration with China University of Petroleum/CCPS China Section. The 7th Latin America Process Safety Conference was held in Lima, Peru, with about 200 professionals from 60 companies. The 1st CCPS Conference on Process Safety and Big Data, in partnership with the European Process Safety Center, took place in Frankfurt, Germany, with more than 100 delegates from 62 companies enthusiastically exploring the power of big data analytics to improve process safety effectiveness. Last, we ended 2016 with the 3rd Global Summit on Process Safety, in Dammam, Kingdom of Saudi Arabia. With nearly 500 delegates, the conference highlighted the implementation of CCPS Vision 20/20. We held regional Technical Steering Committee (TSC) meetings in key regions, in addition to our usual face-to-face TSCs in the US.

CCPS saw good growth in global membership this year, welcoming 26 new members while unfortunately losing a few. We understand that lower oil prices have created economic challenges for several of our members,

and therefore we have closely monitored market conditions and worked to assist CCPS Members facing those financial hurdles.

In 2016, CCPS made important progress on two key initiatives: Undergraduate Process Safety Education and Process Safety Professional Certification. The Undergraduate Process Safety Education Initiative will deliver 10 new interactive SACH modules, with five new modules already translated into Spanish. We trained 92 educators in four faculty workshops hosted by Dow, ADM, Cargill and Chevron. Ninety-five knowledge-thirsty students attended three Process Safety Student Boot Camps as well. The CCPS Credentialing team launched the CCPS Process Safety Professional Certification program [CCPSC] this past spring. We completed two certification exam cycles, resulting in 92 CCPSC certificants.

Our journey toward CCPS Vision 20/20 continues, with a special emphasis this year on "responsible collaboration." The Energy Institute and the Society of Petroleum Engineers joined us in new projects. We, in turn, supported the Synthetic Organic Chemical Manufacturing Association in responding to its members' process safety needs. And our working relationship with the US Chemical Safety Board has become deeper and stronger than it has been in years.

On behalf of CCPS, I want to thank our 196 member companies for continuing to work together, tirelessly, to pursue our shared vision: protecting people, property and the environment by bringing the best process safety knowledge and practices to stakeholders around the world. Through collective wisdom, tools, training and expertise, we are sure to reach that goal.

# Vision 20/20

By the year 2020, leaders in process safety will value and demonstrate actionable commitment to the Vision 20/20 tenets 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 demonstrate what great process safety will look like when it is championed by industry and driven by the Vision's five tenets and 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 process safety excellence:

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

## Four Societal Themes

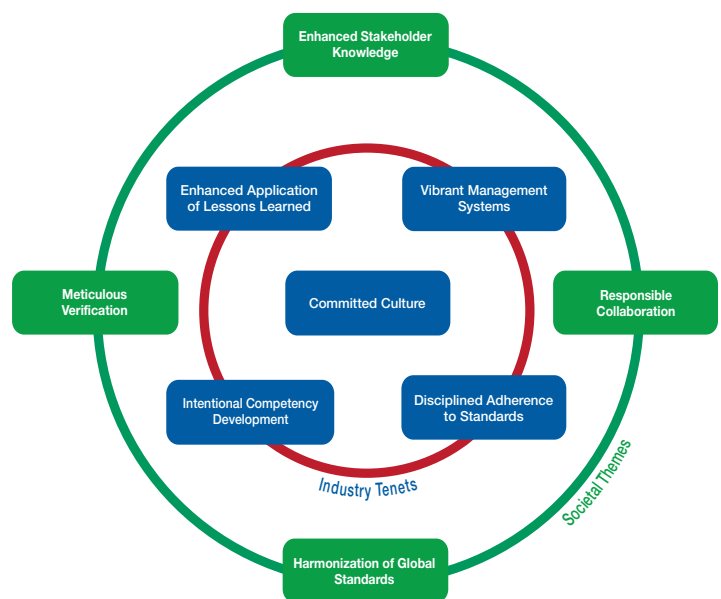
Vision 20/20 is a call to action for society, our leaders, governments and the public at large to be fervent about protecting people and property. The Vision 20/20 bridge to that commitment is its four societal themes:

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

## Driving 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 CCPS to establish a global framework for excellent process safety, driven by industry tenets and global societal themes, that will achieve:



- Significant reduction of industrial and plant incidents
- Consistent overlap of corporate and plant employees, to ensure enhanced process safety understanding as well as rigorous adherence to standards and practices
- Persistent knowledge, cultural values, understanding and implementation strategies, 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

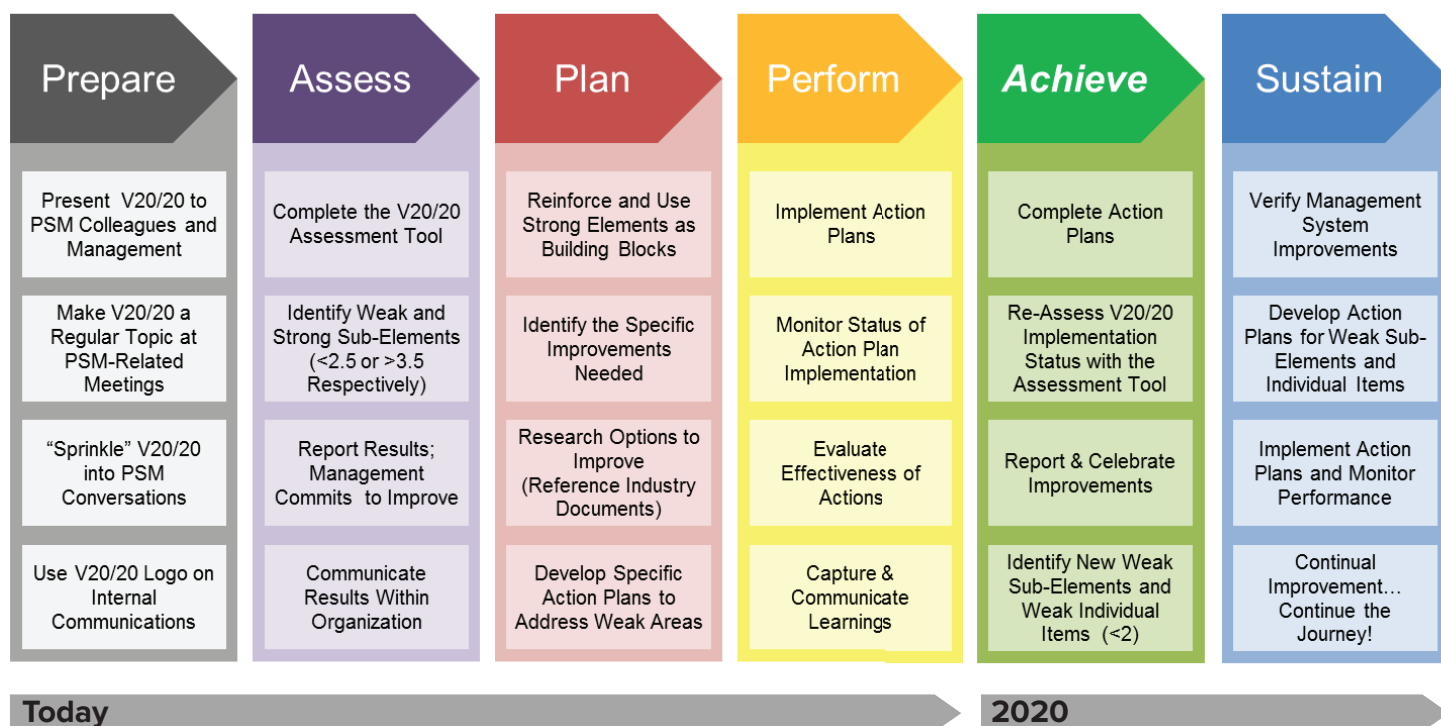
## The 20/20 Difference

What does great 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 to imagine what that same day would look like if all industries were guided by Vision 20/20 tenets.

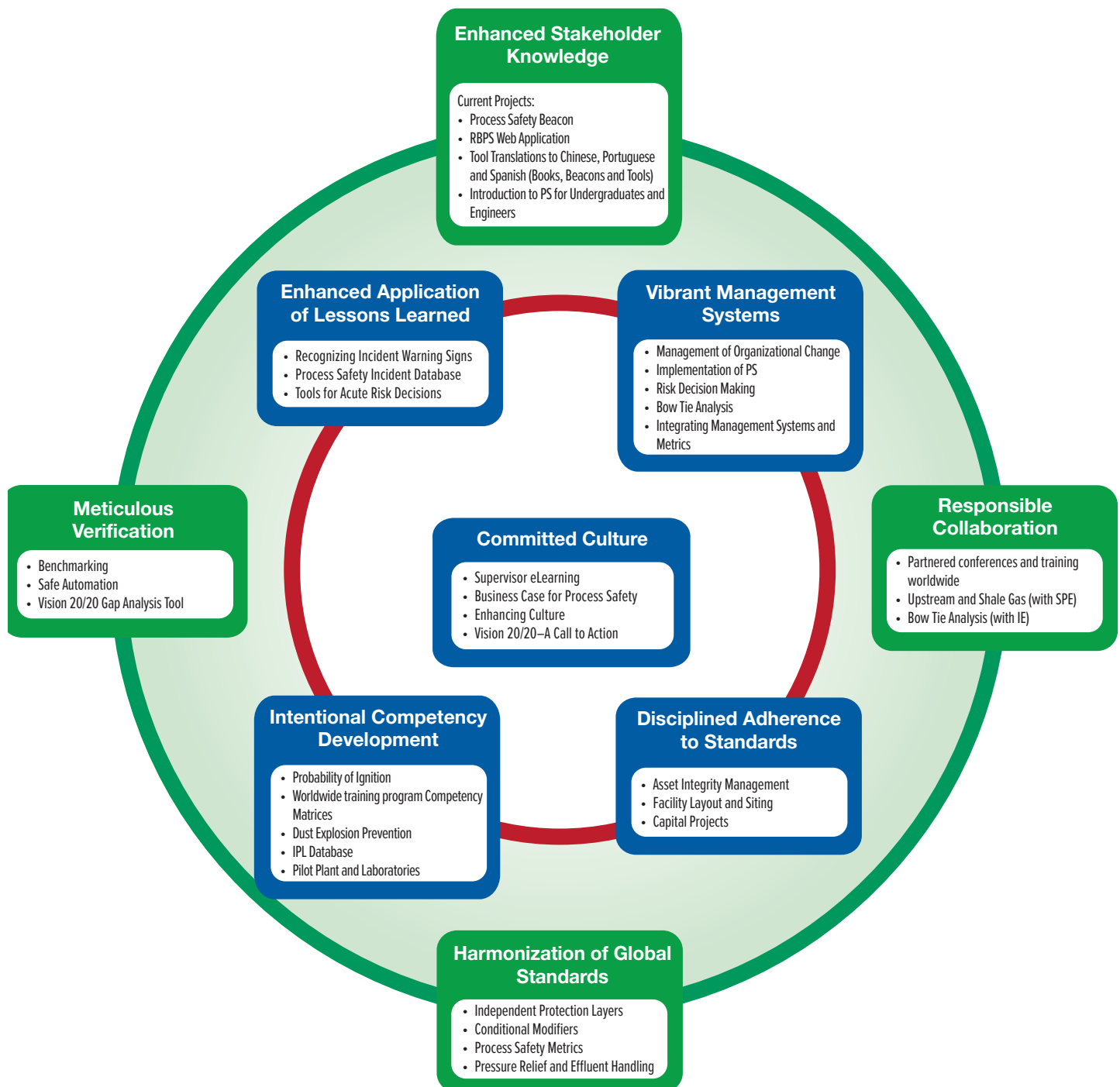
Visit [aiiche.org/ccps/about/vision-2020](http://aiiche.org/ccps/about/vision-2020) to read more about the four societal themes and five tenets for industry, to envision a day in industry's not-too-distant future and to see more of what industry leaders are saying about this important journey of process safety.

