Meeting the Process Safety Challenge Together

PUBLIC

EXECUTIVES

OPERATIONS & MAINTENANCE MANAGEMENT

TECHNICIANS & OPERATORS

ENGINEERS

GOVERNMENT OFFICIALS

STUDENTS
THE CCPS STORY

JUST AFTER MIDNIGHT on December 3, 1984, water contamination of a tank of methyl isocyanate 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, 17 chemical 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 and by the end of 1985 had enlisted 39 charter member companies. CCPS and its member companies quickly published CCPS’ first book, Guidelines for Hazard Evaluation Procedures. In a series of subsequent publications, CCPS first codified the critical elements of process safety and provided key tools to manage, implement, and continually improve process safety programs. Focused workshops and annual international conferences provided additional opportunities for integrated learning and formal discussion regarding process safety.

Still following this approach 27 years later, CCPS continues to address the most important process safety needs and encourage an overall culture of process safety. Over 140 corporate members from around the world now participate in CCPS, including most of the world’s leading chemical, petroleum, and pharmaceutical companies. CCPS’ body of work reflects the great strides made in the area of process safety in the past quarter century.

CCPS continues to expand its catalog of over 100 books and products, build on its legacy of over 30 successful international conferences, and cultivate its Safety and Chemical Engineering Education (SAChE) university curriculum program.
You Made an Impact In 2011

- Recognizing Catastrophic Incident Warning Signs in the Process Industries
- Benchmarking: Process Safety Management Systems, 2nd Round
- Guidelines for Engineering Design for Process Safety, 2nd Edition
- Guidelines for Auditing Process Safety Management Systems
- Guidelines for Conduct of Operations
- Executive Process Safety Seminars

Get Your Company Involved

VOLUNTEER for a CCPS project subcommittee and get the opportunity to share your knowledge and help shape industry best practices

EDUCATE your colleagues by hosting a Process Safety Boot Camp® training

SHARE Share your expertise by submitting an abstract to the Global Congress on Process Safety

MENTOR your new employees by bringing them to the young professional program at GCPS

MODEL your company as a leader in process safety by being a contractor for a CCPS publication

SPREAD Spread the word by forwarding the Beacon to your colleges

CONNECT with your process safety peers through CCPS LinkedIn

JOIN CCPS as a member company and prevent catastrophic process safety incidents
A Message From the Executive Director

AT ITS FOUNDING, and at many occasions throughout its history, CCPS members have asked themselves, “What does excellence in process safety look like?” It should come as no surprise that the answer has changed over the years. In fact, from today’s perspective, the 1985 CCPS vision of “Well-defined hazard evaluation methodology and sound emergency planning” seems relatively primitive. As the vision evolved from “Top management commitment,” to “Sound regulatory policy,” to “Advanced technical analysis,” to “Strong culture” to “Better results with limited resources,” CCPS’ visions of yesterday map out the maturation of process safety to the present day, telling the story of Process Safety in Action.

Today, CCPS looks again to the future, to the “Vision Year,” 2020. Our vision will mature through the coming year, and as it does, CCPS will report it to stakeholders through its website and other forums. Nonetheless, several aspects of this vision can be anticipated with clarity.

First, the flattening of the world makes Unifying the Community of process safety leaders and practitioners more important than ever. As the “Global Community Committed to Process Safety,” CCPS plays a lead role in this effort. CCPS will need to maintain its existing communities like the Technical Steering Committee and Project Subcommittees while building new regional, virtual, and topical communities, forging new partnerships, and providing connections between them.

Implementation will be a critical theme. As CCPS approaches the publication of its 100th book, lack of basic guidance can no longer be given as an excuse for poor performance. As manufacturers and producers focus more on implementation, CCPS will need to ensure that its future guidance come equipped with tools to implement that guidance.

Educating and preparing the next generation will also be important. With the first baby-boomers retiring, a new generation of experts and leaders must step forward, and a new generation of implementers must emerge to take their place. CCPS will need to increase its focus on professional and university education to help make sure the next generations are ready for their important new roles.

On behalf of CCPS, I thank our now more than 140 member companies for rallying together to continually set a new vision and then working tirelessly at innovating the vision. Sometimes when contemplating the future, we can be tempted to think that we can never reach the ideal we strive for. When that happens, just look back at how our vision has been advanced by everything we’ve accomplished. It will be then be clear how much more we can do to prevent accidents.

VISION
In order to protect people, property and the environment, CCPS is committed to bringing the best process safety knowledge and practices to industry, academia, the government and the public around the world through collective wisdom, tools, training and expertise.

MISSION
Eliminate process safety incidents, in all industries, by:
• Promoting process safety as a key societal value and expectation.
• Establishing process safety as the foundation for responsible operations.
• Serving as the premier world-wide resource for process safety and development of the “state-of-the-art” solutions.
• Fostering knowledge, understanding and implementation of process safety by executives, management, technicians, engineers, students, government officials and the public.
• Advancing process safety technology, culture and management practices.
The 8th Global Congress on Process Safety

On April 1-4, 2012 the 8th Global Congress on Process Safety will convene in Houston Texas at the Hilton Americas-Houston and George R. Brown Convention Center, to explore new ways to avoid incidents, manage risk, ensure plant safety and strengthen our process safety management programs.

The “Bring a Young Colleague” program, encouraging attendees to bring a colleague under the age of 35 for half price, continues to be great success.

