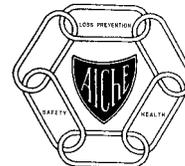


Safety & Health News

AIChE

AMERICAN INSTITUTE OF
CHEMICAL ENGINEERS

SAFETY AND HEALTH
DIVISION
www.shdiv.aiche.org



WINTER 2005/2006

SAFETY FORUM

ARE NANOTECHNOLOGY PRODUCTS NEXT?

As scientists and engineers, we must recognize that having solved a problem and presented a solution at one point in time does not mean that the solution should not be revisited. Assumptions must continually be evaluated. Every error that occurs has at least one lesson to be learned so that the error does not occur again. For example, why did the World Trade Center twin towers collapse? This question must be asked in order to adjust building codes to deal with new and different potential problems. At the time the World Trade Center was constructed, planes were not as big, and did not carry as much fuel as they do today. Thus technological developments in one area, such as aviation, can well have implications in other areas such as high-rise building construction.

One key societal problem, however, is not to impose current standards of information and performance on historic situations. Unfortunately, lawyers love to do this. Thus, technical people must have a significant influence on the examination of information about, say, a new product, not only during the pre-market development stage, but in a continuing manner as well.

Examples are plentiful over the years. Pewter was an amazing metal for making durable plates and mugs in the 18th century, until users got lead poisoning. Coal-burning stoves were a vast improvement over wood-burning equipment, but many involved with coal mining got black lung disease. Asbestos was a great building and insulation material, until construction workers and auto repair mechanics began to die from a relatively obscure form of lung cancer. DDT was a miracle insecticide in preventing the spread of malaria and thus saving literally millions of lives, until Rachel Carson wrote "The Silent Spring." Thalidomide was a good cure for morning sickness, until babies were born with malformed limbs. A popular anti-inflammatory drug was used for some time, until there was a link to increased risk of heart attacks.

At what time will a thorough search for such ramifications regarding new products take place before there is a significant marketing effort? Chances are, however, that despite due diligence, there probably is neither sufficient creativity nor sufficient money available nor enough time to look into the wide range of ramifications possible with every new product.

Are the products from nanotechnology the next area that will lead to currently unknown safety and health problems? Nanotechnology is somewhat loosely defined, but generally it covers engineered structures, devices, and systems that have a length scale of 1 to 100 nanometers. At these scales, materials exhibit unique properties that affect physical, chemical, and biological behavior. At the heart of this new technology is the development and utilization of these unique properties. Nanoscale materials are increasingly being used in electronic, medical, medical imaging, drug delivery, cosmetic, and catalytic applications.

(continued on page 6 - see Nanotechnology)

Safety & Health News is issued quarterly by the Safety and Health Division of the American Institute of Chemical Engineers (AIChE). It is available on the Division web site: www.shdiv.aiche.org. Since news items of interest to members of the Division of Chemical Health and Safety (CHAS) of the American Chemical Society (ACS) are included, the Newsletter is also available on the CHAS web site: <http://membership.acs.org/c/chas/>.

A. S. West, P.E., *Editor*
3896 Sidney Road
Huntingdon Valley, PA 19006
215-938-7181
e-mail: aswest@worldnet.att.net

INFORMATION SOURCES RUSSELL PHIFER, CHAIR

ACS DIVISION OF CHEMICAL HEALTH AND SAFETY

In the Information Age of the 21st Century, perhaps the most difficult part of getting an answer to a question is often sifting through all the possible sources of information in addition to all the possible answers. This is as true in the safety field as in any other, where a "simple" internet query search yields hundreds, if not thousands, of possible sites. Vendors, consultants, colleges and universities, and other information sources may be able to solve your safety problem or provide an answer to your question, but the sheer volume of possibilities can sometimes be overwhelming.

In light of this, it is good to know that the DCHAS-L List Serv is available, and that there is an answer to almost any safety question you might have. Recent topics have included fire extinguishers in clean rooms (Halon substitutes are recommended over ABC), a discussion of safety shower locations (within 10 seconds walking distance of all hazards), immersants for lithium metal (kerosene and mineral oil work despite the fact that lithium floats in these materials), eyewash fountain flow rates, the role of OSHA regarding students in a laboratory (OSHA regulations cover employees only, but!), and perchloric acid hoods (always use this substance in a perchloric hood). Most subjects draw multiple responses, and these are usually comprehensive and thoughtful. While there may occasionally be disagreement about an appropriate answer, there is a high level of expertise available which is clear from the discussions appearing in response to a question.

There are obviously other good e-mail lists with safety information, many of which receive considerably more "traffic." With a larger List Serv, it often pays to subscribe to the digest instead of the list itself. I find the number of e-mail responses from the DCHAS-L list queries is not overwhelming. The responses are concise in the chemical safety topic in question, and the topics are useful. CHAS members may subscribe to the DCHAS-L list by sending an e-mail to Ralph Stuart, the web master, at rstuart@uvm.edu. He will be glad to add your name to the list.

On a personal note, I would like to thank all those hard working individuals who have made this a good year for the Division of Chemical Health and Safety. I've enjoyed my year as Chair, and I want to wish Jim Kapin all the best as he takes on the challenge as Chair for 2006. Good luck Jim, and Happy New Year to everyone! May your 2006 be a safe and productive year.

Russ Phifer

CHAS FACTS

In a presentation at the 230th ACS National Meeting in Washington, Russ Phifer, CHAS Chair, discussed several items regarding membership in the Division of Chemical Health and Safety. The median age of the members is 45, with the youngest being 23 and the oldest 95. About 30% of the members hold doctorate degrees, mostly in chemistry. About 75% of the members have degrees with chemistry as the major.