# VISION 20/20

## Implementing Vision 20/20: An Overview



# CCPS 2016 Projects in Support of Vision 20/20



# Get Your Company Involved



**Volunteer** for a CCPS project subcommittee. Get the opportunity to share your knowledge and help shape industry best practices. You must be a CCPS member to volunteer for a project.

To volunteer, visit [aiche.org/ccps/resources/forms/become-volunteer-ccps-projects](https://aiche.org/ccps/resources/forms/become-volunteer-ccps-projects) (Note: You must be logged in as a CCPS member to volunteer for a project.)



**Educate** your entire workforce by getting involved with the CCPS education curriculum, with face-to-face instructor-led courses including Process Safety Boot Camp (CH 900), Foundations of Process Safety (CH 910), Incident Investigation (CH901), Recognizing Catastrophic Incident Warning Signs (CH850) and our many eLearning courses on process safety and related topics.

To learn more, visit [aiche.org/ccps/resources/education](https://aiche.org/ccps/resources/education).



**Share** your expertise by participating in the Global Congress on Process Safety (GCPS), a CCPS Regional Conference or a Global or Regional TSC meeting.

For conference information, visit [aiche.org/ccps/resources/conferences](https://aiche.org/ccps/resources/conferences). For meetings information, visit [aiche.org/ccps/resources/conferences/events](https://aiche.org/ccps/resources/conferences/events).



**Mentor** your new employees by bringing them to the Young Professionals program at the GCPS.

For information, visit [aiche.org/community/sites/committees/young-professionals](https://aiche.org/community/sites/committees/young-professionals).



**Model** your company as a process safety champion for CCPS publications and tools.

For information, email [ccps@aiche.org](mailto:ccps@aiche.org).



**Communicate** the message by forwarding CCPS's monthly business blast, the "Process Safety Beacon," to your colleagues.

Sign up for the Beacon at [aiche.org/ccps/resources/process-safety-beacon](https://aiche.org/ccps/resources/process-safety-beacon).



**Connect** with your process safety peers through CCPS LinkedIn.

Join CCPS LinkedIn at [ccpsonline.org](https://ccpsonline.org).



**Participate** by getting your company involved in CCPS's Vision 20/20 Responsible Collaboration activities throughout the year.

E-mail Louisa Nara for more information at [Louna@aiche.org](mailto:Louna@aiche.org).



**Join** CCPS as a member company and prevent catastrophic process safety incidents. Not a CCPS member yet?

Join CCPS at [aiche.org/ccps/community/membership](https://aiche.org/ccps/community/membership).

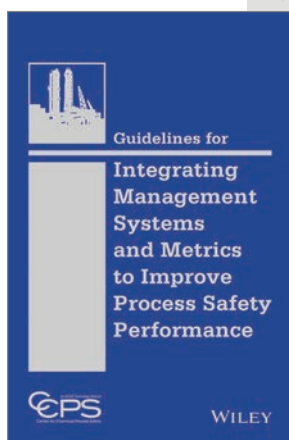


**Certify** yourself now! Assure your company and colleagues that you are thoroughly versed in process safety. CCPS® Process Safety Professional Certification (CCPSC), based on a rigorous assessment process, verifies that your process safety knowledge is broad, deep and current. When you earn your CCPSC you show the world you have what it takes to be a CCPS Process Safety Professional.

Get certified at [aiche.org/ccps/resources/certified-process-safety-professional](https://aiche.org/ccps/resources/certified-process-safety-professional).

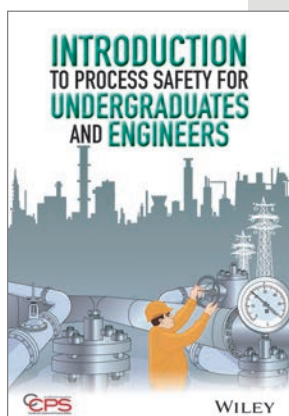


# Completed Book Projects



## *Guidelines for Integrating Management Systems and Metrics to Improve Process Safety Performance*

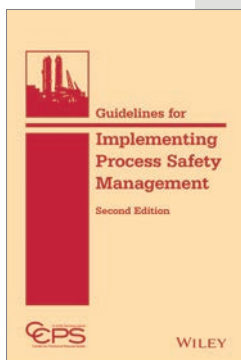
This book combines the synergies between performance improvement systems to help ensure safe and reliable operations, streamline procedures and cross-system auditing, and support regulatory and corporate compliance requirements. Many metrics are common to more than one area, such that a well-designed and implemented integrated management system will reduce the load on the Process Safety, SHE, Security and Quality groups, and improve manufacturing efficiency and customer satisfaction. Systems to improve performance include: process safety, traditional safety, health and environment, and product quality.



## *Introduction to Process Safety for Undergraduates and Engineers*

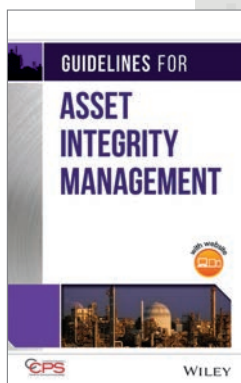
This book familiarizes the student or an engineer new to process safety with the concept of process safety management and serves as a comprehensive reference for Process Safety topics for student chemical engineers and newly graduated engineers. It can act as a reference material for a stand-alone process safety course or as a supplemental material for existing curricula. The book includes the evaluation of SACHE courses for application of process safety principles throughout the standard Ch.E. curricula in addition to, or as an alternative to, adding a new specific process safety course.





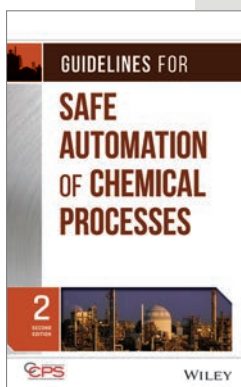
### *Guidelines for Implementing Process Safety Management*

The second edition updates the first to include best practices for managing process safety developed by industry as well as incorporate the additional process safety elements. In addition, the book includes a focus on maintaining and improving a Process Safety Management (PSM) System. This edition also provides how-to information to determine process safety performance status, implement one or more new elements into an existing PSM system, maintain or improve an existing PSM system and manage future process safety performance.



### *Guidelines for Asset Integrity Management*

This book is an update and expansion of topics covered in Guidelines for Mechanical Integrity Systems (2006). The new book is consistent with Risk-Based Process Safety and Life Cycle approaches and includes details on failure modes and mechanisms. Also, example testing and inspection programs for various types of equipment and systems are included. Guidance and examples are provided for selecting and maintaining critical safety systems.



### *Guidelines for Safe Automation of Chemical Processes*

This book provides designers and operators of chemical process facilities with a general philosophy and approach to safe automation, including independent layers of safety. An expanded edition, this volume includes a revision of original concepts as well as chapters that address new topics such as the use of wireless automation and Safety Instrumented Systems. This book also provides an extensive bibliography to related publications and topic-specific information.

# Education

## AICHE Academy



### CCPS eLearning Courses Launched in 2016

- The Importance of Codes and Standards for Process Safety
- Maintenance and Reliability for Chemical Engineers
- OSHA Process Safety Management Review
- What Every New Engineer Needs to Know about Process Safety
- Hazard Identification for Operators and Maintenance Workers—Spanish
- Process Safety Leadership for Front-Line Supervisors—Spanish



## CCPS Safety and Chemical Engineering Education (SACChE)

**DOING  
A WORLD  
OF GOOD**

AIChE and CCPS recognize that the best way to lead the way to a safer world is through better process safety education. Although most companies have extensive safety training programs, experience has shown that

presenting process safety concepts earlier, as part of the undergraduate chemical engineering curriculum, proves most effective.

### The Undergraduate Process Safety Learning Initiative

The Undergraduate Process Safety Learning Initiative is a multi-prong effort that will benefit companies, students, universities and ultimately society.

The Initiative concentrates on three primary areas:

- Curriculum
- Faculty Competence
- Undergraduate Boot Camps

Rollout of the Undergraduate Process Safety Learning Initiative is well underway, and it is poised to meet and exceed goals in faculty and student participation, module development and industry and university awareness of the program on a global level.

