

# Chemical Engineering Newsletter

Fall Semester, 2005

## Advisor's Corner

By Professor David W. Murhammer

### Inside This Issue

- 1 Advisor's Corner
- 1 Spooky Sprint
- 2 Departing Faculty
- 3 French Connection
- 3 Excerpts from an Internship
- 4 EPA Dodges another Bullet
- 5 The Good, the Bad and the Energy-Efficient
- 6 Creating a More Secure Chemical Industry
- 8 Chemical Plant Safety from Terrorism
- 9 National Conference
- 10 Faculty and Student Awards

Greetings to Hawkeye Chemical Engineers!! I have received many comments from our alumni about the absence of our AIChE Student Chapter Newsletter (last published Spring 2003). The student chapter officers and I believe that publishing the newsletter is an excellent mechanism through which we can keep our alumni informed of our departmental activities. Therefore, we decided to add a "Newsletter Editor" as one of our elected student chapter officers in order to formalize the process of publishing our semi-annual newsletter. Julie Karceski is currently serving as our first Newsletter Editor.

This issue begins with an article about our Second Annual Spooky Sprint, a fun run with Halloween costumes that serves as a fundraiser for the local Shelter House. This issue also includes a profile of Professor Victor Rodgers who is leaving Iowa to take a faculty position at the University of California, Riverside. We will certainly miss Prof. Rodgers, but wish him all the best. Three other articles in this issue discuss specific student activities, including a student project involving University of Iowa and French students, an internship experience at Cambrex Charles City, and attendance at the 2005 AIChE Annual Student Conference. Classroom activities are also included in this issue. Specifically, students in the Process Calculations course that I taught during the Fall 2005 semester were required to write two "topical papers." These were opinion pieces about passage of the Energy Policy Act of 2005 and about strategies to protect chemical plants from terrorists. Two student papers on each of these topics are included in this issue.

I am very pleased to inform you that the University of Iowa AIChE Student Chapter has been recognized as an Outstanding Student Chapter by the National Organization for the 2004-05 academic year. This is the 11<sup>th</sup> time our chapter has received this award in the last 12 years!

Finally, I want to encourage all of our alumni to donate to the endowment that will be used to support our student chapter activities. These funds will be used primarily to support student attendance at the Regional and National AIChE Conferences.

## Second Annual Spooky Sprint a Success

By Leigh Brooks

On October 23<sup>rd</sup>, 2005, the AIChE student chapter hosted its second annual Spooky Sprint 5k fun run, a benefit to raise money for the emergency Shelter House in Iowa City. Last year, the first annual Spooky Sprint turned out to be a great success and rose just over \$800 for the Shelter House. The student chapter voted to donate all the proceeds from the Spooky Sprint after learning about a fire that occurred on February 7<sup>th</sup>, 2004. UI junior Alex Conway said, "As engineers, giving back to the community is very important to us. It's in our code of ethics."

For the Spooky Sprint 2005 race, co-coordinating seniors Leigh Brooks and David Swiderski spent countless hours organizing this year's event. The major goal this year was to try to increase community awareness of Spooky Sprint, as well as increase the number of participants. Swiderski and Brooks were able to make appearances on the local Public access TV show, Live and Local, as well as an interview on the university radio station. Besides just marketing to potential runners, the AIChE members also found several sponsors to donate money to Spooky Sprint, including Iowa State Bank and Trust, Titronics and the UI Department of Chemical and Biochemical Engineering.

(Continued on next page)

---

*"As engineers, giving back to the community is very important to us. It's in our code of ethics."*

---

*Spooky Sprint continued from page 1*

This year, there were nearly 100 participants in Spooky Sprint. Race participants were encouraged to wear a costume the day of the race. Dean Barry Butler and Alec Scranton were contest judges and selected winners in each age category. In all, the UI AIChE student chapter was able to give the shelter house just over \$1200. Shelter House director, Crissy Canganelli, who thanked all participants at the end of the race, said, "These are the kinds of things throughout the community that help us keep our doors open. I want you to know you did a great thing." Involvement in the Spooky Sprint was a very rewarding experience for all because it made a positive difference in someone's life.

The Student Chapter would like to thank department chair, Dr. John Wiencek, for his generous support.