Interest in chemical health and safety by the members originated mostly for three reasons: (1) personal interest, (2) personal responsibility, and (3) through employment needs.

About 25% are specifically involved in environmental health and safety activities as the primary function, while 30% work in an educational facility, 30% in an industrial facility, 10% at a government location, and 10% in consulting (numbers slightly over 100% since some members were identified as part of more than one group).

Work involvement by the members is quite varied as indicated by the following: aerospace, agricultural/food, analytical, biochemistry, biotechnology, chemical education, chemical information, clinical, combinatorial, electrical and semi-conductors, forensic, geochemistry, health and safety, inorganic, lubricants, marketing and business functions, medicine, metals, molecular modeling, nuclear, organic, paints and coatings, personal care products, physical chemistry, polymers, pulp and paper, rubber, soap and detergents, textiles, and toxicology. ■

The American Chemistry Council and OSHA signed an agreement in November to recognize and promote the common safety commitments of the ACC Responsible Care initiative and the OSHA Voluntary Protection Programs. The pact identifies joint opportunities to make VPP evaluations and Responsible Care audits more efficient. Through training and information sharing, employee health and safety should be enhanced.

CHAS ELECTION RESULTS

The election of officers and councilors for the ACS Division of Chemical Health and Safety (CHAS) for terms starting in 2006 by the membership has been completed. The results follow:

Chair-Elect: **Barbara L. Foster** will serve as Chair-Elect in 2006, and will then become Chair in 2007. She has served as Safety Director at the C. Eugene Bennett Department of Chemistry at West Virginia University since 1991 and the Safety Coordinator for the Science Departments within the Eberly College of Arts and Sciences since 1999. Barbara, a Certified Chemical Hygiene Officer, is the Secretary of the ACS Joint Board-Council Committee on Chemical Safety, and is currently the Secretary of CHAS. She is on the Board of Editors of *Chemical Health & Safety*. She has published articles on laboratory safety in several peer-reviewed journals and in newsletters. She has presented symposium talks on various aspects of laboratory safety management at the last eight ACS National Meetings as well as at various academic institutions.

Treasurer: **Neal Langerman** will serve as Treasurer for the three-year period 2006-2008. He received a B.S. in Chemistry from Franklin and Marshall College, and a PhD in Biochemical Thermodynamics from Northwestern University. Following an NIH postdoctoral year at Yale, he joined the faculty of the Departments of Biochemistry and of Pharmacology at Tufts University Medical School in 1970. In 1975, he joined the Chemistry Department at Utah State University. At both Tufts and USU, he assumed responsibility for departmental safety programs. In 1979, he started his career as a consultant. His first consulting company, Chemical Safety Consultants, was in conjunction with other members of the USU faculty. In 1997, he set up his current consulting firm, Advanced Chemical Safety, in San Diego. His professional interests are in the prevention of chemical incidents and injuries. He is on the Board of Editors of *Chemical Health & Safety* and of *Occupational Safety*. He served as the Chair of DivCHAS in 2004.

Councilor: **Kathryn G. Benedict** was elected Councilor of the Division for the 2006-2008 term. A CSP, she is manager of Laboratory and Training for Pfizer Global Research and Development at the Ann Arbor Laboratories. She is responsible for laboratory safety and regulatory compliance for laboratory researchers at three facilities in Michigan. Kathy began her career at Pfizer as a research chemist following employment at the General Electric Corporate Research and Development Center in Schenectady, NY. Her job responsibilities include occupational health and safety compliance, global safety auditing, HAZMAT, respiratory protection, and confined space entry. She has participated in DivCHAS programming at National Meetings as Program Chair for Fall meetings, speaker, and symposium co-chair. She is a contributing author for *Chemical Health & Safety*, and is a member of the Editorial Board.

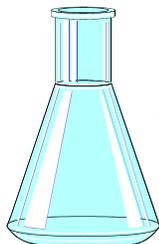
Alternate Councilor: **George Wahl, Jr.**, was elected Alternate Councilor of DivCHAS for the 2006-2008 term. He received his B.S. from Fordham University and his PhD from New York University. He is Professor of Chemistry at North Carolina State University in Raleigh. Within DivCHAS, George has served as Program Chair, Councilor, and 1995 Division Chair. He is the recipient of the Tillmanns-Skolnick Service Award, was in the first class of CHAS Fellows, and was a long-term member of the ACS Committee on Chemical Safety. During 1999, he served as Chair of the ACS North Carolina Local Section. He is a Founding Member of the Board of Editors of *Chemical Health & Safety*. He is co-developer and presenter of the successful CHAS workshop, "How to be a More Effective Chemical Hygiene Officer." He Chairs one of the most effective divisional programs, the "Teaching Safety" Symposium, at each ACS National Meeting.

In action by the CHAS Executive Committee, **Ralph Stuart** was appointed **Secretary** for the 2006-2008 term. Ralph is Director of Environmental Health and Safety at the University of Vermont. He is currently the DivCHAS webmaster and also organized and handles the CHAS ListServe. He was one of the leaders of the EPA Project XL, and is a member of the ACS Task Force on Laboratory Environment, Health, and Safety. He has served as Chair of the CHAS Membership Committee. ■

SAFETY AT THE ACS WESTERN REGIONAL MEETING

The ACS Western Regional Meeting scheduled for January 22-26, 2006, in Anaheim, CA, will include a session entitled "Fundamentals of Laboratory Safety" organized by Jim Kapin of Advanced Chemical Safety, who is the current CHAS Vice-Chair. Topics include laboratory security issues, laboratory spill management, principles of chemical storage in laboratories, managing carcinogens and other chronic toxic chemicals, laboratory ventilation/effective fume use, and protective equipment selection. Several laboratory safety-related workshops will be offered. For details, see: www.wrm2006.org/.