A core initiative of AIChE's Doing a World of Good campaign, the program incorporates process safety training into the chemical engineering curricula at universities throughout the world in order to ensure that *every chemical engineering graduate has a working knowledge of process safety.*

AIChE is collaborating with industry partners to introduce the Initiative to its 22,800 student members and over 50,000 global members through AIChE's extensive communication channels, university outreach, membership publications, meetings and conferences.

# DOING A WORLD OF GOOD

Creating a safer,  
more livable  
world begins in  
the classroom.

Introducing the  
AIChE® Undergraduate  
Process Safety  
Learning Initiative.

## Doing a World of Good Sponsor Companies

### FOUNDERS' CIRCLE

#### Benefactors



#### Patrons



**EASTMAN**



### CAMPAIGN PARTNERS

Archer Daniels Midland Company  
Mitsui & Co. (U.S.A.), Inc.  
Olin  
PolyOne  
Wacker Chemical Corporation

### CAMPAIGN SUPPORTERS

Air Liquide  
Arkema Inc.  
Bouchard Transportation  
Cargill  
Evonik  
Exxon Mobil Corporation  
Intercontinental Terminals Company LLC  
Novus International, Inc.  
Trinseo LLC

### CAMPAIGN FRIENDS

3M	Honeywell
Accella Performance Materials	Jacobs
Air Products	Jenner & Block
Arsenal Capital Partners	Johnson & Johnson
Asset Management Company	Kirkland & Ellis LLP
Axalta Coating Systems	MANA
Bank of America	Morgan Stanley
Barclays	Peach State Labs, LLC
BASF	Pfizer
BBDO	Praxair
Biogen	Shearman & Sterling LLP
Centerview Partners	SNF Holding Company
Day & Zimmermann	Teneo Strategy LLC
Duff & Phelps	The Lubrizol Corporation
Fragomen, Del Rey, Bernsen & Loewy, LLP	UMUS



# 2016 Events and Meetings

## North America

The 12th Global Congress on Process Safety, held in Houston, Texas, from April 10–13, 2016, drew over 1,000 process safety professionals and more than 300 companies from over 40 countries.



*12th GCPS Symposium and Track Chairs*



*GCPS Luncheon with over 500 attendees*

The CCPS Spring Technical Steering Committee Meeting was held on April 14, 2016, in Houston, Texas, and had over 140 attendees from more than 100 companies.



*Spring TSC group photo*

The CCPS Fall Technical Steering Committee Meeting was held from November 8–9, 2016, in Atlanta, Georgia, with over 60 attendees from more than 55 companies.



*Fall TSC Meeting in Atlanta, Georgia*

The 2016 AIChE Gala, built around the theme “Innovation,” was held on November 28, 2016. The Gala recognized companies and their leaders for distinguished achievements in innovation. Funds raised will support programs for chemical engineering students and professionals in entrepreneurship, innovation and creativity.

They will aid the international growth of the Institute’s Chem-E-Car Competition®, the “Futures” program for high-achieving young researchers and the development of a new program that fosters manufacturing innovation through modular chemical process intensification.



*AIChE Executive Director June Wispelwey with Ashish Khandpur, Senior VP of Research & Development and CTO, 3M Company; Teresa Szelest, President of Market & Business Development, BASF; George Scangos, CEO, Biogen; Robert Langer, Hoover Medal Recipient, and David Koch, Institute Professor at MIT*

## South America

The 7th CCPS Latin American Conference on Process Safety was held in Swissotel Lima, Peru, from August 21–22, 2016, with more than 200 attendees from 60 companies and 13 countries. Sponsored by Cargill, DuPont and PSRG, CCPS made a big impact at just the right time, with Peru soon implementing process safety regulations. The conference was preceded by a pre-conference workshop, “Incident Warning Signs,” which drew over 75 attendees.



*CCPS Technical Director Louisa Nara delivering 7th LACPS keynote address*



*Attendees at the 3rd LACPS*

The 3rd CCPS Latin America Regional Meeting was held in Rio de Janeiro, Brazil, on September 13, 2016, with more than 40 attendees.



*7th LACPS Chairs*



## 2016 EVENTS AND MEETINGS

### Europe

The 1st CCPS Europe Regional TSC Meeting was held in Zwijndrecht, Belgium, on March 15, 2016. This meeting was sponsored and hosted by the 3M Company. The meeting had 30 attendees from 25 CCPS Member companies.



*European TSC Meeting at 3M Company in Zwijndrecht, Belgium*

The 2016 European Conference on Process Safety and Big Data was held in Frankfurt am Main, Germany, from October 5–6. This conference was a joint event organized by CCPS and the European Process Safety Center (EPSC) with 108 attendees from more than 62 companies worldwide. Sponsors included TOTAL, Siemens, Orpic, Petrotechnics, Cefic, Rolls Royce and Sphera Solutions.



*2016 ECPS & BD session*

The 5th CCPS European Regional Meeting was held in Frankfurt am Main, Germany, on October 7, 2016, sponsored by DECHEMA. The meeting had 14 attendees from 11 companies.



*European Regional Meeting at DECHEMA House*

CCPS and AIChE participated and exhibited in the International Congress of Chemical and Process Engineering organized by the Czech Society of Chemical Engineering (CSCHE), in Prague, Czech Republic, from August 27–31.



*AIChE/CCPS booth at the International Congress of Chemical and Process Engineering*

### Asia-Pacific

The 4th China Conference on Process Safety was hosted by AIChE, CCPS and the China University of Petroleum in Qingdao, China, from June 1–3. The conference drew more than 300 delegates worldwide, with representatives from government, academia and industry.



*4th China Conference on Process Safety Opening Reception*

The 10th Asia Pacific Regional Meeting, sponsored by Reliance Industries Ltd., was held on October 14, 2016, in Mumbai, India, with more than 65 participants.



*10th Asia Pacific Regional Meeting sponsored by Reliance Industries Ltd.*

The 3rd Global Summit on Process Safety, with host sponsor SABIC, was held in Dammam, Saudi Arabia, from December 3–5, 2016, with nearly 500 attendees.



*3rd Global Summit on Process Safety*

### Middle East and North Africa

The 1st CCPS Technical Steering Committee Meeting was held on February 29, 2016, in Manama, Bahrain. The meeting was sponsored by the Gulf Petrochemical Industries Company and was attended by more than 15 participants.



*Middle East Technical Steering Committee Meeting sponsored by Gulf Petrochemical Industries Company*



# CCPS 2017 Meetings, Destinations and Global Offices

## NORTH AMERICA

### New York, NY

CCPS Advisory Board Dinner  
3/8/17

CCPS Advisory Board Meeting  
3/9/17

### San Antonio, TX

13th Global Congress on Process Safety  
3/26–3/29/17

CCPS Latin America Technical Steering  
Committee Regional Meeting  
3/29/17

CCPS Technical Steering  
Committee Networking Dinner  
3/29/17

CCPS Technical Steering  
Committee Meeting  
3/30/17

### Houston, TX

Offshore Technology  
Conference (OTC)  
5/1–5/4/17

### College Station, TX

Mary Kay O'Connor  
Process Safety  
Center Conference  
10/24–10/26/17

### Houston, TX

Fall Technical Steering  
Committee Meeting  
11/8–11/9/17

## EUROPE

### Colombes, France

CCPS European  
Regional Meeting  
3/16/17

### Prague, Czech Republic

EUROCORR 20th International  
Corrosion Congress & Process  
Safety Congress 2017  
9/5–9/6/17

### Frankfurt am Main, Germany

Conference on Process Safety  
and Big Data  
11/14–11/15/17

## SOUTH AMERICA

### Rio de Janeiro, Brazil

CCPS Latin America  
Regional Meeting  
3/9/17

### San Antonio, TX

CCPS Latin America Technical  
Steering Committee  
Regional Meeting  
3/26/17

### Buenos Aires, Argentina

CCPS Regional Meeting  
Q2 2017

### Bogota, Colombia

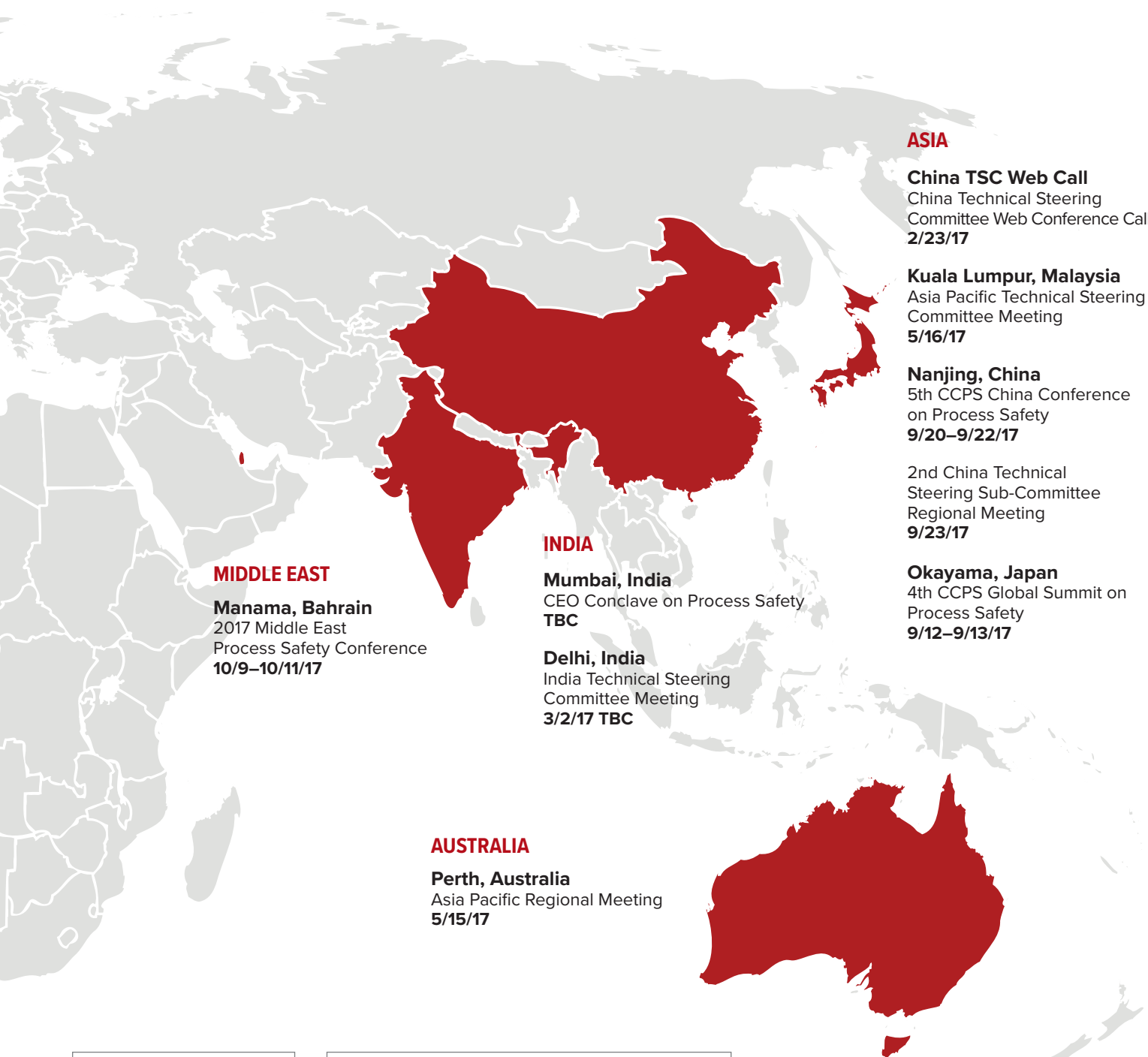
Latin America Technical Steering  
Committee Regional Meeting  
Q3 2017

