The Chemical Consultant

Association of Consulting Chemists and Chemical Engineers, Inc.

Scientific, Engineering, Business & Management Consultants

Volume 24, No. 3 www.chemconsult.org

September—December, 2012

FUTURE MEEINGS

FEB 2013
TBA

Snuffy's Restaurant
Scotch Plains, NJ

6 p.m. Networking/Cash Bar; 6:30 p.m. Dinner; 7:30 p.m. Presentation

ABOUT THE ASSOCIATION

The Association of Consulting Chemists & Chemical Engineers (ACC&CE) is a network of senior-level consultants with a broad range of functional expertise and many years of experience in the chemical and allied industries.

The purposes of the organization are:

To furnish support to its members as they conduct their consulting practices.

To offer prospective clients a "clearing house" which they can use to find the most qualified consultants or team of consultants whatever their particular problem may be.

This newsletter is intended to support those purposes as well as to educate prospective new members and prospective client organizations about ACC&CE, and how we can be most helpful to them.

The ACC&CE has an interactive website – **www.chemconsult.org,** that allows prospective clients either to input their problem or to search for those consultants most skilled in their area of concern.

IN THIS ISSUE

In this issue, we again have letters both from our Executive Director, John Bonacci (page 2) and by our President, (also your editor), Joe Porcelli (page 3). We are also welcoming three more new members to the organization. You can learn about these members on page 5. On pages 8 and 9, our Executive Director, and one of our most successful members discussed his views of the current natural gas situation in the United States. On pages 12 and 13, Past President Richard M Goodman has contributed an article on sustainability.

As always, your editor is seeking feedback and if appropriate, alternative views on these issues and others of interest to you. We again suggest that all of our readers (EXCEPT non-member consultants and consulting organizations) consider the benefits of advertising—see the price list at the top of page 7.

We'd like to hear from all of you. Email **jvpii@jvporcelli.com**

MESSAGE FROM THE EXECUTIVE DIRECTOR

John C. Bonacci, Ph.D. P.E., U.S. Patent Agent (Certificate #821) and the Executive Director of ACC&CE

EXECUTIVE DIRECTOR'S YEAR END COMMENTARY

Dr. John C. Bonacci 12-28-2012

We hope everyone had a happy holiday so far and we wish all our members and friends a Happy New Year for 2013.

Our organization is coming along fine (dues, ads, meetings, client projects, Newsletter) and we even had five guests for our December luncheon meeting. Let me know if you can attend more luncheon meetings with or without speakers.

Membership is again on the rise for the second year since reorganization. For the few who still owe $75 dues please send a December 31, 2012 dated check and you probably can take a tax deduction this year. Ads for the Newsletter also have a slight increase via some non-member ads.

Regards, John C. Bonacci

FIBONACCI CONSULTING, LLC.

Technology & Business Consultants
U.S.Patent Agent

John C. Bonacci, PhD, PE
president & principal

tel (908) 464-8295
fax (908) 464-3182
156 Gallinson Drive
Murray Hill, NJ 07974
car / mobile (908) 230-8488
e-mail FibonacciJ@aol.com

LETTER FROM THE PRESIDENT

Dr. Joseph V. Porcelli, (Certificate #906), President of ACC&CE and Editor of our newsletter, "The Chemical Consultant".

First of all, I would like to wish all of the readers of this newsletter (members and guests alike) a healthy and successful New Year.

The first full year of ACC&CE's new operating model has passed, and I think we can regard it as a success! We have turned around the previous multiyear trend of member attrition, and we are gaining members, primarily through word-of-mouth. I would like to express my thanks and those of our members to those members and others who have actively talked up our organization with their acquaintances and colleagues.

An interesting trend is that many of our new members are not from the NY/NJ Metro area but from different parts of the country. Given our "virtual" mode of operation, this is a very viable trend that I hope will continue and accelerate. As a matter of fact, we currently have space for several more people on our Council, and a number of our Council members are from other parts of the country. I would like to encourage all members who read this to consider volunteering to serve on Council. Anyone interested should let me know (at **jvpii@jvporcelli.com)**, or Executive Director John Bonacci (at **accce@chemconsult.org**).