For more information about the Shelter House visit their website at:

<http://www.shelterhouseuiowa.org/>

## Departing Faculty: Dr. Rodgers Heads for Riverside, California

By Julie Karceski



*Dr. Victor Rodgers*

---

*"You realize you can do a lot in a lifetime when you come to Iowa."*

---

"I'm appreciative of all the opportunities at Iowa," says Dr. Victor Rodgers, professor of chemical and biochemical engineering. Over sixteen years with Iowa's engineering department has brought Rodgers many accomplishments in teaching and in his internationally recognized research. While he may be grateful for the chance to build a successful career, it is the students whose lives he has impacted that are most appreciative. As Director of the Ethnic Inclusion Effort for Iowa Engineering, he has worked hard to reach out to groups underrepresented in engineering and promote cultural awareness among students. Rodgers' efforts to increase the number of women and minorities in Iowa's College of Engineering has made Iowa a national leader in inclusion.

After this semester, Dr. Rodgers is leaving Iowa for University of California, Riverside to become a part of their chemical and environmental engineering program and build up the new bioengineering department. Always intrigued by science, from electrical circuits to biochemistry, it was his interest in environmental health problems that facilitated Rodgers' decision to become a chemical engineer. "Chemical engineers can solve big problems," Rodgers notes, "You have the potential for positive impact." Rodgers' research focuses on just that, specifically membrane separations and protein thermodynamics, which may potentially have industrial applications such as wastewater cleanup.

After sixteen years, it is difficult for Rodgers to articulate how much Iowa has shaped his life and career. He jokes that when applying for teaching positions, he had to look at a map to figure out where Iowa was, but now says, "Iowa is becoming highly respected. It's a small engineering school that has captured the attention of the nation for a variety of reasons. You realize you can do a lot in a lifetime when you come to Iowa."

Rodgers has taken every opportunity to give back to the university which he says built him into the person he is today. Beyond teaching and research, he has also changed the graduate program curriculum, started cultural competency program and worked for ethnic diversity in the college of engineering. It will be impossible to replace a professor who has worked so hard for his students, his university and the community. We wish Dr. Rodgers the best in his future work.

## The French Connection

By Peter Rasmussen

I had the opportunity to work with another UI chemical engineering student, Chad Smith, on a year-long endeavor called Virtual International Project Teams (VIPT). VIPT is a concept developed by Dean Butler that involves the collaboration between the UI Engineering College and the École Polytechnique Universitaire de Marseille in France. The UI and Polytech-Marseille teams are being overseen by Dr. Wiencek and Dr. Médale, respectively. The primary goal of VIPT is to develop “personal skills necessary to work on a team with engineers from another country on a common project”.<sup>1</sup> Chad and I have been working with a team of five mechanical engineering students from Marseille on a project that seeks to use biofuels in radio-controlled aircraft.

Since Marseille and Iowa City are separated by approximately 4,500 miles, both teams have been communicating with one another both by videoconferencing and by email. Initially, videoconferencing was a challenge due to the language barrier between both teams. However, as both teams became more familiar with one another, communication became more relaxed and effective.

Also, each team made trips to the other’s university. In May, Chad and I traveled to Marseille. We took the high speed train from Paris to Marseille and spent a week working with the French students and touring the city. We obtained an understanding of how the French engineering system works and of the cultural differences and similarities between our two countries.

The French team made their week-long trip to Iowa City during the end of October. Chad and I took the students to several UI research facilities, including the Hydraulics Laboratory and the IATL building. In addition, we made plant tours to John Deere in Davenport and to Pella.

Dean Butler would like to expand VIPT to include two separate projects. Next year the RC aircraft biofuel project will be continued and a new project will be initiated involving the construction of a super fuel-efficient car.

## Excerpts from an Internship

By Bill Liechty

This semester I have been working as a process engineering intern at Cambrex Charles City, Inc. in Charles City, IA. Cambrex is a diverse, global company, but the site I work at is a contract manufacturer of chemicals for use in animal feed additives, human pharmaceuticals, and fine chemicals.

My duties thus far have been diverse, yet educational. I am supervised by a senior process engineer, and assisting the engineer with day-to-day responsibilities is a big part of my job. I draft and review batch records, which are simply instructions on how to run a specific chemical process. I also draft and review supplements, which are revisions to these instructions. I am using software called BatchPlus® to perform air emission calculations for the EPA. Most recently, I prepared a series of campaign summaries for a multi-million dollar project. A campaign summary is a synopsis of a multi-batch project, provided to the customer, which details yield data, costs, and a description of each completed batch.

