



JANUARY MEETING NOTICE

Joint Meeting with the Air & Waste Management Association (Allegheny Mountain Section) and the American Academy of Environmental Engineers (Western PA Section).

Where: *Penn Brewery*

Troy Hill and Vinial Street (North Side)
Pittsburgh, PA

When: *Wednesday, January 19th, 2004*

Time:

4:00 Registration
4:30 The North Shore Connector Project -
Gregory R. Yates, P.E., DMJM+Harris and Henry M. Nutbrown, P.E., Port Authority of Allegheny County
5:15 Questions, Answers, and Discussion
5:30 Tour of Penn Brewery – Brewmaster Tom
Pastorius will provide a tour of the Penn Brewery.
5:45 Dinner and Social
8:00 Adjournment

Menu: A buffet dinner of German specialties

Cost: Member of AIChE / A&WMA / AAEE \$35
 Non-Members \$45
 Students \$25

RSVP NO LATER THAN FRIDAY JAN 13TH, 2005

To: Mr. Ed Moretti, AIChE / A&WMA

Phone: 412-276-2228

E-mail: emoretti@moretticonsulting.com

Your RSVP must include: **Name, Company Name, Email Address, and Phone Number.**

PLEASE PAY AT DOOR

CANCELLATIONS: If you must cancel your meeting reservation, please do so no later than 48 hours prior to the meeting. Otherwise, you will be invoiced for the cost of your meal.

Proceeds will benefit local AIChE and A&WMA scholarship and education programs.

**THE NORTH SHORE CONNECTOR PROJECT:
ENGINEERING ISSUES AND ENVIRONMENTAL
IMPACTS OF CONSTRUCTING A TUNNEL UNDER
THE ALLEGHENY RIVER**

~ About the Presentation ~

**GREGORY R. YATES, P.E., VICE PRESIDENT,
DMJM+HARRIS**

**HENRY M. NUTBROWN, P.E., ASSISTANT
GENERAL MANAGER OF ENGINEERING &
CONSTRUCTION, PORT AUTHORITY**

Expansion, redevelopment, and future economic development efforts within Downtown Pittsburgh and along the North Shore have renewed interest in a public transit investment to serve this corridor. Since January of 1999, Port Authority of Allegheny County has undertaken environmental analysis, planning, design and engineering of a transit investment proposing to link together the Golden Triangle and Pittsburgh's North Shore.

The North Shore Connector project will extend Port Authority's 25-mile Light Rail Transit system, the T, 1.2 miles from the Gateway Subway Station underneath Stanwix Street and the Allegheny River – in twin bored tunnels below the river - to the North Shore. While remaining underground along the North Shore, the alignment would travel adjacent to Bill Mazerowski Way accessing a station near PNC Park. Continuing below grade adjacent to Reedsdale Street, the alignment will transition to an elevated alignment near Art Rooney Avenue to a station along Allegheny Avenue near Heinz Field before terminating near the West End Bridge. A .3-mile light rail line from the Steel Plaza Subway Station to a subway station at the new and expanded David L. Lawrence Convention Center will also be constructed.

With the FEIS and preliminary engineering work complete, Port Authority is concluding final design on the North Shore Connector. Port Authority is expected to begin construction in 2005. The North Shore Connector could be complete and operational in 2008.

Mr. Yates and Mr. Nutbrown will discuss the North Shore Connector project including the engineering issues and environmental impacts of constructing a tunnel under the Allegheny River and other related issues to this large transportation project.

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MONTHLY MEETING

CONTINUED FROM PAGE 1

~Directions to the Penn Brewery~

From the East:

Take I-376 /US-22 heading West. Take exit 1A toward I-279 N/Northside. Stay straight to go onto Fort Pitt Blvd. Merge onto I-279 N. Merge onto PA-28 N via exit number 7C toward Chestnut St/East Ohio St/Etna. Take the Chestnut Street exit. Turn left onto Chestnut Street. Turn right onto Phineas Street, which becomes Troy Hill Road.

From the West:

Follow US-22/30 heading East to I-279 N. Take the 279 N exit on the left toward Fort Duquesne Blvd /Convention Center/Strip District. Merge onto I-279 N via the ramp on the left. Merge onto PA-28 N via exit number 7C toward Chestnut St/East Ohio St/Etna. Take the Chestnut Street exit. Turn left onto Chestnut Street. Turn right onto Phineas Street, which becomes Troy Hill Road.

Once on Troy Hill Road, you will see the Penn Brewery on your left. You can park in the parking lot just past the Brewery. For more information, please go to:

<http://www.pennbrewery.com>

MARK YOUR CALENDAR FOR ENGINEERS' WEEK 2005!