**231ST AMERICAN CHEMICAL SOCIETY NATIONAL MEETING
ATLANTA, GA
MARCH 26-30, 2006
DIVISION OF CHEMICAL HEALTH AND SAFETY**



Organizer: Debbie Decker
University of California, Davis
dmdecker@ucdavis.edu

SESSION TITLES

1. "Ask Dr. Safety"
Chair: James M. Kapin
Advanced Chemical Safety
Co-Chair: Neal Langerman
Advanced Chemical Safety
Round table discussion with experts available to answer your safety questions.
2. "Do You Know What You Are Breathing? Exposure Assessment Strategies in Research Laboratories"
Chair: Thomas Murdock
Medtronic World Headquarters
Co-Chair: James M. Kapin
Advanced Chemical Safety
3. "How Did That Happen? Learning from Our Mistakes"
Chair: Robert H. Hill
Atlanta Analytical Services
4. "Teaching Safety - Industry Focus"
Chair: George H. Wahl
North Carolina State University
5. General Papers
Chair: Kathryn G. Benedict
Pfizer Michigan
Co-Chair: Debbie M. Decker
University of California, Davis
6. "Spot the Hazard"
Chair: Frankie Wood-Black
ConocoPhillips
Poster session at the SCI-MIX
7. "Safety Humor"
Chair: Russell Phifer
WC Environmental
Poster session at the SCI-MIX

For further information, including registration information, see www.chemistry.org, National Meetings Section. ■

CHAS AWARDS

The ACS Division of Chemical Health and Safety is currently soliciting nominations for awards recognizing outstanding leadership and service in the area of chemical health and safety.

The **Howard Fawcett Chemical Health and Safety Award**, established in 1983, recognizes outstanding individual contributions to the field of chemical health and safety. The Award consists of a plaque and a \$500 travel honorarium.

The **Tillmanns-Skolnick Award** was established in 1984 to recognize and honor outstanding, long-term service to the Division of Chemical Health and Safety. Originally named the Distinguished Service Award, it was renamed the Tillmanns-Skolnick Award in 1986 to honor Emma Jean Tillmanns-Skolnick. Nominees must have been an active member of the Division for at least five years, and must have shown, through personal effort, outstanding support for the realization of the Division's goals in chemical health and safety. The Award consists of a plaque and a \$500 travel honorarium.

The **College and University Health and Safety Award** is given to recognize the most comprehensive laboratory safety program in higher education (undergraduate study only).

Nominations should be submitted to Douglas B. Walters, President, KCP Inc., 6807 Breezewood Road, Raleigh, NC 27607, or waltersdb@earthlink.net.

Information can be found at: <http://membership.acs.org/c/chas/awards/default.htm>. ■

THE CCPS PAGE CENTER FOR CHEMICAL PROCESS SAFETY

CURRENT STATUS OF PROJECTS

There are a number of CCPS projects currently active. Some are nearing completion with the final work product, for example, a book, just about ready to be issued. Some are just now being initiated. Here is the current status of several selected projects.

Guidelines for Transportation Risk, 2nd Edition (Project #169). The scope of this project is to issue a second edition of the "Guidelines for Transportation Risk." The objective is to provide introductory transport risk considerations for process engineers when determining viability of a project, to provide guidance on route selection, equipment factors, and materials that may affect public risk, and to provide guidance on transportation security risk issues and industry practices to mitigate the risk. Volunteers are now solicited to join the technical subcommittee responsible for preparing the book. Anyone interested may contact Karen Person at karep@aiche.org.

Risk-Based Process Safety Management (Project #179). The scope of the project is to update previous CCPS Process Safety Management books with the goal of achieving better safety results with fewer resources. Most companies have process safety systems in place, but are challenged to make their systems more efficient. Efficient systems will result in fewer incidents since the systems are more likely to be fully implemented. The 12-element process safety management system developed by CCPS in 1989 will be updated. The new framework builds upon the original PM ideas, integrates industry lessons learned over the intervening years, utilizes applicable "total quality" principles, and organizes it in a way that will be useful to all organizations. The book is about 50% completed.

Management of Change (Project #180). This project is designed to provide an up-to-date guide that describes the best current thinking about Management of Change. Work on the book has been moving ahead well. The first review of the complete book is currently underway, and the second review is scheduled for mid-January.

Pre-Start-Up Safety Review (Project #184). The scope of this project is to provide guidance to those having responsibility for scheduling and executing a Pre-Start-Up Safety Review. This project will provide guidance to enable the PSSR to be integrated throughout the project or turnaround phases, with a verification at the traditional PSSR step. The goal is to eliminate surprises late in the game. The project team has decided to produce a CCPS Guidelines book and a database of pre-start-up check list items. Selection of the writer is targeted for January 2006. ■

TEACHING THE TEACHERS

Safety and Chemical Engineering Education (SACHE) is a project of the Undergraduate Education Committee of CCPS. The charter of SACHE is to enhance the presentation of process safety in undergraduate education.