---

*“I have gained insight as to where I want to go with my career along with some valuable work experience.”*

---

The parallels between writing these documents and writing a lab report were surprising to me. The format of report is often dictated by the customer, data and figures are to be presented in a certain way, and there are aspects of the report to be elaborated upon. In much the same manner, our lab course instructors have laid out lab report formats and guidelines to be followed, as well as outlined specific topics to highlight in the report. The ability to communicate concise, logical explanations in writing is a must at my internship. It’s also something I felt well prepared to do. The chemical engineering curriculum has given me many “opportunities” to hone my technical communication skills through lab reports, topical papers, and presentations.

I am learning much about the “real world” of chemical engineering and about my strengths and weaknesses as an engineer. I am also learning what types of work I enjoy doing as well as those I detest. Overall, participating in this internship has been a valuable experience for me. I have gained insight as to where I want to go with my career along with some valuable work experience. And of course, taking a semester off from homework is a great bonus.

# The EPA Dodges another Bullet

By Vinayak Vittal

This past summer, the United States Congress voted to pass the Energy Policy Act of 2005 (EPA Act of 2005) on July 29, 2005 and signed it into law August 8, 2005 at Sandia National Laboratories in Albuquerque, NM. The act consists of a series of provision, subsidies, and controls that seek to curtail this country's rapid use of nonrenewable energy sources. Although the most widely used source of natural energy in America is fossil fuels, the EPA Act of 2005 does little to address this fact. This summer the cost of crude oil has soared to its highest level since December of 1979. Prices at that time, if adjusted for today's inflation rates, would cost roughly \$96 per barrel (inflationdata.com). After the landfall of Hurricane Katrina in August, crude oil prices jumped above \$70/barrel, but have recently steadied in the mid \$60's (inflationdata.com). While the EPA Act of 2005 contains numerous measures that are crucial to regulating and protecting American energy use, it seemed reasonable that the nature of supply and demand had finally forced our nation to address its dependence upon foreign oil. But in yet another legislative gaffe, Congress has managed to side step this essential issue.

In general, the EPA Act of 2005 has created positive alterations to U.S. energy policy. Tax credits for hybrid car owners, subsidies for wind and other alternative energy sources, loan guarantees for "innovative technologies" that reduce or eliminate greenhouse gases, and tax breaks for those who make energy conservation changes to their homes, are all initiatives that establish encouraging futures for conservation in America.

One of the more interesting policies within the act is the extension of daylight savings time. Currently, daylight savings time is observed from the first Sunday in April to the last Sunday in October. With the new proposal, this period would be extended by nearly two months. It seems odd that such a change would have a large effect on energy conservation. However, a study by the California Energy Commission has shown that energy consumption is directly related to when Americans go to sleep. As people go to bed, lights turn off, TVs and computers are shut down, and there is an all round reduction in energy usage. Studies done in the 1970's suggest that there is a 1% cutback in American electricity usage for each day that daylight savings is in effect (usgovinfo.about.com). Coincidentally, the Uniform Time Act of 1966 (UTA of 1966) contained a provision that gives individual states the choice to regulate their own standards for daylight savings. One state that does not conform to national daylight savings provisions is Arizona. This clause in the UTA may hinder Congress's plans if enough states choose to ignore the change. The new standards for daylight savings may come into effect as early as the spring of 2006 (usgovinfo.about.com).

Perhaps the most significant shortcoming of the EPA Act of 2005 is its failure to address the need for alternative renewable energy sources. This can be seen quite clearly by how tax relief is set up within the Act. Tax breaks for renewable energy research, which includes hydrogen power, received a total of \$1.3 billion. In contrast, nuclear power, continued fossil fuel development, and other conservation efforts received over \$10 billion (www.en.wikipedia.org). This isn't to say that initiatives other than renewable energy research are not viable, especially in the case of nuclear power, but the fact that so little attention is being paid to the subject is simply irresponsible. Scientists contend that the world's fossil fuel reserves are limited at best. This may mean we can live off oil for another fifty years, or perhaps even less. In any event, research to produce a safe, reliable, and renewable source of energy must begin immediately. For years, the U. S. government has ignored this problem, and continues to do so today.

The EPA Act of 2005 at its completion was over 1,700 pages long, but in reality only scratched the surface of the energy crisis that Americans and the rest of the world will inevitably face. Slight changes in rules and regulations along with monetary concessions serve a negligible purpose. Congress had the opportunity to meet the real problem of fossil fuel depletion head-on, and they flinched. Whatever the reason, may it be overseas interest groups or big-money oil companies, is now inconsequential. Our government failed to protect us from this impending crisis. The question now is were we too late?

