



Institute News

CENTER FOR CHEMICAL PROCESS SAFETY MARKS 30 YEARS CHEMICAL ENGINEERS REFLECT ON PROCESS SAFETY

Chemical engineers from around the world will assemble this month in Austin, TX, for the 11th Global Congress on Process Safety (GCPS). Held in conjunction with AIChE's Spring Meeting and organized by the Institute's Center for Chemical Process Safety (CCPS), Safety and Health Div., and Design Institute for Emergency Relief Systems (DIERS), the Global Congress has become the world's largest and most influential annual gathering of process safety practitioners and innovators. At the GCPS, safety engineers, process designers, and plant managers discuss new technologies and best practices to help companies avoid incidents, manage risk, ensure facility safety, and strengthen process safety programs.

The 2015 Global Congress incorporates the programming of several major conferences, including the 30th CCPS International Conference, which expands on the concepts laid out in CCPS's Process Safety Vision 20/20 — a roadmap to help companies achieve process safety excellence. CCPS leads this global effort, sharing technical strategies and process safety best practices through a growing network of international member organizations and collaborators. Naturally, chemical engineers — with their training and sensibilities attuned to sound, efficient, and safe work processes — have been instrumental in advancing CCPS's work.

Chemical engineers' contributions to process safety will be spotlighted in 2015 as CCPS marks its 30th anniversary. Since its establishment in 1985, CCPS and its knowledgeable collaborators have filled a void in industrial process safety — publishing more than 100 guidelines books on a spectrum of chemical facilities management issues, and launching educational programs that integrate safer approaches to chemical process design into the training and practices of chemical industry employees.

In connection with its anniversary-year activities, CCPS's leaders and contributors are reflecting on the Center's history, its positive impact on plant safety, and the next steps in process safety management.

Filling a need

Scott Berger, who directed CCPS's activities from 2002 through 2014, says that, prior to the 1980s, "industry had an appreciation of safety, but it was more related to preventing personal injuries." Companies were aware of the need to manage serious incidents, says Berger, but "while process safety was practiced, it was not done in a consistent or reliable way." Reference materials and resources for process

safety management were scarce. In fact, at the time, among the few organized efforts to inform the process safety community were AIChE's annual Safety in Ammonia Plants and Related Facilities Symposium (established in 1955) and the annual Loss Prevention Symposium, which was first held in 1967 and continues today as part of the Global Congress on Process Safety.

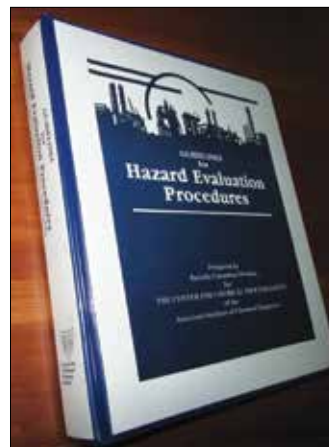
As Berger explains in a historical overview written for AIChE's centennial in 2008, industry's undisciplined application of process safety practices began to change after a succession of incidents in the 1980s, including the devastating release of methyl isocyanate gas in Bhopal, India, on Dec. 4, 1984.

As chemical industry leaders began examining their companies' approaches to safety, "it became obvious that the practices necessary to ensure safety of the process required much more of a chemical engineering focus than the practices to ensure safety of personnel," wrote Berger. Thus, in February 1985, leaders from several chemical companies asked AIChE to launch a major initiative to advance the practices of process safety at plants in the U.S. and around the world. The plan called for the creation of new resources and broad-based education and training — not only to instill knowledge of sound and effective practices, but also to promote process safety as a core industry value.

With these objectives, AIChE's Council (now the Board of Directors) approved the creation of CCPS on Mar. 23, 1985. Later that year, the Center published its first book, *Guidelines for Hazard Evaluation Procedures*.

Since then, CCPS's roster of participating companies has increased from 39 charter members to more than 180

companies today. These collaborators have helped CCPS to document, maintain, and continually improve upon its body of process safety knowledge and information, while advocating for more



◀ From the CCPS archives — an original looseleaf binder edition of the first CCPS book, *Guidelines for Hazard Evaluation Procedures*, published in 1985. Photo courtesy of Dennis Hendershot.



engagement by industry leaders and stronger in-company safety cultures to ensure successful process safety programs. This work continues today with the launch of new CCPS projects, the expanded programming of the Global Congress, and the addition of CCPS conferences at locations around the world.