For members and other readers in the NY/NJ Metro area, I want to remind you that we have been having dinner (and in one case lunch) presentations frequently, and the talks have been excellent. I strongly urge you to take a look at our website (**www.chemconsult.org)** from time to time and watch our email for our newsletters and meeting announcements. We will also post meeting notices on our Linked In group site **http://www.linkedin.com/groups?gid=4093708&trk=myg_ugrp_ovr.**

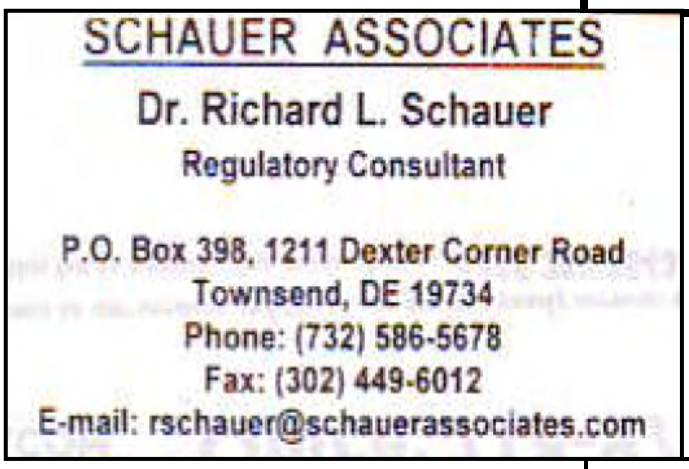
I welcome suggestions from our members and other readers—contact me at (917) 912-9804 or at **jvpii@jvporcelli.com**.

Thank you and Happy New Year.

Joe Porcelli

J. Stephen Duerr, Ph.D., P.E., CPC
Consulting Metallurgist/Chemist
chemlabconsulting, LLC

514 Corrigan Way, Cary, NC 27519
908-500-9333 (FAX 815-301-8348)
chemlabconsulting@gmail.com



Hebah A Wahab, MS
Chemical Consultant

601 Pemberton Browns Mills Rd,
Pemberton, NJ 08068
973-462-2745
wahabta@gmail.com

NEW MEMBER INFORMATION

Timothy J. Grinsteiner, PhD, Certificate #951
390 E. Front Street,
Peshtigo, WI 54157
Central Expertise: Organic Chemistry, in particular, Organic Synthesis; Natural Products.
Secondary Areas: Organophosphorus Chemistry; Wood and Paper Chemistry, Mycology and Bacteriology.
E-mail: gtgrinsteiner@gmail.com

Ronald S. Newman, Ph.D.—Certificate #952
Ecologically Sound Product Development and Consulting
President, Newman Anouvair, LLC
27475 Ynes Road #318
Temecula, CA 92591
Consultant has expertise in new product and technology development from conceptualization to commercialization; and experience in leading and training multi-functional teams to this end. Degrees: PhD in Chemical Engineering & Technology; Diploma in Cosmetic Science. 14 years of experience in the development and introduction of new consumer products. 17 years of experience in the development and introduction of new chemical intermediates. Current areas of activity include the formulation and manufacture of home fragrance consumer products such as air fresheners, room sprays, fragrance diffusers and candles.

Hebah A. Wahab, Certificate # 953
Chemical Consultant
375 Hamilton Street
Somerset, NJ 08873
Tel: (973) 462-2745
E-mail: wahabta@gmail.com
Chemical Consulting, laboratory assistance and custom development offered to industry, academia and government. Eight years experience as Chemistry Professor in the field of organic, physical, inorganic, general and analytical chemistry. Experienced Chemist specializing in materials analysis industry and industrial problem solving to manufacturing clients. Services include materials quantitative and qualitative analysis, practical application of chemistry towards solving technical problems, compound design, synthesis and evaluation using UV/VIS, IR, MS and NMR spectrometers, literature surveys, new product development.