"ANWR Oil -- A New Egg in a Strong Basket." [Anwr.org](http://www.anwr.org) -- [Arcit Nation Wildlife Refuge](http://www.anwr.org). 11 July 2005. Arctic National Wildlife Refuge. 20 Sept. 2005 <<http://www.anwr.org/>>.

"Energy Policy Act of 2005." [Energy Policy Act of 2005 -- Wikipedia, the free encyclopedia](http://en.wikipedia.org/wiki/Energy_Policy_Act_of_2005). 4 Sept. 2005. 20 Sept. 2005 <[http://en.wikipedia.org/wiki/Energy\\_Policy\\_Act\\_of\\_2005](http://en.wikipedia.org/wiki/Energy_Policy_Act_of_2005)>.

Longely, Robert. "Energy Bill Would Extend Daylight Savings Time." Energy Bill Would Extend Daylight Savings Time. 2005 U.S. Gov. Infor. 20 Sept. 2005.  
<<http://usgovinfo.about.com/od/consumerawareness/a/dstextend.htm>>.

"What is the Real Price of Gas?" Gasoline Inflation Rate Chart. 16 Sept. 2005. Financial Trend Forecaster. 20 Sept. 2005 <[http://inflationdata.com/inflation/inflation\\_rate/Gasoline\\_Inflation.asp](http://inflationdata.com/inflation/inflation_rate/Gasoline_Inflation.asp)>.

## The Good, the Bad and the Energy-Efficient

By Emily Rice

Only a couple politically significant events occurred this summer: the London Bombings and the passing of the 2005 Energy Policy Act. The purpose of this energy bill is to encourage large industries and even the average consumer to make more energy-efficient choices, from buying/manufacturing their cars to heating and cooling their homes/businesses. In this way the United States can slowly wean itself off its dependence on foreign resources. Amid the 1,724 pages there is a smorgasbord of incentives, restrictions, grants, royalties- you name it- all to fulfill that purpose. Basically a freshly baked, 84 billion dollar pie is on the table, and the recipients range from the consumer to large industries. But how can we, the average non-political-jargon-speaking American public, get our piece?

With many delightful prospects, the bill is inspiring to say the least. Renewable Energy, the subsection that sparked my ever-growing interest, covers new energy sources including Geothermal, Hydroelectric, and Insular. Imagine, photovoltaic cells running large business buildings, wind power providing energy for rural communities, and geothermal heating and cooling in every other home. Renewable energy also includes bio-fuels such as ethanol and a "Sugar Cane Ethanol Program (bill)." Many communities have already integrated such fuels into daily life. At the Iowa State Fair this year trams were fueled with soy bio-diesel and nearly every gas station in the mid-west has some form of a super unleaded ethanol. The bill gives the ethanol industry a federal mandate that will "nearly double its output by 2012 (Grunwald A01)" in addition to other subsidies for developing ethanol from other sources. Ten million was set aside for the geothermal industry, mainly in royalties for eligible companies and consumers. "Every industry gets their own little program. There's pork in there for everybody," said Myron Ebell of the free-market Competitive Enterprise Institute (Grunwald A01)'. And \$84 billion is more than appetizing.

Renewable energy pledges cheaper energy. A prize, especially now with gas around \$60/barrel, everyone is eager to receive. Indubitably the research and warranted 'bribes' are anything but cheap. Over 160 million dollars (bill) will be thrown down annually from 2006-2010 for renewable energy research, incentives, and royalties. An expense that is long overdue. Consider the following: the average American consumes about 4½ times as much energy as the world's average per capita and North America's per capita energy consumption is forecast to increase nearly 10 percent by 2010 (according to the North American Energy Working Group). Some experts also predict that with the current global consumption rate, two-thirds of which is North America's, we will be out of our cheap, useable fuel in 40-60 years. If our consumption rate doesn't shrink (and it most definitely will not) we will have to implement renewable forms of energy. So it only seems ideal that this bill covers every base and grants funds to every player.

Nothing in politics is ideal, and so my skepticism creeps in. I support the renewable energy subsection; when I said inspiring, I meant it. But there is a questionable side to "Bill". Renewable energy industries aren't the only recipients of this lavish pie. Others include oil and gas industries, utilities, and nuclear plants. So the same benefits granted to noble causes are equally granted to thriving energy companies; companies that have seen record profits in the last couple of years. For example, "the petroleum industry got new incentives to drill in the Gulf of Mexico- as if \$60-a-barrel oil wasn't incentive enough (Grunwald A01)." Not only are these companies getting perks, they are being excused from Safe Drinking Water Act requirements and some clean-water laws. Permits for oil wells and power lines on public land are issued and the hydropower industry can appeal environmental restrictions. Another startling tidbit is the repeal of the Public Utility Holding Act of 1935; which has kept utilities from being able to merge with other companies. Some worry that this can open a Pandora's Box of issues including higher rates and "Enron-style fraud (Grunwald A01)." Not so appetizing. Environmental laws and restrictions are for the environment's protection and ours- no one should be exempt from them.