Peter Lodal, a Technical Fellow at Eastman Chemical, became involved in CCPS in 1987 and currently chairs CCPS's Planning and Operations Committee. He believes "the most significant accomplishment of CCPS is that it has raised the concept of process safety to the same level as distillation design, reaction engineering, and other long-standing, recognized areas of expertise within the chemical engineering community. The fact that ABET now requires process safety as a part of the undergraduate chemical engineering curriculum speaks volumes on the impact of CCPS."

Dan Crawl, a professor of chemical engineering at Michigan Tech Univ. and a member of CCPS's Technical Steering Committee, has been especially involved in CCPS's work on undergraduate safety education. Contributions by Crawl and other volunteers helped CCPS launch its Safety and Chemical Engineering Education (SACHe) program in 1992. SACHe initially provided universities with safety lectures that could be incorporated into existing undergraduate chemical engineering courses at the many schools where safety instruction was absent from the curriculum. Eventually, SACHe created e-learning modules and a certificate program that allows students to study and acquire process safety education credentials online. The SACHe certificate program has since been expanded and is now offered to non-students.

Even with the widespread adoption of programs such as SACHe, "process safety education throughout the world still needs improvement," says Crawl, who credits AIChE and CCPS with much of his own process safety education. "The wealth of knowledge that CCPS has collected and published, and the communities that have been developed to assemble and spread that knowledge, is an outstanding legacy," says Crawl.

A key to success

Collaboration is at the heart of CCPS's effectiveness, a theme underscored by Dennis Hendershot, who joined CCPS as a staff consultant in 2005 after a career in process design and process safety at Rohm and Haas and later at

Chilworth Technologies. Hendershot, who edits CCPS's monthly *Process Safety Beacon* newsletter (see p. 20), says "I think the biggest impact of CCPS is the collaboration of the people working on its projects — learning from each other and taking the lessons back to their jobs and organizations." As further evidence of this communal effectiveness, Hendershot notes that CCPS's guidelines books are the result of expertise contributed by thousands of people, across specializations and industries.

The technical information compiled and distributed by CCPS has done much to establish protocols for inherently safer industrial process design and practices. "There is no doubt that CCPS has saved lives," says J. Steven Arendt, Vice President of Operational Performance Assurance at ABS Consulting. Arendt has worked on dozens of CCPS projects — from advocating for ABET to adopt process safety principles in its curriculum-accreditation criteria to shaping CCPS's Vision 20/20 plan. In connection with that vision for the future, Arendt emphasizes that a crucial next step for CCPS is to help remove institutional roadblocks to improving safety culture within companies. "The practice cannot be satisfied with a 'compliance is good enough' attitude," says Arendt.

Hendershot concurs with Arendt. "The tools and techniques needed to prevent incidents are already known and available," says Hendershot. "What we need now is to actually do what we already know how to do, everywhere, all the time." He adds, "The biggest improvements in process safety will likely not be a result of improved engineering techniques, but rather improvements in management systems, human factors, safety culture, and process safety leadership at all levels in organizations."

Creating a new culture

Improving process safety culture is a main goal for Shakeel Kadri, former Director of Global Process Safety and Risk Management at Air Products who succeeded Berger as CCPS's Executive Director in February 2015. "Many process safety incidents have one key underlying factor — a need to improve operational discipline," says Kadri. "Industry now has good knowledge of risk-based process safety management systems. It's the implementation — the culture — that needs improvement."

Kadri shared an anecdote about the CCPS Technical Steering Committee's visit to the NASA Space Center in January 2003, where the CCPS representatives viewed the space shuttle's fuel-filling area. "We were impressed with the multiple layers of protection NASA was applying in their fuel-filling procedure," recalls Kadri.