Process Safety in Latin America

“As being originally from Argentina I understand that there is a limited amount of information available in Spanish and Portuguese,” said Laura Turci, CCPS Project Manager for the 3rd & 4th Latin American Conference on Process Safety (LACPS). “I’m proud that the LACPS is leading the movement to fill this void. The LACPS facilitates discussions and really is strengthening the Latin American process safety community.”

As the world’s focus turns to Brazil in anticipation of the Soccer World Cup and the upcoming Summer Olympic Games, CCPS will be in Rio de Janeiro, Brazil to host the 4th LACPS on July 3-5, 2012 at the Hotel Sofitel Rio de Janeiro Copacabana, in partnership with the Brazilian Petroleum Institute. Featuring 3 parallel tracks, 2012 LACPS, promises to be the best one yet!

Projects

Process Safety Vision 2020 (Proj. # 244) ETA 2012:
Create a vision for what good process safety management systems will look like in the year 2020. Emphasis will be on excellent execution of management systems. The vision can be published as an evergreen paper on the CCPS website. There will be guidance to help companies understand where they are in relation to the vision, and tools to help them get there.

Business Case for Process Safety and Sustainability (Proj. # 245) ETA 2012:
Update the existing pamphlet on “The Business Case for Process Safety” to incorporate a current perspective of business impacts. In addition, the impact of process safety on sustainability and sustainable growth will be discussed.

Integrating Management Systems and Metrics to Improve Process Safety (Proj. # 247) ETA 2013:
The book will discuss ways to identify and implement synergy opportunities in developing management systems. Key topics will include how to anticipate and alleviate resistance to integration, how to streamline audit functions by reducing or eliminating duplication of audits, and operational reliability and highly reliable organizations.
CCPS in India

On September 21, 2011, CCPS held its second India regional meeting in Hyderabad, India, thanks to the generous hospitality of member company Dr. Reddy’s Laboratories, Inc. Immediately preceding and following the Regional Meeting, CCPS offered workshops on Risk Based Process Safety and Fire Protection in Mumbai, Hyderabad, and Delhi. Additional onsite training events for senior executives, engineers, and operators occurred throughout the year. The next India Regional Meeting is scheduled for May 2012.

CCPS in China

Since 2006, CCPS has partnered with the China University of Petroleum to provide training and other support in China as the CCPS China Section (CCPS-CS). In 2011, CCPS-CS presented its seventh workshop, this time focused on incident investigation. Nearly 150 trainees from Chinese and multinational companies participated. CCPS is grateful to Li Lin and Gu Nai Bing of member company Akzo Nobel for volunteering as translators.

China SAWS Visits The CCPS New York Office

“It provided us with invaluable experience and expertise on chemical process safety management that we can bring in the Chinese chemical industry,” said Liu Qiang, Deputy Director-General of China SAWS. “We hope to work together with CCPS to develop resources for safe chemical operations in China, and achieve optimal solutions up to par with standards in the developed world.”

Share Your Process Safety Moments with Others (Proj. # 219):
Sharing lessons learned is one of the most powerful and effective ways of learning from our past and preventing an undesirable reoccurrence. To facilitate sharing, CCPS is creating a library of short PowerPoint presentations, video clips, podcasts, etc. that can be used by member companies to impart knowledge on a broad scale. Please share your process safety moments.

Conditional Modifiers and Enabling Events (Proj. # 229) ETA 2013
This book will provide information and considerations on developing and using conditional modifiers for Layer of Protection Analysis. It will also provide similar information on applying enabling event values to hazard analyses.

Hazard Identification for Operators and Maintenance: A CCPS Training Module (Proj. # 224) ETA 2012:
Frequently, front line personnel are not made aware of the full extent of process safety hazards present in their work environments. This project will develop web-based training to enhance awareness and identification of process safety hazards by front line personnel.

PROJECTIONS

Process Safety for Frontline Supervisors (Proj #225) ETA 2012:
Daily “enforcement” at the operator/technician and supervisor levels is essential to follow through on leadership commitment to process safety and other safety programs. This training program will increase the understanding and buy-in at the front-line supervisory level through better understanding of process safety, its benefits, and the interactions of the various elements.
Celebrate The Beacon’s 10Th Anniversary By Forwarding The Beacon

November 2011 marked the 10 year anniversary of the CCPS Process Safety Beacon, a free monthly one page awareness bulletin which shares lessons from process safety incidents. The Beacon is written for front line plant workers – operators, technicians, shift foremen, and maintenance workers, and is also used by engineers, managers and executives. Any organization with a good process safety culture maintains a sense of vulnerability, remembering and respecting the hazards associated with its processes and materials. An important way of doing this is to continually remind personnel of what can happen if process safety management systems fail. Register to receive the Beacon at www.ccpponline.org.

Hazop Studies E-Learning

This course teaches the anatomy of process safety incidents including process hazard analysis terminology, the basic HAZOP study approach to developing potential incident scenarios, the estimating of scenario risk as a means to determining the adequacy of safeguards, the application of the HAZOP method to procedure-based operations, and the logistical aspects of planning and executing a HAZOP team review.

Continued on following page.