Once again, AIChE will be sponsoring a booth at the Carnegie Science Center for National Engineers Week.

Join us on February 18th and 19th, from 10 am to 5 pm.

Please consider volunteering for this worthwhile event! Contact Nancy Hirko at nhirko@air-comp.com or (412) 826-3636 for more information.

Details will follow in the February Newsletter...

AICHE PITTSBURGH SECTION SCHOLARSHIPS

Applications are now available for two \$750 scholarships to be awarded by the Pittsburgh Section AIChE for the 2005-2006 academic school year. Sophomore and junior chemical engineering students are eligible to apply if they:

- *Are enrolled in one of the following chemical engineering programs in the AIChE Pittsburgh Section area: Carnegie Mellon University, University of Pittsburgh, West Virginia University, Youngstown State University*
- *Are enrolled at any AIChE-accredited chemical engineering program in the United States provided that the student is the son or daughter of a member in good standing of both the AIChE and the Pittsburgh Section AIChE.*

*The deadline for submission of an application is **January 14, 2005**. Scholarship recipients will be notified by February 11, 2005.*

For more details or to print out a copy of the application, visit www.aichepgh.org.

NATIONAL ENGINEERS WEEK
FEBRUARY 18-19, 2005
 For Information 412.237.3400
www.CarnegieScienceCenter.org

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MEMBERSHIP CORNER

Dear Members,

We are constantly updating our local membership database. Please send all change of address notifications to our Membership Chair:

Holly Gray
Michael Baker Jr., Inc.
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100 Airside Drive
Moon Township, PA 15108

hgray@mbakercorp.com

If you have not already done so, please verify your updated e-mail address with us so that you will continue to receive monthly newsletters!

Thank you!

Please sign me up for the local Pittsburgh Section of AIChE

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Annual Dues are \$16.00. Make check payable to "AIChE Pittsburgh Section" and send to our Treasurer:

Leigh Anne M. Wacker,
AIChE Treasurer
337 Quail Run Road
Venetia, PA 15367

CLOCKING THE NEW YEAR

A year has gone by, and that means a cesium atom has oscillated some 300 trillion times. I'm talking, of course, about atomic clocks. They work like grandfather clocks, but here the pendulum that keeps the time is the oscillation of the atom. America stores its fifty atomic clocks in a bunker in Boulder, Colorado.

There a team of clock-watchers combine these results with about 200 other atomic clocks from around the world. Their readings are averaged together to calculate what's called Coordinated Universal Time. It's accurate to better than one second in three million years. Can one second in three million years be the least bit important? Well, yes.

Here's an example that no doubt has happened to you. I was travelling in a jet and as we approached the ground we saw nothing but clouds. The ceiling, as they call it, was 100 feet above the ground. So, the pilot had to blindly maneuver the plane to 100 feet above the runway. The pilot used the Global Positioning System, or GPS, to put the plane in exactly the right place. As the jet approached the runway, the pilot received a signal from several satellites. The exact time it took for that signal to arrive determined the jet's position. If an error of even a billionth of a second occurred, the position of the jet would be off by one foot. That's significant for the landing I was involved with, but even more so, if the jet is an F-14 Tomcat landing on an aircraft carrier. There, a foot or two is the difference between life and death. The accuracy of atomic clocks even affects our telephone calls! To pack lots of calls on a single line, the phone company chops conversations into tiny packets, then packs these small bits very efficiently and sends them down the phone line. At the other end, a device reassembles these bits into a coherent conversation. This is done in the time it takes to say a single word. This requires a very accurate system of clocks. If all this makes you feel a slave to the clock, here's some solace: The clocks are actually slaves to us. You see a year is defined by us, by people. We define it as the rotation of the Earth. But our definition isn't perfect: The Earth wobbles and wiggles around its axis, causing random fluctuations in the length of a year. This means that the atomic-time grid falls out of tune with our sense of seasons, with our definition of a year. Thus, the atomic timekeepers must bring their cherished, ultra-precise clocks back in line by adding a few seconds.

Source: www.engineerguy.com



THE TECHNOLOGY BEHIND CHAMPAGNE

It's a New Year and I'm sure that recently you reacquainted yourself with champagne. Here is a different view of that bubbly beverage - a technological view.

Although champagne is closely associated with France - many there see champagne as rooted in the soil and history of the country - in reality champagne came about because of technological innovations across Europe.

Now the part that is very French is the location. The cold climate of northern France makes happen accidentally the double fermentation necessary for champagne. Certain sugars aren't destroyed in the first fermentation, which stops because of cold weather, and which then ferment when triggered by the warm weather of spring. This second step produces the bubbles characteristic of champagne.