Mere days after the CCPS visit, the space shuttle Colum-

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Candidates Announced for 2015 AIChE Election Petition Candidate Filings Due May 18

A IChE's Nominating Committee has announced the slate of candidates for president-elect, secretary, and director for 2015. In the July issue, *CEP* will publish profiles of the candidates that describe their qualifications and platforms.

The president-elect will be elected to a three-year term, serving one year each as president-elect, president, and past-president. The secretary and directors are elected for three-year terms. Voting by paper and electronic proxy ballot will begin on September 8 and end on October 12. To keep up to date on this year's election, visit www.aiche.org/election.

For President-Elect

T. Bond Calloway, *Savannah River National Laboratory*

Wendy Young Reed, *Chemstations, Inc.*

For Secretary

Freeman Self, *Bechtel*

Rosemarie Wesson, *National Science Foundation*

For Director (four to be elected)

Heriberto Cabezas, *U.S. Environmental Protection Agency*

Gregory T. Frank, *Amgen*

Zenaida Gephardt, *Rowan Univ.*

Meagan Lewis, *UOP, a Honeywell Company*

Timothy "Tim" Odi, *Chevron Phillips Chemical Co.*

Joseph B. Powell, *Shell*

Edward M. Trujillo, *Univ. of Utah*

Ranil Wickramasinghe, *Univ. of Arkansas*

Are You Interested in Running?

Members interested in running for the AIChE Board election or nominating another member can do so as a petition candidate.

Any Fellow, senior member, or 4-year member of the Institute who would like to run for president-elect, secretary, or director can file as a petition candidate with the Office of the Secretary by May 18, 2015. Nominees for president-elect must have previously served as an AIChE officer or director.

Petition candidates must submit the support, in writing, of 100 or more Fellows, senior members, or members. This can be done by signing a petition or by email. For more information on filing as a petition candidate, please contact election@aiiche.org.

AIChE Board of Directors Campaign Guidelines

In order to keep campaigning on a high professional level and to maintain fairness to all candidates, the Institute will rely on the integrity of the candidates. The Office of the Secretary of the Institute oversees the elections and will provide interpretation of the guidelines as needed. The following are the campaign guidelines for AIChE's election:

1) AIChE or any AIChE group (*e.g.*, division, forum, committee, or local section) cannot endorse or oppose any Board of Directors candidate. Members of the Board of Directors shall not endorse or oppose any candidate; however, a current member of the Board of Directors may campaign on his/her own behalf.

2) Campaigns shall be financed by the candidates themselves. Campaigns cannot be financed by AIChE or any AIChE groups, or by any organization, company, or university. All campaign costs are to be borne by the candidate.

3) Campaign committees may be formed. A Board Member cannot be on a campaign committee.

4) Candidates may campaign via social media. A URL or link to the official election information on the AIChE website should be provided when possible.

5) AIChE groups cannot provide campaign information to their members. AIChE Committees cannot endorse or oppose a Board of Directors candidate via newsletters, emails, websites, or any form of social media.

6) Members of the Board of Directors are not permitted to endorse or oppose a candidate via social media (*e.g.*, "liking," reposting or commenting on "Facebook").

7) AIChE will advertise the candidate's personal statement presenting his/her qualifications and views as published in AIChE's official magazine (*CEP*) and on AIChE's web page. The candidate may provide an email address, website URL, or social media information for more details on his/her positions in order to foster a dialog between the candidate and the voting membership.

8) Interactions between the candidate and voting membership are permitted and encouraged; however, mailing lists, email lists, and social media contacts cannot be provided by AIChE or any AIChE group.

9) Campaigning at AIChE meetings (*e.g.*, the AIChE Spring, Annual, local section, or regional meetings) is limited to personal interactions between the candidates and meeting attendees. Distribution and posting of campaign materials at AIChE meetings are prohibited.

The Board recognizes that it is not practical to develop a complete set of rules to regulate campaigning; the Board is convinced that it can depend on the Institute's membership to enforce these regulations.