Guidelines for Likelihood of Ignition of Released Flammables (Proj. #212) ETA 2012

This book will be the culmination of a research project to collect and evaluate the experiences and methodologies related to the ignition of released flammables. This information will form the foundation for technically estimating the probability that a release of a flammable material will ignite. With this capability, industry can better define risk-based equations and make better technology-based decisions. This may be very useful in the task of siting, as it relates to the protection of people in buildings, as well as for CPQRA and LOPA studies.

Guidelines for Safe Automation, 2nd Edition (Proj. # 241) ETA 2013:

An update to the original 1993 guideline, this edition will cover state-of-the-art design and maintenance of Basic Process Control Systems (BPCS) and their role in overall safe operation. It will also focus on the BPCS/operator interface and will have worked examples of control schemes in combination with SIS. RBPS principles will be integrated, and a control strategy for cyber attack security will also be covered.

Continued on following page.
PROJECTS continued

Guidelines for Facility Siting and Layout, 2nd Edition (Proj: # 246) ETA 2013:
This project will revise and update the current CCPS publication, and add new information on occupied portable buildings, facility and plant layout.

Developing, Strengthening and Implementing Process Safety Culture (Proj: # 249) ETA 2013:
Process safety culture is the combination of group values and behaviors that determine the manner in which process safety is managed. It is critical in any process safety management system and business. Without a good culture, even the best management system will only achieve mediocre results or fail outright. This project, which continues CCPS longstanding culture efforts, will develop guidance and tools on establishing, evaluating, and improving process safety culture to help organizations understand, recognize, improve, and sustain a positive process safety culture.

Instantly search the entire CCPS library.
The complete collection of CCPS books is available online through partnership with Knovel Corporation. The CCPS-Plus collection, available exclusively for CCPS members contains additional content (see below) and is available at a discounted price. The CCPS collection is also available via Knovel as part of a broader subscription of engineering and science references.

What’s On CCPS Plus
• All Current and Archived/Older Editions of CCPS titles on Knovel
• A master index of Checklists from the CCPS library (available only to CCPS members)
• All historical issues of the CCPS Process Safety Beacon
• AIChE/CCPS conference proceedings, 2000 - 2011
Safety In Undergraduate Education

For the last 20 years, the Safety and Chemical Engineering Education program (SAChE) has been on the forefront supporting process safety as an integral part of chemical engineering curricula in universities. SAChE provides more than 50 prepared lectures and 8 self-study modules on a range of process safety topics available worldwide to over 200 universities. Lectures can be integrated into mainstream chemical engineering courses, or used as part of a comprehensive process safety course. Self study modules conclude with an online test. Students passing the test receive a certificate of learning. More than 4,500 students received certificates in 2011.

Advising Technical Policy Worldwide

CCPS engages broadly in efforts to make policymakers worldwide aware of the best practices in process safety. Highlights of 2011 include:

- Advising the US Department of Homeland Security on lifecycle metrics for inherently safer processes
- Supporting the United Nations Environmental Program (UNEP) APPEL and Responsible Production forums in China and Sri Lanka
- Promotion of the use of Global Process Safety Metrics in Argentina, Brazil, the European Union, India, and Japan

Projects

Guidelines for Process Safety Knowledge and Expertise (Proj. #239) ETA 2012

This project will present a framework of process safety knowledge and expertise versus the desired competency level in a “super-matrix” format. The guideline will target multiple audiences, ranging from front-line chemical operators, mechanics and instrument technicians through senior management, including financial and business executives. Gaps between existing and desired training levels can then be identified, and potential remedies suggested. Customization for a specific company will be possible.

Student Handbook for Process Safety (Proj. #242) ETA 2013:

This project will include the development and evaluation of tools for application of process safety principles throughout the standard chemical engineering curriculum in addition to, or as an alternative to, adding a new specific process safety course.
Guidelines for Implementing Process Safety Management Systems, 2nd Edition (Proj. # 240) ETA 2013:
The second edition is an update to the original process safety management system implementation guideline that recognizes that most companies now have some form of process safety management system, but a number of companies, especially smaller companies, need a roadmap of how to efficiently and effectively upgrade their systems.

Guidelines for Managing Process Safety Impacts of Organizational Change: (Proj. # 227) ETA 2012:
Many companies continue to struggle with effective implementation of Organizational Management of Change (OMOC). This project will culminate in a short book that provides guidance for addressing this issue and will help companies advance their OMOC systems.

Free E-Learning Course: Process Safety for Biofuel Plants.
Process Safety Management in the Biofuel Industry E-Learning Course is an awareness-training course developed by CCPS under a “Susan Harwood Grant” from US OSHA. Its intent is to increase process safety awareness for employees of companies in this rapidly emerging technology sector. The course may be accessed via www.ccpsonline.com and is free under the grant through September 30, 2012.

Technical Steering Committee (TSC)
TSC meetings are a great to network with and learn from your process safety peers as they share their experiences and lessons learned. TSC meetings feature presentation on useful and applicable new developments, process safety technology and management. These meetings are a great way to learn from the experts and benchmark with your peers. Make sure someone from your company attends the next meeting.
CCPS activities are monitored and directed by a Managing Board, an Advisory Board, and a 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 includes members of the Executive Committee and Board of Directors of AIChE, as well as the CCPS Executive Director. It is chaired by the Executive Director of AIChE and oversees CCPS’ fiscal and management operations.

The Advisory Board, chaired by the CCPS Executive Director, brings together senior executive representatives of member companies to review CCPS’ mission and strategies, support its initiatives, and provide guidance on CCPS projects.