### Rio de Janeiro, Brazil

Offshore Technology  
Conference (OTC)  
10/24–10/26/17

### Lima, Peru

CCPS Latin America  
Regional Meeting  
Q4 2017



## ASIA

**China TSC Web Call**  
China Technical Steering  
Committee Web Conference Call  
**2/23/17**

**Kuala Lumpur, Malaysia**  
Asia Pacific Technical Steering  
Committee Meeting  
**5/16/17**

**Nanjing, China**  
5th CCPS China Conference  
on Process Safety  
**9/20–9/22/17**

2nd China Technical  
Steering Sub-Committee  
Regional Meeting  
**9/23/17**

**Okayama, Japan**  
4th CCPS Global Summit on  
Process Safety  
**9/12–9/13/17**

## MIDDLE EAST

**Manama, Bahrain**  
2017 Middle East  
Process Safety Conference  
**10/9–10/11/17**

## INDIA

**Mumbai, India**  
CEO Conclave on Process Safety  
**TBC**

**Delhi, India**  
India Technical Steering  
Committee Meeting  
**3/2/17 TBC**

## AUSTRALIA

**Perth, Australia**  
Asia Pacific Regional Meeting  
**5/15/17**

### CCPS Offices

- New York, NY, U.S.
- Frankfurt, Germany
- Houston, TX, U.S.
- Mumbai, India
- Qingdao, China
- Singapore

### Global Web Conferences

- |                       |                                  |
|-----------------------|----------------------------------|
| 2/2/17                | <b>TSC Winter Web Conference</b> |
| 6/15/17               | <b>TSC Summer Web Conference</b> |
| 9/19/17               | <b>TSC Fall Web Conference</b>   |
| 9/19/17<br>to 9/27/17 | <b>TSC Fall Web Conference</b>   |

For the latest information on  
upcoming events, please visit  
**ccpsonline.org**

# 2017 Important Dates and Events

Event	Location	Date
CEO Conclave on Process Safety	Mumbai, India	TBC
Technical Steering Committee Winter Web Conference Call	CCPS Global Web Conference	2/2/17
Web Conference	China TSC Web Conference	2/23/17
Asia-Pacific Technical Steering Committee Meeting	Delhi, India	3/2/17 TBC
China Technical Steering Committee CCPS Advisory Board Dinner	New York, NY	3/8/17
CCPS Advisory Board Meeting	New York, NY	3/9/17
CCPS Latin America Regional Meeting	Rio de Janeiro, Brazil	3/9/17
CCPS Europe Regional Meeting	Colombes, France	3/16/17
CCPS Latin America TSC Regional Meeting	San Antonio, TX	3/26/17
13th Global Congress on Process Safety	San Antonio, TX	3/26–3/29/17
CCPS Spring Technical Steering Committee Networking Dinner	San Antonio, TX	3/29/17
CCPS Spring Technical Steering Committee Networking Meeting	San Antonio, TX	3/30/17
CCPS Regional Meeting	Buenos Aires, Argentina	Q2 2017
Offshore Technology Conference	Houston, TX	5/1–5/4/17
Asia Pacific Regional Meeting	Perth, Australia	5/15/17
Asia Pacific Technical Steering Committee Meeting	Kuala Lumpur, Malaysia	5/16/17
Technical Steering Committee Summer Web Conference Call	CCPS Global Web Conference	6/15/17
Latin America Technical Steering Committee Regional Meeting	Bogota, Colombia	Q3 2017
EUROCORR 20th International Corrosion Congress & Process Safety Congress 2017	Prague, Czech Republic	9/5–9/6/17
4th CCPS Global Summit on Process Safety	Okayama, Japan	9/12–9/13/17
5th CCPS China Conference on Process Safety	Nanjing, China	9/20–9/22/17
CCPS 2nd China Technical Steering Sub-Committee Regional Meeting	Nanjing, China	9/23/17
Technical Steering Committee Fall Web Conference	CCPS Global Web Conference	9/27/17
CCPS Latin America Regional Meeting	Lima, Peru	Q4 2017
2017 Middle East Process Safety Conference	Manama, Bahrain	10/9–10/11/17
Mary Kay O'Connor Process Safety Center Conference	College Station, TX	10/24–10/26/17
Offshore Technology Conference (OTC)	Rio de Janeiro, Brazil	10/24–10/26/17
Fall Technical Steering Committee Evening	Houston, TX	11/8–11/9/17
Conference on Process Safety and Big Data	Frankfurt am Main, Germany	11/14–11/15/17

For the latest information on events, please visit [ccpsonline.org](http://ccpsonline.org).

# Organizational Structure

## Technical Steering Committee (TSC)

The Technical Steering Committee (TSC) is the main body of CCPS, with one representative of each CCPS member company. The key functions of the TSC are to assist the CCPS director in:

- Developing an overall multi-year program for CCPS;
- Defining priorities for project selection;
- Selecting specific projects for CCPS;
- Defining and reviewing scope for these specific projects;
- Suggesting membership for the project subcommittees;
- Reviewing the status of all project programs.

The CCPS Technical Steering Committee meets face-to-face two times a year and by web conference throughout the year.

## CCPS Activities Management

Activities are monitored and directed by the:

- CCPS Managing Board
- Advisory Board
- Project Planning Committee
- Technical Steering Committee

Additionally, members of the Technical Steering Committee and other member company representatives serve on subcommittees that oversee CCPS projects. The Managing Board has fiduciary responsibility for CCPS's operations. The Advisory Board has strategic responsibility for CCPS. Board members review CCPS's mission and strategies and recommend new initiatives. The Planning and Operations Committee is responsible for evaluating opportunities and gaps in CCPS programs relative to its strategy and generating potential initiatives to address them.

## Managing Board

**June C. Wispelwey**  
AIChE Executive Director, Chair

**Shakeel Kadri**  
CCPS Executive Director

**Gregory Stephanopoulos**  
AIChE President

**Cheryl Teich**  
AIChE Past President

**Bond Calloway**  
AIChE President-Elect

**Freeman Self**  
AIChE Secretary

**Tim Odi**  
AIChE Director

**Dan Lambert**  
AIChE Director

**Alan Nelson**  
AIChE Director

**Billy B. Bardin**  
AIChE Director

## ORGANIZATIONAL STRUCTURE

### CCPS Advisory Board

**Shakeel Kadri**

CCPS, Chair

**Laura Ambrose**

The Dow Chemical Company

**Per Bagge Angelo**

Maersk Oil

**Bob Bahr**

ExxonMobil Chemical Company

**Steve Burton**

TOTAL

**Ana Davis**

Syngenta Crop Protection, Inc.

**Robert DiValerio**

BP

**Derek Farclough**

BASF Corporation

**Cheryl Grounds**

BP

**Linda Hicks**

Vertellus Specialties, Inc.

**Robin Higgs**

3M Company

**Robert Kelley**

Formosa Plastics Corporation

**Matthew Koenings**

DuPont Company

**David Lewis**

Occidental Chemical Corporation

**Anne O'Neal**

Chevron Corporation

**Louisa Nara**

CCPS

**Carl Parker**

Eastman Chemical Company

**Joe Pietrantonio**

Air Products and Chemicals, Inc.

**Khaled Saleh Kharboush-Al**

SABIC

**Kieth Silverman**

Ashland, Inc.

**Deborah Small**

Monsanto Company

**Michael Snyder**

Dow Corning Corporation

**Prasad Tipnis**

Reliance Industries, Ltd.

**Akio Ueda**

Mitsubishi Chemical Corporation

**Thomas Walsh**

Honeywell, Inc.

**June C. Wispelwey**

AIChE

**John Wnek**

Evonik

### Project Planning Committee

**Pete Lodal**

Eastman Chemical Company, Chair

**Chris Aiken**

Cargill, Inc.

**Todd Aukerman**

LanXess

**Anthony M. Downes**

Honeywell, Inc.

**Jerry Forest**

Celanese Corporation

**Jeffery L. Fox**

Dow Corning Corporation

**Eric Freiburger**

Praxair, Inc.

**Cheryl Grounds**

BP

**Shakeel Kadri**

CCPS

**Neil Maxson**

Covestro LLC

**Jack McCavit**

CCPS Emeritus

**Louisa A. Nara**

CCPS

**Cathy Pincus**

ExxonMobil Chemical Company

**Jatin Shah**

BakerRisk

**Ken Tague**

Archer Daniels Midland Company

**Karen Tancredi**

Chevron Corporation

**Kevin Shaughnessy**

The Dow Chemical Company

**Scott Wallace**

Olin Corporation

**John Wincek**

Croda, Inc.