AIChE 2015 Election Timeline

May 18: Petition Candidate Cut-Off Date

August 24: Election Ballot Mail Date

September 8: Election Commences

October 12: Election Ballot Receipt Deadline

October 15: Tellers Committee Meeting

November 9: Election Results Announced at the Annual Business Meeting in Salt Lake City, UT

LANGER IS AWARDED QUEEN ELIZABETH PRIZE FOR ENGINEERING

Robert Langer, the David H. Koch Institute Professor at the Massachusetts Institute of Technology (MIT), has been selected to receive the 2015 Queen Elizabeth Prize for Engineering — an international honor that recognizes an engineer whose innovations have benefitted humanity. Langer is being honored for his work in controlled-release drug delivery, and is being credited with improving the lives of hundreds of millions of people each year through the disease treatments created in his lab.

The Queen's Prize was established in the United Kingdom to raise the public profile of engineering, and is administered by the U.K.'s Royal Academy of Engineering. The £1 million (\$1.5 million) prize is awarded in the name of Queen Elizabeth II, who will present the award to Langer at a ceremony later in 2015.

Langer, who holds appointments in MIT's departments of chemical engineering and biological engineering, and at the Institute for Medical Engineering and Science and the Koch Institute for Integrative Cancer Research, is cited as "the first person to engineer polymers to control the delivery of large-molecular-weight drugs." He has developed new nanoparticles to treat cancer, mental illness, and other diseases,

and he has also created novel approaches for the engineering of new tissues and organs.

Langer has written more than 1,250 articles, which have made him the world's most-cited engineering researcher. His nearly 1,050 patents worldwide have been licensed to hundreds of pharmaceutical, chemical, biotechnology, and medical device companies.



Langer is a member of the U.S. National Academy of Sciences, National Academy of Engineering, and Institute of Medicine. Among many international honors, he received the 2002 Charles Stark Draper Prize; the 2003 John Fritz Award; the 2006 U.S. National Medal of Science; the 2008 Millennium Prize; the 2008 Max Planck Research Award; the 2008 AIChE Founders Award; the 2012 Priestley Medal; the 2012 Perkin Medal; the 2013 Wolf Prize in Chemistry; the 2013 U.S. National Medal of Technology and Innovation; and the 2014 Breakthrough Prize in Life Sciences.

Your AIChE Membership

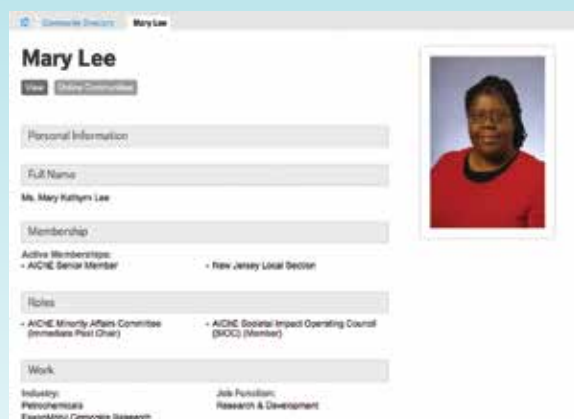
The AIChE Community Directory

The community of AIChE members is the foundation of the Institute, defining AIChE's direction and bringing energy and impact to its activities around the world.

The ability to connect with colleagues, mentors, and thought-leaders is a key to learning and thriving in the chemical engineering profession. In this regard, one of the most basic and useful AIChE membership benefits is the AIChE Community Directory — www.aiche.org/directory. This resource provides members with access to the network of Institute members — more than 46,000 of them — across specializations and at all career levels. Using the directory, you can make professional connections and share information on topics of relevance to your field and locale.

AIChE members can use the directory by logging in and searching by name, organization, industry, membership type, city, or country. To get the most out of the AIChE Community Directory, make sure your member profile is up to date and complete. To do so, visit www.aiche.org, log in using your member I.D. and password, and follow the instructions.

Within your profile, you have the option of adding a



photo, biographical information, and details about your work, education, and other endeavors.

In the coming year, the AIChE Community Directory will be enhanced further to maximize members' experience. If you have questions about or recommendations for the AIChE Community Directory, contact James Abel, Membership Associate, at jamea@aiiche.org.

Center for Chemical Process Safety Marks 30 Years;
ChemEs Reflect on Process Safety, continued from p. 55

bia and its crew were lost when thermal protection failed upon their return to Earth. NASA's analysis of the incident struck a chord with the members of CCPS.