The Technical Steering Committee (TSC) is CCPS’ primary operating group. Chaired by the Technical Director, it provides technical direction to CCPS activities and selects its projects. TSC members serve voluntarily on CCPS project subcommittees and provide the technical expertise evident in CCPS publications. All member companies have one voting representative on the Technical Steering Committee.

The Planning Committee is responsible for monitoring process safety needs and trends of industry, and other stakeholders in order to supply the TSC with a portfolio of projects and other activities to consider. The Planning Committee also coordinates with the affiliates of the CCPS Global Community to leverage projects, training, and other efforts.

Managing Board

June Wispelwey .............. AIChE Executive Director, Chair
Scott Berger ................. CCPS Executive Director
David Rosenthal .......... AIChE President
Phil Westmoreland ....... AIChE President Elect
Maria Burka ................. AIChE Past President
Andre Da Costa ............ AIChE Treasurer
Kimberly Ogden .......... AIChE Secretary
Monty Alger ................. AIChE Director
Jack Hipple ................. AIChE Director
Kate Ziemer ................. AIChE Director

PROJECTS

Tools for Making Acute Risk Decisions with Chemical Process Safety Applications (Proj. # 248) ETA 2013:

The 2nd Edition will be a general update to include modern decision-making processes based on current practices of member companies and industry leaders. The decision aid concept and the risk analysis section can be built upon and strengthened. New tools, such as LOPA, etc., will be added.

Process Safety Implementation in Capital Projects (Proj. # 250) ETA 2013:

This CCPS concept series book will guide operating companies on how to define the scope and validate performance of Engineering and Contracting (E&C) firms to incorporate adequate process safety considerations into their designs. The scope will address a range of projects from the design of an individual facility component to major capital projects.
### Advisory Board

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<tr>
<th>Name</th>
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<tr>
<td>Scott Berger</td>
<td>Executive Director, CCPS, Chair</td>
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<tr>
<td>Per Bagge Angelo</td>
<td>Group Vice President, In-service, Integrity/Maintenance, Maersk Oil</td>
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<tr>
<td>Karen Carter</td>
<td>Vice President, HSE Honeywell Honeywell, Inc.</td>
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<td>David Dupre</td>
<td>Vice President, Eng. Solutions, Tech Centers, M&amp;E Work Process, The Dow Chemical Company</td>
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<td>Cheryl Grounds</td>
<td>Group Vice President, Process Safety, BP</td>
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<td>Linda Hicks</td>
<td>Vice President, Corporate Technology and Manufacturing, Vertellus Specialties, Inc.</td>
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<td>Craig Huffman</td>
<td>Vice President, Engineering, Ashland, Inc.</td>
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<td>Kou Jianchao</td>
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<td>Robert Kelley</td>
<td>Vice President of Environment, Safety &amp; Communication, Formosa Plastics Corporation</td>
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<tr>
<td>Steve Kemp</td>
<td>Vice President, Health, Environment and Safety, Occidental Chemical Corporation</td>
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<td>Danny Kite</td>
<td>General Manager, HSE, Total</td>
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<td>John Licata</td>
<td>Head, Health Safety, Environment and Safety, Syngenta Crop Protection</td>
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<tr>
<td>Patrick Loughlin</td>
<td>Vice President, Environment, Health, Safety and Quality, Air Products and Chemicals, Inc.</td>
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<tr>
<td>Don Lycette</td>
<td>Vice President of EHSS, Chevron Phillips Chemical Company</td>
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<td>Craig Matthiessen</td>
<td>Director, Regulations and Policy Development, US EPA/OEM</td>
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<tr>
<td>Anne O’Neal</td>
<td>Manager, Health, Environmental and Safety, Chevron Energy Technology Company</td>
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<td>Ron Rife</td>
<td>Process Safety Manager, ExxonMobil</td>
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<td>Paul Shelton</td>
<td>Process Safety Director, Monsanto Company</td>
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<td>Maureen Song Chai Kee</td>
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<tr>
<td>Karen Tancredi</td>
<td>Global Technology Manager — Environmental and Process Safety, DuPont Company</td>
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<td>Prasad Tipnis</td>
<td>Senior Vice President, Chief Centre for HSE, Excellence, Reliance Industries, Ltd.</td>
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<tr>
<td>Kenichi Uno</td>
<td>Managing Executive Office Manager, Mitsubishi Chemical Corporation</td>
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<td>June Wispelwey</td>
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<td>Linda Zabel</td>
<td>Director HSE, 3M Company</td>
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### Project Planning Committee

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<td>Pete Lodal</td>
<td>Eastman Chemical Company Chair</td>
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<td>Kathy Anderson</td>
<td>Vertellus Specialties, Inc.</td>
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<td>Air Products and Chemicals, Inc.</td>
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<td>Neil Maxson</td>
<td>Bayer Material Science</td>
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<td>Cathy Pincus</td>
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<td>Kenan Stevick</td>
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<td>DuPont Company</td>
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<td>Scott Wallace</td>
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Process Equipment Reliability Database (PERD)

Gene Meyer The Dow Chemical Company Chair

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Kumar Bhimavarapu FM Global Research

Vincenzo Cane BASF Corporation

Rich Gauvin Zynergy Consulting, LLC

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Manny Marta NOVA Chemicals Corp.