# Projects and Volunteers

## Project 152 Process Safety Beacon

**John W. Herber**  
CCPS Emeritus, Co-Chair

**Rüdiger Lenz**  
Celanese Corporation, Co-Chair

**Dennis C. Hendershot**  
CCPS Staff Consultant

**Donald W. Abrahamson**  
CCPS Staff Consultant

**Katherine M. Anderson**  
ioMosaic Corporation

**Pedro A. Bonilla**  
Buckman North America

**Seshu Dharmavaram**  
Dupont Company

**Jeffrey L. Fox**  
Dow Corning Corporation

**David Guss**  
Nexen, Inc.

**Carolina Herrera**  
BP

**Kathy Kas**  
The Dow Chemical Company

**David A. Krabacher**  
BASF Corporation

**Michael W. Korst**  
LyondellBasell

**Antonio Lauzana**  
Petrobras (retired)

**Larry K. LeMesurier**  
Suncrude Canada Ltd.

**Marc E. Levin**  
Washington State University

**Georges A. Melhem**  
ioMosaic Corporation

**Jack L. McCavit**  
CCPS Staff Consultants

**Louisa A. Nara**  
CCPS

**Albert Ness**  
CCPS

**William M. Olsen**  
Merck & Company, Inc.

**Yasser A. Rahim**  
Gulf Petrochemical Industries Company

**Roy Sanders**  
PPG, retired

**Nicholas P. Sands**  
Dupont Company

**Sara K. Saxena**  
BP Corp North America

**Adrian L. Sepeda**  
CCPS Staff Consultant

**Jatin N. Shah**  
BakerRisk

**Mike Smith**  
Shell Downstream Manufacturing

**John C. Stoney**  
BP Corp North America

**Tom Spicer**  
University of Arkansas

**Anthony A. Thompson**  
Monsanto Company (retired)

**John C. Wincek**  
Croda, Inc.

**Jan Windhorst**  
Emeritus

## Project 233 Key Performance Indicators for Risk-Based Process Safety (Process Safety metrics)

**Eric Freiburger**  
Praxair, Inc., Chair

**Daniel E. Sliva**  
CCPS Staff Consultant

**Elroy M. Christie**  
Koch Industries

**Sean Dee**  
Exponent, Inc.

**Nancy Faulk**  
Siemens Energy

**Jeffrey L. Fox**  
Dow Corning Corporation

**R. Wayne Garland**  
Eastman Chemical Company

**Andrew Goddard**  
Arkema, Inc.

**Gil Guillory**  
Burns and McDonnell

**Mahendran Guru**  
Orpic

**Scott Allen Haney**  
Marathon Petroleum Company

**Astor Harris**  
Petrotrin

**Michell LaFond**  
Dow Corning Corporation

**Sue Lee-Martin**  
Arkema, Inc.

**Darrell Loewe**  
Formosa Plastics Corporation

**Steven R. Marwitz**  
Formosa Plastics Corporation

**Louisa A. Nara**  
CCPS

**Mark Paradies**  
System Improvements, Inc.

*continued on page 22*

*continued from page 21*

**Cesar Puma**

Pluspetrol

**Marcela Recaman**

Equión Energía Ltd.

**Sonny Sachdeva**

PSRG

**Dan Sorin**

Nova Chemicals Corporation

**Scott Wallace**

Olin Corporation

**Dan Wilczynski**

Marathon Petroleum Company

**Rukyah Hennessey**

CCPS

**Project 237 Guidelines for  
Barrier Risk Management  
(Bow Tie Analysis)**

**Kiran Krishna**

Shell Downstream Manufacturing,  
Chair

**Charles Cowley**

CCPS Staff Consultant

**Umesh Dhake**

CCPS

**Zsuzsanna Gyenes**

EC JRC MAHB

**Joanne Hill**

Risktec Solutions, Inc.

**Martin Johnson**

BP Corp North America

**Mark Richard Stening Manton**

ABS Consulting

**Darrin J. Miletello**

LyondellBasell

**Louisa A. Nara**

CCPS

**Americo Diniz Carvalho Neto**

Braskem (retired)

**Sudhir Kumar Phakey**

Linde Gas

**Robin M. Pitblado**

DNV GL

**Keith Serre**

Nexen, Inc.

**Ryan Supple**

ConocoPhillips

**Thiruvaiyaru V. Venkateswaran**

Reliance Industries Ltd.

**Stephanie Wardle**

Husky Energy

**Robert J. Weber**

PSRG, Inc.

**Danny White**

BHP Billiton Petroleum

**Project 237 Members from  
the Energy Institute**

**Ahmed Alzouibi**

Tullow Oil

**Dennis Evers**

Centrica

**Peter Jeffries**

Phillips66

**Rob Miles**

Hu-Tech

**Rob Saunders**

Shell Downstream Manufacturing

**Mark Scanlon**

Energy Institute

**Don Smith**

Eni

**Project 241 Guidelines  
for Safe Automation, 2nd  
Edition**

**R. Wayne Garland**

Eastman Chemical Company, Chair

**Daniel E. Sliva**

CCPS Staff Consultant

**Mohammed Rehan Baig**

Bayer CropScience

**Troy F. Bennett**

ExxonMobil

**William G. Bridges**

Process Improvement Institute, Inc.

**Michael P. Broadribb**

BakerRisk

**Michael Boyd**

Husky Energy

**John R. Campbell**

ConocoPhillips

**John D. Day**

Air Products & Chemicals, Inc.

**David A. Deibert**

Air Products & Chemicals, Inc.

**Rick Dunn**

Dupont Company

**William S. Fink**

Sage Environmental, Inc.

**Andrew Goddard**

Arkema, Inc.

**Bill Hearn**

SIS-Tech Solutions

**Kevin L. Klein**

Celanese Chemicals

**Suhas Kulkarni**

Toyo Engineering India, Ltd.

**Len Laskowski**

Emerson Process Management



**Victor J. Maggioli**  
Feltronics Corporation

**John Martens**  
Exponent, Inc.

**Norm Mcleod**  
Arkema, Inc.

**Ken J. O'Malley**  
aeSolutions

**Russell A. Ogle**  
Exponent, Inc.

**Justin Ogleby**  
Solutia, Inc.

**Eloise Roche**  
SIS-Tech Solutions

**Bob Roubion**  
Shell Downstream Manufacturing

**Raymond P. Stickles**  
ioMosaic Corporation

**Angela E. Summers**  
SIS-Tech Solutions

**Joe Veasey**  
aeSolutions

**Gregory G. Weidner**  
Huntsman Corporation

### **Project 244 Process Safety– Vision 2020**

**Cheryl A. Grounds**  
BP International Ltd., Chair

**Jack McCavit**  
CCPS Staff Consultant

**Walter L. Frank**  
CCPS Staff Consultant

**Todd Aukerman**  
LanXess Corporation

**Jeffrey L. Fox**  
Dow Corning Corporation

**Rukyah Hennessey**  
CCPS

**Peter N. Lodal**  
Eastman Chemical Company

**Louisa A. Nara**  
CCPS

**Samantha N. Scruggs**  
BP International, Ltd.

**Karen Tancredi**  
Chevron Corporation

### **Project 246 Guidelines for Siting and Layout of Facilities, 2nd Edition**

**Martin L. Timm**  
Praxair, Inc., Chair

**Charles Cowley**  
CCPS Staff Consultant

**Susan E. Bayley**  
Linde Engineering North America

**Chris Buchwald**  
ExxonMobil

**Bruce D. Bullough**  
Pfizer

**Andrew R. Carpenter**  
Exponent, Inc.

**Andy Crerand**  
Shell Downstream Manufacturing

**Donald J. Connolley**  
BP Corp North America

**Christopher P Devlin**  
Celanese Chemicals

**Jonas Duarte**  
Chemtura Corporation

**Randy Hawkins**  
AON Energy Risk Engineering

**Manuel Herce**  
DuPont Company

**David D. Herrmann**  
Baker Engineering & Risk  
Consultants, Inc.

**David Hill**  
Occidental Chemical Corporation

**Casey G. Johnson**  
Covestro LLC

**Jayant Kulkarni**  
Risktec Solutions, Inc.

**Annette Kyle**  
Risktec Solutions, Inc.

**Bill D. Lindberg**  
Air Liquide Large Industries US

**Reid McPhail**  
Canadian Natural Resources, Ltd.

**Timothy Murphy**  
Arkema S.A.

**Pamela M. Nelson**  
Solvay USA, Inc.

**Eric Peterson**  
MMI Engineering

**Ruifeng Qi**  
Huntsman Corporation

**Mark Saunders**  
Koch Industries

**Adrian L. Sepeda**  
CCPS Staff Consultants

**Florine Williams Vincik**  
BASF

### Project 248 Tools for Making Acute Risk Decisions

**Fred Henselwood**

NOVA Chemicals Corporation,  
Co-Chair

**Jeffrey C. Stawicki**

The Lubrizol Corporation, Co-Chair

**Dave Belonger**

CCPS Staff Consultant

**Christopher S. Buehler**

Exponent, Inc.

**Sorin Dan**

NOVA Chemicals Corporation

**Seshu Dharmavaram**

Dupont

**Marc A. Guindon**

Suncor Energy

**Elizabeth Lutostansky**

Air Products & Chemicals, Inc.

**Derek Miller**

Air Products & Chemicals, Inc.

**Guilherme Da Silva Telles Naegeli**

Petrobras

**Russell A. Ogle**

Exponent, Inc.

**Anne-Michael Pelupessy**

Akzonobel

**Robin M. Pitblado**

DNV GL

**Richard W. Sarnie**

CCPS

**Adrian L. Sepeda**

CCPS Staff Consultant

**Jatin N. Shah**

BakerRisk

**Martin L. Timm**

Praxair, Inc.

**John H. Traynor**

Evonik Corporation

**Dinesh Vaidya**

Reliance Industries Ltd.