These bubbles caused the first vintners great trouble. Up to 40% of their bottles would explode from the pressure created by the carbon dioxide in the champagne. To solve this problem the French got stronger bottles from, of all people, the British.

In the seventeenth century the British learned Venetian glass blowing techniques from Italian immigrants, the finest craftsmen of the time. At first the British made bottles just about as weak as the French, but then a Royal Edict changed everything. British glass furnaces were fueled by wood, which caused major deforestation in Britain. To save what remained of Britain's woodlands, a Royal edict of 1615 forbid burning wood in glass-making furnaces. So new factories appeared in Britain using coal, which provided a hotter and more reliable source of heat. The higher temperatures allowed stronger bottles to be made, in contrast to the French, who still used wood-burning furnaces that operated at lower temperatures and made weaker bottles.

The next technological innovation that helped champagne reach the market was the stopper. The French used one of wood, wrapped with hemp cord and soaked in olive oil, something that had been around since Roman times. This stopper, though,

wasn't strong enough to keep in the bubbling champagne. The British came to the rescue again by using cork stoppers to keep the fizz inside, although not without help from others: The British imported their cork from Spain.

So, although champagne is closely identified with France, it was a European effort with help from Italy, Spain, and especially Britain. Even today Britain is the number one importer of French champagne - 28 million bottles a year. And that interest comes right from the top: Recently a Buckingham Palace tax inventory found Queen Elizabeth had, in her cellars, four million dollars worth of French champagne.

Source: www.engineerguy.com

SEMINAR SERIES LAUNCHED AT PITT

Dr. George Klinzing previously taught in the Chemical Engineering Department at the University of Pittsburgh, and is a member of the Pittsburgh Section AIChE.

The Center for National Preparedness, a University of Pittsburgh initiative developed by Vice Provost for Research George Klinzing, is launching a series of seminars highlighting research on international-, biological-, and homeland-security research at Pitt.

"This is a way of keeping the community apprised of activities going on at the University and outside the University, nationally and internationally, in this field," said Klinzing. "I'm looking forward to having significant University participation in the seminars and in the center."

The Center for National Preparedness is a broad, multidisciplinary, collaborative enterprise that engages the University's scientists, engineers, policy experts, and clinical faculty. Members of the center possess expertise in biomedical research, public health, medicine, national security policy, engineering, and information technology. The center communicates the innovative research of the University's faculty to the broader public through the educational and training programs in which students, policymakers, and other interested parties participate.

For more information, see <http://www.pitt.edu>.

**A BOTTLE OF BUBBLY?**

Champagne may be the elixir of celebration, but for something so closely tied to joyous events, champagne is mercilessly encumbered by laws. The Appellation d'Origine Contrôlée outlines 35 of these rules conceived to uphold the quality of Champagne wines.

From a chemical perspective, though, champagne and all other sparkling wines must conform to just one law, Henry's law: The amount of gas dissolved in a fluid is proportional to the pressure of the gas with which it is in equilibrium. This dissolved gas--carbon dioxide in the case of champagne--gives the wine its characteristic effervescence. In an unopened bottle, CO₂ gas dissolved in the wine is in equilibrium with gas in the space between the cork and the liquid. Uncorking the bottle releases this headspace gas and disrupts the equilibrium. Following Henry's law, the dissolved CO₂ leaves the wine via bubbles, reestablishing the equilibrium through effervescence.

Champagne makes its gas naturally during fermentation. Yeast turns glucose from grape juice into CO₂ and ethanol. The same fermentation process occurs in all wines, but valves on the casks let winemakers release the CO₂ so that it doesn't build up.

Champagne gets its characteristic bubbles by trapping CO₂ gas while in its bottle, where it ferments a second time. The happy accident of this second fermentation was discovered in the mid-1600s, before which all Champagne wines were still--that is, unbubbly. The chilly onset of winter in northern France stopped the fermentation process before the yeast had consumed all the wine's sugar. Although the French drank this young, still wine in the winter, warm spring weather triggered a second fermentation that added effervescence to the wine that had been shipped abroad and bottled upon arrival.

With the popularity of this prized sparkling wine, Champagne's cellar masters tried to control the phenomenon, with varying degrees of success. Some bottles of the wine would have no bubbles at all, while others would explode under unbearable pressures of CO₂ gas.

Today, champagne houses employ chemists and oenologists to control this second fermentation and champagne's unique flavors in a more scientific

manner. Routine analyses include monitoring sugar, acidity, and pH in grapes during the ripening process in order to harvest at the optimum time and checking residual sugars at the end of alcoholic fermentation to make sure all sugars have been metabolized, as sugar could be metabolized by bacteria and turned into volatile acidity--a major flaw in wines.