Annually, a workshop for chemical engineering faculty members, particularly younger professors, is held to provide both technical and hands-on experience related to process safety issues at an industrial facility. The 2005 Workshop, sponsored by Rohm and Haas Company, Arkema, Inc., and Chilworth Technologies, Inc., was held in September at the Rohm and Haas facilities in Bristol, PA, and at the Chilworth Technologies laboratories in Plainsboro, NJ. Attendance totaled about 40, with 25 faculty members plus workshop instructors, SACHE Committee members, three graduate students, and technical personnel from the sponsoring organizations. The program focused on batch polymer processing, reactive chemical hazards, dust explosion hazards, and logic model based tools for incident investigations. Feedback from participants was highly positive.

Anjana Meel, a graduate student at the University of Pennsylvania, said: "The workshop was really helpful for me, as my thesis focuses on safety and risk analysis of chemical plants. In particular, sessions on dust explosions and incident investigation were really stimulating."

Cristina Piluso, a graduate student at Wayne State University, commented: "The 2005 SACHE workshop for chemical engineering faculty and graduate students was an excellent learning experience for all in attendance. I came in not knowing what to expect and left feeling very fortunate for having the opportunity to attend."

Felix Rantow, a graduate student at Drexel University, thought that "participating in the 2005 SACHE workshop proved to be a one-of-a-kind experience."

The SACHE Committee thanks Ron Willey of Northeastern University for organizing the workshop and all of the sponsors for their support, both financial and in making people available to participate. ■

ANNUAL STUDENT AWARDS IN SAFETY



The Safety and Health Division National Student Design Competition Awards for Safety, the Ted Ventrone Awards, were presented on October 30, 2005, at the AIChE Annual Meeting in Cincinnati, OH, during the Annual Student Brunch. These awards are given for the best utilization of the principles of inherent safety in the 2005 AIChE Student Design Competition. The winners were **Christopher Hill** (Michigan Technological University), and the teams of **H. Marcy Hammer and Christopher Katinas** (Rose Hulman Institute), **Zeena Kas and Mihai Manitiu** (Wayne State University), and **Justin Guinn, Robert T. Taylor, and Tim Plowman** (Oklahoma State University).

The Safety and Chemical Engineering Education (SACHE) Program Student Design Competition for Safety in Design Awards were presented at the same time. One individual design award and one team award were given to the two best applications of chemical process safety in the 2005 AIChE Student Design Competition. **Ben Koenigsnecht** (Michigan State University) was awarded the Walt Howard Individual Award. **Jon Fleener, Ryan Michael Sistrunk, and Kenneth Wayne Proffitt** (Lamar University) were presented with the Jack Wehman Team Award. ■

NANOTECHNOLOGY (continued from page 1)

While very little is known about the safety risks posed by engineered nanomaterials, the prevalent safety risks can be considered from the toxicity, fire, and catalytic reaction perspective.

The toxicology of nanoparticles is poorly understood at this point since there are no regulations to test such substances for health, safety, and environmental impact. It is highly unlikely that the materials used in construction of nanoparticles will be biologically inert. There is also the unsettled issue of "size matters" with respect to toxicity. For example, studies have shown that ultrafine particles, irrespective of chemical composition, can induce inflammatory lung injury. Generally, the smaller the particles, the more reactive and toxic are their effects. Nanoscale materials were recently nominated to the National Toxicology Program at NIEHS. The NTP is now developing materials and protocols to test a broad spectrum of nanoscale materials for toxicity in animal models over the next five years.

Although insufficient information exists to predict the fire and explosion risk associated with nanoscale powders, such combustible material could present a higher risk than a similar quantity of average scale material. Decreasing the particle size of combustible materials can increase combustion potential and combustion rate, leading to the possibility of relatively inert materials becoming highly reactive as nanomaterials. Dispersions of combustible nanomaterial in air can present a greater safety risk than dispersions of non-nanomaterials with similar compositions. Some nanomaterials are designed to generate heat through the progression of reactions at the nanoscale. In the case of some metals, explosion risk can increase significantly as particle size decreases.

Nanometer-diameter particles and nanostructured material have been used as effective catalysts for increasing the rate of reactions or decreasing the necessary temperature for reactions to proceed. Depending upon their composition and structure, some nanomaterials may initiate catalytic reactions that would not otherwise be anticipated from their chemical composition alone.

Do we have the creativity, intelligence, time, and money to resolve these safety and health issues before another calamity strikes?

Sam West

GREEN CHEMISTRY

The EPA Green Chemistry Awards for 2005 were presented in five categories. The Academic Award was presented to **Dr. Robin D. Rogers** at the University of Alabama for developing a new process for dissolving cellulose. The Small Business Award was given to **Metabolix, Inc.**, for a process that uses bacteria to turn sugar and vegetable oil into plastic. **Archer Daniels Midland** received the Alternate Synthetic Pathways Award for developing a greener, cheaper process to make margarine and shortening from vegetable oil without generating trans fat, as did **Merck & Co.** for commercializing a significantly greener process to manufacture Emend®. The Award for Alternate Solvents/Reaction Conditions was presented to **BASF Corp.** for creating an automotive primer paint with less than half the usual volatile compounds. **Archer Daniels Midland** received the Award for Designing Safer Chemicals for its ArcherRC™, a component that can replace volatile organic compounds in paint.