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Mikelle Moore Buckman North America

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Ronald G. Schaffhauser PPG Industries, Inc.

Clark Shepard ExxonMobil

S.L. Sreedhar Santos, Ltd.

Gary Weimer Suncor Energy

Peter Williams Syncrude Canada, Ltd

Raul Wang SINOPEC

David Zhang Husky Energy
## Process Safety Beacon

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<th>Name</th>
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<td><strong>George King</strong></td>
<td>Huntsman Chair</td>
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<td><strong>Dennis Hendershot</strong></td>
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<td>US Chemical Safety Board</td>
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<td><strong>Mike Korst</strong></td>
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<td><strong>Antonio Ribeiro Lauzana</strong></td>
<td>Petrobras</td>
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<td><strong>Larry LeMesurier</strong></td>
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<td><strong>John Stoney</strong></td>
<td>BP</td>
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<tr>
<td><strong>Tony Thompson</strong></td>
<td>Retired</td>
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<tr>
<td><strong>Jan Windhorst</strong></td>
<td>CCPS Emeritus</td>
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## Guidelines for Likelihood of Ignition

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
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<tr>
<td><strong>Bob Stack</strong></td>
<td>The Dow Chemical Company Chair</td>
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<tr>
<td><strong>Adrian L. Sepeda</strong></td>
<td>CCPS Staff Consultant</td>
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<td><strong>John Baik</strong></td>
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<td><strong>Mervyn Carneiro</strong></td>
<td>Eli Lilly and Company</td>
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<td><strong>Wayne Chastain</strong></td>
<td>Eastman Chemical Company</td>
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<td><strong>Americo Diniz Carvalho Neto</strong></td>
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<td><strong>Jeff Fox</strong></td>
<td>Dow Corning</td>
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<td><strong>Randy Hawkins</strong></td>
<td>AON Energy Risk Engineering</td>
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<td><strong>David Hermann</strong></td>
<td>DuPont Company</td>
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<tr>
<td><strong>Mike Moosemiller</strong></td>
<td>BakerRisk</td>
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<tr>
<td><strong>Brad Otis</strong></td>
<td>Shell Downstream Manufacturing</td>
</tr>
<tr>
<td><strong>James E. Salter</strong></td>
<td>Chevron Energy Technology Company</td>
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</tbody>
</table>
Process Safety for Frontline Supervisors

Jerry Forest  Celanese Chemicals Chair
Don Abrahamson  CCPS Staff Consultant
Kathy Anderson  Vertellus Specialties, Inc.
Troy Bennett  Arizona Chemical Company, LLC
Susan Dadd  Bayer MaterialScience
Americo Diniz Carvalho Neto  Braskem
Jonas Duarte  Chemtura
Frank Gallo  Bristol-Myers Squibb Company
John Herber  CCPS Emeritus
Don Hess  3M Company
Dan Housenga  Lyondell Basell
Shah Khajeh Najafi  Safer Systems
Susan Lee-Martin  Arkema
Donald K. Lorenzo  ABS Group, Inc.
Bill Marshall  Eli Lilly and Company
Mickey Norsworthy  Process Improvement Institute, Inc.
Robert Pappas  MeadWestvaco
Adriano Reis  Monsanto Company
Sheri Sammons  TPC
Francis Schultz  SABIC Innovative Plastics
Brandon Sproles  ChevronPhillips Chemical Company
Kristie Terpening  BP
John Traynor  Evonik

Guidelines for Managing Process Safety Risks During Organizational Change

John Wincek  Croda Chair
Andréia Virginia Pepe Ambrozin  Monsanto Company
Habib Amin  Contra Costa County Health Services
Steve Arendt  ABS Group, Inc.
Michael P Broadribb  BakerRisk
Joe Chandler  Koch Industries, Inc.
Glenn Crowe  Potash Corp.
Ken Harrington  ChevronPhillips Chemical Company
Don Lanier  Bayer MaterialScience
Jim Miller  ConocoPhillips
Keith Pace  Praxair
Cathy Pincus  ExxonMobil
Dave Thaman  PPG Industries, Inc.
Rachel Vincze  Suncor Energy

The Global Community Committed to Process Safety
**Conditional Modifier and Enabling Events**

**Wayne Chastain** Eastman Chemical Company Chair  
**Stanley Urbanik** DuPont Company Co-Chair  
**John Murphy** CCPS Staff Consultant  
**Kathy Anderson** Vertellus Specialties, Inc.  
**Larry Bowler** SABIC  
**William Bridges** Process Improvement Institute  
**Martyn Brown** Huntsman Corporation  
**Mervyn Carneiro** Eli Lilly and Company  
**Andrew Carpenter** Exponent, Inc.  
**Chris Devlin** Celanese Chemicals  
**Thomas Di Leo** Albemarle  
**Jeff Fox** Dow Corning  
**Randy Freeman** CCPS Emeritus  
**Michela Gentile** BP  
**Kieran Glynn** BP  
**Ken Harrington** ChevronPhillips Chemical Company  
**Randy Hawkins** AON Energy Risk Engineering  
**David Kahn** AcuTech Consulting Group  
**Kimberly Mullins** Praxair  
**Robin Pitblado** DNV  
**Jack Reisdorf** Fluor Enterprises  
**Kathy Shell** AE Solutions  
**Byan Saab** BP  
**Bob Stack** The Dow Chemical Company  
**Angela Summers** SIS-Tech Solutions  
**Dave Thompson** Koch Industries, Inc.  
**Nico Versloot** TNO  
**Tim Wagner** The Dow Chemical Company  
**Robert Wasileski** NOVA Chemicals Corp.