Take an Opportunity to Advertise your Business or your Company in this Newsletter

This newsletter issues three times and for special situations, four times a year, and advertising is sold on an annual basis, with ads appearing in each issue. Advertising is open to all members and any non-members who wish to advertise their products and services to our readership. The price list for advertising is as follows:

	Members	Non-members
Business Card Size (2.0 x 3.5 inches—	$50/year	$100/year
Larger Size (3.0 x 6.0) -	$90/year	$180/year
Half-page—	$250/year	$500/year
Custom size and features—	pricing upon request	

Please note: Ads for Non-member consultants and consulting organizations are not accepted.

To discuss advertising with us, please contact --
John Bonacci—**acccce@chemconsult.org**

Natural Gas Impact on US Economy: A Primer-Refresher

By John C. Bonacci, PH D, PE, US Patent Agent—Certificate #821

At the end of 2012, we have a slowly recovering US economy (~2 % annual GDP). Some say there could be a 6 month recession in 2013. This commentary addresses natural gas supply and specifically as a result of "fracking" in the Marcellus and other shale rock deposits. This is recent new technology (just a few years) and only getting more widely publicized in the past few months.

First though, we should recap a few decades of history. In the 70's natural gas was deregulated and more became available through standard production means. Much of this came to the East and Northeast area via two large pipelines from the Southwestern US.

Second, via the 1979 PURPA law (Public Utilities Regulatory Act), which said that private enterprises could use natural gas to fuel gas-fired cogeneration turbines to make steam and electricity? The Act only allowed central public utilities to own up to 50% of the entity and provided for the private user to sell back electricity to the utility at what was defined as the avoided cost. The PURPA law gave birth to a large private cogeneration industry and also became an adjunct of the central power plants. Thus an active cogeneration market developed for turbines and natural gas and also emission catalysts to remove CO and NOX. An indirect impact was the emissions reduction from oil and coal burning power plants due to the fuel switching.

Now, within the past decade and most specifically the past several years, the new drilling technology (called "hydrofracking" or just "fracking" frees up gas trapped in shale rock (in New York, Pennsylvania and West Virginia it is called the Marcellus shale). There is also shale rock out west (Bakken) and in the Southwest as well as certain global areas. For the US, reliable sources say we have 100 to 200 years of supply if all used internally. This is important because it will reduce oil imports and coal usage. Also a few years ago (5 or so) the US was contemplating and may have started building offshore terminals to IMPORT liquefied natural gas (LNG). Obviously this would decrease oil imports but not make us any more energy independent (maybe less dollar outflow to the Mideast). Currently the effort is being made to convert those LNG stations to export stations so we can sell LNG globally (a much better impact).

Let us now put into perspective briefly the energy and environmental aspects of natural gas vs. the other two fossil fuels, oil and coal. The environmental impact on climate change due to industrial CO2 is a key factor. Coal has an approximate Carbon (C) and Hydrogen (H) chemical content of CH and oil has about CH2 with natural gas at CH4, mainly methane. So when you burn these three fossil fuels on an equivalent energy or BTU basis, coal is the worst former of CO2 (carbon dioxide) and oil is second worst and natural gas is the best. So the lowest "greenhouse" gas formation is the low CO2 from burning natural gas. Depending on the impact on global warming which most climatologists believe to be from CO2, we have a significant benefit in the USA which together with China emits the most CO2.

Continued on next page

Natural Gas Impact on US Economy:
A Primer-Refresher—Continued

On the direct economic side for these three fossil fuels we have the cost per BTU and natural gas again comes out the cheapest raw material with coal second and oil third. An explanation requires getting a little technical again. We refer to barrels of oil equivalent (BOE) for the cost comparison on just a raw material basis. A barrel of oil contains about 6 million BTU's and natural gas is currently selling around $3.00 per million BTU's and has ranged from $2.50 to $5.00 over many years. Thus simple arithmetic shows that six of the $5.00 per million BTU natural gas quantities is equivalent to one BOE. So natural gas is available now at between $15 and $30 per BOE. Oil is currently about $95 per barrel and has ranged from $80 to $120 during the past two years. We note that all the new supplies of oil (Athabasca Sands from Canada and "tight" oil from the US Bakken) are all expensive. We don't see oil ever getting much below $75 per barrel except in a global depression and even then not to the $15 to $30 level of a natural gas BOE. In the case of coal there is a significant range in BTU content requiring more detailed calculations but approximately half way between natural gas and oil on a $/BOE basis. So we have a very significant raw material cost advantage with natural gas and it is also usually less expensive to process than either coal or oil.
The only logical conclusion is that we should switch our usage over to natural gas as fast as possible. It will be cheaper, more efficient and make the US independent of oil importing no matter where it comes from.