SAFETY NOTES

- Hearing-impaired workers face challenges on the job including receiving emergency notices, evacuating safely in an emergency, receiving training, communicating, and responding to workplace hazard situations. These barriers can be minimized through implementation of the practical steps, as appropriate for each situation, described in a recently issued OSHA Safety and Health Bulletin on *Innovative Workplace Safety Accommodations for Hearing-Impaired Workers*. This Bulletin, available at www.osha.gov, offers safety and health considerations.
- An explosion at a Texas refinery last March that claimed the lives of 15 workers and injured more than 170 others has resulted in an OSHA penalty of \$21 million against BP Products North America Inc. The company announced it would pay the fine, abate hazards, and make necessary safety and health upgrades throughout the Texas City refinery, which covers about 1,200 acres and employs 1,600 permanent workers. The \$21 million penalty is the largest ever assessed by OSHA, surpassing an \$11.2 million fine levied in 1991 against IMC Fertilizer Inc.
- The Board of Certified Safety Professionals (BCSP) initiated in August a new online feature for earning certification points inexpensively. Continuance of Certification (COC) quizzes are now available to CSPs at www.bcsp.org/rqms for a fee. Passing demonstrates that the CSP has continued to remain engaged in the profession by reading and understanding the content of reputable journals and texts, regulatory standards, consensus codes, and best practices. Quizzes are currently based on the journals published by membership organizations, including AIHA, ASSE, NFPA, NSC, and SFPE.
- A new analysis based on animal studies suggests that showering in manganese-contaminated water for a decade or more could damage the central nervous system, according to researchers at Wake Forest University Medical School. Manganese is monitored in public water supplies, and high levels of this naturally occurring substance can be found in wells and private water supplies. Everyone is exposed to small levels of manganese in rocks, air, food, soil and water. At high levels, manganese is toxic to the central nervous system and can cause learning and coordination disabilities, behavioral changes, and a condition similar to Parkinson's disease. This study is the first to show that breathing manganese in a vapor, such as in a shower, could cause permanent nervous system damage.
- Current areas of focus in the testing program at NTP (National Toxicology Program) include potential hazards associated with nanoscale materials, herbal dietary supplements, radio-frequency radiation emissions from cellular telephones, photoactive chemicals, brominated flame retardants, dioxin-like compounds, contaminants of drinking water, endocrine-disrupting substances, and methods for assessing potential cardiac toxicity. There will be several levels of review before specific areas are selected by NTP for study. NTP is headquartered at the National Institute of Environmental Health Sciences.
- OSHA has issued a new Safety and Health Information Bulletin to highlight the specific workplace hazard of dusts. The bulletin is entitled *Combustible Dusts in Industry: Preventing and Mitigating the Effects of Fire and Explosions*. Work practices and guidelines that reduce the potential for a combustible dust explosion or that reduce danger to employees if such an explosion occurs, are described. Training to protect employees from these hazards is described. The bulletin is available at www.osha.org.
- Scientists in Norway have developed a fast test that can identify *Legionella* bacteria in water reservoirs or biofilms. The new test is a realtime polymerase chain reaction method specifically aimed at *L.pneumophila*, the dominant infectious species in fatal legionellosis. The test takes only a few hours to complete. The current test method involves a cultivation that can take 2-10 days to perform.
- Ethylene glycol, a common antifreeze, has a sweet taste that small animals like. Spills may be lapped up by dogs and cats leading to severe sickness and even death, mostly by injury to the kidneys. This type of incident is one of the most frequent causes of toxicity in small animals. ■



Second Global Congress on Process Safety
SPECIAL 40TH ANNUAL LOSS PREVENTION SYMPOSIUM
APRIL 23-26, 2006, ORLANDO, FL

The Loss Prevention Symposium, organized by the AIChE Safety and Health Division Area 11a, has been held annually since 1967. The objective of the symposium is to promote safety in the process and allied industries by providing a forum for practitioners from industry, academia, and government to share experiences, technological advances, and new ideas in the loss prevention and process safety fields. This special 40th Annual Symposium will consist of the following six sessions of five or six papers each.

Symposium Chair
 Erdem A. Ural, PhD
 Loss Prevention Science &
 Technologies, Inc.

Symposium Vice-Chair
 Christopher Hanauska
 Hughes Associates, Inc.

1. LOSS PREVENTION: PAST, PRESENT, AND FUTURE.

An invited paper will introduce this session by highlighting the 40-year history of the Loss Prevention Symposiums and by addressing how this forum has remained in the forefront of ever-changing process safety and loss prevention technologies and practices. Papers defining the "state of the art" and illuminating where this "art" must go in the future are scheduled. Papers will be presented that discuss the long-term consequences of industrial accidents, with special emphasis on continued corporate vitality and financial health, on corporate loss prevention programs, and on ever-changing regulations.

Chair
 David G. Clark
 DuPont Company

Vice-Chair
 Walter L. Frank
 ABS Consulting

2. FIRE, EXPLOSION, AND REACTIVE HAZARDS. The analysis, prevention, and mitigation of fire, explosion, and reactivity hazards continues to be important in the Loss Prevention community. This session includes papers that identify, characterize, or offer appropriate design guidance.

Chair
 Peter N. Lodal
 Eastman Chemical Company

Vice-Chair
 Jean Paul LaCoursiere
 Universite de Sherbrooke

3. HAZARD ASPECTS OF COMBUSTION EQUIPMENT.

This session focuses on hazard aspects of various types of combustion equipment such as fired heaters, flares, thermal oxidizers, steam boilers, waste heat boilers, and paper plant recovery boilers. Papers cover the following topics: process design for safe operation, equipment specifications for improved safety, control systems and instrumentation for improved operational safety, operating procedures and practices for safe operation, and case histories of combustion equipment failures and accidents.

Chair
 Stanley S. Grossel
 Process Safety & Design Inc.