**David Weimer**

MMI Engineering

**Florine Williams Vincik**

BASF

### Project 249 Essential Practices for Developing, Strengthening and Implementing Process Safety Culture

**Eric Freiburger**

Praxair, Inc., Co-Chair

**Karen Tancredi**

Chevron Corporation, Co-Chair

**Robert M. Rosen**

CCPS Staff Consultant

**Steve Arendt**

ABS Consulting

**Henry Brinker**

Monsanto Company

**Michael A. Dossey**

Contra Costa Health Services

**Walter L. Frank**

CCPS Staff Consultant

**Michael J. Hazzan**

AcuTech Consulting Group

**Louis Higgins**

Solvay Specialty Polymers

**Gretel Ivana D'amico**

Pluspetrol S.A.

**David W. Jones**

Chevron Corporation

**Dan Miller**

BASF (Retired)

**David A. Moore**

AcuTech Consulting Group

**Lou Musante**

Echo Strategies

**Cho Nai Cheung**

Contra Costa Health Services

**Anne E. O'Neal**

Chevron Corporation

**Gilisa Pacheco Monteiro**

Petrobras

**Ravi Ramasamy**

Nghi Son Refinery and  
Petrochemical LLC

**Randy Sawyer**

Contra Costa Health Services

### Project 250 Process Safety in Capital Projects

**Eric Freiburger**

Praxair, Inc., Chair

**Dave Belonger**

CCPS Staff Consultant

**Ignacio Alonso**

CSP-LA

**Michael Broadribb**

BakerRisk

**Christopher Buehler**

Exponent, Inc.

**Robert Dayton**

Chevron Corporation

**Jonas Duarte**

Chemtura Corporation

**Andrew Goddard**

Arkema, Inc.

**Emmanuelle Hagey**

NOVA Chemicals Corporation

**Jim Johnstone**

Contek Solutions LLC

**Graeme Leggett**  
BP Corp North America

**Leisa Porter**  
Fluor Corporation

**Richard Sarnie**  
CCPS

**Kevin Watson**  
Chevron Corporation

### **Project 251 Process Safety in Pilot Plants and Laboratories**

**Kathy Anderson**  
ioMosaic, Chair

**Jerry Jones**  
CCPS Staff Consultant

**Bruce Bullough**  
Corden Pharma Colorado

**David Caspary**  
Michigan Technological University

**Michael Cleary**  
DuPont Company

**L. Mark Delong**  
SABIC

**Russell Dunn**  
Vanderbilt University

**Khateeta Emerson**  
Merck & Co.

**Jeffrey Foisel**  
Dow Corning Company

**Jeff Grant**  
Albemarle Corporation

**William Flemming**  
Bristol Myers Squibb

**Michael Grossman**  
Buckman Laboratories International

**Bill Hargest**  
PPG Industries, Inc.

**Jeffrey Hedges**  
Chevron Corporation

**Randy Keller**  
Dow Corporation

**Paul McAllister**  
Shell Downstream Manufacturing

**Andrew Minister**  
DOE-Pacific Northwest National  
Laboratory

**Kabier Moideenkutty**  
Abu Dhabi Oil Refining Company  
(TAKREER)

**Richard Palluzi**  
ExxonMobil (retired)

**Christian Rauchegger**  
Linde Process Plants, Inc.

**Sebastien Righini**  
Solvay/Rhodia

**Atanas Serbezov**  
Rose-Hulman Institute

**Amy Theis**  
Fauske & Associates LLC

**Marathe Vinayak**  
Reliance Industries Ltd.

**Joel Young**  
BASF Corporation

### **Project 255 Evergreen LOPA/IPL Database**

**J. Wayne Chastain**  
Eastman Chemical Company, Chair

**John F. Murphy**  
CCPS Staff Consultant

**William G. Bridges**  
Process Improvement Institute, Inc.

**Art Dowell**  
Process Improvement Institute, Inc.

**Christopher Ilies**  
Evonik Corporation

**Kimberly Mullins**  
Occidental Chemical Corporation

**Kathy Shell**  
aeSolutions

**Angela Summers**  
SIS-Tech Solutions

**Scott Wallace**  
Olin Corporation

### **Project 268 Dealing with Aging Process Facilities and Infrastructure**

**Eric Freiburger**  
Praxair, Inc., Chair

**Brian D. Kelly**  
CCPS Staff Consultant

**Derin Adebekun**  
Air Products & Chemicals, Inc.

**Bennie Barnes**  
Pacific Gas and Electric Company

**Laura E. Bellman**  
Covestro LLC

**Larry O. Bowler**  
SABIC Innovative Plastics

**Bill Callaghan**  
NOVA Chemicals Corporation

**Jonas Duarte**  
Chemtura Corporation

**Nancy Faulk**  
Siemens Energy, Inc.

**Reyyan Koc**  
ExxonMobil Chemical Company

**Susan Lubell**  
Nexen, Inc.

**John F. Murphy**  
CCPS Emeritus

**Sudhir Kumar Phakey**  
Linde Gas

**Tom Sandbrook**  
The Chemours Company

**Jatin N. Shah**  
BakerRisk

*continued on page 26*

*continued from page 25*

**Kenneth E. Tague**  
Archer Daniels Midland Company

**Rob Van Sickle**  
Koch Industries

**Robert F. Wasileski**  
NOVA Chemicals Corporation

**Terry White**  
Pacific Gas and Electric  
Company

### **Project 269 Preventing Normalization of Deviation**

**Jennifer F. Mize**  
Eastman Chemical Company, Chair

**Daniel Silva**  
CCPS Staff Consultant

**Dan Wilczynski**  
Marathon Petroleum Company

**Steve Arendt**  
ABS Consulting Group

**Michelle L. Brown**  
FMC Corporation

**Kelly-Ann Charles**  
Methanex Trinidad, Ltd.

**Joey Cranston**  
Albemarle Corporation

**Scott Haney**  
Marathon Petroleum Company

**Greg Horton**  
SABIC Innovative Plastics

**Patti Jones**  
Praxair, Inc.

**Jai Karia**  
Chevron Corporation

**Neil L. Maxson**  
Covestro LLC

**Louisa Nara**  
CCPS

**Mark Parades**  
System Improvements, Inc.

**Michael (Mick) Pelupessy**  
AkzoNobel Chemicals, Inc.

**Manuel Alberto Rodriguez**  
FMC Corporation

**Joan Schork**  
BakerRisk

**Tony Strawhun**  
NewMarket

**Kenneth E. Tague**  
Archer Daniels Midland Company

**Karen Tancredi**  
Chevron Corporation

**John C. Wincek**  
Croda, Inc.

**Elliot M. Wolf**  
Syngenta

### **Project 270 Guidelines for Process Safety in Upstream Oil, Gas and Shale Ops**

**Eric Freiburger**  
Praxair, Inc., Co-Chair

**Jean Bruney**  
Chevron Corporation, Co-Chair

**Dave Belonger**  
CCPS Staff Consultant

**Amar Ahiuwakia**  
DNV GL

**Steve Arendt**  
ABS Consulting Group

**Michael P. Broadribb**  
BakerRisk

**Christopher S. Buehler**  
Exponent, Inc.

**Jonas Duarte**  
Chemtura Corporation

**Sergio Luiz Guedes**  
Petrobras

**Kevin He**  
Shell Downstream Manufacturing

**Jim Johnstone**  
Contek Solutions LLC

**Graeme Leggett**  
BP Corp North America

**David R. Mohler**  
Honeywell, Inc.

**Jason W. Nicholls**  
ExxonMobil

**Richard Piette**  
Suncor Energy

**Kevin D. Watson**  
Chevron Corporation

**Robert J. Weber**  
PSRG

### **Project 271 Process Safety Applications for Electronic Devices (Smart Phones/ Tablets/Desktop, etc.)**

**Jerry Forest**  
Celanese Chemicals, Chair

**Daniel Sliva**  
CCPS Staff Consultants

**Rukyah Hennessey**  
CCPS

**Christopher Keller**  
BASF

**Nguyen Trung Kiet**  
Binh Son Refining & Petrochemical  
Co., Ltd (BSR)

**Dave Moore**  
AcuTech Consulting Group, Inc.

### Project 275 Process Safety During Transient Operations (Start-up/Shutdown)

**Theresa Lynne Broussard**  
Chevron Corporation, Chair

**Daniel Sliva**  
CCPS Staff Consultant

**Donald J. Connolley**  
BP Corp North America

**Eddie G. Dalton**  
BASF Corporation

**Astor W. Harris**  
PETROTRIN

**Jitesh Patel**  
New Jersey Dept. of Environmental Protection

**Pamela M. Nelson**  
Solvay USA, Inc.

**Scott Schiller**  
BakerRisk

**Mario Enji Yamaguchi Sumida**  
BASF Corporation

**Robert J. Weber**  
PSRG, Inc.

**Elliot M. Wolf**  
Syngenta

### Project 276 Guidelines/ Essentials of Safe Work Practices/Conduct of Operations

**David Lewis**  
Occidental Chemical Corporation, Chair

**Dave Belonger**  
CCPS Staff Consultant

**Katherine M. Anderson**  
ioMosaic Corporation

**Steve Arendt**  
ABS Consulting

**Jonas Duarte**  
Chemtura Corporation

**Pam Feldman**  
Chevron Corporation

**Kevin He**  
Shell Downstream Manufacturing

**Jerry Keezer**  
Arkema

**Dan Miller**  
BASF Corporation (retired)

**Mikelle C. Moore**  
Buckman North America

**Mike Neill**  
Petrotechnics USA, Ltd.

**Jitesh Patel**  
DEP NJ

**Robert J. Weber**  
PSRG, Inc.

**Carlos Wigstrom**  
Pluspetrol S.A.

**Dan Wilczynski**  
Marathon Petroleum Company

### Project 277 Guidelines for Inherently Safer Design

**John C. Wincek**  
Croda, Inc., Chair

**Daniel Sliva**  
CCPS Staff Consultant

**Steve Arendt**  
ABS Consulting Group

**Oliva Cheng**  
Chevron Corporation

**Robert Coover**  
Praxair, Inc.

**Russ Davis**  
MISTRAS Group

**Jonas Duarte**  
Chemtura Corporation

**Andrew P. Hart**  
NOVA Chemicals Corporation

**Dennis Hendershot**  
CCPS Staff Consultant

**Nicole B. Loontjens**  
Americas Styrenics

**Jitesh Patel**  
New Jersey Dept. of Environmental Protection

**Katherine Perm**  
Arkema, Inc.

**Leisa Porter**  
Fluor Corporation

**Morgan Reed**  
MMI Engineering

**Sabrina Putruele**  
Pluspetrol S.A.

**Sonny Sachdeva**  
PSRG, Inc.

**Randy Sawyer**  
Contra Costa Health Services

**Scott Wallace**  
Olin Corporation

**Robert J. Weber**  
PSRG, Inc.

### Project 278 Risk-Based Process Safety Web Application Tool

**Karen Tancredi**  
Chevron Corporation, Co-Chair

**Tony M. Downes**  
Honeywell, Inc., Co-Chair

**Jing Chen**  
CCPS

### **Project 279 Incidents That Define Process Safety, Volume II**

**David Prior**

Honeywell, Inc., Chair

**Steven G. Eason**

CCPS Staff Consultant

**Albert Ness**

CCPS

**Sean J. Dee**

Exponent, Inc.