Getting back to other US economic factors, we know that natural gas is a key chemical manufacturing feedstock for fertilizer, methanol, and monomers to make polymers, textiles and other petrochemical materials. So with lower raw material costs, lower energy costs and proximity to US markets, we should see a resurgence of manufacturing in the United States. It has already started with announced plans of DOW and others to build plants in the Southwestern US. Technology is also preeminent in the US and will contribute to lower labor costs, closer to those of other countries and thus further enhance manufacturing in the US.
I believe these basic industrial and technology factors to be so important that the US will return to past years eminence. Also these kinds of benefits are quite independent of our government actions but of course laws are always a factor to be considered. For example people say that the environmental factor is causing coal to be used less. I believe this is mainly a consequence of economics and coal usage has declined significantly in 2012 already mainly because of the low cost supply of natural gas and not because of any major change in environmental actions.

Poly(Chem-Tech)
CHEMICAL CONSULTING

Industrial
Consumer Product
Healthcare

TechnologyTransfer
Dental Products
Polymers

DANIEL KRUH, Ph.D
President

8 Braddock Street
East Brunswick, NJ 08816

Voice/Fax: (732) 238-3182 Email: DanKruh@aol.com

HYDROPHILIC RESINS
PRODUCT FORMULATION, SYNTHESIS
PROCESS DEVELOPMENT
*****
GOLDSTEIN ASSOCIATES --
CONSULTING CHEMISTS
P.O. Box 88, Adelphia, NJ 07710; (732) 780 7171
Fax: (732) 462 3644; E-mail: goldstein@monmouth.com
http://www.monmouth.com/~goldstein

Jasprit Singh
President

JMS PROCESS

Consultants & Engineers

P.O. Box 541
Grand Island, NY 14072
(716) 773-4666
(Fax) 773-6420
info@jmsprocess.com

Process Plants
Design – Build
Troubleshooting

Mh Beauty Care Consulting,LLC
Hair;Skin;Sun Care Formulae
Michael Helioff
President

5557 Pacific Blvd.
Apt. 3906
Boca Raton,FL 33433
908-337-3855

mhelioff@gmail.com
chemconsult.org

SUSTAINABILITY

By Dr. Richard M. Goodman, Certificate #747

Sustainability literally means that for any enterprise one preserves the ability to supply the necessary raw materials, consumables and energy inputs on a virtually eternal basis. That is, one will never run out of any key component necessary for the production of the item of commerce. Implied is that the process itself is most efficient and causes the least disruption to the overall ecology. In the chemical manufacturing realm, for example, sustainability usually entails the use of process designs which minimize the waste and maximize the utilization of reactants to produce products. Examples include new one pot syntheses which produce no significant waste streams because the product chemical incorporates the same atoms as the raw materials supply. Corollary to this concept is that solvents utilized are either fully recoverable or result from sustainable resources.

We should be particularly clear that sustainability is NOT synonymous with reducing ones carbon footprint and in fact does not require practitioners to have any particular view towards climate change. Using less to do more simply makes good sense independent of one's belief in global warming.