**Guidelines for Process Safety Knowledge and Expertise**

**Jeff Fox** Dow Corning Chair  
**Dave Belonger** CCPS Staff Consultant  
**Michael P Broadribb** BakerRisk  
**Joe Chandler** Flint Hills Resources  
**S. Ganeshan** Toyo Engineering India, Ltd.  
**Francois Joseph** BP  
**David Lewis** Occidental Chemical Corporation  
**Kay Koslan** The Dow Chemical Company  
**Annette Kyle** AON Energy Risk Engineering  
**Mikelle Moore** Buckman North America  
**Thane Russey** Petrotechnics USA Inc.  
**Sara Saxena** BP  
**Eddy Schedule** ABS Group, Inc.  
**S.L. Sreedhar** Santos, Ltd.  
**William Ward** Praxair  
**Larry Westrum** Boulder Scientific Company

**Key Performances Indicators for Risk Based Process Safety**

**Kenan Stevick** The Dow Chemical Company Chair  
**Elroy Christie** Honeywell  
**Jeff Fox** Dow Corning  
**Eric Freiberger** Praxair  
**Andrew Goddard** Arkema  
**Shakeel Kadri** Air Products and Chemicals Inc.  
**Steven Lyth** Spectra Energy  
**Louisa Nara** CCPS  
**Tim Overton** BP (retired)  
**Jeff Philiph** Monsanto  
**Phil Rasch** BASF Corporation  
**Marcela Recaman** Equion Energia  
**Daniel Sliva** CCPS Staff Consultant

Guidelines for Safe Automation, 2nd Edition

Wayne Garland  Eastman Chemical Company Chair
Daniel Sliva   CCPS Staff Consultant
Rehan Baig    Bayer
Troy Bennett  Arizona Chemical Company, LLC
Michael Boyd  Husky Energy
William Bridges  Process Improvement Institute
Michael P Broadribb BakerRisk
Russ Davis    AON Energy Risk Engineering
Dave Deibert  Air Products
Rick Dunn     DuPont Company
Kevin He     Dow Corning
Kevin Klein  Celanese
Vilas Kulkarni Toyo Engineering India, Ltd.
Len Laskowski Emerson Process Analysis
Jack McCavitt CCPS Emeritus

Norm Mcleod  Arkema
Russell Ogle Exponent, Inc.
Justin Ogleby Solutia
Ken O'Malley AE Solutions
Eloise Roche   Dow
Bob Roubion  Shell
Peter Stickles IoMosaic Corporation
Angela Summers SIS-Tech Solutions
Greg Weidner Hunstman
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<th>Project Committees</th>
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<tbody>
<tr>
<td><strong>Guidelines for Mechanical Integrity, 2nd Edition</strong></td>
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<tr>
<td><strong>Eric Freiburger</strong> Praxair Chair</td>
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<tr>
<td><strong>Bob Ormsby</strong> CCPS Staff Consultant</td>
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<td><strong>Michael P Broadribb</strong> BakerRisk</td>
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<td><strong>Russ Davis</strong> AON Energy Risk Engineering</td>
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<td><strong>Norm Mcleod</strong> Arkema</td>
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<td><strong>Georges Melhem</strong> IoMosaic Corporation</td>
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<td><strong>Randy Montgomery</strong> ABS Group, Inc.</td>
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<td><strong>Alastair Painter</strong> DNV</td>
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<td><strong>Jeff Philiph</strong> Monsanto Company</td>
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<td><strong>Bhadresh Prajapati</strong> ExxonMobil</td>
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<td><strong>Bob Ricker</strong> BakerRisk</td>
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<td><strong>Tom Sandbrook</strong> DuPont Company</td>
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<td><strong>John Traynor</strong> Evonik</td>
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<td><strong>Nico Versloot</strong> TNO</td>
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<td><strong>Tom Wash, PE</strong> 3M Company</td>
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<td><strong>Project Committees</strong></td>
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<td><strong>Process Safety Vision 2020</strong></td>
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<tr>
<td><strong>Jack McCavit</strong> CCPS Emeritus, Chair</td>
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<tr>
<td><strong>Louisa Nara</strong> CCPS Project Manager</td>
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<td><strong>Lansing Bicknell</strong> CCPS Facilitator</td>
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<td><strong>Annette Kyle</strong> AON Energy Risk Engineering</td>
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<td><strong>Joe Allaben</strong> Koch Industries, Inc.</td>
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<td><strong>Steve Arendt</strong> ABS Group, Inc.</td>
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<td><strong>Dave Jones</strong> Chevron Energy Technology Company</td>
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<td><strong>Karen Tancredi</strong> DuPont Company</td>
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<tr>
<td><strong>Vincent Van Brunt</strong> University of South Carolina</td>
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<tr>
<td><strong>Scott Berger</strong> CCPS</td>
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</table>
CCPS STAFF

Scott Berger, Executive Director, joined CCPS in 2001 after 5 years at Owens Corning, where he held a range of Environment, Health, and Safety (EHS) assignments including Director of EHS Strategic Management. Scott also worked for 18 years at Rohm and Haas Company in R&D, engineering, and EHS. Scott received his BS and MS from the Massachusetts Institute of Technology.