**Jerry Forest**

Celanese Chemicals

**Derek Miller**

Air Products & Chemicals, Inc.

**Karen Tancredi**

Chevron Corporation

### **CCPS Staff**

**Shakeel Kadri**

Executive Director

**Orlando Acosta**

Latin American Regional Manager

**Lamese Bader**

Membership & Communications Manager

**Jing Chen**

Engineering Specialist

**Umesh Dhake**

Asia Pacific Regional Manager

**Rukyah Hennessey**

Engineering Specialist

**Angela Louis**

Projects Coordinator

**Horst Massong**

European Regional Manager

**Louisa Nara**

Technical Director

**Shami Nayak**

Asia-Pacific Business Development Manager

### **CCPS China Section**

**Professor Zhao Dongfeng**

Director China Section

**Dr. Yi Lie**

Assistant Director China Section

### **CCPS Staff Consultants and Instructors**

**Don Abrahamson**

**Dave Belonger**

**Jim Conner**

**Charles Cowley**

**Steve Eason**

**Walt Frank**

**Warren Greenfield**

**Dennis Hendershot**

**John Herber**

**Jerry L. Jones**

**Brian Kelly**

**Jack McCavit**

**Dan Miller**

**John Murphy**

**Bob Rosen**

**Adrian L. Sepeda**

**Daniel E. Sliva**

**Nestor Sposito**

**Byron Sun**

# CCPS Staff



**Shakeel Kadri**  
*Executive Director*



**Louisa Nara**  
*Technical Director*



**Orlando Acosta**  
*Latin American  
Regional Manager*



**Lamese Bader**  
*Membership &  
Communications  
Manager*



**Umesh Dhake**  
*Asia-Pacific  
Regional Manager*



**Rukyah Hennessey**  
*Engineering  
Specialist*



**Horst Massong**  
*European Regional  
Manager*



**Shami Nayak**  
*Asia-Pacific  
Associate*



**Jing Chen**  
*Engineering  
Specialist*



**Angela Louis**  
*Project  
Coordinator*

## Moving On

**Albert Ness** joined CCPS in 2013 as a Process Safety Writer and subsequently took on the Senior Process Safety Specialist role. He has been influential in the technical writing and publishing of a number of CCPS books over the past four years, most recently the *Guidelines for Pressure Relief and Effluent Handling Systems, 2nd ed.* and *Guidelines for Combustible Dust Hazard Analysis*. Al retired at the end of 2016, but will return to CCPS in 2017 as a staff consultant.

**Rich Sarnie** joined CCPS in 2015 as the CCPS Projects Director and took on additional oversight roles in DIERS and DIPPR. Rich made important contributions in the completion of the CCPS Credentialing Program (CCPSC) and worked to increase the number of faculty workshops offered. He was involved in responsible collaboration with other organizations by giving presentations on process safety for non-chemical manufacturing.

CCPS thanks both individuals for their service to CCPS and AIChE over the past several years and wishes them good luck in their future endeavors.



## AIChE Academy Staff



**Anne Schaeffer**  
*Director, AIChE Academy*



**Denise DeLuca-Mallon**  
*In-Company Training, Account Manager*



**Jeffrey Perez**  
*Education Associate*



**Kandice Ross**  
*eLearning Associate*



**Ashley Smith**  
*Education Specialist*

## CCPS Staff Consultants



**Don Abrahamson**



**Dave Belonger**



**Charles Cowley**



**Steve Eason**



**Dennis Hendershot**



**Jenny Wang**



**B. Karthikeyan**



**Jack McCavit**



**Bob Rosen**



**Daniel E. Sliva**



**Byron Sun**



**Dennis Bernhard**



**Jim Conner**



**Walt Frank**



**John Herber**



**Jerry L. Jones**



**Brian Kelly**



**John Murphy**



**Adrian L. Sepeda**



**Nestor Sposito**

# Notes

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

# 2016 Worldwide CCPS Members

3M Company  
 ABIQUIM  
 ABS Consulting Group  
 AcuTech Consulting Group Inc.  
 ADGAS  
 AdvanSix  
 aeSolutions  
 Agrium Wholesale  
 AIG  
 Air Liquide Large Industries US LP  
 Air Products and Chemicals, Inc.  
 AkzoNobel Chemicals, Inc.  
 Albemarle Corporation  
 Ambatovy  
 Amec Foster Wheeler Energy Ltd.  
 American Electric Power  
 American Refining Group, Inc.  
 Americas Styrenics  
 Amgen  
 Archer Daniels Midland Company  
 Arkema, Inc.  
 ARPEL  
 Ascend Performance Materials  
 Ash Stevens, Inc.  
 Ashland, Inc.  
 Assero Resources, LLC  
 Axalta Coating Systems  
 Baker Hughes, Inc.  
 BakerRisk  
 BASF Corporation  
 Bayer Business & Technology Services, LLC  
 Bayer CropScience  
 BHP Billiton Petroleum  
 Binh Son Refining & Petrochemical Co., Ltd. (BSR)  
 Boulder Scientific Company  
 BP  
 Braskem  
 Bristol-Myers Squibb Company  
 Buckman North America  
 Burns and McDonnell  
 Calumet Montana Refining, LLC  
 CAMBREX  
 Canadian Natural Resources, Ltd.  
 Cargill  
 Celanese Chemicals  
 CEPESA  
 CF Industries Holdings, Inc.  
 The Chemours Company  
 Chemtura Corporation  
 CHENIERE  
 Chevron Corporation  
 Chevron Phillips Chemical Company LP  
 Chilworth Technology, Inc.  
 Cholamandalam MS Risk Services Ltd.  
 CNOOC Safety Technology Service Co.  
 Colonial Pipeline  
 ConocoPhillips  
 Contek Solutions LLC  
 Contra Costa County Health Services  
 Coogee Chemicals Pty. Ltd.  
 Corden Pharma Colorado, Inc.  
 Covestro LLC  
 Cristal  
 Croda, Inc.  
 DASIS Corp.  
 Deccan Fine Chemicals India Pvt. Ltd.

Dexco Polymers  
 Dixie Chemical Company  
 DNV GL  
 The Dow Chemical Company  
 Dow Corning Corporation  
 DuPont Company  
 Eastman Chemical Company  
 ECOLAB  
 Ecopetrol S.A.  
 Eli Lilly & Company  
 Emerson Process Management  
 Engro Fertilizer Ltd.  
 Engro Polymer & Chemical, Ltd.  
 Equión Energía  
 essenscia  
 Evonik Corporation  
 Exida  
 Exponent, Inc.  
 ExxonMobil Chemical Company  
 Fauske & Associates LLC  
 Fluor Corporation  
 FM Global Research  
 FMC Corporation  
 Formosa Plastics Corporation  
 GAIL  
 Gateway Consulting Group, Inc.  
 Gexcon India  
 Gulf Petrochemical Industries Company  
 Hess Corporation  
 Honeywell, Inc.  
 HOWAT RISK  
 Huntsman Corporation  
 Husky Energy  
 Idemitsu Kosan Co., Ltd.  
 ioMosaic Corporation  
 IRESC  
 Jacobs Company  
 Johnson & Johnson  
 KBR Energy & Chemicals  
 King Industries  
 Koch Industries, Inc.  
 Kraton Polymers  
 Kuraray America, Inc.  
 Larsen & Toubro Ltd.  
 LanXess Corporation  
 Linde Gas  
 Linde Process Plants, Inc.  
 LORD Corporation  
 The Lubrizol Company  
 Lummus Technology, a CB&I Company  
 LyondellBasell  
 Maersk Oil  
 Mallinckrodt Pharmaceuticals  
 Map Ta Phut Tank Terminal  
 Marathon Petroleum Company  
 MeadWestVaco Corporation  
 Merck & Company, Inc.  
 MISTRAS Group, Inc.  
 Mitsubishi Chemical Corporation  
 MMI Engineering  
 Monsanto Company  
 The Mosaic Company  
 National Grid  
 New Crest Mining Company  
 New Jersey Dept. of Environmental Protection  
 NewMarket

Nexen, Inc.  
 NOVA Chemicals Corporation  
 Nuclear Fuel Services  
 Occidental Chemical Corporation  
 Oil Industry Safety Directorate  
 Olin Corporation  
 Optima Chemical Group, LLC  
 Orchid Chemicals & Pharmaceuticals, Ltd.  
 Orpic  
 Pacific Gas and Electric Company  
 Pan American Energy, LLC  
 Petrobras  
 Petrochemical Corporation of Singapore (Pte), Ltd.  
 Petronas  
 Petrotechnics Ltd.  
 PETROTRIN  
 Phillips 66  
 Phoenix Park Gas Processors Ltd.  
 Pluspetrol S.A.  
 Potash Corporation  
 PPG Industries, Inc.  
 Praxair, Inc.  
 Process Improvement Institute, Inc.  
 Procter & Gamble  
 PSRG, Inc.  
 Quaker Chemical Corporation  
 REC Silicon  
 Reliance Industries, Ltd.  
 REPSOL  
 Rhodes Technologies  
 Risk Integrity Safety Knowledge  
 SABIC Innovative Plastics  
 Sadara Chemical Co.  
 Saudi Aramco  
 Scientific Protein Labs  
 Shanghai SECCO Petrochemical Co. Ltd.  
 Shell Downstream Manufacturing  
 Siemens Energy, Inc.  
 SINOPEC  
 SIS-TECH Solutions  
 Solvay USA, Inc.  
 Spectra Energy Transmission West  
 Starr Technical Risks Agency Inc.  
 Strem Chemicals  
 Suncor Energy  
 Syngenta Crop Protection, Inc.  
 System Improvements, Inc.  
 TAKREER Abu Dhabi Refining Company  
 Tejin Aramid  
 Tesoro Companies, Inc.  
 TonenGeneral Group  
 TOTAL  
 Toyo Engineering India, Ltd.  
 TPC  
 TransCanada  
 US EPA/OEM  
 Valspar Corporation  
 Vertellus Specialties, Inc.  
 Visimix Ltd.  
 Wesfarmers Chemicals, Energy & Fertilisers  
 Woodside Energy, Ltd.  
 WorleyParsons  
 Yara Trinidad Ltd.  
 YPF – Yacimientos Petroliferos Fiscales