Vice-Chair
 Daniel A. Crowl
 Michigan Technological
 University

4. HAZARDS & RISKS ASSOCIATED WITH ALTERNATE ENERGY SYSTEMS.

The commercialization of alternative energy systems is becoming increasingly important to the Loss Prevention community. New hazards and risks are being introduced that must be addressed. Renewable energy sources, fuel cells, liquified natural gas, hydrogen, and nuclear energy are technologies that will compete with traditional sources. This session includes papers that deal with research, tools, and methods to identify and manage risks associated with these new systems.

Chair
 Brian R. Dunbobbin
 Air Products & Chemicals Inc.

Vice-Chair
 Cheryl A. Grounds
 Baker Engineering
 & Risk Cons.

5. MECHANICAL INTEGRITY. Mechanical integrity is a key requirement for harnessing the tremendous hazard potential created by industrial operations dealing with toxic materials or large quantities of chemical, thermal, mechanical, and electrical energy. MI failure is often the initiating event that leads to major fires or explosions. Papers in this session cover all aspects of mechanical integrity including design, reliability, and maintenance.

Chair
 Christopher Hanauska
 Hughes Associates, Inc.

Vice-Chair
 Henry L. Febo
 FM Global

6. CASE HISTORIES AND LESSONS LEARNED. Papers dealing with incidents, near misses, and the lessons learned will be presented to provide valuable learning experiences.

Chair
 John F. Murphy
 (retired)

Vice-Chair
 Robert P. Benedetti
 NFPA International

The Global Process Safety Congress will include a luncheon on each of the three days, receptions in the evenings, and a vendor display area. There will be coffee breaks during the sessions. The AIChE Spring Meeting registration fee will provide admission to all technical sessions. Luncheons and receptions will be ticketed events. The Annual Safety and Health Division dinner is scheduled for Monday evening. The Annual Division Executive Committee Meeting will be scheduled during the Congress. All Division members are welcome to attend this Committee meeting. The time and place will be posted. Be sure to mark your calendars now to attend the Global Congress - **April 23-26, 2006**, in Orlando, FL.

Second Global Congress on Process Safety
8TH PROCESS PLANT SAFETY SYMPOSIUM
APRIL 23-26, 2006, ORLANDO, FL



The Process Plant Safety Symposium (PPSS), originally organized as a stand-alone conference by the AIChE South Texas Local Section, is now part of the AIChE Safety and Health Division programming effort. The Program Area 11b Committee is responsible for the program development. Through 2005, the PPSS was held on a biennial basis which made it part of the First Global Congress on Process Safety. The very positive response of the attendees at this Global Congress to the idea of having a choice of three simultaneous process safety related sessions led to the decision to move the PPSS to an annual basis, and thus to the development of the Second Global Congress on Process Safety scheduled for 2006.

The Global Congress on Process Safety presents a rare opportunity for process engineers to obtain significant knowledge about the advances in process safety technology.

The scheduled sessions in the 8th PPSS are as follows:

Symposium Chair

Jim Thompson
INVISTA

Symposium Co-Chair

Phil Meyers
Advantage Risk Solutions Inc

1. IMPROVING SAFETY CULTURE.

A strong safety culture is of critical importance to the development and maintenance of a superlative safety program. Papers are scheduled for this session that demonstrate approaches to reducing incidents through management processes such as Operational Discipline, Behavior Sampling, Operator Training, effective operating procedures, interactive management systems, and similar procedures.

Chair

Dr. M. Sam Mannan
Mary Kay O'Connor
Process Safety Center

Co-Chair

Dr. Stephanie C. Payne
Texas A&M University

2. RISK ASSESSMENT.

Risk assessment is key to evaluating and improving the safety and business risk of process systems. This session includes papers demonstrating the application of both qualitative and quantitative risk assessment techniques (such as HAZOP, Layer of Protection Analysis, Fault Tree, and Quantitative Risk Assessment) as well as Risk Screening Techniques. Practical applications are discussed.

Chair

Albert I. Ness
Rohm and Haas Co.

Co-Chair

Chris Richardson
WS Atkins

3. SAFETY INSTRUMENTED SYSTEMS AND SAFETY CRITICAL DEVICES.

The proper application of Safety Instrumented Systems (SIS) is obviously important in process plants. However, non-SIS Safety Critical Systems (e.g., Safety Critical Devices) also play an important role. This session includes papers in the areas of (1) Safety Instrumented Systems such as SIS design, application of LOPA to SIS, and probability calculations, and (2) Safety Critical Devices (SCD) such as opportunities to apply SCD instead of SIS, management of SCD, and application of LOPA to SCD.

Chair

Harry West
Mary Kay O'Connor
Process Safety Center

Co-Chair

Angela Summers
SIS-Tech Systems

4. FACILITY SITING ISSUES.

Facility siting remains important to Process Safety, and has many aspects. Papers in this session include novel approaches and applications to facility siting, and on important ancillary issues such as controlling the location of temporary buildings/trailers, and controlling access of non-essential personnel to process areas during startup/shutdown/emergency operations.

Chair

Jack Chosnek
KnowledgeOne

Co-Chair

Michael Livingston
WS Atkins

5. CASE HISTORIES AND LESSONS LEARNED

(Joint Session with the 40th Loss Prevention Symposium; see page 8) ■

ADDITIONAL SAFETY SESSIONS

There are two additional safety sessions scheduled for the 2006 AIChE Spring Meeting that have been organized by program groups outside of the Safety and Health Division and of CCPS. These sessions are:

Plant Safety

Presentations cover ethylene plant safety, safety practices, risk management, and learning from incidents. This session is part of the Ethylene Producers Conference.

Chair

Mark M. Moderski
ABB Lummus Global Inc.

Co-Chair

David Gent
NOVA Chemical Corp.