Louisa Nara, Technical Director joined CCPS in 2010 after 15 years at Bayer, most recently as Director of Risk Management, NAFTA. Louisa has over 30 years of domestic and international experience in the chemical, petrochemical, pharmaceutical and food industries. Louisa holds a BS in Chemical Engineering from West Virginia University, a MS in Environmental Engineering from Villanova University and is a Certified Compliance and Ethics Professional (CCEP).

Laura Turci, Project Manager, joined CCPS in 2011. Laura has responsibility for CCPS undergraduate activities (SACHe), global conferences, and regional support for Latin America. Before joining CCPS, Laura specialized in process safety during R&D and scale-up at Sanofi Aventis, L’Oreal, and other pharma companies. Laura is also an Adjunct Professor in Process Safety at NJIT. Laura has a BS and MS in chemical engineering from Universidad Tecnologica Nacional, Argentina.

Pronob Mukherjee, joined CCPS as Asia Pacific Regional Manager in 2009 and manages the CCPS office in Mumbai. Pronob has more than 25 years of experience in process safety. He has worked for both chemical manufacturing companies as well as loss prevention associations in India. Pronob received his BSChE from National Institute of Technology, Durgapur.

Lamese Bader, Membership Coordinator, joined CCPS in late 2011. Lamese has responsibility for membership development and coordination within CCPS. Before joining CCPS, Lamese worked as the Associate Director of the Arab American Association of New York, and as the Dean of Discipline at A. Fantis Parochial School. Lamese received her BA from Hunter College and a MA in International Affairs from The New School University.

CCPS CHINA SECTION

Prof. Zhao Dongfeng has worked in the China University of Petroleum since 1992. He is now the Director of the CCPS China Section.

2012 Important Dates

<table>
<thead>
<tr>
<th>EVENT</th>
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<tbody>
<tr>
<td>Advisory Board Meeting, Philadelphia</td>
<td>March 7</td>
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<tr>
<td>Managing Board Meeting, Houston</td>
<td>March 31</td>
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<tr>
<td>8th Global Congress on Process Safety, Houston</td>
<td>April 1 - April 4</td>
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<tr>
<td>Technical Steering Committee Meeting, Houston</td>
<td>April 5</td>
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<tr>
<td>3rd India Regional Meeting</td>
<td>May 15</td>
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<td>Technical Steering Committee Web Meeting</td>
<td>June 26 @ 9:30 AM EDT</td>
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<td>4th Latin American Conference, Rio de Janeiro, Brazil</td>
<td>July 3 - July 5</td>
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<td>China Section Training, Qingdao, China</td>
<td>3rd Quarter, TBD</td>
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<tr>
<td>Technical Steering Committee Web Meeting</td>
<td>September 13 @ 9:30 AM EDT</td>
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<tr>
<td>1st Southeast Asia/Australia Regional Meeting</td>
<td>October 16</td>
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<tr>
<td>Managing Board Meeting, Pittsburgh</td>
<td>October 30</td>
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<tr>
<td>Technical Steering Committee Meeting, Rhode Island</td>
<td>November 13 -14</td>
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For more details e-mail ccps@aiche.org
CCPS STAFF CONSULTANTS

Don Abrahamson has over forty years of experience in operations and engineering roles to draw from: process safety management, operations management, process safety engineering, technical management, quality assurance management, process development and research. He recently retired from Celanese as the Global Process Safety Manager.

David J. Belonger came to CCPS in 1996 as staff consultant for PERD. Dave is a graduate chemical engineer from the University of Wisconsin. He spent most of his career in various assignments with Rohm and Haas Company, including Corporate Safety Director and Plant Manager.

Dennis Hendershot retired in 2005 as Senior Hazard Analysis Fellow at Rohm and Haas Company after 35 years of service. Dennis has dedicated most of his career to process safety and risk management, and is one of the world’s foremost champions of inherently safer design. Dennis has a BS in chemical engineering from Lehigh University and an MBA from the University of Pennsylvania.

John Herber joined CCPS in 2009 after a 33-year career with 3M Company that included positions in process and project engineering, production operations and corporate safety. John developed programs for improving PSM systems across 3M’s operations, including metrics, policy and implementation guidance. John has a BS in Chemical Engineering from Purdue University.

David J. Belonger came to CCPS in 1996 as staff consultant for PERD. Dave is a graduate chemical engineer from the University of Wisconsin. He spent most of his career in various assignments with Rohm and Haas Company, including Corporate Safety Director and Plant Manager.

Greg Keeports joined CCPS in early 2008 after retiring from Rohm and Haas Company where he held positions including Global Technical Manager for Agricultural Chemicals and Director of Risk Management Services. He has over 38 years experience in the chemical industry. Greg earned BS and MS degrees in chemical engineering from Penn State and University of Pennsylvania, respectively; he also completed the Wharton Business Management program at Penn.

John Herber joined CCPS in 2009 after a 33-year career with 3M Company that included positions in process and project engineering, production operations and corporate safety. John developed programs for improving PSM systems across 3M’s operations, including metrics, policy and implementation guidance. John has a BS in Chemical Engineering from Purdue University.