AIChE  
120 Wall Street, New York, NY 10005  
[ccps@aiiche.org](mailto:ccps@aiiche.org) | [ccpsonline.org](http://ccpsonline.org)

# PROCESS SAFETY AT A GLANCE

A Roadmap to CCPS Tools,  
Management Systems and  
Technical Resources



# PROCESS SAFETY AT A GLANCE

GUIDELINES (G/L) FOR RISK BASED PROCESS SAFETY

## CCPS MANAGEMENT RESOURCE TOOLS

### COMMIT TO PROCESS SAFETY

- G/L for Implementing Process Safety Management Systems, 2nd ed. (2016)
- G/L for Process Safety in Outsourced Manufacturing Operations
- Local Emergency Planning Committee Guidebook: Understanding the EPA Risk Management Program Rule
- Inspiring Process Safety Leadership: The Executive Role (online and DVD)
- Process Safety Boot Camp - 2nd Generation
- Foundations of Process Safety for Offshore Operations
- Process Safety Culture Toolkit

### UNDERSTAND HAZARDS AND RISKS

- G/L for Defining Process Safety Competency Requirements
- Introduction to Process Safety for Undergraduates and Engineers (2016)
- A Practical Approach to Hazard Identification\*\*
- HAZOP eLearning
- LOPA eLearning
- Hazard Identification eLearning
- Hazard Identification for Operations and Maintenance Workers eLearning
- G/L for Chemical Process Quantitative Risk Analysis, 2nd ed.
- G/L for Chemical Transportation Safety, Security, and Risk Management, 2nd ed.
- G/L for Developing Quantitative Safety Risk Criteria
- G/L for Hazard Evaluation Procedures, 3rd ed.
- Layer of Protection Analysis\*\*
- G/L for Enabling Conditions and Conditional Modifiers in Layer of Protection Analysis
- Guidelines for Initiating Events and Independent Protection Layers in Layer of Protection Analysis
- Recognizing Catastrophic Incident Warning Signs in the Process Industries

### MANAGE RISK

- G/L for Integrating Management Systems and Metrics to Improve Process Performance
- Conduct of Operations and Operational Discipline
- G/L for Management of Change for Process Safety\*\*
- G/L for Managing Process Safety Risks during Organizational Change
- G/L for Improving Plant Reliability through Data Collection and Analysis
- Process Equipment Reliability Database
- G/L for Mechanical Integrity Systems
- G/L for Performing Effective Pre-Startup Safety Reviews\*\*
- G/L for Process Safety Documentation
- G/L for Technical Planning for On-Site Emergencies
- Revalidating Process Hazard Analysis
- G/L for Analyzing and Managing the Security Vulnerabilities of Fixed Chemical Sites
- Process Safety for Front-Line Supervisors eLearning
- G/L for Writing Effective Operating and Maintenance Procedures

### LEARN FROM EXPERIENCE

- Wisdom of Chemical Process Safety: Beacon Lessons and Accident Prevention (\*Currently available in Japanese.)
- CCPS Process Safety Benchmarking Program
- CCPS Process Safety Metrics Online Reporting Application
- G/L for Process Safety Metrics
- Process Safety Leading and Lagging Metrics: “You Don’t Improve What You Don’t Measure”\*/\*\*
- Process Safety Leading Indicators Industry Survey
- G/L for Acquisition Evaluation and Post Merger Integration
- G/L for Auditing Process Safety Management Systems, 2nd ed.
- G/L for Investigating Chemical Process Incidents, 2nd ed.
- Incidents That Define Process Safety
- Process Safety Incident Database
- Tools for Making Acute Risk Decisions with Chemical Process Safety Applications
- Vision 20/20 Process Safety: The Journey Continues

## 20 CCPS ELEMENTS OF PROCESS SAFETY

### Process Safety Culture

### Standards, Codes, Regulations and Laws

### Process Safety Competency

### Workforce Involvement

### Stakeholder Outreach

### Process Knowledge Management

### Hazard Identification and Risk Analysis

### Operating Procedures

### Safe Work Practices

### Asset Integrity and Reliability

### Contractor Management

### Training and Performance Assurance

### Management of Change

### Operational Readiness

### Conduct of Operations

### Emergency Management

### Incident Investigation

### Measurement and Metrics

### Auditing

### Management Review and

### Continuous Improvement

## CCPS TECHNICAL RESOURCE TOOLS

### ELECTRONIC APPLICATIONS

- CCPS Glossary
- CCPS Process Safety Incident Evaluation Tool
- NOAA Reactive Chemistry Worksheet Tool

### VENTING AND EMERGENCY RELIEF

- Deflagration and Detonation Flame Arresters
- Emergency Relief Systems Design Using DIERS Technology
- G/L for Pressure Relief and Effluent Handling Systems
- Safe Design and Operation of Process Vents and Emission Control Systems

### CHEMICAL REACTIVITY HAZARDS

- Chemical Reactivity Hazard Training CD-ROM
- Essential Practices for Managing Chemical Reactivity Hazards
- G/L for Process Safety in Batch Reaction Systems
- G/L for Reactivity Evaluation and Application to Process Design
- G/L for Safe Storage and Handling of Reactive Materials
- Reactivity Evaluation Software Tool

### SAFE DESIGN

- Continuous Monitoring for Hazardous Material Releases
- G/L for Engineering Design for Process Safety, 2nd ed.
- G/L for Fire Protection in Chemical, Petrochemical, and Hydrocarbon Processing Facilities
- G/L for Safe Warehousing of Chemicals
- Inherently Safer Design, 2nd ed.

### CONSEQUENCE MODELING

- G/L for Consequence Analysis of Chemical Releases
- G/L for Evaluating Process Plant Buildings for External Explosions, Fires, and Toxic Releases, 2nd ed.
- G/L for Vapor Cloud Explosion, Pressure Vessel Burst, BLEVE, and Flash Fire Hazards, 2nd ed.
- Understanding Explosions
- Wind Flow and Vapor Cloud Dispersion at Industrial and Urban Sites
- G/L for Determining the Probability of Ignition of a Released Flammable Mass

### BIOPROCESS SAFETY

- G/L for Process Safety in Bioprocess Manufacturing Facilities
- PSM Biodiesel eLearning
- PSM Bioethanol eLearning

### DUST EXPLOSION HAZARDS

- G/L for Safe Handling of Powders and Bulk Solids

### HUMAN FACTORS

- Human Factors: Methods for Improving Performance in the Process Industries
- G/L for Preventing Human Error in Process Safety

### SAFETY INSTRUMENTED SYSTEMS

- G/L for Safe and Reliable Instrumented Protective Systems
- G/L for Safe Automation of Chemical Processes, 2nd ed.

### R&D

- Making EHS an Integral Part of Process Design

### UPSTREAM

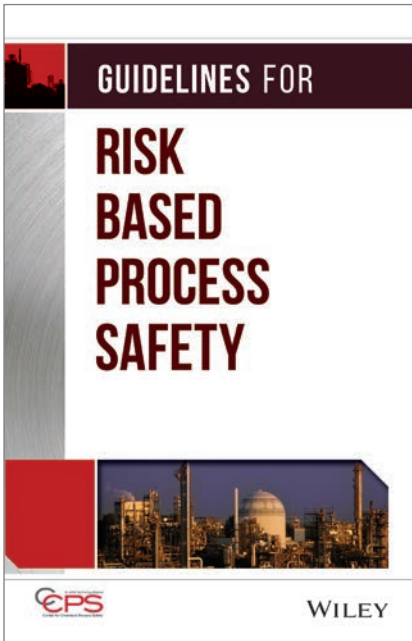
- G/L for Process Safety in Upstream and Shale Operations
- Most CCPS titles apply equally to upstream processes. (Please see appropriate RBPS element or technical topic.)

## ADDITIONAL RESOURCES

View the **CCPS Video** "Leading the Way to a Safer World" at [aiche.org/ccps/safety](http://aiche.org/ccps/safety).



Find **CCPS resources** to meet your needs from the chart on this page. Additional information can be found at [aiche.org/ccps](http://aiche.org/ccps).



**It always makes sense** to start with Guidelines for Risk Based Process Safety.\*

### Find CCPS Management Resource Tools

Look up CCPS resources based on the 20 CCPS Elements of Risk Based Process Safety categories. Find the applicable elements from the center column and look left to find more detailed resources.

### CCPS Technical Resource Tools

Look up CCPS resources for specific technical topics by searching the right-hand column for the topical area, then searching for a title within the area.

**Most CCPS books are available at** [wiley.com/go/ccps](http://wiley.com/go/ccps).

### Deep Search CCPS

by searching for “CCPS” and keywords on [Knovel.com](http://Knovel.com).

### CCPS Education

Tools and courses are available at [aiche.org/ccps/resources/education](http://aiche.org/ccps/resources/education).

### Translated Materials

Mandarin, Japanese, Portuguese, Spanish and Italian versions available at [aiche.org/ccps/QuickLinks](http://aiche.org/ccps/QuickLinks).

\* Available in Spanish, Japanese and Portuguese

\*\* Available in Chinese