During bottling, the winemakers add sugar and yeast to the wine for the requisite second fermentation. Chemical analyses are used to follow the process. These include SO₂ analysis, and the monitoring of glycerol and gluconic acid. For other parameters, like sugar, FTIR (Fourier Transform Infrared Spectroscopy) is used.

No less than 600 different chemical compounds can be found in a bottle of champagne, each lending its own unique quality. But the wine's final flavors ultimately depend as much on art as they do on science. Often chemical analysis can help make a decision on various aspects of the process, but for tasting, the only performing tool is the taster.

Even with careful flavor finessing, champagne would be just another fine white wine were it not for those delicate little bubbles. As they ascend the length of the glass in tiny trains, they drag along molecules of flavor and aroma until they explode at the surface of the liquid, tickling the nose and stimulating the senses.

Connoisseurs believe the smaller the bubble, the finer the champagne.

Source: www.chemistry.org

NEWSLETTER DEADLINE

**THE DEADLINE FOR THE FEBRUARY 2005 NEWSLETTER IS
FRIDAY, JANUARY 13, 2004.**

Please submit information to:

*Mariangela Peters
Bayer MaterialScience, LLC
100 Bayer Road
Pittsburgh, PA 15205*

*Phone (412) 777-4195
mariangela.peters@bayermaterialscience.com*



VOLUNTEERS NEEDED AS JUDGES FOR FUTURE CITY COMPETITION

The National Engineers Week Future City Competition™ seeks engineers to volunteer this fall and winter to introduce middle school students across the nation to a career in engineering. Since its founding in 1992, the educational program has made engineering come alive for hundreds of thousands of students.

The Engineers' Society of Western Pennsylvania (ESWP) in conjunction with the Carnegie Science Center will present the 6th Annual Future City Competition in the Pittsburgh area. It is a national program sponsored by the engineering community to promote technological literacy and engineering to middle school students.

The number of Middle Schools that have registered in the Pittsburgh Regional Competition has grown each year. The Competition's growth is testimony to the program's unique capacity to challenge students to learn and test new concepts related to engineering and city planning, to apply the mathematics and science they have already learned, to explore their imaginations about what our Cities will be like in the future, and to build an example of the result using ingenuity and their own hands. However, another important facet of the Pittsburgh Regional Future City Competition that has allowed it to expand is the associated growth of a cadre of dedicated volunteers. Without volunteers, there would be no competition.

Please, volunteer as a Presentation Aide or Judge. During November and December, judges will review the SimCity files and essays. On Saturday, January 15, 2005 the Pittsburgh Regional Competition will be held at the Carnegie Music Hall in Oakland. Based on past experience we anticipate that we will need more than 120 volunteers to fill the positions of Essay Judges, Disk Judges, Registrars, Model Movers, Room Manager/Timers, Score Keepers, Special Awards Judges, Presentation Judges, Exhibit Area Control Volunteers, Still and Video Camera Operators, and Public Relations Coordinators. Our goal is to identify all volunteers, and make assignments by January 2, 2005. Orientation

Meetings for Presentation Aides and Judges will be held as needed in early January.

Please add Your Name to Our 2004-2005 Volunteers List. We welcome the help of anyone who is interested in volunteering his or her time. To qualify as a Presentation Judge, you must have judged before or have attended a Judge Orientation Meeting. If you are interested in registering as a volunteer for the 2005 Future City Competition please take a minute and fill out the

VOLUNTEER REGISTRATION FORM at:

http://www.futurecitypittsburgh.org/futcityvolunteer_form.htm

If you have any questions, call Bill Pruss at (412) 273-7100.

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Please contact Mariangela Peters at
mariangela.peters@bayermaterialscience.com
or 412-777-4195 for more information.

Happy New Year!

From your Pittsburgh AICHE Officers and Chairs



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2005 Monthly Meeting Schedule

Date	Topic	Location
January 19, 2005	Joint Meeting with AWMA	Penn Brewery
February 10, 2005	Annual Student Night	Univ of Pittsburgh - Oakland
March 2005	Technical Presentation	TBA
April 2005	Plant Tour	TBA
May 2005	Last Meeting of Year / Award Dinner	TBA

Mark your calendars!

For the Following Dates:

Jan 19, 2005	Monthly Meeting	Presentation and Joint Meeting with the AWMA at the Penn Brewery
Feb 18-19, 2005	Outreach Event	National Engineers' Week At the Carnegie Science Center
Feb 10, 2005	Monthly Meeting	Annual Student Night



The Catalyst

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