Brian Kelly joined CCPS in 2005 as a staff consultant after 34 years of service with Imperial Oil and Syncrude Canada Ltd. He held a number of senior positions in engineering, operations, risk management and process safety. Brian received his BASc and MASc degrees in chemical engineering from the University of Ottawa (Canada).

CCPS wishes to thank Lauren Horowitz for two years of outstanding contributions to CCPS. Lauren’s non-profit management experience and insight proved invaluable to CCPS as we negotiated a period of high growth and increasing impact. Lauren left behind sound systems to grow on. We wish her well in her future endeavors.
Jack McCavit retired from Celanese Chemical Company after 35 years with experience in operations management and practical application of process safety management systems. Jack served as the BP Baker Panel's technical project manager. He graduated from Texas Tech University with a BS in chemical engineering.

John Murphy retired from the U.S. Chemical Safety and Hazard Investigation Board where he served as lead investigator. John also retired from Dow Chemical Company where he was a leader in process safety. He has a BS in Chemical Engineering from Tufts University and an MBA from Central Michigan University.

Robert W. Ormsby joined CCPS as a staff consultant in 2003 after 27 years of service with Air Products and Chemicals, Inc. Bob served as Global Manager of Process Safety. Bob has a BS in chemical engineering from Penn State University and an MS from Lehigh University.

Bob G. Perry retired as Managing Director of AIChE in 1997. Previously, Bob had a 37-year career with Union Carbide, retiring in 1993 as Vice President of Manufacturing and Engineering. Bob is a BS chemical engineering graduate of the University of Texas.

Adrian L. Sepeda joined CCPS in early 2002 as a staff consultant after 33 years of service with Occidental Chemical Corp. During those years, he held positions in a variety of technical and management positions, retiring as the Director of HES Risk Management. Adrian holds a BS in mechanical engineering from Lamar University.

Daniel E. Sliva joined CCPS after he retired from GE, where he held a variety of positions over his 30-year career. Dan received his BS and PhD in chemical engineering from Rensselaer Polytechnic Institute and an MS in chemical engineering from the University of Rochester.

Néstor Sposito joined CCPS as a staff consultant in 2011 after 32 years of service with Dow Argentina. He has been actively involved in the leadership of NFPA and the United Nations Environmental Program’s APPEL Process.

With sadness we bid farewell to Tom Carmody, first CCPS Director. Tom championed the initial idea for CCPS, and later became the first full-time employee of CCPS. Under Tom’s leadership from 1986-1993, CCPS became firmly established, and many of Tom’s systems and philosophies guide us to this day. A resident of Amelia Island, FL, and Chappaqua, NY, Tom is survived by his wife of 54 years, Jill, his four children, and their families.
Process Safety At A Glance
Management System

A Roadmap to CCPS Management and Technical Resources
### CCPS RESOURCE MANAGEMENT TOOLS

**COMMEL TO PROCESS SAFETY**
- G/L for Implementing Process Safety Management Systems
- G/L for Process Safety in Outsourced Manufacturing Operations
- Local Emergency Planning Committee Guidebook: Understanding the EPA Risk Management Program Rule
- Practical Compliance with the EPA Risk Management Program
- Process Safety Boot Camp
- Process Safety Culture Toolkit

**UNDERSTAND HAZARDS AND RISK**
- A Practical Approach to Hazard Identification
- G/L for Chemical Process Quantitative Risk Analysis, 2nd Ed.4
- G/L for Chemical Transportation Safety, Security, and Risk Management
- G/L for Developing Quantitative Risk Criteria
- G/L for Hazard Evaluation Procedures, 3rd Ed. Layer of Protection Analysis
- Recognizing Catastrophic Incident Warning Signs in the Process Industries

**MANAGE RISK**
- Conduct of Operations and Operational Discipline
- G/L for Management of Change for Process Safety
- G/L for Improving Plant Reliability Through Data Collection and Analysis
- 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
- G/L for Postrelease Mitigation Technology in the Chemical Industry
- G/L for Writing Effective Operating and Maintenance Procedures
- Process Equipment Reliability Database

**LEARN FROM EXPERIENCE**
- CCPS Process Safety Benchmarking Program
- CCPS Process Safety Metrics Online Reporting Application
- 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.
- G/L for Process Safety Metrics
- Incidents that Define Process Safety
- Process Safety Incident Database
- Tools for Making Acute Risk Decisions with Chemical Process
- Safety Applications

### 20 CCPS ELEMENTS OF PROCESS SAFETY

- Process Safety Culture
- Standards, Codes, Regulations, and Laws
- Process Safety Competency
- Workforce Involvement
- Stakeholder Outreach

### CCPS TECHNICAL RESOURCE TOOLS

**VENTING AND EMERGENCY RELIEF**
- Deflagration and Detonation Flame Arrestors
- 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 and Fires and Toxic Releases, 2nd ed
- G/L for the Characteristics of Vapor Cloud Explosion, Pressure Vessel Bursts, BLEVE, and Flash Fire Hazards, 2nd Edition
- Understanding Explosions
- Wind Flow and Vapor Cloud Dispersion at Industrial and Urban Sites

**BIOPROCESS SAFETY**
- G/L for Process Safety in Bioprocess
- Manufacturing Facilities

**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

**R&D**
- Making EHS an Integral Part of Process Design

**UPSTREAM**
- (Most CCPS titles apply equally to upstream processes. Please see appropriate RBPS element or technical topic)