(Continued on page 6)

And the Policy Act seemed so candid. Imagine what your dog feels like when you sneak his heartworm pill into a piece of cheese. Probably cheated or betrayed, offended you find him that naive, pretty much upset. Lawmakers fed environmentalists and the consumer with Renewable Energy incentives and royalties, along with promises to continue researching other forms of cheaper energy- a distraction from the tiramisu they're handing out to energy industry. Overall the Policy Act is promising, but like a bad boyfriend it promises too much, leaving hollow hope for a more energy-efficient America. We can do our best to spit out the cheese, sending the message that we refuse to be duped, or we can relinquish our fight and take in the good with the bad. In the passing of the Policy Act we, as Americans, are taking a responsible step, however small it may be, towards environmental obligation. Our piece of the pie is just that.

Blum, Justin and VandeHei, Jim. "Bush Signs Energy Bill, Cheers Steps Toward Self-Sufficiency." The Washington Post 9 Aug. 2005: A03.

Energy Bill 2005

Grunwald, Michael and Eilperin, Juliet. "Energy Bill Raises Fears About Pollution, Fraud." The Washington Post 30 July. 2005: A01.

"North America: The Energy Picture."

<http://www.eia.gov/emeu/northamerica/engecon.htm>. June. 2002. North American Energy Working Group. 22 Sept. 2005

## Creating a More Secure Chemical Industry

By Alan Martin

Bhopal, India: late on the night of December 2, 1984 "... people woke to the sounds of screams with gases burning their eyes, noses and throats. They began coughing up froth streaked with blood. Whole neighborhoods fled in panic, some were trampled, and others convulsed and fell dead" (International Campaign for Justice in Bhopal). The next morning thousands lay dead in the streets. The tragedy in Bhopal was caused by a release of methyl isocyanate from a chemical plant owned by Union Carbide. The official report claims it could only have been caused by sabotage; someone put water in the storage tank causing a massive chemical reaction which overwhelmed what safety systems were in place (Union Carbide). Could this happen here? The terrorist attacks of September 11 have added urgency to this question. A terrorist attack creating a massive release of toxic gases in heavily populated areas could lead to thousands of deaths. The Chemical Security Act, Senate Bill 157, attempts to address this threat by requiring increased security, calling for the reduction of the storage of dangerous chemicals, and the use of inherently safer technologies. The Chemical Security Act should be passed because the threat is too great to ignore.

The potential for tragedy caused by a release of toxic chemicals in heavily populated areas is huge. According to one EPA report 123 plants in the U.S. have the potential to kill or injure more than a million people (Johnson 2005). The danger is from large quantities of stored industrial chemicals which are toxic if inhaled including chlorine, phosgene, methyl bromide, and hydrochloric acid. "Some of these are identical to weapons used in World War I" (Johnson 2005). Stephen Flynn, a retired Coast Guard commander, declares "Al Qaeda has no need to smuggle weapons of mass destruction into the U.S." because chemical plants are in effect a "vast menu of pre-positioned weapons" (Johnson 2005). Not only is the danger great but emergency personnel are unprepared to respond to it. Carolyn Merritt, chairman of the Chemical Safety & Hazard Investigation Board, is troubled by the "lack of preparation among emergency responders around the nation" and declared "residents were unsure what to do when ordered to evacuate or shelter in place" (Johnson 2005).

The lack of security around hazardous chemicals must be addressed. Investigations by The Pittsburgh Tribune-Review and 60 Minutes found poor to nonexistent security at chemical plants, gate unlocked and chemical plants unguarded (Hind & Halperin). Although 1.7 million railcar loads of hazardous chemicals travel on U.S. railways each year, rail workers have little training in security and rail yard are often unprotected (Johnson 2004). Terrorists seeking to release hazardous chemicals would see these as soft targets.

*(Continued on page 7)*

The Chemical Security Act has the backing of industry groups. The security provisions are modeled after the American Chemical Council's Responsible Care Security Code. This code requires members to assess their security situation and address potential issues. Company actions are then subject to review from third party auditors (Reisch). The American Chemical Council's member companies taking the lead in this issue have voluntarily spent over \$2 billion enhancing security at their facilities (McGlooin). The council now endorses the bill saying legislation requiring enhanced security is needed to level the playing field and bring the rest of the industry on board. Furthermore federal legislation is preferred to a patchwork of state and local legislation.