LNG VI - Risk and Safety

Issues of risk and safety in the liquid natural gas industry are reviewed. This session is part of the 6th Natural Gas Utilization Topical Conference.

Chair

Harry West
Mary Kay O'Connor
Process Safety Center

Co-Chair

Chen-Hwa Chiu
ChevronTexaco

Second Global Congress on Process Safety
21ST ANNUAL CCPS INTERNATIONAL CONFERENCE
APRIL 23-27, 2006
WALT DISNEY WORLD DOLPHIN RESORT, ORLANDO, FL
"PROCESS SAFETY CHALLENGES IN A GLOBAL ECONOMY"



Twenty some years ago, when the Center for Chemical Process Safety was founded, the process industry was considered as being global in nature. Looking back from today, that was an understatement! The chemical process industry today participates in the continuing growth of the globalization of the world economy in response to many factors such as changes in raw material availability and costs, off-shoring of production and services, worldwide customers, and increasing technical capabilities of emerging economies. This globalization creates many significant issues in process safety. The 21st Annual CCPS Conference will focus on understanding and managing process safety in this global concept. With this 21st Annual Conference, CCPS joins with the AIChE Safety and Health Division in organizing the Second Global Congress on Process Safety

Session Titles and Topics for the 21st CCPS Annual Conference Include:

- When and how to say "NO" (or "YES"):
 - The use of tools such as cost-benefit analysis, decision analysis, multi-attribute utility analysis, and other decision making tools to prioritize hazard mitigation options.
- Transportation Safety:
 - Process safety issues with global transportation of hazardous materials.
 - Understanding and dealing with different regulations.
 - Multimodal shipments.
 - Import and export terminals.
 - Global transport of time sensitive and temperature sensitive cargos.
- International trends in Process Safety regulations, enforcement, cultural differences, and practices:
 - China and other areas of the Pacific Rim.
 - India and the Middle East.
 - Europe.
 - Latin America.
- Synergies between Process Safety and Security.
- Process Safety of liquified natural gas (LNG) production, transportation, and distribution.
- Process Safety issues in global contract manufacturing and in joint ventures.
- Human factors considerations for Process Safety in a global economy:
 - Communication of technology and hazard information.
 - Creating a good safety culture in developing countries.
 - Tips and techniques for conducting a multi-lingual, multi-cultural Process Hazard Analysis.
- Global implications and practices of inherently safer technology (IST):
 - Incorporating IST considerations into an existing Process Safety management system.
 - Protocols for identifying IST opportunities in existing facilities.
 - Techniques for understanding IST opportunities early in process and product development.
 - Understanding IST conflicts, and avoiding unintended consequences of changing technology.
 - Is IST more important in developing countries?

For more information, visit www.aiche.org/ccps/icw.

The positive feedback from those attending the First Global Congress on Process Safety in 2005 in Atlanta led to the establishment of the Second Global Congress described on pages 8, 9, and 10 of this *Safety & Health News*. A special 40th Anniversary Loss Prevention Symposium is scheduled, together with the 8th Process Plant Safety Symposium and the 21st Annual CCPS International Conference.



PAPERS PAPERS PAPERS

"Pilot-Scale Evaluation of the Inhibition of Exothermic Runaway," T.J.Snee and L.Cusco, *Trans.IChemE* **83**, No.2, Part B (Process Safety and Environmental Protection), 135-144 (March 2005).

Even if an emergency relief system successfully prevents catastrophic failure of a chemical reactor, there may be a significant release of toxic or flammable material. Thus, reaction inhibition is being considered as an alternative or additional measure. Reaction inhibition system design methodology was evaluated on a pilot-scale. Experimental results on the polymerization of styrene initiated by benzoyl peroxide and subsequently inhibited by the addition of t-butyl catechol are reported. These 340-liter pilot-scale runaway polymerization tests were supported by 1-liter laboratory runaway reaction experiments and by adiabatic calorimetry. The pilot-scale experiments demonstrated that with a simplified kinetic model, and analysis of heat and mass transfer, it is possible to predict the conditions on a large scale.

"Dangerous Dusts," R.Marshall, *Chem.Eng.* **112**, No.9, 25-30 (September 2005).

The challenge of handling dusts in industrial situations ranges from a mere nuisance in some plants to a critical safety hazards in others. Far too many plants that handle explosive dusts have inadequate protection measures in place. More attention should be paid to NFPA 654: "Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Matter." This standard provides useful advice on how to identify operations that pose dust explosion and fire concerns. Paradoxically, the same equipment that is used to control dust is where some of the worst explosions get their start. Dust-collection equipment actually can create an explosion hazard.

"Development of an Advanced Nanocalorimetry System for Material Characterization," Y-S Liu, *J.Loss Prev. Process Ind.* **18**, No.3, 139-144 (May 2005).

Calorimetric techniques are widely used to characterize energetic materials. A key drawback of conventional macroscale DSC technology is the large thermal inertia of the calorimetric cell and its associated hardware for small sample sizes. A microscale calorimeter is being developed to obtain accurate measurements on small sample sizes. Because these systems incorporate a very small thermal mass and use sample sizes in the nanogram/nanoliter range, rapid and uniform heating and cooling can be achieved while maintaining a high level of temperature homogeneity. This paper discusses the design and fabrication of a nanocalorimeter device.

"Report on Carcinogens - History and Process," C.W.Jameson, *Chem.Health & Safety* **12**, No.3, 9-14 (May/June 2005).