"After reading the Columbia Accident Investigation Report, which concluded that organizational safety culture factors contributed to the loss, we recognized that the lessons learned by NASA could be applied to all organizations that operate facilities handling hazardous materials or that engage in similar activities," says Kadri. This incident, he notes, gave impetus to CCPS's focus on process safety culture, and led to CCPS's first project devoted to organizational culture: a compilation of lessons from the Columbia disaster. Today, CCPS's work on safety culture continues, with projects such as a new book, *Essential Practices for Developing, Strengthening and Implementing Process Safety Culture*, that is now in development.

Pursuing a vision of process safety excellence

CCPS's progress continues on many fronts, as it promotes its Vision 20/20 objectives for industry, including committed safety culture, disciplined adherence to standards, intentional competency development, vibrant management systems, and the enhanced application and sharing of lessons learned.

Leaders point to the strides that CCPS has made in bringing process safety instruction to companies outside North America, with recently established CCPS conferences and committees in Latin America, China, and the Asia Pacific region, as well as new activities planned for sites in Europe, the Middle East, and India. Process safety in some of these locations — particularly in regions where government oversight of health, safety, and the environment is just beginning — has lagged behind that of companies in more developed regions.

Improving the safety practices and cultures of the weakest-performing organizations, regardless of their locations, will remain a focus of CCPS's network of member companies and contributors, who together have created a legacy of readily available and well-organized process safety information where it did not exist before. Armed with these resources, companies in the chemicals and petrochemicals industries are primed for solving practically any problem related to process safety.

"I envision CCPS as an unbiased — and indisputable — source for global process safety information," says Kadri. He concludes, "The most satisfying aspect of my involvement with CCPS has been the opportunity to be in the company of so many peers who really care about improving process safety, and who, without any hesitation, share their learning for the greater good."

CEP

CCPS MIDDLE EAST PROCESS SAFETY CONFERENCE, MAY 19–21, ABU DHABI

A IChE's Center for Chemical Process Safety (CCPS)

continues its worldwide mission to prevent industrial incidents through process safety excellence at the CCPS Middle East Process Safety Conference (MEPSC), to be held May 19–21, 2015, at the Ritz Carlton Hotel in Abu Dhabi, United Arab Emirates. More than 600 engineers, process designers, plant managers, and company leaders are expected at the conference, where sessions will be tailored to the interests of the chemicals and petrochemicals industries of Saudi Arabia, Qatar, Kuwait, the U.A.E., Turkey, and across the region.

With its programs built around the theme "Process Safety — A Journey Toward Excellence," the Middle East Process Safety Conference is the latest in a series of new international conferences that extend the reach of CCPS's annual Global Congress on Process Safety (April 26–30, 2015, in Austin, TX). CCPS-MEPSC will bring together experts to share industry best practices in sessions devoted to process safety leadership and culture, safety metrics, management of change, inherently safer design, hazard identification, risk analysis, incident management, business continuity, and more.

Keynote speakers include Abdul Munim Saif Al Kindy, CEO of Abu Dhabi Co. for Onshore Petroleum Operations (ADCO), who will discuss best practices for operational excellence; and Shakeel Kadri, Executive Director of CCPS, who will present CCPS's Vision 20/20 (see article beginning on p. 54).

Short courses (May 19) will present a Toolkit for Process Safety and an Overview of Risk-Based Process Safety.

MEPSC sessions are being co-programmed by CCPS and the Abu Dhabi National Oil Co. (ADNOC), which is serving as the MEPSC host sponsor. All the sessions are designed to guide stakeholders toward operational excellence and to instill process safety concepts as strategic priorities and core values in the process industries.

For complete program information, or to register, visit www.mepsc.org.



In Memoriam

Chandler H. Barkelew, 94, Salem, OR

Kenneth O. Beatty, Jr., 100, Durham, NC

William E. Keppler*, 92, Lititz, PA

Richard W. Kersey, 92, Bellingham, WA

John M. Roebuck, 96, Concord, CA

Robert S. Schechter, 85, Austin, TX

Naresh Suchak, 55, Glen Rock, NJ

Dorman J. Swartz, 96, Falmouth, MA

* AIChE Fellow