The more controversial part of the Chemical Security Act deals with limiting storage of hazardous chemicals and using inherently safer technology. Inherently safer technology replaces a process using hazardous chemicals with one using less hazardous chemicals. An example is replacing the chlorine used to purify water with sodium hypochlorite, the active ingredient in bleach. A previous version of the bill was opposed because these provisions were believed to be too rigid (Johnson). The challenge according to Martin Durbin, a director of the American Chemical Council, is to tailor the legislation so it encourages safer technology while acknowledging that there are few standard processes for making chemicals. Durbin acknowledges that safer technology can lower costs by improving worker safety and reducing insurance, liability and regulatory expenses. Durbin emphasizes the tradeoffs involved in attempting to find safer processes: a process using less toxic chemicals may require a higher temperature and pressure presenting a different risk, or chemicals thought to be safe may carry hidden risks, for example CFC's.

Adopting new regulations is often difficult. Typically they are automatically opposed by the industry concerned. The Chemical Security Act may be able to get past this difficulty because industry groups acknowledge the problems addressed and are supporting the bill while trying to retain flexibility for their responses. Hopefully the issues brought up by the chemical industry will be attended to. A more secure chemical industry is needed in today's environment. The possibility of a Bhopal happening in the U.S. is too alarming not to be addressed. The Chemical Security Act will decrease the likelihood of that happening by increasing security around hazardous chemicals and reducing the amount stored. A well written bill which takes into consideration both public safety and industry costs is needed and will make the country safer.

Durbin, Martin. 13 July 2005 Chemical Facility Security: What is the Appropriate Federal Role?  
Testimony Before the Senate Committee on Homeland Security & Governmental Affairs  
Retrieved 25 Oct 2005 from  
[http://www.americanchemistry.com/s\\_acc/sec\\_article\\_acc.asp?CID=258&DID=1279](http://www.americanchemistry.com/s_acc/sec_article_acc.asp?CID=258&DID=1279)

International Campaign for Justice in Bhopal. Retrieved 21 October 2005 from  
<http://www.bhopal.net/index1.html>

Hind, Rick & Halperin, David. Lots of Chemicals Little Reaction. 22 September 2004. *The New York Times*

Johnson, Jeff. 9 May 2005. Senate Panel Backs Plant Security Bill. *Chemical and Engineering News*. Vol. 83, no.18, pp.32-33

Johnson, Jeff. 22 November 2004. New Voices for Plant Security. *Chemical and Engineering News*. Vol.82 no. 46 pp.51-53.

McGlooin, Kate. ACC Supports Federal Security Legislation. Retrieved 22 Oct 2005 from  
[http://www.americanchemistry.com/s\\_acc/sec\\_policyissues.asp?CID=329&DID=1156](http://www.americanchemistry.com/s_acc/sec_policyissues.asp?CID=329&DID=1156)

Reisch, Marc. 26 May 2003. Taking the Next Step. *Chemical and Engineering News*. Vol. 81 no. 21 pp.15-17

Union Carbide. Statement of Union Carbide Corporation Regarding the Bhopal Tragedy  
Retrieved 20 October 2005 from <http://www.bhopal.com/ucs.htm>

## Chemical Plant Safety from Terrorism

By Stacy Sommerfeld

It has been four years since the terrorist attack on the World Trade Center on September 11, which took the lives of almost 3000 people (Kugler, 2003). Since then, minimal efforts have been initiated to increase the security of chemical plants, where volatile chemicals could cause a more devastating catastrophe. The Environmental Protection Agency (EPA) "identified 123 sites where toxic gases released in a terrorist attack could kill or injure more than one million people in or near each plant, as well as 700 other sites where the death and injury toll could reach 100,000" (*Chemical Security*). It is obvious that changes need to be made in the near future. The American Chemical Society President William Carroll stated that "thousands of hours and over \$2 billion" have been "invested in making [industry's] processes less vulnerable to terrorism (Ember, 2005). However, even with this effort toward improvement, the plants are not achieving the goal of safety, both for the workers and for the general population. Chemical plants cannot be expected to voluntarily make the needed changes, especially since financial limitations are involved. The government should establish and enforce guidelines for all chemical plants, and it should provide financial support.