The Report on Carcinogens (RoC) is prepared in response to the U.S. Public Health Service Act, as amended. This law stipulates that the Health and Human Services Department Secretary shall publish a report which contains a list of all substances which either are known to be human carcinogens or may reasonably be anticipated to be human carcinogens, and to which a significant number of persons may be exposed. The Report is not intended to constitute a risk assessment; it is a hazard identification document only. The history of and the process for the review of nominations of potential carcinogens is discussed. The most recent RoC (11th Edition) was released in January 2005.

"Size Safety Relief Valves for Any Conditions," R.Darby, *Chem.Eng.* **112**, No.9, 42-50 (September 2005).

Proper design of a relief system requires not only determining the correct size for the valve or rupture disc, but also the proper size and selection of upstream and downstream piping and effluent handling systems. The limitations of the design calculation methods used must be clearly understood. The paper covers some of the key issues involved.

"Pressure Relief of Liquids Containing Suspended Solids," D.McIntosh, S.Waldram, and J.Etchells, *Trans.IChemE.* **82**, No.1, Part B (Process Safety and Environmental Protection), 26-36 (January 2004).

The multi-phase venting of vapor, liquid, and glass particles has been studied experimentally in 1 and 10 liter scales. In non-reacting systems, the depressurization profiles of superheated water and water-glycerine mixtures were studied on their own and with added glass particles. Results are reported. ■

AICHe SAFETY AND HEALTH DIVISION 2005

[Chair]

Robert P. Benedetti, 1st Vice-Chair
National Fire Protection Association
rbenedetti@nfpa.org

Ronald J. Willey, 2nd Vice-Chair
Northeastern University
willey@neu.edu

Scott W. Ostrowski, Past-Chair
ExxonMobil Chemical Company
scott.w.ostrowski@exxonmobil.com

Albert I. Ness, Secretary/Treasurer
Rohm and Haas Company
ANess@rohmmaas.com

DIRECTORS

Robert W. Johnson (2003-2005)
Unwin Corporation
rjohnson@unwin-co.com

Erdem A. Ural (2003-2005)
Loss Prevention Science &
Technologies
erdem.ural@lpsti.com

Peter N. Lodal (2004-2006)
Eastman Chemical Company
pnlodal@eastman.com

Katherine E. Pearson (2004-2006)
Rohm and Haas Company
KatherinePearson@rohmmaas.com

David G. Clark (2005-2007)
DuPont Company
david.g.clark@usa.dupont.com

Jean-Paul Lacoursiere (2005-2007)
Universite de Sherbrooke
jpla@sympatico.ca

PROGRAM COORDINATORS

Walter L. Frank
ABS Consulting
wfrank@absconsulting.com

Erdem A. Ural
(see Director 2003-2005)

AWARDS COMMITTEE

Robert P. Benedetti, Chair
(see 1st Vice-Chair)

PUBLICATIONS COMMITTEE

Daniel A. Crowl, Chair
Michigan Technological University
crowl@mtu.edu

WEBMASTER

Daniel A. Crowl
(see Publications Committee)

AICHe STAFF LIAISON

Karen E. Person
karep@aiche.org

MEMBERSHIP COMMITTEE

Joseph F. Louvar
Wayne State University
jlouvar@eng.wayne.edu

John F. Murphy
john.murphy@member.aiche.org

CONTINUING EDUCATION COMMITTEE

Dennis C. Hendershot, Chair
dchendershot@alumni.lehigh.edu

GOVERNMENT RELATIONS

Randy Freeman
ABS Consulting
rffreeman@absconsulting.com

EDITORS - PROCESS SAFETY PROGRESS

Daniel A. Crowl
(see Publications Committee)

Joseph F. Louvar
(see Membership Committee)

ACS DIVISION OF CHEMICAL HEALTH AND SAFETY 2005

Russ Phifer, Chair
WC Environmental, LLC
P. O. Box 1718
West Chester, PA 19380
610-696-9220
rphifer@glasmesh.com

Jim Kapin, Chair-Elect
Advanced Chemical Safety
jim@chemical-safety.com

Barbara Foster, Secretary
West Virginia University
bfoster@wvu.edu

Erik A. Talley, Treasurer
Medical College of Cornell Univ.
ert2002@med.cornell.edu

Neal Langerman, Past-Chair
Advanced Chemical Safety
neal@chemical-safety.com

MEMBERS-AT-LARGE

Henry J. Elston (2005)
Editor, *Chemical Health & Safety*
helston@bigfoot.com

Ken Fivizzani (2006)
Nalco Company
kfivizzani@nalco.com

COUNCILORS

George H. Wahl, Jr. (2005)
North Carolina State University
george_wahl@ncsu.edu

Eileen B. Segal (2006)
ebsegal@aol.com

ALTERNATE COUNCILORS

Ruth Hathaway (2005)
Hathaway Consulting
ruth@hathawayconsultingllc.net

Frankie Wood-Black (2006)
Conoco Phillips
Frankie.K.Wood-Black@
conocophillips.com

EDITOR, CHEMICAL HEALTH & SAFETY

Henry J. Elston
helston@bigfoot.com

PROGRAM COMMITTEE

Debbie M. Decker (Spring)
Univ. of California - Davis
dmdecker@ucdavis.edu

Kathryn Benedict (Fall)
Pfizer Global R&D
kathryn.benedict@pfizer.com

AWARDS

Douglas Walters
KCP, Inc.
waltersdb@earthlink.net

PUBLICATIONS

Eileen B. Segal
ebsegal@aol.com

WEB AND E-MAIL ADMINISTRATOR

Ralph Stuart
University of Vermont
rstuart@uvm.edu