As rational scientists we must also recognize that sustainability is a universal concept and even applies to areas as medicine or higher education, for example. We can't increase these costs at a rate greater than the growth of wealth indefinitely. Logic dictates that at some point the trend lines have to begin to coalesce or cross or else we reach the point when 100% of all wealth is going into, for example, medicine!! An obvious impossibility. As chemical consultants, therefore, we should begin to look into opportunities to solve medical care in a sustainable way.
In the consumer realm sustainability gets more complicated. As one example, We have all heard the expression that one is becoming more green by not printing documents to "save a tree". Of course, as scientists we all know that paper manufacturers consider trees as their sustainable basic raw material. Thus for more than 70% (and growing) of paper, more trees are planted than harvested to produce the paper stock. Conversely, we also know that electronic gizmos, like smart phones, computers, etc incorporate significant quantities of raw materials as rare earths, complex polymers, toxic components which are not sustainable, not recyclable and dangerous often to dispose of. Similarly the intense use of power by network infrastructure often requires the use of fossil fuel generation stations which are similarly non sustainable. Thus the trend towards all electronic media must run onto an inevitable need to get more sustainable. Admittedly, Moore's Law has provided a magnificent way to put off the inevitability but forever? One might ask what does it matter? Are the earth's resources really "that finite" that we should worry about sustainability? Remember Occam's Razor when responding to these questions. As chemical scientists we should always strive for the highest efficiency in the use of materials.

An appropriate question to ask of the ACC&CE is does sustainability lead to opportunities for chemical consultants. Frankly, that's a more complex question. In a very narrow realm where the consultant possesses a distinct chemical synthesis talent in a particular area the ability to turn that skill into development of novel and therefore marketable concepts for sustainable chemical manufacturing is pretty good. But the caveat is that companies are always looking for

(Continued on next page)

SUSTAINABILITY (Continued)

specialist knowledge from their consultants. If they want to know about manufacturing acrylic polymers they want someone who has actually made the exact product they are envisioning and not general knowledge of the field. This also applies to sustainability. Such was a recent experience of this author.

Cleantech for sustainable energy production has been one of the most successful and fastest growing industries during our recent challenging economic climate. It is reported that the global markets for solar voltaic, wind power and biofuels grew at a 30% rate in 2011 to a total market size of $246 B and the US from $5.1 B in 2010 to $6.6 B in 2011. IP issues still dominate in many of these areas: from as yet uncommercialized nanomaterials through early commercial biofuels and smart grids to mainstream industries like solar power, hybrid vehicles or LEDs. Finding the connection to developers throughout the commercialization chain requires the usual patience and getting to know the players through networking. For chemists activities through the Green Chemistry Institute provide guidelines as to "what's in" in the field.
A final suggestion concerns the "finding the niche" opportunity. I'll give you an example. A small company named GreenDustries is making a big name by revolutionizing the foodservice packaging industry. GreenDustries is changing the way people eat fast food with its proprietary packaging: the PleatPak (for burgers and sandwiches). The packaging provides the consumer with a superior consumption experience as it eliminates messy stains and cold, soggy food by using its pleated technology.

The PleatPak is manufactured to perfectly fit the contours of the food it is intended to contain. Other packaging products in the foodservice segment are merely different configurations of flat (sheet) wraps, boxes and bags that have been around for a long time.

The PleatPak's pleated package snugly surrounds and clutches the sandwich keeping the burger and toppings in place - amazingly, even if tossed high in the air, or even against the wall! The PleatPak provides the consumer a sanitary way to eat out of the PleatPak and prevents condiments from spilling onto ones lap. It allows the sandwich to be eaten comfortably and neatly with just one hand. The company say the PleatPak is also the best solution for the nearly 70 percent of fast food consumers who order from the drive-thru window, many of whom eat in the car.

So, the message is that as chemical scientists we should look into areas where current practices are clearly non-sustainable, find the niche improvement that will make the enterprise more sustainable and connect with someone who will implement the improvement. I don't expect the government to be especially cooperative here- there's too many stakeholders who rely on the status quo no matter how unsustainable it is. Thanks for reading this article.

THE CHEMICAL CONSULTANT

A publication of
The Association of Consulting Chemists
& Chemical Engineers
P.O. BOX 902
Murray Hill, NJ 07974-902
Phone—(908) 464-3182
FAX—(908) 464-3182 Call First
accce@chemconsult.org
www.chemconsult.org
Opinions expressed herein are not necessarily those of
ACC&CE.