Almost a year after the World Trade Center attack, security at many plants was still negligent. An article in the Pittsburgh Tribune-Review states:

"The security was so lax at 30 sites that in broad daylight a Tribune reporter – wearing a press pass and carrying a camera – could walk or drive right up to tanks, pipes, and control rooms considered key targets for terrorists." Many of these targets were unguarded, and twelve rail tracks led up to large quantities of toxic and explosive chemicals. "In two of the 123 plants that could cause the most damage, the reporter spent more than an hour walking through each without encountering a guard or employee." The EPA also tested many chemical sites by "planting fake bombs under chemical rail cars and setting up phony companies to order deadly gases, [which were] largely unchallenged...only one of the sites the Tribune visited...likely would have foiled the test bombers. Twice guards and workers at the sewage plant turned away a stranger" (Prine, 2002).

A 2004 "study commissioned by the National Institutes of Health and conducted by the Paper, Allied-Industrial, Chemical and Energy Workers International Union (PACE) determined that despite improvements, manufacturers have failed to take steps to prevent or prepare for a release of toxins at some of the nation's largest plants" (Prine, 2004). In 2004, "the CBS program "60 Minutes" ...highlighted lax or nonexistent security at chemical plants, with gates unlocked or wide open and chemical tanks unguarded" (Halperin & Hind, 2004).

With such lax security at many chemical plants, it is evident that the sites cannot be deemed dependable to create and enforce the needed changes for safety. The government needs to establish and enforce a safety bill to guide all of the chemical plants toward increasing safety. This safety bill should include parts from previous suggestions of declined ideas, including Fossella's bill, Pallone's bill, and Senator Jon Corzine's ideas. From Fossella's bill, the safety bill should keep the requirement of companies to conduct vulnerability assessments and to develop site security plans (Ember, 2005). From the Pallone's bill, the safety bill should keep the civil and criminal penalties for noncompliance (Ember, 2005). The safety bill should include Senator Jon Corzine's ideas of having chemical plants use safer chemicals and technologies when feasible (Halperin & Hind, 2004). Whenever possible, less volatile chemicals should be used. To reduce risk, hazardous chemicals should be kept in smaller quantities. There should also be more guards watching over control rooms, tanks, and railway switching and derailing levers. The walls and fencing need to keep unwanted people from entering the plant. In addition to setting up rules and penalties for noncompliance, the safety bill should also include financial assistance for the chemical plants, which could possibly be in the form of setting up low interest loans, giving direct, untaxed assistance, or giving tax incentives.

*(Continued on page 9)*

The government needs to establish and enforce a safety bill for all chemical plants to prevent and prepare for the next terrorist attack. The bill should require companies to fill out vulnerability assessments and to develop site security plans. The site security should be improved both in structure and workforce, having better walls and fences surrounding the perimeter of the chemical plant and having more guards for the key target areas. The government should also help the chemical plants to accomplish these goals through financial support. Given that future attacks could dwarf the death toll of the World Trade Center assault, it is imperative that safety measures be taken now, not after an attack that could have possibly been prevented.

Ember, L. (2005). *Securing Chemical Facilities*. *C&EN*. Retrieved on October 19, 2005. From <http://courses.uiowa.edu> Fall 2005 Process Calculations Website.

Halperin, D., & Hind, R. (2004). Lots of Chemicals, Little Reaction. *The New York Times*. Retrieved on October 19, 2005. From <http://courses.uiowa.edu> Fall 2005 Process Calculations Website.

Kugler, S. (2003). *New WTC Death Toll is 2,752*. *War on Terror*. Retrieved on October 24, 2005. From <http://www.cbsnews.com/stories>

Prine, C. (2002). Lax Security Exposes Lethal Chemical Supplies. *Pittsburgh Tribune-Review*. Retrieved on October 19, 2005. From <http://www.pittsburghlive.com>

Prine, C. (2004). Study Finds Chemical Plants Are Still Vulnerable to Terrorism. *Pittsburgh Tribune-Review*. Retrieved on October 19, 2005. From <http://www.pittsburghlive.com>

(2003). Chemical Security. *The New York Times*. Retrieved on October 19, 2005. From <http://courses.uiowa.edu> Fall 2005 Process Calculations Website.

## Iowa Students Attend National Conference

By Alexandra Olson

The AIChE National Undergraduate student conference was held in Cincinnati, Ohio, October 29<sup>th</sup> through October 31<sup>st</sup>. This was a chance for chemical engineering students across the country to come together, race their "ChemE" cars, present research, and attend sessions intended to enhance the chemical engineering undergraduate experience.

This year's conference was attended by four University of Iowa undergraduate students. While each student had a slightly different experience, all felt that it was a beneficial and worthwhile trip. The conference began with an opening ceremony, and the rest of the weekend included a ChemE social, a costume contest, and, of course, a little Cincinnati sight-seeing!

Sunday morning the students attended the Student Awards Brunch. This was an opportunity for AIChE to honor students and student chapters across the country for their achievements. The University of Iowa was honored with the presentation of an "Outstanding Student Chapter" award recognizing student involvement in local, regional, and national arenas of AIChE.

One special highlight of the trip was presentation of research by University of Iowa student Afton Thumser. Thumser had come in second place for research presentation at Regionals last spring in Manhattan, Kansas, and had the opportunity to present a poster at the conference. Her poster, titled "The Effect of Baculovirus Infection on the Intracellular pH of Insect Cells" highlighted research she performed in the lab, advised by Dr. David Murhammer. Her poster won third place at the National Conference, so congratulations are in order!

All in all, the trip was fantastic. Cincinnati was a fun city to visit, and it is always entertaining when over 1000 chemical engineering students come together for one weekend. Friendships were made, research was shared, and all came out with a little bit more added to their educational experience.

## Chemical and Biochemical Engineering

### Faculty Awards

- Victor Rodgers -- 2005 /Distinguished Educator Award, /The University of Iowa, presented by Multicultural Graduation Recognition Banquet Graduating Students
- David Rethwisch -- Published his book (It is a supplement to the text). Callister, W. D. Jr. and Rethwisch, D.G., "Materials Science and Engineering: An Introduction, Student Problem Set," Wiley, New York, NY 2006 ISBN 0-471-74477-8
- Tonya Peeples, associate professor of chemical and biochemical engineering in the University Of Iowa College Of Engineering, received the 2005 Distinguished Service Award from the American Institute of Chemical Engineers (AIChE) Minority Affairs Committee.

### Graduate Student Awards/Scholarships

- Joshua Galgano has an NASA fellowship.
- Cynthia Hoppe was awarded an NSF Fellowship.

### Undergraduate Awards/Scholarships

- Alexandra Olson of La Porte City, Iowa, was awarded one of only 15 AIChE Donald R. and Mildred Topp Othmer National Scholarship Awards (\$1,000). The scholarship is presented on the basis of academic achievement and involvement in student chapter activities.
- Also, Afton Thumser of Dubuque, Iowa, received third place in the student poster session.
- Alexandra Olson and William Liechty received Goldwater Scholarships in the Spring of 2005.
- Jackie Alcantar was awarded a Department of Homeland Security Scholars and Fellows Program award (August 2005).
- Alexander Conway received the Donald F. Othmer Sophomore Academic Excellence Award.

## An Endowment for Undergraduate and Graduate Student Professional Development

Background: Although students in Chemical and Biochemical Engineering at The University of Iowa receive a solid education in the fundamentals, there is so much more to the engineering profession that simply cannot be conveyed within the confines of classrooms and academic laboratories. Through the many years of our program's existence, we have found that those learning and networking experiences that occur off-campus, or conversely those visitors from off-campus that come to share their experiences with us, have served as important avenues for our students to learn about the Chemical and Biochemical Engineering profession.

Avenues of Exposure: Currently, our students are encouraged to attend both the national and regional meeting of the American Institute of Chemical Engineers and the American Chemical Society. However, many students simply cannot afford the travel and registration fees to participate in such events. In addition, we bring speakers to our campus from renown institutions throughout the world, but on a fairly infrequent (less than once a year) basis due to the expensive travel arrangements that are required. So, our speakers tend to be from local industries and universities and only a limited number of students are able to afford attendance at the professional society meetings.

Goal: Our goal is to generate an endowment in support of our undergraduate and graduate student professional development. The funds be utilized to assist students with travel expenses to professional meetings and to attract speakers to our seminar series. We are striving to achieve a \$200,000 endowment.

Strategy: Genencor International has provided seed funding of \$50,000 which we are trying to supplement to meet our \$200,000 goal. We have one alum who matched the Genencor contribution and a few other significant gifts which put our current total at approximately \$120,000. Currently, we are working with alums and local companies to achieve our goal.

#### **Newsletter Contributors:**

##### **Editor-in-Chief:**

Julie Karceski

##### **Faculty Advisor:**

Professor David Murhammer

##### **Contributors:**

Leigh Brooks

William Liechty

Peter Rasmussen

Emily Rice

Alan Martin

Stacy Sommerfeld

Vinayak Vittal

Alexandra Olson